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Sustainability in Desktop Computing of an Organization

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Abstract: ***Desktop Computing is a technique to reduce the power consumption of the computer devices. It is a recent trend towards designing, building, and operating computer systems to be energy efficient. It refers to environmentally sustainable IT. Energy wasted by PCs and related resources promotes global warming. The electric power consumption of India was 778 kWh in January 2012. It will be doubly by 2020. IT sector responses 10% of all power consumption. A typical desktop computer uses about 65 to 250 watts. Laptop uses about 15-60 watts. Laptop is greener than desktop computer. Tablet PC consumes less power than Laptop. Power consumption is major problem of coming days. Reduce them and save the Earth and life.***

Keywords: Power consumption in Computer, Laptop, Tablet PC.

1. Introduction

Green computing is a technique to reduce the environmental impact of their IT operations. Green IT is the environmentally responsible and eco-friendly use of computers and their resources. The goals of green computing are similar to green chemistry.

2. Power Consumption

Multi-meter measures Power Consumption of Devices. In benchmark for Green Computing, power consumption is the form of energy consumption that uses electric power. It is measured by

Power = watt x hour.

1Wh = 3600 Joule=859.8 calories.

Kilo-watt hours is calculated by

Watts = volts x amps.

The electric power consumption of India was 912 kWh in January 2014. It will be doubly by 2020. IT/ICT sector consumes 10% of all power. Power consumption is responsible for Global Warming. Energy wasted by PCs and related resources Promotes global warming. Green Computing is a technique to reduce the power consumption of the computer devices.

3. Energy Efficiency

Energy efficiency is "using less energy to provide the same service". Energy Star was started in 1992 by the environmental Protection Agency (EPA). Version 3.0 of Energy star is effective 20–30% more efficient than standard homes. Energy Star 4.0 specifications for computers became effective on July 20, 2007. It includes 60% energy efficiency. Energy Star 5.0 became effective on July 1, 2009. It includes 80 % energy efficiency. The EPA released Energy Star version 6.0 on June 1, 2013. Recently EPA allowanced that Computer power supplies should be only 80 percent efficient.

4. Power consumption in computers

4.1 Power consumption in super computers

Larger/Mainframe computers use 200-400 watts power supplies. Most home mini computers use 100-150 watts. Micro-computers use 65-150 watts.

Recently 9.89MW is lowest and 48.89MW is highest power consumption of super computers. The first super computer Cray-1 consumed about 115 kilowatts of power. The power consumption of param-10000 was 3kW which is around 35% less power consumed by param 8000. In June 2011, average power consumption of top-10 super computers was 4.3MW. In January 2012, average power consumption of top-10 super computers was 4.09MW.

4.2 Power consumption in desktop computers

Computer power supplies are only 55 to 80 percent efficient. A typical desktop computer uses about 65-250 watts. On screen saver mode same electricity is consumed. On sleep/standby 1 to 6 watts power is consumed. Sleeping computer consumes 3.5 watts.

4.3 Power consumption in Laptops

A laptop is a portable personal computer. Laptops are also sometimes called notebook, ultra books or net books. A typical laptop uses 20-90 watts. It uses 80 watts when it running/charging for 3 hours per day. It Consumes 8 kWh per month. Laptop power Consumption is 10-25% of that of a desktop Computer.

5. Computer Vs Laptop

Most Laptop uses about 15-60 watts far less than desktops. Desktop uses about 250 watts while laptop uses 90 watts. Laptop generates less carbon footprint than computer. Laptop saves electricity than a desktop. It is greener than

PCs because they do not have separate Monitors. The environmental footprint with PC and monitor 70% are embodied and 30% in use. With a laptop, 80% of the costs are embodied and 20% are in use. The versus graph is shown in figure 1.1

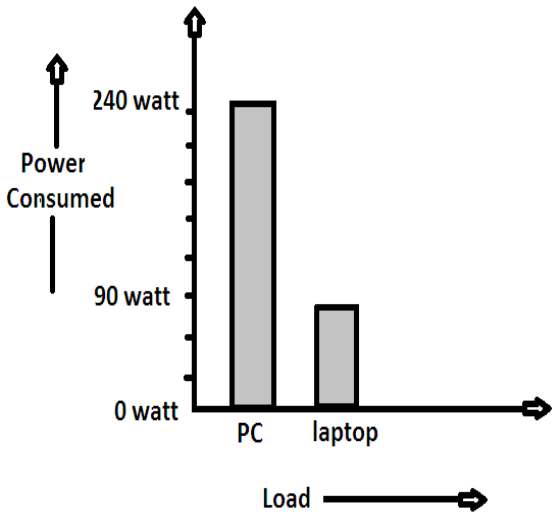

Figure 1: Load Vs power comparison.

6. Conclusion

There are 60 million computers across India on Jan 2014, (by Computer Industry Almanac Inc) that means total energy used per year is equal to
60 million computers **x 5**hrs/day **x 365** days **x 240** Wh = **26,280,000,000** kW/year.

If these computers to be replaced by laptops of 90 Watt power consumption, then total energy used will be
60 million laptops **x 5**hrs/day **x 365** days **x 90** Wh = **9855,000,000** kW/year.

India will save on total
26,280,000,000 kW/year(**computer**) - **9855,000,000** kW/year (**laptops**) =**16,425,000 MW per year**

There are 132 computers in my college hence total energy consumed is
130 computers * 5hr/day * 240 working days/year * 240W =**3,74,40 kW/yr**
If replaced by laptop of 90 W then our college KITE will save
130 laptops *** 5**hr/day *** 240** working days/year *** 90W** =**1,404 kW/yr**
KITE college will save =
23,400 kW/year.

These positive impacts from such efforts will not only result in reduction of energy consumption by the computers but also reduce the carbon dioxide emission up to a large extent.

This study was undertaken with the sole motive to identify those factors that contribute to the excessive Carbon dioxide emission, and to suggest measures that are to be put into practice for cleaner, greener tomorrow.

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Author Profile

Amol Shrivastava perusing the Bachelor of Engineering degrees in Electrical and Electronics Engineering from Kruti Institute of Technology & Engineering and will pass out in year 2015. I have also presented a paper on "Sustainability in mobile computing" on same field to spread the small but effective means in the field of energy conservation.

Sweta Gabhane perusing the Bachelor of Engineering degrees in Electrical and Electronics Engineering from Kruti Institute of Technology & Engineering and will pass out in year 2015.Being an electrical engineer, I am presenting this paper to conserve energy by small concepts.