A Concern on Monitor in Green Computing

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***Abstract*-- Green computing or green IT, refers to environmentally sustainable computing or IT. It is "the study and practice of Designing, Manufacturing, Using, and Disposing of computers, servers, and associated subsystems efficiently and effectively with minimal or no impact on the environment". It helps to minimise the energy by educating consumers on efficient ways to keep power usage low. It reduces impacts on environmental and human health. Monitors are the primary output device in a system. It is the one produces visuals for human being to perceive. They consist of a display and an enclosure. The future of green computing are that the plan towards green IT should include new electronic products and services with optimum efficiency and all possible options towards energy savings.**

Keywords-CRT, LCD, LED, OLED, PDP, Blackle, Proxy site

I. INTRODUCTION

Green computing is also called as green IT, which is environmentally sustainable computing. It is a novel and an innovative trend in the world of computing. It is required because Computer consumes a lot of energy unnecessarily so it reduce the power consumption, Printing often unnecessary stuff is waste, Reduce pollution, Reduce the power consumption, reduce the global warming, Toxicity which is nothing but the toxic chemicals that are used in the manufacturing of computers and components which can enter the food chain and water. Green computing addresses many problems. To be in precise, the goals are (which are collected from various literatures as mentioned in reference) to reduce the power consumption of the products, to reduce the harmful effects to the environments through the use of hazardous materials, to increase the life time of the product, to maximize energy efficiency during the product's lifetime to promote recyclability of defunct products and factory waste.

Power dissipation is also a major concern in portable, battery-operated devices that have proliferated rapidly in recent years. Each of us has experienced the event that the battery of our laptop or mobile phone is depleted. The issue is even more serious in autonomous, distributed devices such as sensor networks where the charging of batteries is difficult or impossible. Finally, energy dissipation causes thermal problems. Most of the energy consumed by a system is converted into heat, resulting in wear and reduced reliability of hardware components.

II. ISSUES ON MONITOR

Monitors are the primary output device in a system. It is the one produces visuals for human being to perceive. They consist of a display and an enclosure. They are mainly of three types, namely,

- Cathode Ray Tube (CRT)
- Liquid Crystal Display (LCD)
- Light Emitting Diode (LED)
- Plasma display panel
- OLED

A. CATHODE RAY TUBE

These are the oldest type of monitors that were used in the past. They have better viewing angles. But it is a power hog which consumes very much power in comparison with the other types. The cathode ray tube (CRT) is a vacuum tube containing an electron gun (a source of electrons or electron emitter) and a fluorescent screen used to view images. It has a means to accelerate and deflect the electron beams onto the fluorescent screen to create the images. The image may represent electrical waveforms (oscilloscope). CRTs can emit a small amount of X-ray radiation as a result of the electron beams bombardment of the shadow mask/aperture grille and phosphors. The amount of radiation escaping the front of the monitor is widely considered harmless.

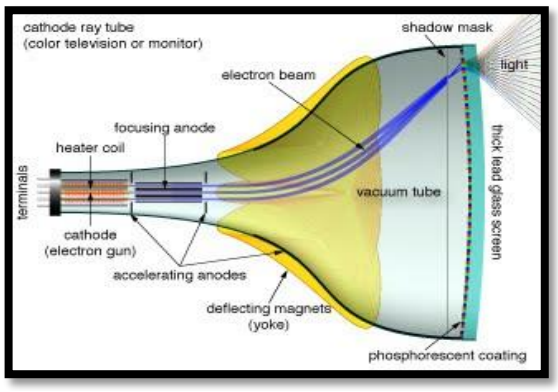

Figure 1.Structure of Cathode Ray Tube (CRT)

The CRT monitors in our work is Samsung. CRT monitors typically consume 150 W of power.

B. LIQUID CRYSTAL DISPLAY:

LCD monitors got fame for their flat panels, low power consumption and less space. It uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are used in a wide range of applications including computer monitors, televisions, instrument panels, aircraft cockpit displays, and signage.

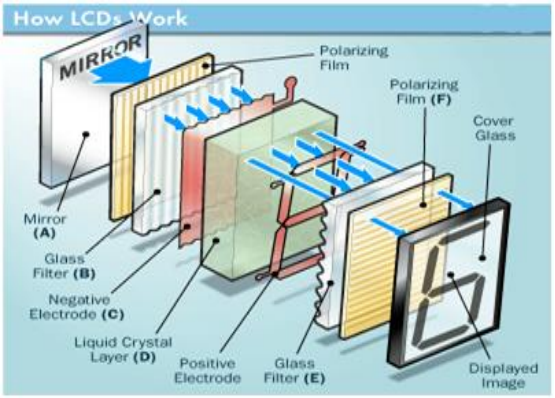

Figure 2.Working of LCD

The LCD screen is more energy efficient and can be disposed of more safely than a CRT. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. Depending on the set display brightness and content being displayed, the older CCFT backlit models typically use 30–50% of the power a CRT monitor of the same size viewing area would use. Many LCD monitors are powered by an external 12v power supply, which means that (with a proper cable) they can also be run directly on one of the computer's 12v power supply outputs, removing the overhead and quiescent power consumption of the monitor's own power supply. This can increase the power efficiency, especially if the computer has a high-efficiency PFC power supply. This is also convenient because the monitor will power on when you turn on the computer, and will power off when the computer sleeps or is shutdown. The LCD monitors used is ACER 16" LCD Monitor which consumes around 30W.

C. LIGHT EMITTING DIODE DISPLAY

An LED display is a flat panel display, which uses light-emitting diodes as a video display. An LED panel is a small display, or a component of a larger display. It is mainly used to backlit the LCD display which don't have ability to display true black colours. There are two types of LED backlighting techniques used. One is RGB dynamic LED and the other one is edge LED. The former type of backlighting uses LEDs placed behind the LCD TV or monitor screens, while the latter uses LEDs placed around the monitor rim, from where light is made to diffuse behind the screen. Since LEDs are placed around the rim on edge LED monitors, they can be a lot slimmer than conventional LCDs.

D. PLASMA DISPLAY PANEL (PDP)

It is a type of flat panel display commonly used for large TV displays, typically above 37" (940 mm). Many tiny cells located between two panels of glass hold an inert mixture of noble gases (neon, which are contained in hundreds of thousands of tiny cells positioned between two plates of glass. electrodes are sandwiched between the glass plates, in front of and behind the cells. Control circuitry charges the electrodes that cross paths at a cell, creating a voltage difference between front and back and causing the gas to ionize and form a plasma; as the gas ions rush to the electrodes and collide, photons are emitted. To erase a cell, all voltage is removed from a pair of electrodes.

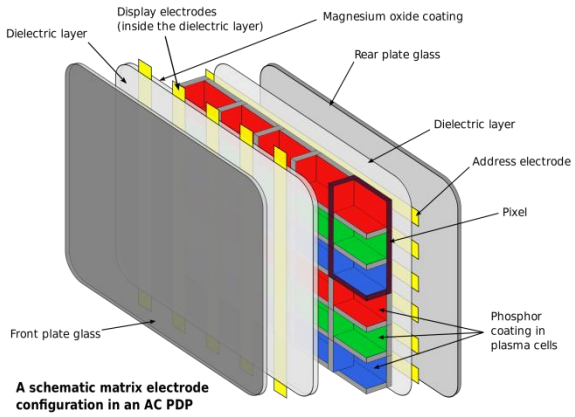

Figure 3. Plasma Display Panel

Every pixel is made up of three separate sub pixel cells, each with different coloured phosphors. One sub pixel has a red light phosphor, one sub pixel has a green light phosphor and one sub pixel has a blue light phosphor. These colours blend together to create the overall colour of the pixel. Plasma displays use as much power per square meter as a CRT, and consumption varies greatly depending on what is watched on it. Bright scenes (say a football game) will draw significantly more power than darker scenes (say a movie scene at night). Nominal measurements indicate 400 watts for a 50" screen. Currently, plasma displays are not popular for computer monitors. However, since they operate similarly to CRT technology, the energy differentials are similar.

A study conducted by G4TechTV using a Samsung 42" plasma display found a 191W differential for a white vs. black screen in normal mode, and a 138W differential in super energy savings mode. Plasma displays are particularly well suited for the large displays, outpacing other types of display technologies. As of late 2006, analysts note that LCDs are overtaking plasmas, particularly in the important 40" (1.0 m) and above segment where plasma had previously enjoyed strong dominance a couple of years before.

E. OLED:

An organic light-emitting diode (OLED) is any light-emitting diode (LED) whose emissive electroluminescent layer comprises a film of organic compounds. The layer usually contains a polymer pixels can emit light of different colours. Substance that allows suitable organic compounds to be deposited. They are deposited in rows and columns onto a flat carrier by a simple "printing" process. The resulting matrix of OLEDs are used in television screens and computer displays; a great benefit of OLED displays over traditional liquid crystal displays (LCDs) is that OLEDs do not require a backlight to function. Thus they draw far less power and, when powered from a battery, can operate longer on the same charge. No comprehensive studies have been conducted of a comparison a white vs. black screens, but due to the nature of their construction, it is probable that displaying white consumes more energy than black on a OLED device.

III. SYSTEM WITH DIFFERENT FUNCTIONAL UNITS AND THE POWER UTILIZED

S.no	Functional units	CRT (in %)	LCD (in %)	LED (in %)
1	Monitor	35.71	10	6.9
2	Peripherals	4.76	6.67	6.9
3	VGA	9.52	13.33	13.79
4	MB	2.38	3.33	3.45
5	HD	4.76	6.67	6.88
6	DVD	5.95	8.33	8.62
7	RAM	7.14	10	10.34
8	Processor	29.78	40	41.38
9	CPU	59.52	83.33	86.2
10	Total Power (Monitors + CPU + Peripherals)	150 + 250 + 20 420 W	30 + 250 + 20 300 W	20 + 250 + 20 290 W

Table 1. Comparison of Total Power in each monitor

COMPARISON OF LCD AT DIFFERENT BRIGHTNESS

Brightness	70%	20%
Contribution to computer's Power	98% of normal	95% of normal

LED MONITOR COMPARISON BETWEEN MONITORS POWER

	CRT	LED	LCD
Comparison of computer's	100 %	71.4% OF CRT	69% OF CRT

Table 2. Comparison of Brightness

IV. USING A PROXY SITE

One of the approaches is to use a third party site to implement some functionality of an existing site, and then use an alternative colour scheme. This is the approach used by Blackle and similar sites to mimic the Google site. In this case, users must deliberately use the alternative site instead of Google's home page.

Using this approach, the savings in energy is directly related to the type of monitor that the individual is using at the time, and how often they frequent the site. As indicated, if one is using a CRT, Plasma, or OLED monitor, energy savings will certainly be accrued. However, for LCD monitors the results are not so clear; studies have shown that LCD monitors either save or use a small amount of energy displaying a black page as compared to a white one, so the energy savings would be much smaller or, worse, the monitor could use more energy on the modified site.

V. FUTURE SCOPE

The future of green computing are that the plan towards green IT should include new electronic products and services with optimum efficiency and all possible options towards energy savings. That is enterprise wise companies are laying emphasis on moving towards Eco Friendly Components in Computers, the use of eco-friendly sustainable components will become the norm rather than the exception in future.

VI. CONCLUSION

By Concluding that the greenest computer will not miraculously fall from the sky one day, it'll be the product of years of improvements. The features of a green computer of tomorrow would be like: efficiency, manufacturing & materials, recyclability, service model, self-powering, and other trends.

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