Review on Green computing to save environment and power management

[1]Prof. Deshmukh N.S., [2]Prof. Satyavan M. Kunjir
[1]Assistant Professor,Mamasaheb Mohol College, Paud Road, Pune 38,
[2]Dr. D.Y. Patil ACS College, Pimpri,Pune -18

Abstract:.
Computers are used everywhere in human life hence computer consumes more electricity.Toxic, carbon dioxide produce by computer material. But use of computer is necessary in human life. Existence of Green Computing to overcome negative effect of computer to environment.Green computer solves the problem of power consumption of computer system. It also provides technique to minimize pollution by computer material. Moreover, thousands of computing devices are manufactured every day and the same amount of old computers is being thrown away loading up the e-wastes. So it is highly important to manage these computing devices in such a way that they last longer and even if they are disposed of, they shouldn't cause much harm to the nature. Green computing can take many forms in itself. Green technology focuses on reducing the environmental impact of industrial processes and innovative technologies caused by Earths growing population It has taken upon itself the goal to provide society's needs in ways that do not damage or reduce natural resources. It is mainly used to protect environment, optimize energy consumption and keeps Green environment. The main goal of green computing is that increasing energy efficiency and reducing the use of harmful materials. Green computing ultimately focuses on ways in reducing overall environmental impacts. It require the integration of Green computing Practices such as recycling, electronic waste removal power consumption, virtualization, improving cooling technology, and optimization of the requirements. The major power consumption components are processors and the main memory in the servers.This paper gives idea of saving energy & environment which helps to save money.

Keywords - Energy Efficiency, Electronic Waste, Green Computing, Power Consumption, and Recycling.

Introduction

In today's world computers are most important part of human life. Because of speed, storage capacity & programming ability computers are used in everywhere in human life. But more use of computer creates harm to environment.With increasing energy cost and growing environmental concerns, green computing is receiving more and more attention. It is because the pollution or effect of harmful rays in the environment has started to affect the health of the individuals directly.Green computing refers to the study of designing, engineering, and proper usage and disposal of computing devices in such a way that it reduces their impact on the environment. Green computing holds green infrastructure and refers to the efficient and effective handling of computers, servers and accessories such as, printers, monitors ,networking/communicationgadgets and storage devices with minimal or zero environmental impact by studying and adoptingglobal best practice in their design, manufacture, usage, and disposal. The goal of green computing is reduce the use of harmful material, maximize energy efficiency during the product's lifetime, and promote recyclability of obsolete product and factory waste.

Technology Environment

Many of the technologies we use every day consume a lot more resources and power than they need to, and using and manufacturing them can create a mess. Here are a few of the ways that technology can harm the environment:

- **Consuming resources** - Non-renewable resources, including precious metals like gold, are used to make technology. Many others, such as coal, are consumed to generate the electricity to use technology. Even some renewable resources, like trees and water, are becoming contaminated or are used up faster than they can renew themselves because of technology.
- **Waste** - Manufacturing technology creates large amounts of waste, and used computers and electronics get thrown out when they break or become outdated. Called "techno trash," these electronics contain all sorts of harmful materials that are very unsafe for the environment. They need to be disposed of using special methods.
- **Health Hazards**- Using toxic materials that can harm our health can cause cancer, and technology addiction can lead to other health problems like obesity and carpal tunnel syndrome.

You can encourage manufacturers by choosing to buy more energy-efficient and less hazardous electronics and by supporting companies that make protecting the environment a priority. You can also do your own part to reduce environmental impact by not being wasteful and disposing of your electronics safely and properly.

Negative effects of E-waste

E-waste refers to thrown out electronic equipment like printers, Televisions, mobile phones, computers etc. which are harmful to our ecosystem if not disposed properly. Proper recycling and disposal of E-waste is important to safeguard our earth from Environmental pollution.

Electronics for consumers are being treated like disposable items more and more every day. One major factor causing this trend is that companies are endlessly marketing new technologies to us, which effectively render recent products as obsolete. . By 2005 the lifespan had shrunk down to less than two years. In 2016, that number shrunk even further with the introduction of more and more devices. Compounding the problem is the fact that we are disposing of electronic waste (e waste) improperly.

Effect of e-waste on Human Health

Electronic waste affects nearly every system in the human body because they contain a plethora of toxic components including **Mercury, Lead, Cadmium, Polybrominated Flame Retardants, Barium** and **Lithium**. Even the plastic casings of electronics products contain **Polyvinyl Chloride**. The health effects of these toxins on humans include birth defects, brain, heart, liver, kidney and skeletal system damage. They will also significantly affect the nervous and reproductive systems of the human body.

E-Waste Toxic Components and their Damage to Human Health

Toxic Materials	Birth Defects	Brain Damage	Heart, Liver, Lung & Spleen Damage	Kidney Damage	Nervous/ Reproductive System Damage	Skeletal System Damage
Barium		X	X			
Cadmium	X		X	X	X	X
Lead	X	X		X	X	
Lithium	X	X	X	X	X	
Mercury	X	X	X	X		
Nickel	X		X	X	X	
Palladium	X	X	X	X		
Rhodium			X			
Silver	X	X	X	X	X	

Without safe recycling, most of these toxic components will end up in land fill – poisoning the soil and water

Effects of E-waste on Environments in Third World Countries

E-waste adversely affects our developing nations. Instead of responsibly recycling our electronic devices, America sends our e-waste to these countries. when e-waste disposal is not subsidized, the pollutants from our electronic waste can end up in toys for our children that are sent back to us. Instead of exporting e-waste, or letting it rot in landfills, we can help our environment by returning our electrical products to stores and manufacturers, sending them to responsible recycling centers, selling them to people that will find them useful, or donating them to stores such as Goodwill donation center.

Poor E-Waste Management Effects Data Security through Improper Data Destruction

Proper recycling and disposal of electronics is not only important for the environment but it also has a big impact on data security as well. When e-waste is disposed of improperly and without the use of a company that specializes in proper data destruction, there is a severe risk of identity theft, data breaches and massive liability for the companies involved. Prior to disposing of IT Equipment improperly, always consider all aspects, including data security and liability in addition to the environmentwaste is not a problem . In fact it is only going to get worse. By 2017, the volume of our thrown away e-products throughout the world is expected to rise by

33 % from 2012, and we can expect the weight of this garbage to equal eight of the Great Pyramids of Egypt. The amount of e-waste that we produce, including computers, DVD players, cell phones and global positioning products, could rise by a whopping 500% over the next decade in countries such as India. It is crucial to know the effects of e-waste on the environment, and what we can do to stop it.

Before you recycle your **techno trash**, check out these tips:

Sanitize your Hard Drive

Before donating a machine, be sure to remove all of your files and data from it. Most people will just try to drag everything to the trash can or recycle bin, but this only partially erases the information! Cyber criminals can find this "deleted" information and use it however they want. To really protect yourself, you need to run a program that "sanitizes" your hard drive. These programs, which can be found online, work by replacing all your data with a jumble of useless nonsense. That way, your information is safe, and your good deed goes unpunished!

Consider Donating your Mobile Device

There are actually a LOT of great things your old mobile devices can do for people. Whether that means helping soldiers overseas talk to their families or helping victims of domestic violence, they can be a lot more than clutter for your junk drawer.

Raise Some Funds

Because electronics contain precious metals including gold, silver andcopper,technotrashcan actually be worth a little money.

Reuse Those Ink Cartridges

Many locations that sell new printer ink cartridges will refill your old cartridge for a fraction of the cost. Each cartridge you throw away takes anywhere between 400 and 1,000 years to decompose, and on average, there are 11 cartridges thrown out every minute across the globe! Not all cartridges can be refilled, and even cartridges that you've filled in the past will eventually break down after continual use.

While some of the impact of computers and the Internet has unfortunately been negative, much of it has also been positive. Here's just a few of the ways that technology is helping to improve the environment:

- It helps us develop and produce new materials and technologies that are sustainable and do not harm the environment, so we can eventually stop using ones that do harm it.
- It allows for paperless communication like email and online bill paying to reduce the amount of trees cut down
- It allow us to monitor and study our environment to better understand how it works and the impact of our actions on it
- It allows us to have a worldwide virtual laboratory, so that experts from all fields can share their research, experience and ideas to come up with better, smarter solutions. Not only does this allow people far away from each other to work together, but it also reduces the environmental impact people would normally cause from traveling to meet with each other
- It helps us create smarter technologies that respond to how we use them and adjust themselves to reduce their environmental impact, such as lights that can sense when no one is in the room and automatically turn off.
- It allows companies to reduce shipping and manufacturing impact and to reach a broader audience

Green Computing

Green computing refers to the study of designing, engineering, and proper usage and disposal of computing devices in such a way that it reduces their impact on the environment.Now we will discuss green computing in detail.

Advantages and Disadvantages

Advantages:-

- Saving energy and recourses save money.
- Green computing includes changing government policy to encourage recycling and lowering energy used by individuals and business..
- Conserving resources means less energy is required to produce,use and dispose products therefore automatically lower energy cost.
- reduced health risk for computer workers and recyclers.
- Reduced environmental impact..

Disadvantages:

- Green computing could actually be quit costly.
- Rapid technology change.
- .Green   computing   could   actually   be   quit   costly.

GREEN COMPUTING SAVE ENVIRONMENT

Green Computing save the environment from pollution by computer material .Different ways are provided in green computing for environmental benefit

- Recycle the computer material
- Minimize carbon Emission: The computer material generate gaseous such as methane(CH4), nitrous oxide (NO2) and fluorocarbons (CCl4).Temperature of earth is increasing because of this gases .In green computing companies are started manufacturing computer material which generate less amount of such gases.
- Reduce Paper wastage. In computer operation we use more papers for printout purpose which is wastage.

Here are some suggestions for reducing waste:

- Take less amount of printout to save paper or indirectly save trees. Try to use store much amount of data on storage devices.
- Recycle waste paper as many times as you can.
- It is necessary to plant trees to maintain environmental stability
- Reuse ink cartridge.

Sometimes people can get so excited about using a new technology that they overlook the negative impact on the environment. But, it's very important that we use technology in the smartest and most responsible manner, so that we are solving problems, not creating more for the future.

e-CycleRecycling Old Tech - It's the Law

Takeaway: *Many people are accustomed to throwing out their old technology with the trash, but new laws are enforcing proper disposal of unwanted electronic devices.*

- More companies are making the effort to "go green" and are responsibly recycling their used and outdated electronic devices. However with the hazardous chemicals and confidential data contained inside of these devices, recycling e-Waste is more involved than taking your used mobile phones and tablets to a recycling center or trading them to reseller companies online.

- Now more than ever, it is essential for businesses to partner with a credible electronics recycler and ensure that their mobile phones and tablets, as well as the sensitive data stored inside, are recycled properly. Companies need to research their current asset recovery companies and their processes. Partnering with the wrong electronics recycler can be extremely hazardous not only for the environment but also for the business.

- Many organizations may think that they are acting responsibly when recycling with an electronic buyback company when in fact, their mobile devices could be causing severe damage to the environment. The EPA reports that 70-80% of "reputable" recyclers are sending e-Waste to remote villages in developing countries where the use of cheap and sometimes slave labor is used to reclaim the precious metals inside electronic devices.

- In addition to the impact e-Waste has on developing nations, the improper handling of electronic devices also poses a threat to the confidential business information stored on these devices. Many enterprises rely on corporate-liable smartphones and tablets for their day-to-day business and consequently mobile devices contain an abundance of private data. For these reasons, businesses must investigate their mobile recycling partners and trust that they will provide the utmost data security and deletion processes.

Green Computing Saves Power

One of the advantages of green computing to reduce the Power Consumption. Different technics are used to save power

- Keep computer in Standby mode when it is not in use and therefore it can be reduced the energy consumption by 70% to 80%.
- Activate "hibernate" or "deep sleep" mode can reduce the energy consumption by 96% as offering greater savings.

- Desktop computer uses six times more energy than laptop as much as 80% less? When we consider about monitors, large Cathode Ray Tube (CRT) monitors and high resolution models use more energy than small ones. The Liquid Crystal Displays (LCDs) which are used in laptop computers are more energy efficient and also the use 10% - 20% of power.
- Power management devices are used in computing environment.
- GE's data centre is one of the first in the world to be awarded the Leadership in Energy and Environmental Design (LEED) Platinum Certification. The award is presented by the US Green Building Council for IT projects that go beyond standing codes, implement green technology, and create energy efficient buildings.
- These hot and cold aisle energy efficiency tips aim to help you reduce your energy consumption within the data centre. Take a look to see if you're using a cooling technique that is wasting energy rather than saving it.
- Software programs like Local Cooling can calculate how much electricity your computer uses and adjust the settings of your power options to help minimize it. Physical devices like the Earth Watts Power Supply can help increase the efficiency of your computer's power supply and keep the computer cooler, so the fan doesn't have to work as hard.

The various ways in which one can adopt green computing are as follows:

1. E-waste must never be mixed with the ordinary organic wastes as they become useless once they come in contact with such organic wastes. There are e-waste farms available where all these e-wastes must be disposed of. These e-wastes can then be reused or recycled depending upon the condition in which it is. In any case, this minimizes the stress on the nature and also reduces the piling up of e-wastes.
2. A more friendly approach of green computing is to implement the green design. All the computing devices must me designed in such a way that they pose minimal threat to the nature and their manufacturing doesn't cause much harm either. Designing energy-efficient computers, scanners, printers, projectors and other computing devices holds the key in green design aspect of the green computing.
3. The manufacturing units of the big and established companies and all the subsystems must contribute to minimizing the environmental impacts of the manufacturing processes.
4. Green use refers to a sensible approach towards minimizing the usage of the computing devices, controlling the rate of usage of output devices and having a good check of the machines so that they do not get disposed because of getting out of order.
5. More efficient power supply units must be manufactured. Most of the times it is seen that the systems give the same amount of power no matter how much work are being done. Even if a small task is being performed, a large amount of power is dissipated. Similarly, if the computing device is being operated for many tasks at the same time, still the same amount of energy is being dissipated. This is what causes a waste in power unit dissipation. Hence, efficient power unit manufacturing is the demand of the green computing tactics.
6. Put laptops in "sleep" mode when not in use. The EPA has estimated that this reduces their energy use by 60 to 70 percent –
7. E-cycle used computer equipment. Find a recycler in your area. Also, Staples, the office supply retailer, has now started a recycling program. They will accept any brands of used desktop and

notebook computers, monitors, printers, fax machines and all-in-one devices with a fee of $10. Smaller items like keyboards, mice and speakers are free to drop off.

8. Buy the new "Smart Strip" power strip. The Smart Strip actually senses how much power your computer peripherals use. And when the Smart Strip senses that you've turned your computer off, it automatically shuts off your peripherals, too, preventing them from drawing an idle current, which is the current drawn even after equipment is shut off.

9. Even better, turn OFF computers and other equipment when not in use. Despite the debate over whether it's better for your computer to be left on or shut off, the fact is it's better for the environment to shut it off. Trust me, your computer can handle it just fine; in fact, computers were designed to be turned off and back on!

Conclusion:The advantage of Green Computing is that saving and conserving energy and resources saves money which will support Economy of the country. Green computing can lead to changing government policy to encourage recycling and lowering energy use by individuals and businesses but could actually be quite costly. Environmental and health risks can be minimized. Regular practices like turning off devices when not in use, or buying energy efficient products to begin with. This will enable the promotion and widespread implementation of green computing principles.Green Computing helps to save environment as well as power. It indirectly help to save money. We know that all companies are moving towards the green computing in order to improve the efficiency of resources they have and to reused the harmful pollutions creating by the companies. A lots of researchers are going in order to improve the quality of the green computing by developing the low power consuming software's and recycling the electronic wastes. If we want to really support the green computing its our individual responsibility to **GO Green.**

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