



# International Journal of Advanced Research in Computer Science and Software Engineering

Research Paper

Available online at: [www.ijarcsse.com](http://www.ijarcsse.com)

## Green Computing: Somewhat Solution to Drought

Manisha Ganapati Patil  
Assistant Professor  
KICAM, Wathar, Karad, India

Dr.R.D.Kumbhar  
Head, Computer Department  
KBPIMSR, Satara, India

**Abstract**— *Energy consumption because of using computing resources is now becomes a vast topic today which also cause big problem to a drought. Green computing is the study and practice of using computing resources efficiently. Taking into consideration the popular use of information technology industry, it has to lead a revolution of sorts by turning green in a manner no industry has ever done before. It is worth emphasizing that this green technology should not be just about sound bytes to impress activists but concrete action and organizational policy. Green computing is the term used to denote efficient use of resources in computing. This term generally relates to the use of computing resources in conjunction with minimizing environmental impact, maximizing economic viability and ensuring social duties.*

**Keywords**— *Green energy, drought, thin client, Energy star, Green computing.*

### I. INTRODUCTION

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—such as monitors, printers, storage devices, and networking and communications systems—efficiently and effectively with minimal or no impact on the environment". Green IT also strives to achieve economic viability and improved system performance and use, while abiding by our social and ethical responsibilities. Thus, green IT includes the dimensions of environmental sustainability, the economics of energy efficiency, and the total cost of ownership, which includes the cost of disposal and recycling. It is the study and practice of using computing resources efficiently. Research continues into key areas such as making the use of computers as energy-efficient as possible, and designing algorithms and systems for efficiency-related computer technologies. Modern IT systems rely upon a complicated mix of people, networks and hardware; as such, a green computing initiative must be systemic in nature, and address increasingly sophisticated problems. Elements of such as solution may comprise items such as end user satisfaction, management restructuring, regulatory compliance, disposal of electronic waste, telecommuting, virtualization of server resources, energy use, thin client solutions, and return on investment (ROI).

#### A. Why Go Green?

Green computing is a very hot topic these days, not only because of rising energy costs and potential savings, but also due to the impact on the environment. Energy to manufacture, store, operate, and cool computing systems has grown significantly in the recent years, primarily due to the volume of systems and computing that companies now heavily rely upon. Computing power consumption of companies has reached a critical point. For example, an e-commerce business with 100,000 can easily spend up to \$20 million a year on server power. Add another \$10 million for a/c cooling and it tops \$30 million a year in power alone. Clearly there is a huge potential for savings in their infrastructure. Despite the huge surge in computing power demands, there are many existing technologies and methods by which significant savings can be made. This series is dedicated to the ways a typical organization can reduce their energy footprint while maintaining required levels of computing performance.



#### B. Facts about Computer Energy Use

- Computer technology use accounts for 2% of anthropogenic CO<sub>2</sub>
  - Roughly equivalent to aviation industry
- IT energy usage will double next 4 years
- A typical desktop PC with a 17-inch LCD monitor requires about 145 watts

- 110 watts for the computer and 35 watts for the monitor.
- For every 12 consumers who keep power settings enabled for their on their monitors and PCs, CO2 emissions equivalent to removing one average automobile from the road will be avoided.

## II. Objectives Of Green Computing

- Minimizing energy consumption
- Purchasing green energy
- Reducing the paper and other consumables used
- Minimizing equipment disposal requirements
- Reducing travel requirements for employees/customers

### A. What is Green Computing?

Green computing is the study and practice of using computing resources efficiently. The primary objective of such a program is to account an expanded spectrum of values and criteria for measuring organizational (and societal) success. The goals are similar to green chemistry; reduce the use of hazardous materials, maximize energy efficiency during the product's lifetime, and promote recyclability or biodegradability of defunct products and factory waste

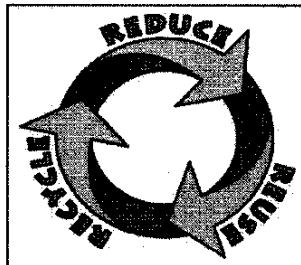


Fig. Green Earth

Modern IT systems rely upon a complicated mix of people, networks and hardware; as such, a green computing initiative must be systemic in nature, and address increasingly sophisticated problems. Elements of such a solution may comprise items such as end user satisfaction, management restructuring, regulatory compliance, disposal of electronic waste, telecommuting

## III. ROADS TO GREEN COMPUTING

1. *Green use* -Reducing the energy consumption of computers and other information systems as well as using them in an environmentally sound manner.
2. *Green disposal* -Refurbishing and reusing old computers and properly recycling unwanted computers and other electronic equipment.



Reduce, Reuse&Recycle

3 *Green design* -Designing energy-efficient and environmentally sound components, computers, servers, cooling equipment, and data centres.

4 *Green design* -Designing energy-efficient and environmentally sound components, computers, servers, cooling equipment, and data centres.

## IV. How to Contribute in Green Computing

1. *Create Green Machines* -Activating the power management features on your computer saves energy and money while helping the environment. Your computer's SLEEP and HIBERNATE settings are two of the most effective ways for you to make your computer more environmentally friendly. You can activate these functions manually or through your operating system's pre-set power management settings.

2. *Sleep Mode* -Sleep or standby mode conserves energy by cutting off power to your display, hard drive, and peripherals. After a pre-set period of inactivity, your computer switches to a low power state. When you move your mouse or press any computer key, you exit sleep mode and your computer takes you back to its previous operating state. Sleep mode is an especially effective way to conserve battery power in a laptop computer

**3.Hibernate Mode** -Hibernate mode saves energy and protects your work by copying system data to a reserved area on your hard drive and then completely turning off your computer. It also reduces wear and tear on your components. When you turn power back on, your files and your documents appear on your desktop just as you left them.

## V. Regulations and Industry Initiative

### 1.From the Government -



Many governmental agencies have continued to implement standards and regulations that encourage green computing. The Energy Star program was revised in October 2006 to include stricter efficiency requirements for computer equipment. The European Union's directives 2002/95/EC (RoHS), on the reduction of hazardous substances, and 2002/96/EC (WEEE) on waste electrical and electronic equipment required the substitution of heavy metals and flame retardants like PBBs and PBDEs in all electronic equipment put on the market starting on July 1, 2006. The directives placed responsibility on manufacturers for the gathering and recycling of old equipment (the Producer Responsibility model).

### 2. From the Industry -

- **Climate Savers Computing Initiative** :- CSCI is an effort to reduce the electric power consumption of PCs in active and inactive states. The CSCI provides a catalog of green products from its member organizations, and information for reducing PC power consumption. It was started on 2007-06-12.
- **Green Computing Impact Organization, Inc.** :- GCIO is a non-profit organization dedicated to assisting the end-users of computing products in being environmentally responsible. This mission is accomplished through educational events, cooperative programs and subsidized auditing services. The heart of the group is based on the GCIO Cooperative, a community of environmentally concerned IT leaders who pool their time, resources, and buying power to educate, broaden the use, and improve the efficiency of, green computing products and services.
- **Green Electronics Council** :- The Green Electronics Council offers the Electronic Products Environmental Assessment Tool (EPEAT) to assist in the purchase of "green" computing systems. The Council evaluates computing equipment on 28 criteria that measure a product's efficiency and sustainability attributes. On 2007-01-24, President George W. Bush issued Executive Order 13423, which requires all United States Federal agencies to use EPEAT when purchasing computer systems.
- **The Green Grid** :- It is a global consortium dedicated to advancing energy efficiency in data centers and business computing ecosystems. It was founded in February 2007 by several key companies in the industry – AMD, APC, Dell, HP, IBM, Intel, Microsoft, Rackable Systems, SprayCool, Sun Microsystems and VMware. The Green Grid has since grown to hundreds of members, including end users and government organizations, all focused on improving data center efficiency. use of metallic waste.

## VI. Recent implementations of Green Computing

- **Blackle** :-  
Blackle is a search-engine site powered by Google Search. Blackle came into being based on the concept that when a computer screen is white, presenting an empty word or the Google home, your computer consumes 74W. When the screen is black it consumes only 59W. Based on this theory if everyone switched from Google to Blackle, mother earth would save 750MW each year. This was a really good implementation of Green Computing. The principle behind Blackle is based on the fact that the display of different colors consumes different amounts of energy on computer monitors.
- **Fit-PC: a tiny PC that draws only 5w:**  
Fit-PC is the size of a paperback and absolutely silent, yet fit enough to run Windows XP or Linux. fit-PC is designed to fit where a standard PC is too bulky, noisy and power hungry. If you ever wished for a PC to be compact, quiet and green then fit- PC is the perfect fit for you. Fit-PC draws only 5 Watts, consuming in a day less power than a traditional PC consumes in 1 hour. You can leave fit-PC to work 24/7 without making a dent in your electric bill.
- **Zonbu Computer:**  
The Zonbu is a new, very energy efficient PC. The Zonbu consumes just one third of the power of a typical light bulb. The device runs the Linux operating system using a 1.2 gigahertz processor and 512 meg of RAM. It also contains no moving parts, and does even contain a fan. You can get one for as little as US\$99, but it does require you to sign up for a two-year subscription.
- **Sunray thin client:**  
Sun Microsystems is reporting increased customer interest in its Sun Ray, a thin desktop client, as electricity prices climb, according to Subodh Bapat, vice president and chief engineer in the Eco Responsibility office at Sun. Thin clients like the Sun Ray consume far less electricity than conventional desktops, he said. A Sun Ray on a desktop consumes 4 to 8 watts of power, because most of the heavy computation is performed by a server.

Sun says Sunrays are particularly well suited for cost-sensitive environments such as call centers, education, healthcare, service providers, and finance. PCs have more powerful processors as well as hard drives, something thin clients don't have. Thus, traditional PCs invariably consume a substantially larger amount of power. In the United States, desktops need to consume 50 watts or less in idle mode to qualify for new stringent Energy Star certification.

- *The Asus Eee PC and other ultra portables:*

The "ultra-portable" class of personal computers is characterized by a small size, fairly low power CPU, compact screen, low cost and innovations such as using flash memory for storage rather than hard drives with spinning platters. These factors combine to enable them to run more efficiently and use less power than a standard form factor laptop. The Asus Eee PC is one example of an ultraportable. It is the size of a paperback, weighs less than a kilogram, has built-in Wi-Fi and uses flash memory instead of a hard drive. It runs Linux too.

*Green Computing Tips*

- Use LCD monitors instead of CRT monitors, which consume a lot more electricity. LCD monitors uses three times less when active, and ten times less energy when in sleep mode.
- Use laptops instead of desktop computers, also cuts down on energy usage.
- If a laptop is not feasible, look for the Energy Star label when purchasing a computer. New US government regulations make this more important than it's been for the past fifteen years.
- Disable your screen saver. Burn-in is not an issue with modern monitors, and screen savers can prevent your monitor and computer from going into idle/sleep mode.
- Enable the power management features on your computer, to turn off components such as the monitor, fans and hard drive when idle. On Windows, go to Control Panel / Power Options. On OS X, go to System Preferences / Energy Saver.
- Switch off the monitor, printer, scanner and other peripherals when not in use.

## VII. Conclusions

After studying the energy used by computing resources it is concluded that, so far, consumers haven't cared about ecological impact when buying computers, they've cared only about speed and price. Devices use less and less power while renewable energy gets more and more portable and effective. New green materials are developed every year, and many toxic ones are already being replaced by them. 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. Green computer will be one of the major contributions which will helps to minimize the drought if every organization supposes to adopt it.

## References

- [1] Maria Kazandjieva, Brandon Heller, Omprakash Gnawali Green Enterprise Computing Data: Assumptions and Realities
- [2] Er. Navdeep Kochhar, Er. Arun Garg), 'Eco-Friendly Computing: Green Computing'.
- [3] Miss Swati Agawam, Mrs. Monika Garg, Mr. Pramod Kumar (2012), 'Green Computing is SMART COMPUTING - A Survey'
- [4] J. V. Mashalkar, S. K. Kasbe, M. B. Bhatade,"Green Computing: A Case Study of Rajarshi Shahu Mahavidyalaya, Latur, INDIA", *International Journal of Computer Applications* (0975 – 8887) Volume 62– No.2, January 2013
- [5] <http://www.scribd.com/doc/91046429/green-computing-Report>
- [6] <http://www.wisegEEK.com/what-is-green-computing.htm>
- [7] <http://123seminaronly.com/Seminar-Reports/021/51161349-Green-Computing.pdf>
- [8] <http://seminarprojects.com/Thread-green-computing-a- seminar-repot>
- [9] <http://www.primeinspiration.com/technology/featured/31-green-computing-need-for-Green-computing-a-how-to-use-your's-pc-the-green-way.html>