# Information and communication technology-go green

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**Abstract**

Information and Communication Technology (ICT) has touched upon every aspect of our life and more so when we are all homebound. But that has certainly not affected our working. We are in a digital era. We cannot fathom a situation where we are not using ICT: ICT has invaded every aspect of our life namely, business, entertainment, Public Service and Education. ICT has changed every facet of our life and has also affected the environment around us both positively and negatively too. There is necessitating willingness to protect our natural world from environmental issues for current and future generations. Green Information and Communication Technology is a pioneering approach of using ICT related to the environment protection and sustainability of ICT in future as well as consists of practices to achieve corporate social responsibility by minimizing carbon footprint, ICT waste and by conserving energy. This paper analyzes the rationale of Green ICT primarily in education and suggests critical factors for Green ICT implementation. This paper presents the facts, benefits and educating the students about the mission for Green India

**Keywords:** Information and Communication Technology (ICT), Green Information and Communication Technology (GICT), Sustenance of ICT, Green House Gases (GHG).

The importance of ICT has long been there in many fields but its presence was strongly felt in this trying time of pandemic.

## INTRODUCTION

The immense growth of industrialization around the globe sorely affects the environment. The information and communication technology (ICT) also affects our environment in several different ways. Manufacturing computers and its various electronic and mechanical components consumes electricity, raw materials, chemicals, water, and generates hazardous waste. All these resources directly or indirectly increase the carbo-days.

The information and communication technology (ICT) has changed the way we live, work, learn and play but at the same time, it is affecting our environment in several ways. It has created many opportunities for employment round the globe as the computer literacy becomes a prerequisite condition for sustenance in almost every public/private sectors. The computer's ability to store, retrieve and manipulate large amounts of data rapidly and cheaply has led to its wide spread use in managing many clerical, accounting and service documentation functions in organizations. But, at each stage of computer's life, from its production, throughout its use, and into its disposal, it exhibits some kind of environmental

problems. Several scientists and authors have quoted their reports on ICT and its impact on the environment. Still, the debate on the effectiveness of green computing for eco-friendly and sustainable IT remains an open issue.

ICT has touched upon every aspect of our life and more so when we are all homebound. But that has certainly not affected our working. We are in a digital era .We cannot fathom a situation where we are not using ICT. ICT has invaded every aspect of our life namely, business ,entertainment ,Public Service and Education. ICT has changed every facet of our life and has also affected the environment around us both positively and negatively too. Though the use of ICT has created opportunities in employment in abundance around the world as computer literacy now is a pre-requisite condition for sustenance in any and every kind of field. The various advantages of a computer like storing of data retrieving of data ,manipulating of the data at minimal cost has revolutionized the working culture. Everything that is done is done technologically. ICT is evolving very rapidly .Over the ages, we have seen advancement from no telephones to radio, then to television and now we are in the world of internet. The world has shrunk. Every piece of information is available just at a mere click. This is the result of innovations ,which has reduced the sizes of the technological tools and have increased the speed of processing the data and communicating the information.

But ,in the bargain we are also adding to the environmental problems. From every stage in the life of the computer starting from production/manufacturing to its use and then its disposal, some kinds of environmental hazards can be seen.

The immense growth in industrialization around the world has affected the world deeply and ICT too being the driving force has affected the environment in many ways. Manufacturing and producing of computers and its components calls for using raw materials ,chemicals, consumption of electricity and water ,it also generates hazardous wastes. These all contribute to release of carbon dioxide(CO,) in the environment. As we all know, CO, is one the main green house gases that is emitted and a cause of global warming .Though present naturally in the atmosphere, its concentration has been increasing alarmingly due to human activities which lead to disastrous consequences like increase in sea level due to melting of ice caps and change in weather systems. Keeping all this in mind, the researchers are now seriously paying attention towards an alternate called 'The green computing'. This is an initiative that is cost-effective, eco friendly and sustainable information technology.

**WHAT IS THE GREEN COMPUTING?**

Green computing is an application of environmental science which offers economically possible solutions that conserve natural environment and its resources. Green computing is designing, manufacturing, using and disposing of computers and its resources efficiently with minimal or no impact on environment. The goals of Green computing is to manage the power and energy efficiency, choice of eco friendly hardware and software, and recycling the material to increase the product's life. Go for Green computer reduced your electricity

bill and give a full rest to your mind. Now in these days, we use the star management strategies and technologies that reduce energy consumption waste.

**HISTORY OF GREEN COMPUTING**

Green computing is started in the 90's when US environment protection energy launched the Energy Star Program. Energy star is a program of label awarded to computers and other electronic devices. It is basically used to minimize the use of the energy and maximize the efficiency of the product/device. This labeling program is basically designed to promote and recognize the energy efficiency in monitors, climate control equipment and other technologies. This technique basically increases the adoption of “sleep mode” among consumer's electronics.

According to Wikipedia “The low magnetic and electrical emission program was first launched by the Swedish organization TCO. It issues the certification from cathode ray tube (CRT) based computer displays. This program was later extends to include criteria on energy consumption and use of hazardous material in construction.”

**NEED OF GREEN COMPUTING**

Green computing is popular now days. By using the computer we save our lot of time and efforts of humans. But the use of the computers also increases the power consumption and also generates the more amount of heat. Great heat generation means greater emission of co,. The major causes for Green computing are:-

**Lot of electricity is used:**

Most of the natural resources are being used to get the electricity that all have some impact on the environment. To save the electricity we have to use the green computing.

**Creates more toxic waste:**

Most of us are updating our computers, throwing our outdated computer resources, peripherals and other hardware devices etc, these are the hazardless toxic waste We are producing that really damaging the environment now a days. For that reason we have to use the Green Computing.

**GREEN INFORMATION TECHNOLOGY - THE FACTS AND BENEFITS**

Green IT also called green computing is the study and practice of designing, manufacturing, using, and disposing of computers, servers, and other paraphernalia efficiently and effectively with minimal or almost no impact on the environment. The goal of green computing is to reduce the use of hazardous materials, maximize energy efficiency during the product's life- time, and promote the recyclability of defunct products and factory wastes. Green computing also aims to achieve economic feasibility and improved system performance. It also provides solutions that saves energy at various levels of use like (i) hardware, (11) software and (111) services. The idea of “green computing” started in 1992

when the US Environmental Protection Agency (EPA) launched a voluntary labeling program, known as Energy Star, to promote energy efficiency in hardware. The Energy Star label has now become a common sight and an important certification. Today, servers, laptops, displays, gaming systems, and many other computing peripherals offerings include Energy Star compliance in their product descriptions.

**BENEFITS OF GREEN INFORMATION TECHNOLOGY**

The benefits of green computing are many not only from just a myopic viewpoint, but a global benefit . It helps reduce energy demands, waste, cost and how we use technology which positively effects the environment.

Green computing is about reducing the environmental footprint of computers or of ICT in general. This is most commonly achieved by:

1. making data centers and computing devices more energy efficient,

2. using more renewable energy sources,

3. using less hazardous materials in computing devices,

4. promoting device longevity

5. making devices and other IT equipment better recyclable.

**This means that the main benefits of green computing are:**

1. reduced environmental impact (less GHG (green house gases) emissions, less ewaste, fewer virgin resources needed for manufacturing new devices)

2. lower energy costs

3. longer lasting computing devices

4. reduced health risk for computer workers and recyclers.

**HOW TO EDUCATE STUDENTS ABOUT GREEN ICT**

Green ICT is an important strategic technology which has various benefits such as reducing green house gas emissions, lowering electricity costs, judiciously using the available resources. It is imperative to educate the students about this approach, the resources consumed ,the emissions spewed and the wastes generated across the ICT lifecycle.

They have to be apprised about reduction of energy consumption and the emission of CO, during ICT use. Also they must be told about the impact that disposing the waste products can cause. The following measures can help in educating the students:

Improving the usage of what you already have :maximizing utilization of current IT assets and putting in place disciplined asset management

1. Consolidating servers ,data centers, storage into more efficient hardware

2. Using new technology to improve use of hardware.

3. Using computer and monitor power management.

4. Don't use a screen saver.

5. Turn down the brightness setting of the computer.

6. Usea laptop instead ofa desk top.

7. Remember to turn off the computer when not in use.

8. Reduce paper consumption.

**CURRENT PRACTISES FOLLOWED BY STUDENTS:**

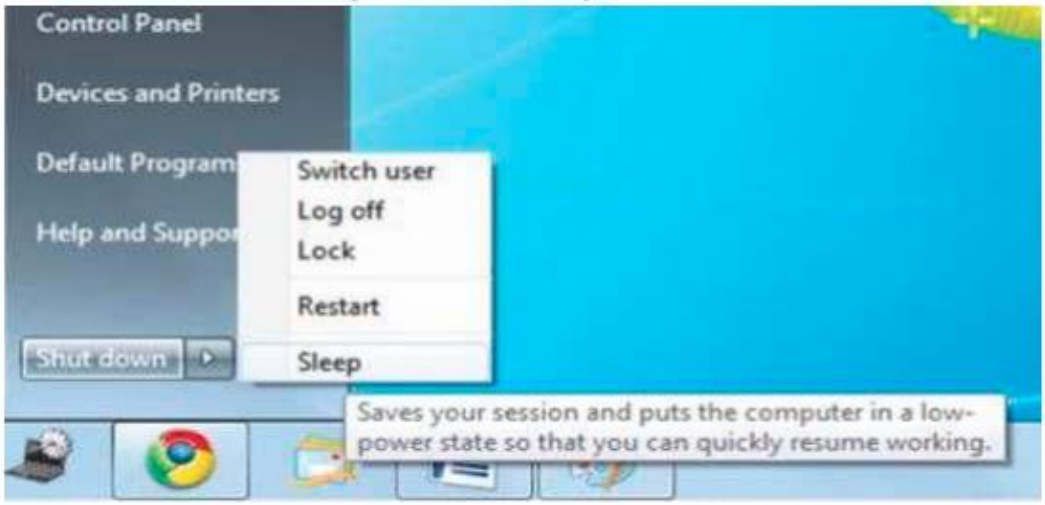
The current practices that are followed by the students need to be altered. They need to be made aware that:The use of screen savers does not save energy. Leaving a computer running consumes electricity and adds to computing costs. It is estimated that a typical desktop computer with a 17-inch flat panel LCD monitor requires about 100 watts— 65 watts for the computer and 35 watts for the monitor. If it left on 24x7 for one year, it will consume 874 kilowatt hours of electricity and release around one ton of CO,. Data centers typically account for 25% of total corporate IT budgets and for information- intensive organizations, it can account for over 50% of the total corporate carbon foot print.Data center power and cooling costs have increased 800% since 1996. In the next five years, it is expected that most U.S. data centers will spend as much on energy costs as on hardware, and twice as much as they currently do on server management and administration costs.

**EFFORTS FOR GREEN COMPUTING**

We need not to stop using computers and even need not to stop using electricity but we have to do some efforts to make environment healthy. The following actions should be taken by us:

A. Use Energy Star labeled products:- All the energy star labeled products are manufactured with keep in mind the term Green Computing and its features. These products are manufactured on the idea of less power consumption. These Gro¢yy, devices are programmed to power-down to a low power state or when they are not in use. So we have to use “Energy Star” labeled desktops, monitors, laptops, printers and other computing ENERGY STAR devices.
B. Turn off your computer:- As stated that PC's and its peripherals consume more power and resultant is the high amount of CO, emission. So we have to keep it in our mind and never hesitate to turn off our personal computers when they are not in use.

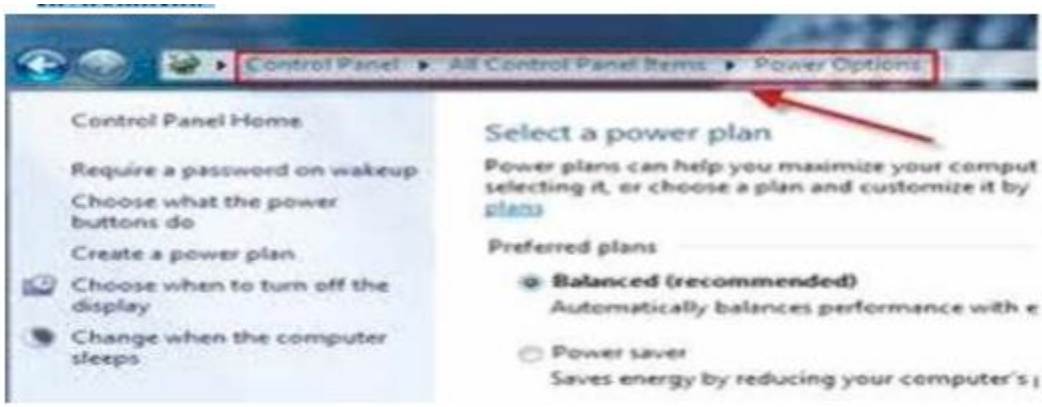
C. Sleep Mode: - Sleep mode save our session and put our computer in a low power state so that we can quickly resume windows. Always put our PC on sleep mode when not in use. It saves 60-70 percent of electricity.




D. Hibernate our computer: - This mode allows us to shut everything down. When we are not using our computer our computer for a short period of time we have to hibernate it. It saves the electricity when computer is not in use.


E. Set a power plan: - Set an effective power plan to save electricity. Because if our computer consumes more electricity, they produced more harmful impacts on our

environment.




F. Avoid using screen saver: - Screen savers are also consumes electricity even when a computer is not in use. Screen saver can be a graphic, text or an image that shows on computer screen when it is not used for pre-set time. But the best option for energy saving than screen saver is turn off your monitor when not in use.


G. Turn down monitor brightness: - Electricity consumption plays a main role in CO, emission. If we use our PC at a high brightness it consumes more electricity than using at a normal brightness. So we should always turn down our PC's brightness to save electricity.


H. Use LCD rather than CRT monitors: - The use of new technologies can play a vital role to reduced power consumption. LCD (Liquid Cristal Display) is the less power consumption device then CRT (Cathode Ray Tube). So if we have to save our environment from the effect of CO2 emission we have to use LCDs rather than CRTs.

**ADVANTAGES OF GREEN PROCESSES AND TECHNOLOGY**

The advantage of using green energy sources is that it must be clean therefore there is no discharge or damage into the environment or atmosphere. Besides, it is also replenishable in contrast to oil. In addition, green energy facilities are difficult on the pocketbook to build, it demands a lesser amount of upkeep thus it lacks to spend some huge cash to work it. Moreover, this may also create economic advantages to some particular areas and even develop tourism industry. Even while these seem excellent, there are a few who believe there exists profits to use such technology.

- Does not release anything detrimental into atmosphere
- Bring economic profits to certain areas
- Need less maintenance
- It is renewable which means will never run out
- Slow the impacts of global warming by reducing CO' emissions

DISADVANTAGES OF GREEN PROCESSES AND TECHNOLOGY

Green processes and technology refers to making efforts to improve energy efficiency or reduce the pollution produced by your home, business and general living habits. The main purpose of this kind of processes and technology is to reduce the potential negative impact that energy consumption and pollution can have on the environment. While environmentally friendly living is a positive ideal, there are several possible disadvantages of Green processes and technology such as:

- High implementing costs,
- lack of information,
- no known alternative chemical or raw material inputs,
- no known alternative process technology,
- uncertainty about performance impacts,
- and lack of human resources and skills

**SUGGESTIONS**

Nowadays industries consume more energy than what it is essential, so it leads to more pollution. That's why it is suggested to create a managerial system based on green processes and products to decrease the different types of pollutions, besides the opportunities that are provided in green technology. Governments, companies and

industries all around the globe have been seeking for methods and techniques to diminish the waste. Because the earth's environment is not in a proper situation today in terms of pollution for instance: water contamination, global warming and disappearing forests which are main difficulties for environment. We must put in use practices that can reduce travel costs, increase worker satisfaction and, through a reduction of facilities requirements, reduce energy consumption and generate significant savings through lower overhead costs for office space, lighting, heat.

**CONCLUSION**

Thus Green computing aims to reduce the unwanted and harmful effects of computers on the environment by reducing air, water and soil pollution. Though the challenges are many but with the ever increasing research in the fields of science and technology, we can overcome the hindrances. Through the small steps that each one of us takes towards adopting green computing measures, we can make our environment congenial for healthy growth.

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