

The role of green chemistry in green technology

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Abstract

Electronic waste, also called e-waste, has become an issue of serious concern to environmentalists as a growing number of electronic items are discarded in landfills every year. Many consumers are not aware that electronics like computers and cell phones actually contain toxins that can leach out into the soil and damage the environment.

Global warming and the increase of toxic waste generated by electronic devices are some of the issues that are being currently addressed through the use of the so-called "Green Technologies". Green Technology is the study and practice of using computing resources efficiently. The goals are similar to green chemistry; that is reduce the use of hazardous materials, maximize energy efficiency during the product's lifetime, and promote recyclability.

Keywords: e-waste, green technology, carbon, recycle

1. Introduction

Green Technology is the practice of using computing resources efficiently. Currently IT Systems depends on a complicated mix of people, networks, and hardware. Green Technology is the requirement to protect environment and save energy.



Green chemistry, also called sustainable chemistry, is an area of chemistry and chemical engineering focused on the design of products and processes that minimize the use and generation of hazardous substances, green chemistry focuses on technological approaches to preventing pollution and reducing consumption of nonrenewable resources.

Green chemistry overlaps with all sub disciplines of chemistry but with a particular focus on chemical synthesis, process chemistry, and chemical engineering, in industrial applications. To a lesser extent, the principles of green chemistry also affect laboratory practices. The overarching goals of green chemistry are namely, more resource-efficient, inherently safer design of molecules, materials, products, and processes.

But before implementing, it is also important to study about what kind of energy gains and operational gains can be achieved. Hence, analysis of the gap between what we have

today and what we'll have to do is essential in order to achieve the benefits of green technology.



Every big change begins from small initiatives. For instance, we started some of the simple but effective initiatives like setting the power options on your computer or in phones to switch to sleep mode when it's not active. When you're going to be away from your PC for more than a few minutes, setting it to stand-by mode and turning off the monitor will save a huge amount of energy. "Green Technology" is the name attached to this movement, which represents an environmentally responsible way to reduce power and environmental e-waste.

2. Current trends

Current trends of Green Technology are towards efficient utilization of resources. Energy is considered as the main resource and the carbon footprints are considered the major threats to environment. Therefore, the emphasis is to reduce the energy utilization & carbon footprints and increase the performance of Computing. There are several areas where researchers are putting lots of efforts to achieve desired results:

i) Energy Consumption

Organizations are realizing that the source and amount of

their energy consumption significantly contributes to Greenhouse Gas (GhG) emissions. In response to this finding, organizations are currently using the following equation:

Reduced energy consumption = Reduced greenhouse gas emissions = Reduced operational costs for the data center

It means adopting fewer and more energy efficient systems while refactoring application environments to make optimal use of physical resources is the best architectural model. According to Environmental Protection Agency in around 30% to 40% of personal computers are kept 'ON' after office hours and during the weekend and even around 90% of those computers are idle.

ii) E-Waste Recycling

Based on the Gartner estimations over 133,000 PCs are discarded by U.S. homes and businesses every day and less than 10 percent of all electronics are currently recycled. Majority of countries around the world require electronic companies to finance and manage recycling programs for their products especially underdeveloped Countries. Green Technology must take the product life cycle into consideration; from production to operation to recycling. E-Waste is a manageable piece of the waste stream.

iii) Virtualization

One of the main trends of Green Technology is virtualization of computer resources. Abstraction of computer resources, such as the running two or more logical computer systems on one set of physical hardware is called virtualization. Virtualization is a trend of Green Technology; it offers virtualization software as well as management software for virtualized environments. One of the best ways to go towards green and save enough space, enough resources, and the environment is by streamlining efficiency with virtualization. Virtualization runs fewer systems at higher levels of utilization. Virtualization allows full utilization of computer resources.

iv) IT Products and eco-labeling

Another approach to promote Green Technology and save environment is to introduce policies all around the World, so that, companies design products to receive the eco-label. There are several organizations in the world which support "eco-label" IT products. These organizations provide certificates to IT products based on factors including design for recycling, recycling system, noise energy consumption etc.

v) Challenges

According to researchers in the past the focus was on computing efficiency and cost associated to IT equipments and infrastructure services were considered low cost and available. Now infrastructure is becoming the bottleneck in IT environments and the reason for this shift is due to growing computing needs, energy cost and global warming. This shift is a great challenge for IT industry. Therefore now researchers are focusing on the cooling system, power and data center space.

3. Green computing techniques

Understanding the ways in which power consumption impacts the "greenness" of any technology, and specifically

computing technology, it is an essential step toward reducing this consumption. The various techniques that can be used to reduce power consumption.

1. Turn Off Equipment When Not In Use.
2. Computer Power Savings Modes.
3. Use Screen Savers.
4. Monitor Sleep Mode.
5. Hard Disk Sleep Mode.
6. System Standby Mode.
7. Hibernate Mode.
8. Upgrade to Extend Computer Lifecycle.

Green Technologies of the Future is Nano-Solar, Solar energy has always been one of the best renewable energy sources as it doesn't release noxious gasses into the atmosphere, and once installed requires little maintenance. However the manufacturing and operational costs have historically been quite high, especially in comparison with more traditional but carbon-intensive means of producing energy. Concentrated Solar Energy Another alternative solar energy technology is Concentrated Solar Power (CSP). Similar in concept to the ancient 'burning mirrors' used by the Chinese back in 700BC, this modern version takes the form of solar farms in which multiple rows of mirrors concentrate the sun's rays onto a fluid-filled vessel, which in turn powers generators or steam turbines. Once these plants are up and running, it would be possible to import the energy. Concentrated Solar Power definitely seems the most likely way forward in producing cost effective and clean renewable energy. Nuclear Fusion Power is a clean, safe technology which has the potential to create much larger volumes of energy than traditional or alternative renewable energy sources. It is quite possibly the best long term energy solution currently being explored.

4. Conclusion

The increasing power costs have forced individuals and firms to develop newer methods and technologies to more efficient and lower power consumption. This paper analyzed the role of green technology towards reducing power costs and thereby supporting a sustainable growth model. An important technique for green technology is to improve the efficiency of power distribution as well as the computational capabilities of the servers and computing devices. The efficiency of the various methods and applications can be measured by the use of metrics such as those developed by the Green Grid. Finally, a model for the development and implementation of sustainable IT services Green IT programs are demonstrating fundamental economic as well as environmental sense, it is understandable why organizations are exploring green technology options with such intense interest across the IT industry needs to be developed.

5. References

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