

Emerging Trends in Green IT

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ABSTRACT

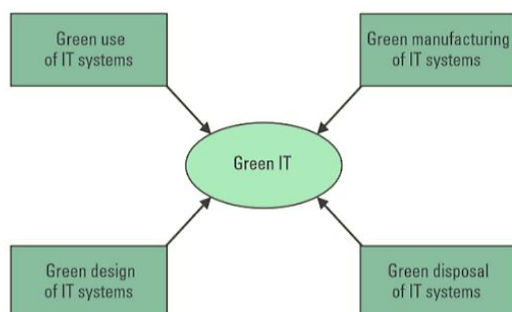
Green IT is also called green computing it describes the study and the using of computer resources in an efficient way. Green IT starts with manufacturers producing environmentally friendly products and encouraging IT departments to consider more friendly options like virtualization, power management and proper recycling habits. The government has also recently proposed new compliance regulations which would work towards certifying data centers as green. Some criteria include using low-emission building materials, recycling, using alternative energy technologies, and other green technologies.

Keywords: Energy Efficiency ,Green IT, Green procurement ,Power Consumption, Renewable Energy

I. INTRODUCTION

Green IT is a set of practical measures designed to ensure that Information Technology is developed, delivered and used in a way that is environmentally friendly, sustainable and energy efficient. so

Green IT=Energy Efficiency + Renewable Energy



This methodology is adopted in order to ensure that the usage of energy is done efficiently, to promote the idea of recycling of waste products. Businesses around the world have realized the importance of securing environment and how beneficial it can prove for them. As a result to this organizations have started taking active part in addressing the environmental issues. Businesses implement Green IT to reduce power consumption and thus lowering costs. Common people

implement Green IT in order to sustain a healthy lifestyle. Data centres are an integral part of any IT firm. They are of utmost importance because they're the central repository where the data of any given organization is stored. Not just that, it also emits a large amount of CO₂ gas in the environment.

II. METHODS AND MATERIAL

Energy consumption in IT

The problem is actually greater than the growth in power consumption by data centres. Much of the electricity that comes through the power cord of the computer is turned into heat and power conversion waste through the PC power supply. In order to encourage these good practices of conserving energy government has started to certify the data centres as Green.

Now talking about implementing Green IT in general, there are ways and means to conserve energy and thereby reducing the ill-effects on environment.

- 1) A little care while using our PC: We needlessly leave our personal computers on even if we're not using them, unaware that it still uses electricity and

heats up which requires additional cooling. In an enterprise the cost of electricity for hundred such computers becomes enormous. Alternately, we can use the power saving methods like sleep mode, hibernation, and standby when computers aren't being used.

- 2) Screensavers: Blank screensavers reduce power consumption as compared to moving ones.
- 3) Another famous concept is that of The 3 R's of going Green: **Reuse**- Instead of throwing away old computer/parts we might reuse them or give them to someone who needs it. This will not only help that person but also reduce landfills which cause environmental hazards. **Replace**: Instead of buying a new computer altogether we can replace the old parts with new ones or buy refurbished hardware. This also helps in capital management as buying a new computer would be more expensive than buying individual parts. **Recycle**: Sometimes computer parts are beyond repair and need to be recycled. If we don't recycle them, they end up as e-waste. If we don't discard them properly, the harmful chemicals/metals in them (like lead, mercury, chromium) might pollute water.

Issues and economics

Green IT practices attract media and management attention today, in part, because of a broader interest and emphasis on corporate social responsibility (CSR) programs. With increasing public awareness of environmental issues, CSR efforts also are tied to initiatives that build a positive environmental brand image.

In the infrastructure support and data center management communities, there is a growing body of evidence that IT organizations can also "green-up" their energy, procurement and recycling practices. These efforts are being closely watched across the industry because, while they contribute to the broader corporate social and environmental agenda, evidence indicates that the initiatives make sound economic sense and in many cases generate substantial savings.

With this "win-win" opportunity emerging across CGI's network of clients, IT is increasingly becoming a major area of focus and opportunity for organizations looking to adopt green or sustainable business practices. In a

practical sense, the new programs target a wide range of energy, cost, environmental and travel-related issues. Among the issues most commonly reported, and those that appear to be fuelling the Green IT movement, are the following:

- Rising energy demand with a more limited supply and increasing utility costs
- Management of hazardous waste and electronic equipment disposal (e-waste)
- Increasing gasoline costs, which drive up employee commuting costs leading to retention issues
- Increasing real estate costs
- Rising airline ticket costs and travel complexities
- A stronger regulatory climate at the federal, state and local levels

The need to take action to address this growing list of business and environmentally linked issues is driving a wide range of thinking and problem-solving activities. New initiatives are reported from all segments of the industry, including businesses, government, computer manufacturers and service providers. Global enterprises also are being driven by toughening regulations adopted by the European Union.

As a result, many IT organizations are looking at Green IT programs to achieve objectives that include improving energy efficiency and power management practices, increasing hardware utilization, reducing life-cycle costs and looking for ways to cut down on computer waste.

Areas of Objectives of Green IT

The major areas of activity associated with these programs fall generally into three categories:

- **Energy efficiency programs**: These programs focus on maximizing energy use and computing efficiency in the IT infrastructure and data center levels to reduce energy consumption, electric utility costs and associated global greenhouse gas impacts.
- **Power consumption**: This category includes efficient approaches to power conservation. For instance, as part of CGI's technology infrastructure management offering, CGI's ongoing data center electromechanical improvement program combines methods, processes and

energy-focused solutions for power and cooling efficiency. For example, CGI data centers use raised floor lighting and cooling retrofits to orient projects toward energy conscious and cost-saving solutions. Using current and efficient power consumption technologies has enabled the centers to reduce utility inefficiency and waste by right-sizing to new, more efficient cooling and power solutions.

- **Cooling** : By leveraging local climates and using chilled loop and free cooling strategies, IT organizations can decrease energy consumption through cooling practices. For example, CGI has decreased energy consumption with its own data center cooling strategies. Through the use of dual, air-cooled, split-type screw chillers, N+1 redundancy is achieved. This use of innovative, green, renewable energy resources enables CGI to reduce its demand for electricity, which also relieves the pressure on already over-burdened local electricity grids.

- **Green Procurement and Asset Management** : This category includes initiatives that focus on purchasing computing equipment that is more energy efficient and environmentally friendly and includes programs to extend equipment useful life, recycle and engage with suppliers that demonstrate a commitment to reducing hazardous materials in their manufacturing, packaging and factory waste management programs.

- **Technology-Based Solutions**: This category includes programs that employ technology in ways that are designed to reduce travel, commuting and real estate costs along with the environmental impacts of jobs related to people movement.

The Climate Savers Computing Initiative

In 2007, recognizing the implications of these energy consumption numbers when projected on a global scale, Google and Intel launched a public awareness program called the Climate Savers Computing Initiative (see the appendix section at the end of the paper). Many people today, for a variety of reasons, look at their computer power consumption as a fixed cost that is largely beyond their control. This perception, or misperception, as it turns out to be, served as one of the primary motivators for the formulation of the Climate Savers group, which now includes industry giants such as Dell, Microsoft and HP.

Promoting the idea that individuals and businesses currently have at their fingertips several simple, low-cost options that can immediately reduce their power demand, Climate Savers is attempting to inform and modify behaviour through their power management awareness program. The program promotes the use of both policies and best practices, including using the power management features that are available on most computers today.

The group reports on their website that an estimated 90% of workstations in use on any given day have their energy conservation features disabled. Of devices that have their power management settings activated, many have a screensaver running that can prevent the power management settings from being automatically engaged. By establishing programs that require screensavers to be disabled, standards for configuring power management settings and best practices that require devices to be powered off when not in use, Climate Savers estimates that power usage could be reduced by an estimated 60-80%.

Cool Earth Promotion

1. Sectorial Approach

- Japan, along with other major emitters, will establish quantified national targets for emissions reductions.
- The target could be set based on a bottom-up approach by compiling on sectoral basis energy efficiency and trying up the reduction volume.

2. Cool Earth Partnership

- Energy efficiency should be improved 30% all over the world by 2020.
- Japan establishes new US\$10 billion financial Mechanism to support developing countries.

3. Development of Innovative Technologies for the Earth

With the internet period, It is estimated that by the year 2025, the amount of data traffic on the internet will be 100-200 times its present value.

The electricity consumption of IT devices (servers, network equipment, PCs and displays) is estimated to grow 5-fold (20% of total generated electricity power) in 2025 than that of today.

III. RESULTS AND DISCUSSION

Green IT Solutions



Solutions for the Enterprise

No matter what the size and nature of the enterprise, the Data Center is a big contributor to the eco-footprint. It is common for ICT to account for 25% or more of the total electricity consumption. The GreenHouse Gas (GHG) footprint from the manufacture, operation and disposal of ICT equipment is a significant part of the total for non-manufacturers. Just as big are the opportunities to make sizeable reductions in the enterprise's eco-profile by implementing programs which reduce space, energy and waste by launching programs for virtualization, power management and other proven methods. GreenIT offers services (IT System Design, IT Infrastructure System Design and Integrated Facilities Design) , seminars (GreenIT Building Blocks) and total service packages (GreenIT 360/365) to help the IT professional succeed with a sustainability program.

1) Government

City governments and government agencies have a high profile when it comes to meeting politically generated sustainability goals, but rarely the budget or manpower to tackle large scale sustainable ICT planning. Timetables for achieving goals bear more relation to election cycles than reality. ICT infrastructure may cross agency barriers, making any systemic planning exercise difficult. [GreenIT Roadmap](#) provides a method to automatically document the entire IT infrastructure and identify areas which promise the largest potential for

near term efficiency in energy use and waste production. [GreenIT Building Blocks](#) seminars can train staff to leverage existing resource.

2) Education

As visible public citizens, educational institutions are expected to embody the highest values of society.



Universities must meet the expectations of alumni, funders and boards, while complying with grant requirements for EPP. They must be good citizens in their communities and act as role models for their students. One of the challenges of creating a sustainable IT plan in a campus environment is overcoming



organizational boundaries and the difficulties of a physical plant whose growth may span decades or centuries. GreenIT helps kick off the sustainable IT planning process with seminars such as [Green IT 21](#) to help diverse organizations reach a common vocabulary. A college can get help formulating and executing new initiatives by using services such as [Eco-Innovation Planning and Project Management](#). [IT Infrastructure System Design and Integrated Facilities Design](#) consulting can help design sustainable IT into new construction.

3) HealthCare

Hospitals, clinics and medical research facilities are pressured to reduce operating costs while constantly upgrading their technologies. Facility expansion creates



new opportunities for implementing IT Infrastructure that operates more efficiently. Innovations in healthcare methods increasingly rely on IT support. As vital parts of the community, healthcare facilities are always in the spotlight and have the opportunity to be leaders in environmental best practices. Seminars such as [Green IT 21](#) teach an organization the basics of IT Sustainability. Healthcare institutions can get help formulating and executing new initiatives by using services such as [Eco-Innovation Planning and Project Management](#), [IT Infrastructure System Design](#) and [Integrated Facilities Design](#) consulting can help design sustainable IT into new construction.

4) Equipment Manufacturers

The last year has seen a dramatic increase in customers adding Green requirements to RFPs and purchasing contracts. High energy costs and more stringent waste disposal requirements provide additional motivation to enterprises to implement aggressive sustainability policies. Environmentally Preferred Purchasing practices are becoming the norm in the Fortune 1000 and beyond. In order to successfully compete, the Equipment Manufacturer must add Green requirements to new product development, and develop a full understanding of the Green qualities of existing products. GreenIT offers a range of standard seminars - [Green IT 21](#), [Push the Green Wave](#), and [Buy Green, Be Green](#) to help train organizations to successfully navigate the green marketplace and EPP.



5) Real Estate Development

Even before the 2008 economic crisis, Real Estate developers were finding that to build commercial and institutional buildings that could successfully compete



for quality tenants required attention to current social and environmental trends. LEED certification is becoming de rigueur. Broadband infrastructure and adaptive HVAC are just a couple of the latest technologies which differentiate a building from its competition. By incorporating Green Information technology requirements into the initial design, future tenants may realize energy savings of 25% or more. GreenIT consulting services such as [IT Infrastructure System Design](#) and [Integrated Facilities Design](#) can guide the developer, architect and sub-contractor through the complete design process.

6) Non-Profit

Non-Profit Institutions are held to a high standard of ethical behavior and community responsibility. Most have developed Sustainability policies but not all have realized the role Information and Computer Technology

play in reducing an institution's eco-footprint. The [Green IT 21](#) seminar can train staff and board members alike on the opportunities to reduce energy and waste by employing Green IT practices. The [GreenIT 360/365](#) service package can guide your organization through the entire Sustainable IT life cycle of assessment, planning and implementation.

7) **Green Business**

Businesses that sell environmentally friendly products are held to a high standard of ethical behavior and community responsibility. All green businesses have active Sustainability programs that undergo constant improvement. Often, the full impact of Information and Computer Technology on the eco-footprint is only partially understood. The [Green IT 21](#) seminar can train staff and board members alike on the opportunities to reduce energy and waste by employing GreenIT practices. [GreenIT Building Blocks](#) can help the IT organization develop ideas for innovative leadership. The [GreenIT 360/365](#) service package can guide your organization through the entire Sustainable IT life cycle of assessment, planning and implementation.

Key Trends In Green IT

Virtualised Data Center

Energy Efficiency

Travel Reduction

Asset Disposal

IV. CONCLUSION

Green IT is continuously interesting people and organizations all over the world, the main reason being greater financial returns on the investment made on green data center. Green IT has gained a lot of importance because of the rising energy costs and its impact on the environment. The need to manufacture and store energy has increased mainly due to the volume of systems that the organizations generally rely on. The power consumption by companies is a critical issue. The idea of using green computing is beneficial as it helps the companies dispose their electronic waste in an effective way so that the environment is not hampered. This is also done in order to help reduce the CO2 emissions from data centers that are responsible for global damage. Green Computing with respect to data centers leads a lot of cost savings over time. Reduction

in energy costs from servers, cooling and lightning helps any organization saves a lot on their budget on power.

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