

Cat III A-1  
**Research Dimensions**

UGC - Journal No. 45814

ISSN No. 2249-3867

Impact Factor: 5.1899(UIF)

Vol IV , March 2018



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# RESEARCH DIMENSIONS

Content

ISSN NO:-2249-3867

Impact Factor : 5.1899(UIF)

Sr. No	Title and Name of The Author (S)	Page No
1	Study Of India's Progress Related To Sustainable Development Goal With Special Refrence To Goal One: No Poverty Dr. Raj Soshte and Mr. Akshay Bhoir	1
2	Recent Economic Reforms And Current Status Of Indian Economy Dr. Rajesh Harichandra Bhoite	5
3	A Study On Recent Trends In Indian Banking System Dr. Reshma More and Dr. Varsha S. Mallah	9
4	Economic Analysis Of Fuel (Petrol And Diesel) Prices In India Dr. Sunil Gosavi	15
5	<b>Green Audit – An Overview On Green It Audit</b> <b>Dr. Sunita Tidke</b>	21
6	Inflation Rates In The Housing Sector In India -A Comparision Of The Pre And Post Demonetisation Period Dr.(CA) Chandrashekhar D. Deore	31
7	A Study Of Risk Management In Banking Sector In India Dr.Vilas B. Zodage	34
8	A Study Of Cyber Crime & Its Impact On E - Business Kashish Malik	40
9	An Analysis Of Different Aspects Of Human Resource Management Krishnaji Ramappa Shindhe	44
10	Recent Trends And Issues In Commerce : Inventory Management Miss. Swapnaja S. Chandekar	48
11	Study Of Exporting Units, In Special Economic Zones [SEZ] And Outside Sez, To Evaluate Whether supply Of Power And fuel Affects choice Of Location Of Exporting Units Mr. Ashok Vasant Mahadik	54
12	E-Governance Challenges And Opportunities In India Mr. Dayanand Vishwanath Thakur	60



# RESEARCH DIMENSIONS

ISSN: 2249-3867

IMPACT FACTOR : 5.1899(UIF)

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## GREEN AUDIT – AN OVERVIEW ON GREEN IT AUDIT

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### ABSTRACT

*This research paper aims to determine to what extent the greenness of an organization's IT environment can be assured by means of a green IT audit and how the IT audit can plan be matured in order to increase assurance provisioning. The greenness of IT depends on the extent of presence of mechanisms for green management, procurement, use and disposal of IT. The scope of a green IT audit should therefore include all these mechanisms. The level of assurance resulting from a green IT audit can range from low, to limited, to reasonable. The level of assurance provisioning can be increased by raising auditor involvement, where evaluation of design can be extended with evaluation of implementation and operating effectiveness of the mechanisms. Whatever the level of assurance is, all mechanisms should be in scope of the audit. In green IT literature mainly normative controls can be found.*

### INTRODUCTION :

Green HR is nothing but an environmentally friendly HR practice by reducing the carbon foot print by less printing of paper, video conferencing and interviews, Rajkumar Adukia says

"Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well being and he bears a solemn responsibility to protect and improve the environment for present and future generation."

Most countries today face environmental threats due to the increase in pollution of the atmosphere, water and land. Wildlife habitats continue to be threatened. Water contamination and air pollution are critical problems facing most countries. Environment related problems are linked closely to the rapid growth of population, as well as to technological advancements.

### WHAT IS GREEN AUDIT?

Green audit is all about corporate responsibility. It uncovers the truth about statements made by governments and companies with regard to the effects of environmental pollution. The aim of green audit is to review the measures taken by the company to combat pollution.

Green audit is defined as an official examination of the effects a company has on the environment. It is also widely known as Environmental Audit. Green Audit can be better understood as: Compliance of Environmental Laws, Audit of Environment Cost and Environment Impact Assessment and Carbon credit



### What is green IT?

It is largely taken as the study and practice of designing, manufacturing, using, and disposing of computers, servers, associated subsystems and peripheral devices efficiently and effectively with highly mitigated negative impact on the environment

### PURPOSE OF GREEN IT AUDIT

An IT audit is different from a financial statement audit. While a financial audit's purpose is to evaluate whether an organization is adhering to standard accounting practices, the purposes of an IT audit are to evaluate the system's internal control design and effectiveness. This includes, but is not limited to, efficiency and security protocols, development processes, and IT governance or oversight. Installing controls are necessary but not sufficient to provide adequate security. People responsible for security must consider if the controls are installed as intended, if they are effective, or if any breach in security has occurred and if so, what actions can be done to prevent future breaches. These inquiries must be answered by independent and unbiased observers. These observers are performing the task of information systems auditing. In an Information Systems (IS) environment, an audit is an examination of information systems, their inputs, outputs, and processing. The primary functions of an IT audit are to evaluate the systems that are in place to guard an organization's information. Specifically, information technology audits are used to evaluate the organization's ability to protect its information assets and to properly dispense information to authorized parties.

### WHAT IS GREEN IT AUDIT?

In the present scenario organizations are facing numerous challenges, issues and risks. One of the biggest one is the 'Global Warming'. Environmental changes, depletion of natural resources, dependency on IT are forcing Green IT strategy to become a necessity. With data centers using 10-30 times more energy per square foot than office space, data center energy use doubling every 5 years, and delayed capital investments in new power plants—energy efficiency is becoming a key metric of IT operational effectiveness. A flexible, secure, dynamic infrastructure has to be devised to help organizations address critical energy and power costs

Green IT emphasizes the role of methods and practices that reduce a company's environmental impact. By Green IT Consulting and Audit offerings, NII can help your organization to optimize your services, better manage risk, and resolve resource constraints—all while reducing overall energy costs by 15%-40%. Green IT advantage will enable and empower your organization to meet all the Global warming related challenges and at the same time help you contribute back so even your organization can participate and contribute to your environmental corporate responsibility.

### Green IT Audit Objectives

Some of the benefits of obtaining Green IT are as follows:

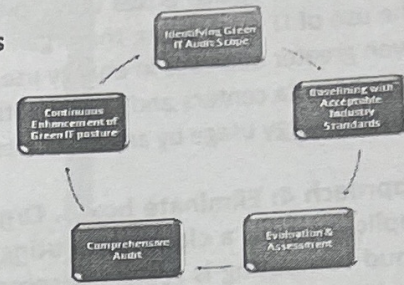
- Become energy efficient
- Save natural resources
- Optimize process
- Enhance infrastructure
- Reduce dependency on natural resources
- Initiate recycling initiatives
- Imbibe green it culture
- Ensure continuous improvement in green it posture
- Realize branding goals



**How NII can help to achieve Green IT Objectives**

**I) Identifying Green IT Assets and Audit scope (Broad category is as listed below):**

- Natural resources
- Energy
- Infrastructure
- IT Infrastructure
- Processes
- Technologies



**II) Green IT Base lining in line with acceptable industry standards.**

In this stage we make sure that Green IT base lining is done for your organization specific to your organization’s Green IT posture mapped with industries best practices and acceptable standards.

**III ) Green Initiative Evaluation and Assessment**

Assessments are carried out to evaluate your organization’s Green IT posture and do a thorough gap analysis based on the base lining done in phase II. You will be consulted and recommendations will be given to improve and meet the Green IT baseline.

**IV) Full-fledged Green IT Audit**

A thorough Green IT Audit is conducted in this stage. A comprehensive Audit report will be submitted along with the Policies and Procedures to be followed in your organization. Recommendations will be given to close the gaps if any.

**V) Enhancement of Green IT Posture**

In this stage framework for continuously improving the Green IT posture will be given so that Green IT project for your organization becomes a culture and is ingrained such that Green IT objectives are met.

**FOUR BROAD APPROACHES**

Some non-IT green projects, such as retrofitting the electrical or cooling systems in existing buildings, can require significant front-end investments that may take years, if ever, to provide an economic return. However, green IT projects have the potential for both quick and relatively high ROIs. There are several reasons why this potential is easily achievable. One primary reason is the short lifecycle of IT equipment, which usually has a refresh rate of three to five years. So, unlike retrofitting a 30-year-old building, new IT equipment will be purchased every three to five years whether environmental impact is part of the motivation or not. Because of competitive pressures on IT manufacturers, each new generation of technology is greener (e.g. more energy efficient) than the prior generation. When replacing equipment, organizations can choose from a mix of four broad approaches.

**Approach1: Replace boxes with newer boxes.** If an organization simply does box-for-box replacements (e.g., replacing desktop PCs with an equal number of new desktop PCs), energy savings will be realized automatically. According to the U.S. Environmental Protection Agency (EPA) (2007), current technologies and design strategies could reduce the energy use of a typical server by 25 percent or more.

**Approach2: Replace boxes with smaller boxes.** By replacing traditional desktop PCs with thin clients or laptops, the organizations will experience an even more substantial drop in energy use.



**Approach 3: Replace boxes with fewer boxes.** By implementing virtualization software and thereby increasing the use of IT equipment, the organization can reduce the total number of computers purchased, resulting in an even greater decrease in energy use. According to the EPA, implementing best energy-management practices in existing data centers and consolidating applications from many servers to one server could reduce current data center energy usage by around 20 percent.

**Approach 4: Eliminate boxes.** Organizations could shut down some of their servers and move relevant applications to a cloud computing environment. At first, it may appear that an organization moving to cloud computing is replacing some computers at its location with computers at a vendor's location, but cloud computing providers have the potential to achieve economies of scale (by increasing usage rates); and they can locate their data centers closer to alternative (non-fossil) energy sources, plentiful (cheaper) water, and less sensitive environments. As an extreme example, Google has more than 200,000 servers, which collectively use as much electricity as a small city and generate a huge amount of heat that requires expensive air conditioning and water usage for cooling. In a search to reduce IT-related costs, a March 9, 2009, Wall Street Journal article, "Where Clouds Displace Forests," describes how Google, Facebook, Amazon, and others have built (or are building) mammoth data centers in Oregon and Washington to be close to cheap electricity and water plus "...low humidity and cool night

### TYPES OF GREEN IT AUDITS

**Technological innovation process audit.** This audit constructs a risk profile for existing and new projects. The audit will assess the length and depth of the company's experience in its chosen technologies, as well as its presence in relevant markets, the organization of each project, and the structure of the portion of the industry that deals with this project or product, organization and industry structure.

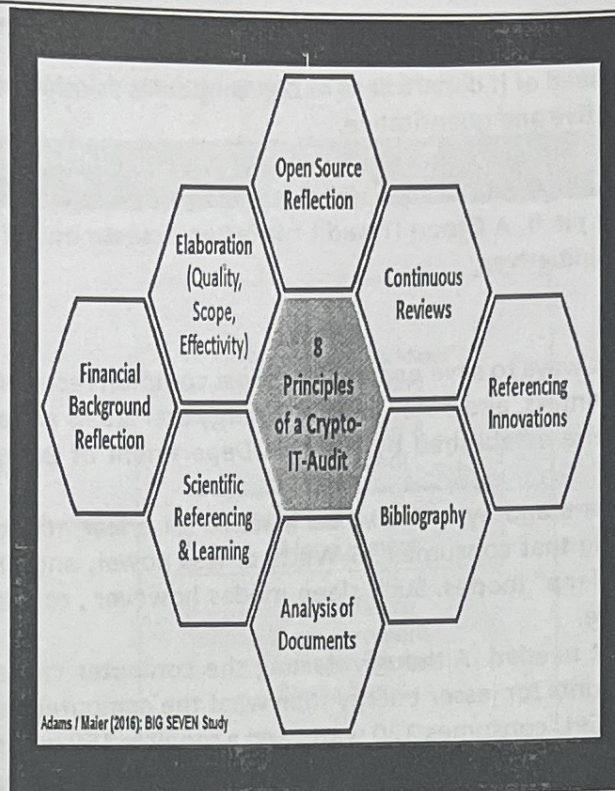
- **Innovative comparison audit.** This audit is an analysis of the innovative abilities of the company being audited, in comparison to its competitors. This requires examination of company's research and development facilities, as well as its track record in actually producing new products.
- **Technological position audit:** This audit reviews the technologies that the business currently has and that it needs to add. Technologies are characterized as being either "base", "key", "pacing" or "emerging".

Others describe the spectrum of IT audits with five categories of audits:

- **Systems and Applications:** An audit to verify that systems and applications are appropriate, are efficient, and are adequately controlled to ensure valid, reliable, timely, and secure input, processing, and output at all levels of a system's activity. System and process assurance audits form a subtype, focusing on business process-centric business IT systems. Such audits have the objective to assist financial auditors.
- **Information Processing Facilities:** An audit to verify that the processing facility is controlled to ensure timely, accurate, and efficient processing of applications under normal and potentially disruptive conditions.
- **Systems Development:** An audit to verify that the systems under development meet the objectives of the organization, and to ensure that the systems are developed in accordance with generally accepted standards for systems development.
- **Management of IT and Enterprise Architecture:** An audit to verify that IT management has developed an organizational structure and procedures to ensure a controlled and efficient environment for information processing.

**Client/Server, Telecommunications, Intranets, and Extranets:** An audit to verify that telecommunications controls are in place on the client (computer receiving services), server, and on the network connecting the clients and servers.





#### OBJECTIVES OF RESEARCH:

1. To know and create awareness about green it audit.
2. To help in imbibing green it culture
3. to study how green it audit helps in conserving energy and to know various ways how firms are following it.

#### Primary data

The research paper is based on primary data and majorly on secondary data as majorly people are not aware about its concept and it is not mandatory by law. So hardly 3-4 big firms are adopting green it audit and are saving 40% of energy by this practice. Companies like TCS, JP MORGAN, KPMG follow green it audit.

Primary data is collected through telephonic and personal interview of employees working in TCS and JP MORGAN

Companies do green it in order to save energy as well as to make people and other stakeholders know about their efforts towards conservation of resources and it is a part of their CSR activities. Companies have fixed budget for their CSR activities they use it in various ways get CSR awards and to show how philanthropy they are and how green they can be.

#### Secondary data

Secondary data is collected through magazine, articles, related peoples and various websites.

#### Sample size

Sample is 3-4 big company like PCS, JP MORGONS, KPMG and one college i.e. KES College.

Related questions from this topic was asked personally to the IT department of head of those companies



### Target population

Target population was head of it department of big companies as others are not aware about it. Data collected is qualitative and quantitative.

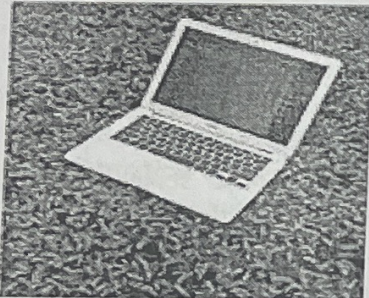
How to know and calculate green it initiatives has saved how much energy?  
Green initiatives save energy and conserve the world's resources, allow considerable cost savings, and make for a good marketing pitch. A Green IT audit makes an assessment of the green initiatives taken, and highlights scope for further initiatives.

#### • Power Saving Methods

The Green IT audit identifies ways to save energy. The most common recommendations include:

- Use Energy Star monitors, printers, and other devices. Energy Star labels appear on appliances that meet strict energy efficiency criteria established by the U.S. Department of Energy and U.S. Environmental Protection Agency.
- Set the computer to sleep or stand-by mode when inactive for a few minutes. Energy Star computers power down to a sleep mode that consumes 15 Watts or less power, and Energy Star monitors power down into two successive "sleep" modes. Such sleep modes however, require the operating system to have the power-down feature.
- Switch off devices when not needed. Although starting the computer causes a small surge in energy usage, such a surge still accounts for lesser energy than what the computer uses, even in sleep mode for extended periods of time. A CPU consumes 120 watts and a monitor 150 watts when in use, and in sleep modes these devices consume just 30 watts each. Laptops, in contrast consume 50 watts. As a rule of thumb, consider turning off the monitor when not using it for more than 20 minutes, and turn off the CPU when not using it for two hours.
- Unplug devices when not needed for extended periods. Computers continue to draw a small amount of power when switched "off" and such phantom loads increase the appliance's energy consumption a few watt-hours.
- Use a power strip to connect printers, copiers, scanners, and other devices, to switch them off, or better still unplug them when not in use.

### Cooling and Ventilation



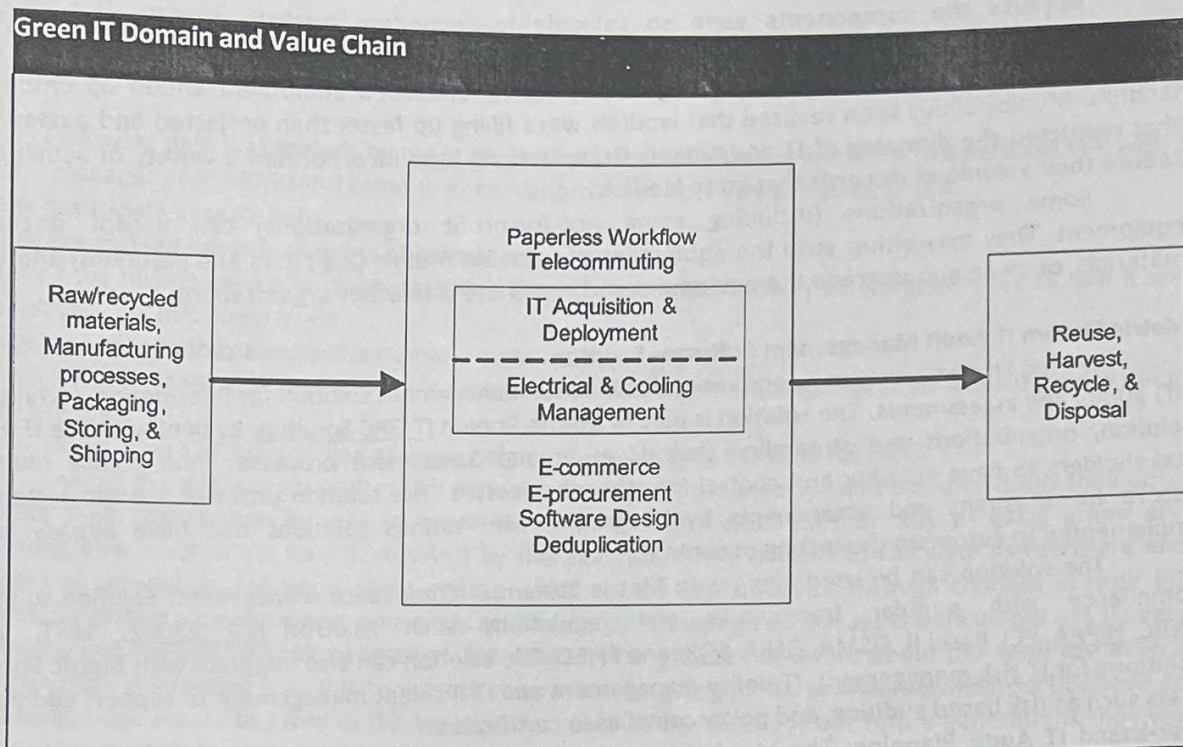
- One major component of the green audit is heating, cooling, and ventilation, which again has a major bearing on energy costs. Computers generate heat. The audit makes an assessment of the adequacy of the ventilation so that the heat diffuses and does not build up near the computer, and check whether CPU fans work properly and remain free of dust.

### THE GREEN IT DOMAIN

The green IT domain is almost boundless. Exploring green IT takes a cradle-to-grave lifecycle perspective. As Figure 1 illustrates, green IT covers many elements in the IT value chain. The narrowest



focus is captured in the center of Figure 1, namely, IT acquisition and deployment. However, as the following section discusses, green IT includes many more elements.



**E-commerce**

E-commerce and e-procurement can greatly reduce trips to stores both on the buying and selling side. As discussed before, reducing vehicle transportation has an immediate and significant impact of reducing fossil fuel and other energy uses and pollution.

**Software Design and Deduplication**

This growing demand for storage means purchasing more storage devices and using more energy. In addition, these big files require more CPU resources to search and retrieve data.

As a short-term deduplication solution, organizations can encourage employees to post attachments to the organization’s intranet and then include a link in the emails to the referenced attachments. For the longer term, the email software could be modified to include pointers to the attachment instead of including the actual attachment with each email.

**Manufacturing**

Moving upstream in the IT value chain, the manufacture, ware- housing, and distribution of IT-related equipment have a very large carbon footprint.

**Disposal and Recycling**

On one hand, it is good news that IT is on a three- to five-year refresh cycle because that means that organizations are constantly deploying the latest technologies with decreasing energy demands. On the other hand, that refresh cycle generates huge amount of trash. Besides the sheer volume (both in quantity and in cubic feet) of IT equipment that must be disposed of, IT



equipment includes toxic materials that can be released into the atmosphere or leached into the soil and water supply.

Because the components were so valuable in secondary markets, traditional mainframe computers were historically stripped of parts instead of being completely discarded. Starting in the early 1980s, as desktop computers were growing in popularity, discarded equipment ended up entirely in landfills. Municipalities soon realized that landfills were filling up faster than projected and passed laws that restricted the dumping of IT equipment. Organizations have incorporated a variety of activities to reduce their volume of discards that go to landfills.

Some organizations (including some not-for-profit organizations) will accept discarded equipment. They may either strip the equipment of valuable metals (e.g., gold and platinum) and toxic materials, or clean and upgrade the equipment and distribute it to other organizations.

### **Metric Stream IT Audit Management Software Solution**

Metric Stream provides a comprehensive IT audit management solution for Information Technology (IT) audits and assessments. The solution is part of Metric Stream IT GRC Solution. By deploying the IT audit solution, organizations can streamline their IT audit and assessment processes, and enable multiple stakeholders to have visibility and control into these processes. The solution provides a single system of record for IT audits and assessments by integrating with various solutions that have already been implemented to automate the testing of controls.

The solution can be used along with Metric Stream IT Compliance Management Solution to audit compliance with popular frameworks and regulations such as COBIT, ISO 27002, NIST, ITIL, NERC, HIPAA, PCI, Basel II, FISMA, GLBA, SOX, and FFIEC. The solution can also integrate with Metric Stream solutions for IT risk management, IT policy management and IT incident management to support additional tasks such as risk based auditing, and policy compliance certification.

**Risk-based IT Audit Planning:** The Metric Stream solution supports risk-based IT auditing and allows IT processes, assets, projects, and other audit entities to be selected to define the scope of the audit based on the risk assessments. The solution integrates with third-party tools to gather risk and vulnerability information from IT systems (e.g. weak passwords and unused ports in web servers) so that auditors can plan audits based on the risk profile of IT assets.

**IT Audit Projects:** IT audit projects can be scheduled periodically based on the annual audit plan, or triggered on an ad-hoc basis for specific processes, projects, or applications. Based on the master audit calendar, auditors can be selected and assigned the IT audit responsibility with a due date. Automatic notifications are sent to the auditor as well as the auditee. Work papers with fully configurable workflows allow auditors to document audit activities and results.

**IT Audits and Assessments:** The Metric Stream solution enables IT auditors to record qualitative or quantitative findings with detailed observations and recommendations in predefined formats, alongside the checklist of evaluation criteria and questions. The system also supports self-assessments and surveys related to IT controls in a consistent, reliable, and predictable manner. Audit managers can track the status of the audit, and measure its progress against milestones to ensure timely execution. A time tracking capability captures the time spent in auditing for optimal resource utilization.

**IT Audit Reviews:** The IT audit solution routes audit findings, observation reports, and auditors' recommendations for review and subsequent actions. Findings are sent to the process owners to seek their response. The solution also has built-in workflows for reviewing responses for approval or rejection. In-built options help initiate remedial actions for undesirable variations and trends, and schedule follow-up audits.

**IT Audit Reports and Metrics:** The IT audit solution provides comprehensive capabilities for compiling IT audit reports and work-papers. It provides complete visibility into the audit process, enables easy status tracking, and offers access to all audit data, as well as analyses of auditor performance and audit results. Graphical executive dashboards and flexible reports with drill-down capabilities provide IT audit statistics by



audited entities, audit schedule, and calendar, finding reports, corrective and remediation actions triggered, and a variety of other parameters.

### DATA ANALYSIS AND INTERPRETATION

As discussed in above chapter that this paper is based on primary and majorly based on secondary data

Following data was analysis by me in my personal and telephoning interview In a personal talk with a senior it manager of JP MORGAN I came to know various ways how they are going green:

1. They participate in earth hour
2. They are moving towards clouding of computers
3. They have human sensor in computers so if there is no human motion on computers for 15 min it will automatically get into sleep mode.
4. They save light as they also have automatic motion lights.
5. They are even looking towards Google's new programmed where u can give your pc when it is on n not in use to use them.

Under their CSR budget they are now helping by developing software for NGO.

Overall this all becomes part of CSR activities for sustainable development but specifically they don't calculate their contribution by way of green it audits as it is a small part or way of going green and calculating how much watts they have saved by this practice is very difficult to calculate as there are end numbers of computers. But yes it saves energy which can be easily marked through changes in their bill amount. So getting a proper report on exactly saved energy through green it ways is difficult but yes its very interesting and challenging topic to research for. Majority people are not aware about this term too even if their company is adopting it as this topic gets covered under going green or CSR activities. So I believe an equal weight-age should be given to this topic as this could be beneficial for our future generations they will get a cleaner earth to live for and good habit of conserving energy.

Many colleges like KES college and many firms are also adopting various ways to conserve natural resources and saving energy but that is different as it is a part of green audit whereas my research is specific about green it audit.

#### Develop a sustainable Green computing plan

- Involve stakeholders to include checklists, recycling policies, recommendations for disposal of used equipment, government guidelines and recommendations for purchasing green computer equipment in organizational policies and plans;
- Encourage the IT community for using the best practices and encourage them to consider green computing practices and guidelines.
- On-going communication about and campus commitment to green IT best practices to produce notable results.

#### Recycle

- Dispose e-waste per central, state and local regulations;
- Discard used or unwanted electronic equipment in a convenient and environmentally responsible manner as computers emit harmful missions;
- Recycle computers through manufacturer's recycling services.

#### Make environmentally sound purchase decisions

- Purchase of desktop computers, notebooks and monitors based on environmental attributes;
- Provide a clear, consistent set of performance criteria for the design of products;



- Recognize manufacturer efforts to reduce the environmental impact of products by reducing or eliminating environmentally sensitive materials, designing for longevity and reducing packaging materials; and
- Use Server and storage virtualization that can help to improve resource utilization, reduce energy costs and simplify maintenance.

- **RECOMMENDATION**

- Bring ideas. Green IT is a growing field, and there is not a checklist for how to do it right. The opportunities for real savings are going to be driven by the specifics of each individual environment. In many organizations, IT auditors have greater knowledge of the broad IT environment than the IT staff members (who are solely focused on their areas of responsibility). Thus, the IT auditors can see opportunities that are missed by line management.
- To bring ideas, IT auditors must continue to educate themselves and enhance their knowledge along a wide spectrum of information: hardware, processing units, HVAC ducting and airflow, tax subsidies and incentives (federal, state and local), building design software, etc. The IT auditor who takes the extra time to educate themselves along these lines will be able to continue delivering shareholder value and insight to the IT function and the organization.

- **CONCLUSION**

- Green IT initiatives are changing the way that organizations approach IT. This represents challenges and opportunities for IT auditors. It is an evolving field and those IT auditors who embrace it will receive career dividends, while those who do not may find themselves at odds with IT management. Think about how the organization's IT environment is changing, and start evaluating how to help to reengineer aspects of one's approach to auditing that environment.
- Green Audit is the most efficient & ecological way to solve such an environmental problem. The experiments on the nature by avoiding natural rules, this can be a one major reason behind Green audit process. Green Audit is one kind of professional care which is the responsibility of each individual who are the part of economic, financial, social, environmental factor. The Green Audit of is Requirement of NACC Committee to the Junior college. It is necessary to conduct a green audit in college campus because student aware of the green audit, its advantages to save the planet & they become good citizen of our country. Thus, Green audit Become necessary at the college level.

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