

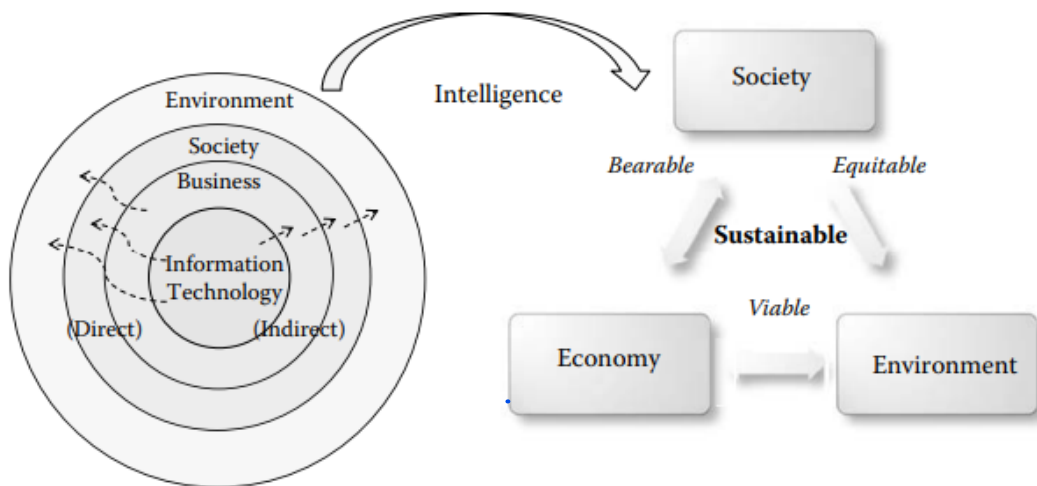
1. what is green IT? Explain how green IT influences business, society and environment, show them with sustainable triangle format.

Green IT (also referred to as **Green ICT** or **Green computing**) has been defined or described by several sources including Murugesan (2008), Lamb (2009), Unhelkar (2010a and 2010c, 2011). Green IT definition appears in Wikipedia, 2010 as well. But it is the definition of Murugesan (2008) that is particularly comprehensive: “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.” This definition can be interpreted as serving an orga-

For example, IT in business makes use of massive computing and networking technologies that require large and dedicated data centers. The location of these data centers and the people who work in them are all socially affected by this use of IT by business. Furthermore, as the social fabric gets disturbed, it in turn affects the overall environment in which the society exists. Finally, there is also a direct influence of IT on the society and environment—independent of its influence on business.

This direct influence of IT is seen in the massive proliferation of household gadgets, use of computers in schools and hospitals, the popularity of social networking, and the high level of communications technology (such as a GPS) in vehicles.

Despite this huge popularity of IT, it appears as if the corresponding environmental considerations of the impact of IT's usage have lagged behind substantially within business strategies. Events, such as the global financial crises (GFC, 2009) Shah, A. (2010), British Petroleum's oil leak in the Gulf of Mexico, and the Icelandic volcanic ash have further exacerbated this lack of



business is tied to its carbon generation. Businesses that generate carbon and pollute the atmosphere are unlikely to be sustainable in the long run, whereas green businesses that use IT intelligently add substantially to their risk management repertoire and are most likely to be successful businesses both now and in the future.

A viewpoint is depicted on the right side in Figure 1.1, wherein the sustainable triangle of an organization is shown to be made up of a balance between society–economy (how much can the society bear?), economy–environment (is the environmental initiative viable?), and society–environment (is the environmental consideration equitable?). The quest for the answers to these questions forms the basis of *this* Green IT initiative—and its fundamental principle is to have the economic, social, and environmental factors in balance.

A holistic, balanced approach to the business and the environment is strongly repeated through the thought processes of various consulting practitioners and researching academics (Unhelkar, 2011). A varied viewpoints in that handbook range from the need to optimize supply chain processes, switching off computers when not in use, and designing low-carbon emitting microprocessor chips to creating long-term awareness about the environmental protocols and standards, incorporating carefully construed carbon metrics and measurements, and changing attitudes of users and employees through education and training.

2. List and explain the specific ways in which green IT is beneficial to the organization.

The following are some of the specific ways in which a comprehensive Green IT strategy is beneficial to an organization:

- Incorporates environmental issues within the business strategies in way that is complementary to each other.
- Demonstrates the importance of environmental issues as one of the “core” business issues rather than merely “good to have” add on.
- Explores the possibilities of enhanced green performance to discover and develop new business opportunities.
- Expands the technologies of Business Intelligence for the purpose of reducing the organization’s carbon footprint—leading in to what is called *Environmental Intelligence* (EI) (Unhelkar and Trivedi, 2009; Wrexham and Cutter, 2009; Unhelkar and Tiwary, 2010).
- Applies the concepts of carbon efficiency to business processes leading up to Green business process management (Green-BPM) and Green business process reengineering (GPR).

Cost savings: Green IT initiatives such as virtualization, cloud computing, and energy-efficient hardware can reduce an organization's energy consumption, leading to lower utility bills and operating costs.

Improved brand image: Adopting environmentally friendly practices can enhance an organization's reputation, making it more attractive to customers, employees, and investors who are increasingly concerned about sustainability.

Regulatory compliance: Many countries and regions have regulations in place to reduce energy consumption and greenhouse gas emissions. Green IT practices can help organizations comply with these regulations and avoid penalties.

Increased efficiency: Green IT initiatives such as telecommuting, video conferencing, and remote collaboration can improve productivity and efficiency by reducing the need for travel and commuting.

Reduced carbon footprint: By reducing energy consumption and greenhouse gas emissions, green IT can help organizations meet their environmental sustainability goals and contribute to the fight against climate change.

- Develops the idea of the carbon footprint of collaborative business processes (Unhelkar, Ghanbary, and Younessi, 2009) that cut across multiple organizations and approaches to improve that collective carbon footprint.
- Proposes a Green enterprise architecture (GEA) that builds on the technologies of Web Services/Service Oriented Architecture and Cloud computing.
- Discusses the importance of people, their attitude, and approaches to Green IT that would bring about a positive change without condemnation.
- Expands on the role of Green HR including the training and positioning of roles and responsibilities in the green space.
- Expands on the vital role of business leadership in bringing about positive green change across the organization.
- Presents the legal and political aspects of the international protocols on greenhouse gases (GHGs).
- Argues for the use of ISO 14001 family of standards for the environment within the organization.
- Discusses metrics and measurements related to carbon data with an aim of understanding and mitigating the sources of carbon generation within and outside the organization.
- Incorporates the use of mobile technologies and smart metering for real-time measurements and use of carbon data.
- Discusses and advises on the use of Carbon Emissions Management Software (CEMS) in the context of carbon metrics, measurements, and reporting.
- Outlines the approach to Green IT audits for reporting and compliance.
- Explores the futuristic issues impacting environmental performance of an organization.

An environmentally responsible business strategy (ERBS) is a judicious combination of

3.How does IT relate to business? what is the impact of this close relationship between IT and business on the environment .

As mentioned earlier, IT is an inseparable, integral part of modern business. In fact, IT is so closely intertwined with business processes that it is difficult to imagine any modern core business process sans IT. In addition to being an integral support to business processes, IT particularly with communications technologies, is a creative cause for many new and wide-ranging business interactions. The maxim “Business *is* IT” is even more relevant in today’s heavily analyzed, networked, and interconnected world of business. It is impossible to imagine a typical banking, insurance, and hospital or airline process without IT. The synergy between business and IT implies that growth in business also implies corresponding growth in IT. This, in turn, also implies greater IT-based carbon generation.

Figure 1.2 attempts to depict this ongoing interplay between the business and the environment.

The IT sheath that encompasses the business is shown on the left in Figure 1.2. Any business activity that involves IT—and most does—impacts the environment. The carbon impact is shown by an arrow from left to right. The impact of business activities through IT on the environment has to be understood in three ways: from the length of time, the depth of activity, and the breadth

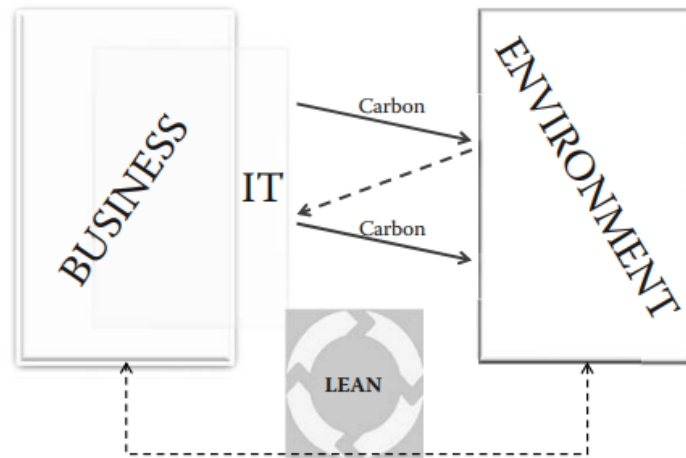


Figure 1.2 Interplay of business and environment through information technology.

of coverage of the carbon effect. The greater the intensity of business activities, the higher is the carbon generation. The awareness of environmental issues, in turn, influence the way in which IT is structured and operated (as is attempted here). This effect, in turn, would lead to an improved IT sheath that would be optimized and efficient. The lean approach to business is thus easily applicable to the Green IT strategies; as a lean business would also have a corresponding lean IT—opening up the idea that *lean is green*.

4. Explain the green enterprise characteristics with a neat supporting diagram

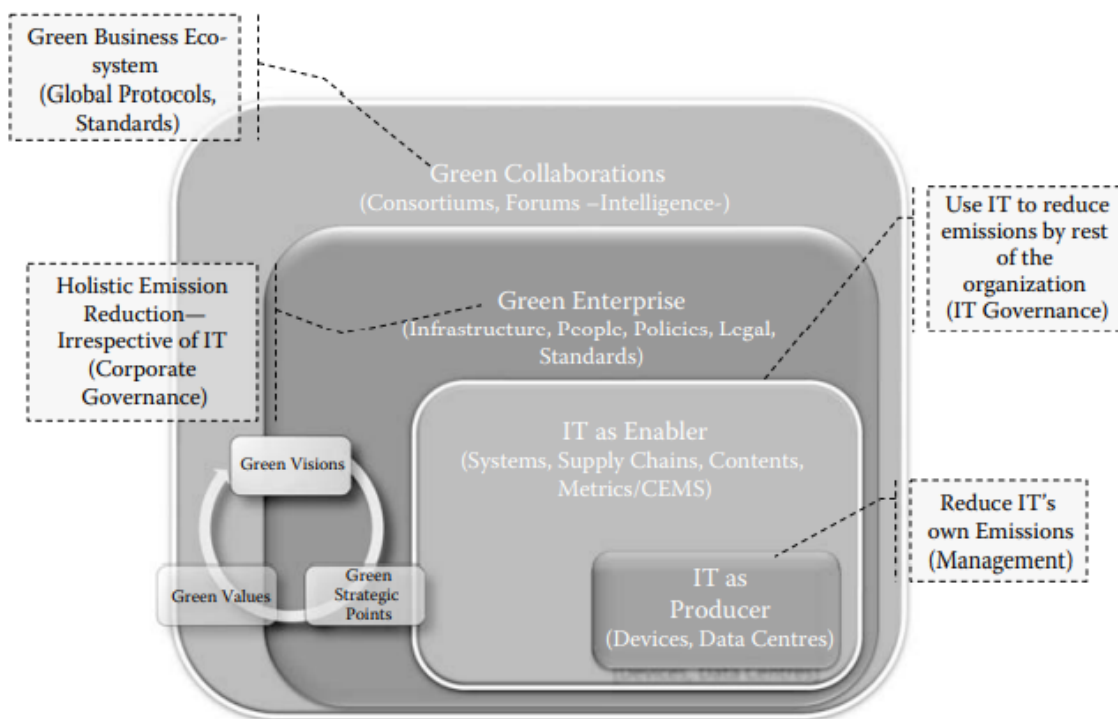
Information technology (IT) plays a crucial role in modern business operations. IT systems and tools are used for a wide range of functions, including data management, communication, collaboration, marketing, customer relationship management, and many more. The close relationship between IT and business has a significant impact on the environment, which can be positive or negative, depending on the nature of IT use.

On the positive side, IT can contribute to environmental sustainability by enabling digitalization and dematerialization of business processes. By reducing paper-based communication, document storage, and transactions, businesses can significantly reduce their environmental impact, including the use of natural resources, energy consumption, and greenhouse gas emissions. Additionally, IT can enable remote work, telecommuting, and virtual meetings, which can reduce transportation-related emissions and associated environmental impact.

On the negative side, the close relationship between IT and business can also contribute to environmental issues. IT infrastructure and devices require a significant amount of energy to operate, which can contribute to high carbon emissions, especially if the energy source is based on fossil fuels. Additionally, the production and disposal of IT equipment can result in environmental degradation, including pollution, resource depletion, and waste accumulation.

Overall, the impact of the close relationship between IT and business on the environment depends on how IT is used, managed, and disposed of. By adopting green IT practices and promoting environmental sustainability, businesses can leverage the positive aspects of the IT-business relationship while minimizing the negative impact on the environment.

- **IT as a Producer:** This is the very first attempt by an organization at Green IT is to handle the emissions produced by the IT gadgets themselves. This is, as shown in Figure 1.3, aims to reduce IT's own emissions that is based on the end-user computer emissions as well as those from the data centers housing the servers and communications equipments.
- **IT as an Enabler:** This area of IT includes its use to enable reduction of emissions across all areas of an enterprise. Thus, IT systems, supply chains, contents, and metrics together with specific CEMS play a role at this level of a green organization. IT governance also plays a role in controlling the procurement and the disposal of IT equipments.
- **Green Enterprise:** This is the level of an organization that is holistically applying environmental strategies to all aspects of its business—irrespective of IT. While IT remains a vital part of this initiative, a green enterprise also deals with infrastructure and buildings, people and attitude, legal and standards, and marketing and sales—areas that may not be directly IT but are supported by IT.
- **Green Collaboration:** Going beyond a single enterprise, this is a collaboration of green enterprises that may come together due to their belonging to a common vertical market, or providing collaborative services using web services on a global scale. These collaborative



5. Write short notes on: a. Green vision b. Green IT opportunities

Green vision refers to a long-term strategy or plan for environmental sustainability, where an organization sets a goal to minimize its negative impact on the environment and promote sustainability in its operations, products, and services. A green vision can involve various measures, including adopting eco-friendly practices, reducing greenhouse gas emissions, promoting circular economy, and supporting environmental causes. By establishing a green vision, organizations can demonstrate their commitment to environmental sustainability, attract environmentally conscious customers and employees, and contribute to a more sustainable future.

Green IT opportunities refer to the various ways in which information technology can contribute to environmental sustainability and support green business practices. Green IT opportunities include virtualization, cloud computing, energy-efficient hardware and software, e-waste management, paperless office, telecommuting, and video conferencing. By adopting green IT practices, organizations can reduce energy consumption, minimize waste, and promote a more sustainable approach to business operations. Additionally, green IT opportunities can bring cost savings, enhance brand reputation, and promote regulatory compliance. As such, green IT opportunities are an essential aspect of any green vision or environmental sustainability strategy.

Green Vision

Green vision is the development of a suitable global strategic vision for an enterprise. A vision, based on the arguments thus far in this chapter, has to be necessarily holistic. A sectional or fragmentary approach to the vision will not lead to a green organization which benefits from the carbon reduction effort in the long term. It is expected that the CEO, together with the board, will understand and analyze the trend of environment factors and review the positioning of the enterprise as well as the industry in the context of these trends.

Presentation and discussion with the employees and the incorporation of their viewpoints also needs to be incorporated in this green vision. A green vision can encompass the future of the organization in the carbon economy. Therefore, this vision can include not only what a carbon-efficient organization will be, but also new avenues of business in the new green markets. A green strategic vision will need acceptance and support across the organization.

Furthermore, customers and business partners who will be invariably affected by the future changes need to be taken in confidence in the development of a green vision. As external stakeholders can also provide valuable input to this vision, especially if they have themselves experienced change due to their own green enterprise transformation.

Green IT Opportunity

A strategic approach to Green IT views the carbon challenge as a actually a green opportunity. Environmental issues have a long-term and strategic impact on the overall business decision-making process on the organization (Garnaut, 2008; Stern, 2007). This also implies that the search for Green IT opportunity

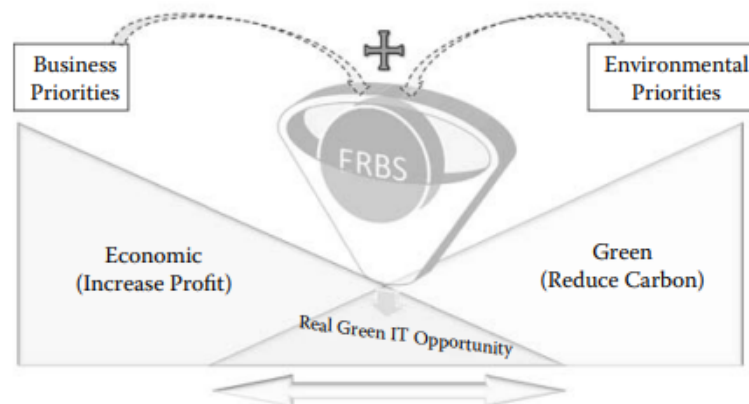


Figure 1.4 The real Green IT opportunity exists where the environmental and business priorities are complimentary to each other.

6.List and explain the challenges of green IT

Following is a list of challenges faced by organizations in their endeavor to be ready for the carbon economy:

- Contextual nature of the environmental sustainability initiative
- Subjective nature of Green IT that depends on the context and also on the personal motivation of the individual
- Lack of robust metrics and measurements associated with Green IT
- Lack of understanding of drivers for the environmental sustainability initiative
- Likely confusion due to number of motivators and drivers for a green initiative
- Lack of robust metrics and measurements across all dimensions of an organization
- Lack of availability of substantial “winning stories” and corresponding supporting metrics
- Uncertainty in terms of rules and regulations that can be applied and adhered to with confidence
- Uncertainty in terms of the scopes of the emissions to be included in the calculations (e.g., measurements of the scope 3 emissions; scopes are discussed in Chapter 3)
- Technologies such as virtualization, thin clients, and Cloud computing are implemented in organizations, but not for improving its environmental performance
- Lack of justification (ROI) for investing in the environmental sustainability solutions
- Nonrecognition of inefficient businesses processes and lack of corresponding business process management
- Uncertainty in terms of trying out new products and services that may be eco-friendly as they may disturb the existing processes

The challenges of green IT include:

High implementation cost: Implementing green IT initiatives such as energy-efficient hardware, cloud computing, and virtualization can require significant investment, which may not be feasible for all organizations.

Lack of awareness and expertise: Many organizations may lack the knowledge and expertise needed to implement green IT practices effectively. Additionally, employees may need training to adopt green IT practices effectively.

Complexity and interoperability: Adopting green IT practices may involve complex IT systems and tools, which may be difficult to integrate with existing IT infrastructure. This can lead to interoperability issues and reduced efficiency.

Limited technology options: Some green IT practices may require specialized technology and hardware, which may not be widely available or cost-effective.

Data security and privacy concerns: Adopting green IT practices may involve using cloud-based services, which can raise concerns about data security and privacy. Additionally, e-waste management and disposal practices may raise data security and privacy risks.

Regulatory compliance: Organizations may face regulatory compliance issues when adopting green IT practices, as there may be specific regulations and standards that need to be followed.

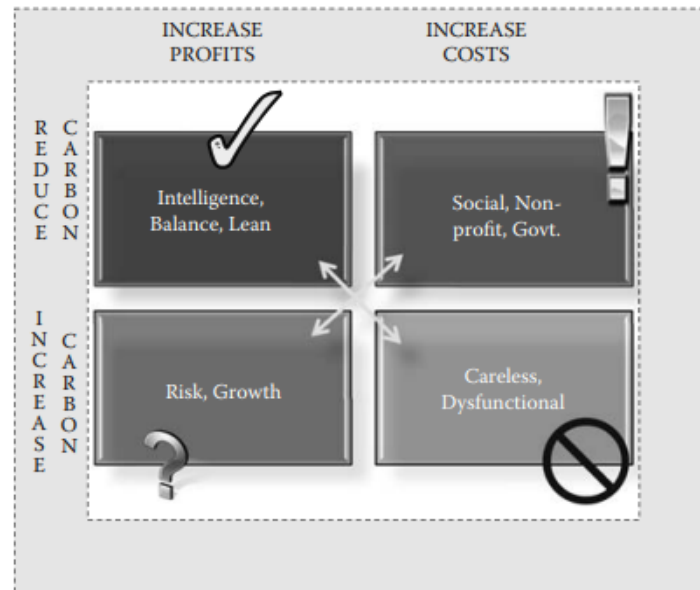
Overall, the challenges of green IT highlight the need for careful planning, management, and training when adopting green IT practices. By addressing these challenges, organizations can leverage the benefits of green IT while minimizing the negative impact on their operations and environment.

- Overall shortage of consulting and in-house skills in the area of EI
- Facilities like data centers cannot be replaced as quickly as the servers inside them due to high infrastructure costs—leading to a mismatch between the hardware and the facilities that house them
- Skepticism from various sections of an organization including, occasionally, some part of the leadership
- An uncoordinated emergence of macroeconomic levers (such as carbon taxes and carbon trading) that are also not uniform across regions
- Disagreements amongst nations—especially divided amongst the developed versus developing economies—to ratify and implement
- Stringent environmentally sustainable legislative and regulatory frameworks
- Lack of accountability on the part of staff for their own carbon emissions—perhaps due to lack of feedback metrics
- Smart/auto meters not sufficiently integrated with the CEMS
- Lack of choice in terms of strategies for cultural change
- Emerging information and communications technologies and corresponding innovations make early attempts at reducing redundant carbon emissions
- Lack of overall industry experience in business transformation programs that are specifically aimed at Green IT
- Highly complex supply chain systems that include collaboration amongst multiple organizations—making it extremely challenging to implement environmental initiatives across the entire supply chain
- Operational requirements usually taking precedence over strategic approach to the environment

- There is still a substantial amount of subjectivity, skepticism, and doubt about the entire green enterprise. This is a personal, individual attitude challenge that is difficult to quantify through contemporary metrics and measurements.
- Quantifying the economic returns of a green project remains uncertain especially when it is considered strategically. However, it is the strategic approach to Green IT that has tremendous significance in terms of green value and meaningful returns.
- Organizations tend to take a hurried and, as a result, fragmented approach to environmental initiatives. Instead, a holistic, unified approach is required.
- There is no single packaged solution that can work as an application to transform the organization to a green one; instead, painstakingly, a collaborative effort that brings together and integrates existing packages as also the carbon emissions management software (CEMS) is required.
- The attractiveness of immediately switching off physical carbon emitting hardware (e.g., monitors, data servers) and the ensuing feeling of smugness at having achieved something for the environment.
- Fuzzy cost-benefit analysis and equally fuzzy metrics associated with green projects. The uncertainty in the payback on the environmental initiatives can discourage an organization-wide initiative.
- Potential risks associated with the use of technology-based initiatives such as Cloud computing, business intelligence, and knowledge management in the area of green initiatives. The inherent risks and challenges associated with these technologies also translate into risks for green initiatives.
- Design, development, and production of goods, as well as appropriate services keeping the carbon costs in mind may initially require greater effort than the status-quo or business as usual scenario. Furthermore, products and services will have to be reconfigured in a manner that produces long-term advantage from a green perspective. For example, the existing CRM, SCM, and HR applications can and will undergo modifications and enhancements to cater

7.Explain the philosophical considerations in green IT strategy

- **Risky, Growing:** Strategies that directly improve the economic performance of the organization but also add to the carbon contents. Expansion of the products and services portfolio by an organization will increase its turnover, but at the same time, there is a very high possibility that its corresponding carbon contents will also go up. This may happen due to increased production activities in the organization. For example, an airline expanding its services to new regions would expect to increase the carbon it produces as it flies to these new geographical regions but with new fuel-efficient aircraft, the increases can be minimized. Organizational growth, which is usually associated with increase in operational costs relating to manufacturing and distribution (supply chains), can be reasonably expected to increase its carbon costs as well.



- **Social, Government, Nonprofit:** Strategies that improve the carbon performance of the organization but hurt the bottom line. For example, optimized insurance services by an insurance organization may imply shifting some aspects of such service to less powerful servers. Such strategies may reduce the carbon generation by those business processes but may also reduce the customer service. Such strategies can hurt the revenues and/or increase the costs.
- **Careless, No Strategy:** These are the less well-managed and even dysfunctional organizations whose activities hurt both their economic and carbon performance. For example, careless increase in the number of servers within a data center without proper estimation of their workload may laden the organization with unnecessary servers. These data servers would not add any discernable gain in terms of economic returns, nor would they provide any business value. The carbon footprint of such an organization would also increase due to additional GHG generation. In most cases, though, such an organization may not be even aware of its carbon impacts as the necessary metrics and measurements are often missing.
- **Lean, Intelligent, Balanced:** Strategies that improve both the economic and carbon performance. This is the core winning philosophy of an ideal Green IT strategy. This is an approach that applies the principles of lean business to evolve into a green business. This is the philosophy that invites and expands the technologies of business intelligence to move toward environmental intelligence. This is an approach that is highly balanced—ensuring that the goals of the business are in balance and in sync with its environmental goals. For example, the same airline mentioned earlier, in its expansion strategy, would consider procurement of new, low-carbon-emitting aircrafts with less fuel consumption. Furthermore, the airline might encourage its

8. List and explain the elements of ERBS of green IT

Driver: This element focuses on the motivations behind implementing green IT practices. Drivers can include corporate responsibility, compliance with regulations, cost savings, and improved reputation.

Dimension: This element looks at the different dimensions of green IT, including hardware, software, data centers, and networks. It recognizes that implementing green IT practices requires a holistic approach that takes into account all of these dimensions.

Business: This element focuses on the business case for implementing green IT practices, including cost savings, improved efficiency, and reduced environmental impact. It recognizes that green IT practices can have a positive impact on a company's bottom line.

System: This element looks at the systems and processes that are required to implement green IT practices. It recognizes that successful implementation requires a structured approach that includes planning, implementation, monitoring, and evaluation. It also acknowledges the importance of engaging stakeholders and promoting awareness and education about the benefits of green IT practices.

Table 2.1 Elements of an ERBS Forming the Green Strategies Mix

<i>Drivers</i>	<i>Dimensions</i>	<i>Business</i>	<i>Systems</i>
<ul style="list-style-type: none"> • Costs and revenues • Sociocultural and political • Regulatory and legal • Enlightened self-interest • Responsible Business ecosystem • New market opportunities 	<ul style="list-style-type: none"> • Economic • People • Process • Technology <p>PPET</p>	<ul style="list-style-type: none"> • Policies, practices, and procedures • Systems and support • Legal compliance • Architecture • Environmental Metrics • Maintenance <p>PS LAME</p>	<ul style="list-style-type: none"> • Data • Information • Process • Knowledge • Environmental intelligence • (EI implementation includes Green ICT) <p>DIPKEE</p>

- **Dimensions**—these are the various areas along which an organization undertakes transformation. There are four such dimensions identified and listed in Table 2.1 in the second column. A corporate ERBS needs to consider all four significant components of any strategy: economy, people, processes, and technologies.
- **Business**—this is the domain of policies, practices, and procedures undertaken by the organization along each of the four dimensions.
- **Intelligence**—this is the systems, information technology, and contents aspect of Green IT. It is the further evolution of the concept of business intelligence into what is considered here as environmental intelligence.

9.Explain how costs and profit margins play a role in driving an organization towards ERBS?(fig 2.7 in text book)

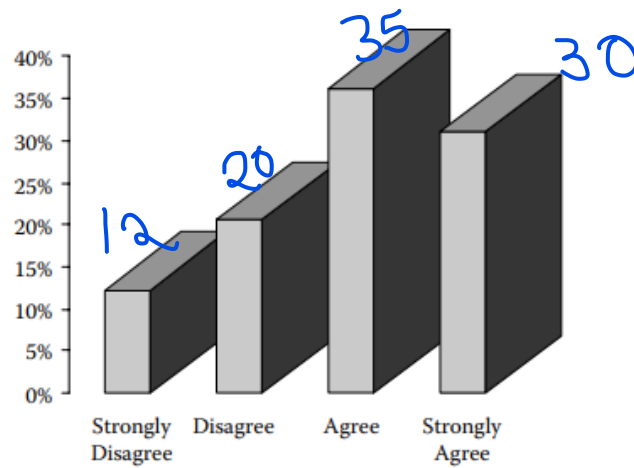


Figure 2.7 Green policies are taken up to increase revenue in an organization. (Based on Trivedi and Unhelkar, 2010.)

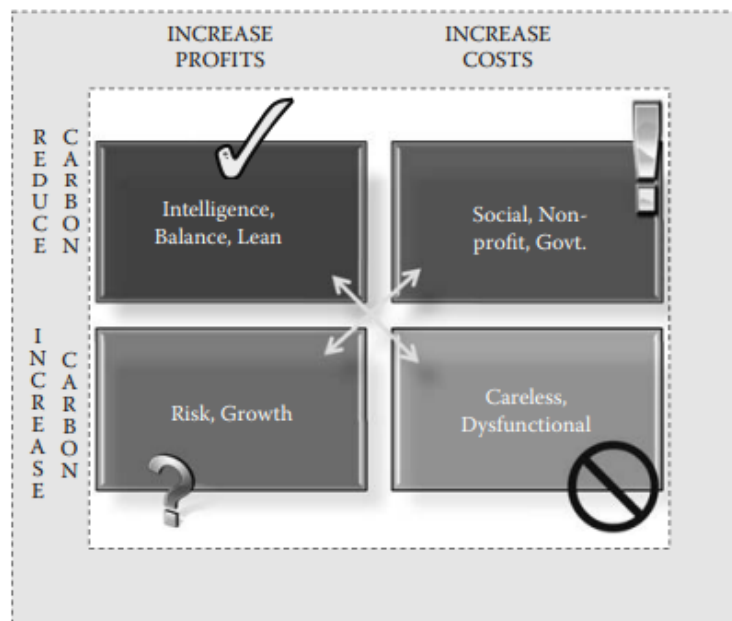


Figure 2.1 Strategy matrix—carbon versus profit.

10.Explain green IT metrics and measurements

- Helps in measuring the carbon footprint of a product or service in an organization, thereby enabling a unit-level measurement of the product or service which can then be totaled to arrive at the overall carbon emission
 - Understanding of the extent of carbon generated and, therefore, providing a benchmark for current as well as reduction in the future of the carbon contents
 - Provide an ability to compare the carbon performance of one organization against another organization, within same or dispersed geographical regions
-

Environmentally Responsible Business ■ 103

- Enable marketing of products and services not only for lower costs and higher quality, but also for reduced carbon generated in the development and distribution of that particular product or service
- Ability to comply with the regulatory requirements through mandatory measurement and reporting of carbon generation
- Potential to trade carbon by measuring and storing the credits generated by optimized carbon performance
- Opportunity to mature the green processes in an organization thereby enabling increasing optimization on the green CMM scale

measure
-carbon emission
- efforts

monitor
- effect
report

mitigate (less severe)
- rework
-reengineer

manage
-process
-use

monetize(earn profit)
-carbon trading
- carbon stocks

- **Measure:** \bar{A} is the primary application of metrics—which is to measure the emissions. \bar{A} is measurement is achieved through a range of emission sensors, measurement platforms, monitoring and inventory systems, and inference methods. Systems associated with

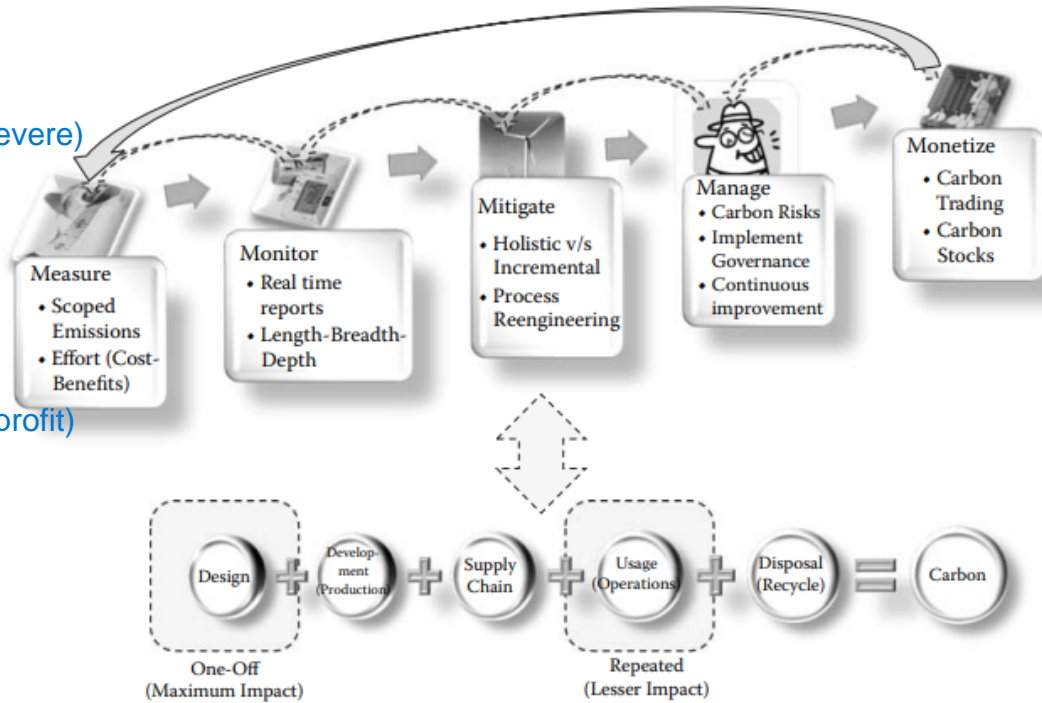


Figure 3.11 Coverage of carbon metrics.

(design + development + supply) + operate + dispose = carbon

the measurement are required to establish baselines and measure carbon storage and emissions changes on various scales from individual machines to large processes of the business. Improved measurement and monitoring technologies and capabilities can help to identify and guide future opportunities for technology development. Measurements can only succeed if these metrics are created and tested for their validity. Currently, in the Green IT domain, very few metrics exist that are robust enough to be applied across the organization. Furthermore, units for these metrics are also not available in a unified and well-accepted manner.

- **Monitor:** ICT's crucial role in economic recovery is the key to unlocking the opportunity of Green growth and standardized metrics are required for the net CO₂ reductions. Once the metrics are developed, they are used to monitor the performance of the organization from a carbon perspective. This monitoring also implies continuous measurement using smart metering devices as well as ability to ascertain improvement. Standards to monitor and verify carbon emissions with reference to a baseline need to be defined in advance. Use of a reporting dashboard (Environmental Sustainability Dashboard) assists with the task of monitoring emissions and taking appropriate actions. Software systems need to be designed to ensure that environmental data collection is considered as a normal part of the business and that regular and frequent feedback is provided to the users.
- **Manage:** Taking the results of the measurement and monitoring process and determining from that data what should be done to improve the process. Managing emissions involves commitment to reduce business impact on climate change, auditing the emissions, making the target plan. A plan must be integrated in the business policies by reviewing the performance and encouraging carbon reducing policies.
- **Mitigate:** Mitigation (Molina et al., 2009) is the action taken to reduce greenhouse gas emissions. This can be achieved by reducing their origin through the places from where they are sourced or by improving the ability of the organization to dissipate or sink the emissions. Mitigation strives for improvement in the process so as to result in permanent reduction in the emissions. Thus, after measuring carbon footprints using intelligent data collection and modeling technology, carbon emissions are mitigated through performance tracking of reduction targets and improved energy efficiency.
- **Monetize:** Deals with converting the improvement of the organization over its carbon performance into monetary value such as through its marketing effort or on the stock exchange or through carbon trading. Developing strategies for energy use, combined with the widespread misconceptions about the energy system. Human resource of an organization essentially be informed and educated about energy. Such education also helps create support for energy-related policies and strategies. Continuous monitoring of automation and behavior change of the business can help to establish new standards and legal precedents to further mitigate the causes and effects of the greenhouse gas emissions from that business. This will also help to develop alternatives to high carbon activities in that business.

11.Explain the steps involved in development of ERBS

Define Objectives and Drivers: Identify the objectives of implementing ERBS and the drivers behind it. Objectives may include reducing carbon emissions, improving energy efficiency, or enhancing corporate social responsibility, while drivers may include regulatory compliance, cost savings, or improved reputation.

Develop a Strategy: Develop a strategy for achieving the objectives identified in step one. This may involve prioritizing specific initiatives, such as energy efficiency improvements or waste reduction, or targeting specific areas of the organization, such as data centers or transportation.

Develop ERBS Policies: Develop policies to guide ERBS initiatives and ensure compliance with relevant regulations and standards. Policies may cover areas such as energy management, waste management, and sustainable procurement.

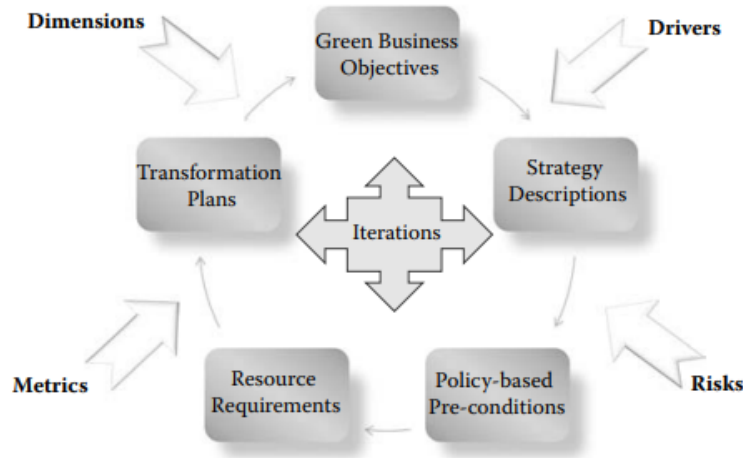
Develop a Resource Plan: Develop a resource plan to identify the resources required to implement ERBS initiatives, including personnel, funding, and technology. The resource plan should take into account the costs and benefits of ERBS initiatives, as well as the potential return on investment.

Develop a Transform Plan: Develop a transform plan to guide the implementation of ERBS initiatives, including timelines, milestones, and targets. The transform plan should also include a plan for monitoring and reporting progress towards ERBS goals.

Steps in Developing an ERBS

After giving due consideration to the wide-ranging factors influencing ERBS, the focus should be on the steps in developing that strategic document. [Figure 2.13](#) shows, at an abstracted level, what are the major phases (steps) in the development of an ERBS.

- As mentioned earlier, though, the development of an ERBS requires active participation from the business leadership—including the CEO and the CGO (Chief Green Officer—discussed in [Chapter 3](#)). Murugesan (2008) has also highlighted the need to engage with the



key stakeholders and create awareness of environmental issues in the green strategies for the enterprise. The drivers, dimensions, length and breadth, metrics, and measurements are all required to be embedded in the ERBS.

These major phases in the development of policies and practices (discussed in [Chapter 3](#)) and the Green IT transformation roadmap ([Chapter 9](#)) are further expanded in the ensuing sections. However, these phases are worth discussing here in terms of what they entail and what resources are required by organizations to undertake these steps.

12. what are the policies and practices in ERBS

Green policies are important high-level documents that spell out what an organization will and will not do when it comes to business decision-making. Green policies ensure that the decision-making in the organization has carbon reduction as its integral component. Together, these policies and practices drive the environmentally responsible activities of the organization

Policies and Practices in ERBS

In practical terms, a policy can be a high-level document that spells out what the organization will (and will not do) when it comes to business decision making. Green policies ensure that the decision making in the organization has carbon reduction as its integral component. The green policies are created with significant input from the senior management of the organization and are embedded into the business strategy of the company. While the policies state, through detailed statements what is implied in the ERBS, the green practices are the implementation of the policies (see Pratt 2009 for related discussion). Together these policies and practices drive the environmentally responsible activities of the organization. For example, these policies and practices help in ascertaining both internal and external decisions made by the organization. Therefore, these policies and practices need to be carefully drafted, validated, and embedded within the strategy of the organization. The policies and practices are based on a number of sources from within and outside of the organization. For example,

- *Purchasing Green equipments/services and turning existing services into green services.* This policy requires the organization to devise standards around procuring new equipments or buying new services from external parties. Figure 3.3 shows that 40% people “agree” with formation of such a policy whereas 15% people “strongly agree” to incorporating such policies for green equipments/services. Such environmentally responsible purchasing for IT products is being incorporated into purchasing programs of many private and public sectors. For example, the EPEAT and Energy Star standards have been widely adopted for government purchases at the Federal, State, and Local government levels (Manuel and Halchin, 2010). These environmental objectives form part of the objectives within government procurement programs
- *Disposal of used materials and equipments.* Disposal of hazardous and harmful waste particularly out of computing equipment requires careful policy consideration. In Figure 3.3, almost equal number of people “agree” (34%) as and “strongly agree” (32%) to having a policy around disposal of waste material. This policy will also ensure that the waste management is performed in accordance with the legislative requirements. This policy should also accompany promotion of environmental awareness that will also encourage change in attitude toward waste minimization, reuse, and recycle. The amount of waste generated from any organization is directly proportional to the business activities. Therefore, this policy will be closely associated with the lean policy on waste reduction.

- **Equipment recycle and use.** A policy reduces the disposal of equipments which may still be functioning. Figure 3.3 shows that 35% people “agree” that it is good to have policies for implementing recycling of equipments whereas nearly half of them (19%) “strongly” recommend the formulation and implementation of such policies. A survey response also indicates that if waste cannot be prevented then as many of the materials as possible should be recovered through recycling. Policy for adopting and implementing recycling of equipments will recover usable materials and components, postpone replacement of working equipment, and increase reuse awareness.
- **Environmentally responsible business policies.** Business processes can vary from utilizing low level resources such as paper to highly required resources such as electricity. In carrying out business processes, a lot of energy is wasted and that energy cannot be recycled at many times. Hence, policies to optimize energy consumption in business processes should be incorporated in business strategy. A survey tells that about 44% people would like to have such a policy as their organizations are viewing their energy resources as a path to strategic competitive advantage. Twenty-one percent respondents suggested implementing such policies strictly.
- **Use of renewable energy sources.** Different sources of renewable energy such as solar power grids, nuclear plants, and wind farms are increasingly coming into play. A survey in Figure 3.3 shows that only 23% “agree” and 14% “strongly agree” to the creation of policies for use of renewable energy sources. Issues around the solar cells, their life, and sunlight were cited by organizations using solar energy. In the case of wind power, consistency of wind for continuous power generation was raised as an issue and for geothermal energy, the management of pollutants was cited. Further analysis of the survey data indicates that decision makers and quality managers strongly believe in alternative, or renewable energy sources, but

cost appears to be a big constraint in the use of alternate source of energy. As this gets written, Japan’s east coast suffered the tragedies of a massive earthquake followed by a Tsunami that destroyed the cooling systems of its Fukushima nuclear plant. A resulting leakages from the near meltdown is having worldwide impact in terms of use of nuclear technology for renewable energy. Also, it is worth noting that 41% respondents disagreed (including strongly) to the policy for the use of renewable energy sources in business processes.

- **Awareness and positive attitude.** Awareness and positive attitude amongst the employees and users within the organization about carbon emissions can bring about substantial changes in the way the organization operates. A awareness need to be inculcated within an organization’s culture. Twenty-seven percent of the respondents “agree” and (18%) “strongly agree” to having policies that raise awareness of green issues among people. Aes e policies that influence the staff requires training plans and budget as well as support from human resource (see discussion on Green HR in Chapter 8).