

BALAJI INSTITUTE OF I.T AND MANAGEMENT KADAPA

GREEN BUSINESS MANAGEMENT MBA II YEAR III SEMESTER

ICET CODE: BIMK

**Ms. L.NIKHILA B.Tech, MBA(P.hD)
ASSISTANT PROFESSOR**

Also download at <http://www.bimkadapa.in/materials.html>



MASTER OF BUSINESS ADMINISTRATION

M- Mastery-Skilled in handling a task

B- Business-Getting value and profit

A- Administration- Getting task done through guiding of people

E-Mail: nikhila7799@gmail.com

GBM EXPECTED QUESTIONS

UNIT 1

- Concept, Evolution, Nature, Scope, Importance and Types of green management.
- Green management in India.

UNIT 2

- How to go green.
- Spreading the green concept in organisation.
- Environmental and Sustainability issues for the production of hi-tech components and materials.
- Life cycle analysis of materials.

UNIT 3

- Biodiversity and its Alternate theories.
- Indicators of sustainability.
- Ecosystem services and their sustainable use.

UNIT 4

- ISO 14001 and ISO 14064.
- Climate change business.
- Green Product Management.
- Green Energy Management.

UNIT 5

- Business redesign
- Eco-Commerce models
- Green Project Management in action
- Green Techniques and Methods

A dream doesn't become reality through magic; it takes sweat, determination and hard work.

(17E00302) GREEN BUSINESS MANAGEMENT

Objective: The objective of the course is to impart students in understanding of green business, its advantages, issues and opportunities and to provide knowledge over the strategies for building eco-business.

1. Introduction to Green Management: The Concept of Green Management; Evolution; nature, scope, importance and types; Developing a theory; Green Management in India; Relevance in twenty first century.

2. Organizational Environment; Indian Corporate Structure and Environment; How to go green; spreading the concept in organization; Environmental and sustainability issues for the production of high-tech components and materials, Life Cycle Analysis of materials, sustainable production and its role in corporate environmental responsibility (CER).

3. Approaches from Ecological Economics; Indicators of sustainability; Eco-system services and their sustainable use; Bio-diversity; Indian perspective; Alternate theories

4. Environmental Reporting and ISO 14001; Climate change business and ISO 14064; Green financing; Financial initiative by UNEP; Green energy management; Green product management

5. Green Techniques and Methods; Green tax incentives and rebates (to green projects and companies); Green project management in action; Business redesign; Eco-commerce models

Text Books:

- Green Management and Green Technologies: Exploring the Causal Relationship by Jazmin SeijasNogarida , ZEW Publications.
- The Green Energy Management Book by Leo A. Meyer, LAMA books

References:

- Green Marketing and Management: A global Perspective by John F. Whaik, Qbase Technologies.
- Green Project Management by Richard Maltzman And David Shiden, CRC Press Books.
- Green and World by Andrew S. Winston, Yale Press B

UNIT-1

INTRODUCTION TO GREEN MANAGEMENT

1.1 THE CONCEPT OF GREEN MANAGEMENT

Green Management is an initiative aiming at continuously improving the foundation of environmental management, such as the development of personnel responsibilities for environmental activities, management systems and conservation of biodiversity. Green Management is the assurance to a healthy future generation. Everyone has to give its contribution to achieve a GREEN system and it should start with multiple awareness programs.

MEANING

Green Business is a business that has no negative impact on the global/local environment, community, society, or economy.

A green Business strives to meet the triple bottom line, which indicates to conserve “People, Planet & profit.”

The triple bottom line: planet, people, profit



“Green Business” is also known as “Sustainable business” which means to maintain the natural resources on earth forever. Green Business adopts

principles, policies and practices that improve the quality of life for their customers, employees and environment.

There are a limited amount of resources on earth which are exploited everyday to produce houses, cars, computers etc. We must act responsibly so that the resources on the planet will be able to support many generations to come.

A sustainable business is a business that “meets the needs of the present (world) without compromising the ability of future generations to meet their own needs”. A Sustainable business must meet customer needs while, at the same time, treating the environment well.

For example, plastic introduced in the early 1990’s and is a mass production item today & occupies a lot of space on earth. Plastic takes millions of years to decompose. So, use of plastic is unsustainable consumption.

In general, business is described as green if it matches the following four criteria:

1. It incorporates principles of sustainability into each of its business decisions.
2. It supplies environmentally friendly products or services that replace demand for non green products and/or services.
3. It is greener than traditional competition.
4. It has made an enduring commitment to environmental principles in its business operations

The “vision” of Green Management system is to decrease global warming, increase ground water level, to make green world and to conserve the humanity.

DEFINITION: According to **Brown and Ratledge**, "Green Management is defined as an establishment that produces green output."

Green management is not a concept describing new business management style. Green management describes the construction of businesses. In other words, business management styles focus on the planning, recruiting, controlling, utilization of competent and talented employees to produce profits on behalf of

the green business. The reliance on expertise, quality of customer service, and quality of the product service is no longer enough. Businesses nowadays are downplaying the message of profit-hungry and communicating the message of being environmentally conscious. In other words, businesses are expressing through actions that not only being environmental friendly is necessary, but also preserving the environment is paramount. It is a win-win situation where businesses can grow and give back.

Hence, going green, in the long run, pays off through tax incentives and the values of green management implementations. Green businesses adopt principles, policies and practices that improve the quality of life for their customers, employees and environment. The concept of green management consists of three components: green building, green energy, and green waste.



The Common Characteristics of green companies are:

1. To minimize the use of plastic material.
2. Use recyclable packaging materials.
3. Recyclable papers

The Importance of green management is:

1. To reuse wastage of resources.
2. To reduce degradation of environment
3. To save the scarce resources for future generation.

1.2 EVOLUTION OF GREEN MANAGEMENT

The evolution of Green movement and green politics began in the **late 1970's**, when the first Green party was formed in Germany. The term 'Green' is the

English translation of the German word ‘**Grun**’. Green politics advocated issues pertaining to ecology, environment, feminism, conservation and peace. A part from all this, the supporters of green politics were also concerned with civil liberties, non-violence, and social justice. Hence, green politics came to be known for ecological and environmental goals during the 1970’s. In 1980’s, the “Green parties” were active in several countries. It is believed that “Green politics” draws its inspirations from Gandhi, Rousseau & Thoreau.(philosophers) . In 1972, the first green party named united Tasmania Group formed in Australia. Later in UK’s Ecology party was established, the first green party in Europe. In 1980’s & 1990’s, several other countries such as Canada, Finland and the U.S. witnessed the formation & growth of green parties.

In 1995, the international Organization for standardization defined new standards in Geneva. In 1996, Publication of ISO 14000 introduced. In 2000, First thoughts to improve ISO 14000 started. Then finally in 2004, New ISO 14001 standard was officially published.

The proponents of green politics support several issues, one of the most important being “Green Economics”. Green Economics emphasizes on the **significance of the health of the environment along with the human well-being**. The supporters on green politics support economic policies that are less harmful to the environment. They denounce subsidies to certain industries and propose green-tax on these industries, thus forcing producers and consumers to make eco-friendly choices.

1.3 NATURE OF GREEN MANAGEMENT

The Nature/Characteristics of Green Management are described as follows:

1. Nature-based Knowledge and Technology: It refers to gaining of nature based knowledge and technology through various ways like growing organic people’s food, harnessing their energy, constructing green things, conducting green business, processing information and designing their sustainable communities with new technology.

2. Products of services to products of consumption:

- ✓ **Products of service (Reusable/Recycle)** are durable goods routinely leased by the customer that are made of technical materials and are returned to the manufacturer and re-processed into a new generation of products when they are worn out. (The products are mostly non-toxic to human and environmental health but toxic materials that are used will be kept within a closed loop type system and not be able to escape into the environment.)
- ✓ **Products of consumption (naturally decomposed on earth)** are shorted lived items made only of biodegradable materials. They are broken down by the detritus organisms after the products lose their usefulness. (These are also non-hazardous to human or environmental health).
- ✓ This principle requires that we manufacture only these two types of products and necessitates the gradual but continual reductions of products of service and their replacement with products of consumption as technological advancements allow.

Finally there is no waste remain on earth.

3. Solar, Wind, Geothermal and Ocean energy: This characteristic advocates employing only sustainable/renewable energy technology like solar, wind, ocean and geothermal- that can meet human beings energy needs indefinitely without negative effects for life on earth.

4. Local - Based Organizations and Economies: This characteristic includes durable, beautiful and healthy communities with locally owned and operated businesses and locally managed non-profit organizations, along with regional corporations and shareholders working together in a dense web of partnerships and collaborations.

5. Value production: The triple value production establishes three simultaneous requirements of sustainable business activities as:

- i. Financial benefits for the company.
- ii. Natural world betterment.
- iii. Social advantages for employees and members of the local community- with each of these three components recognized as equal in status.

6. Continuous Improvement Process: (to intensify value production)

- ✚ The continuous improvement in operational processes like monitoring, analyzing, redesigning and implementing of green business in any

successful organizations occurs continuously for constant advancements and upgrade in business activities.

- ✚ According to the change in the conditions, new opportunities emerge continuously.

1.4 SCOPE OF GREEN MANAGEMENT:

SCOPE

- **Green Foods:** Green business ideas allows people too grow “garden parks” or small seeded trays.
- **Green Consulting:** low budget businesses, best advertising methods and need a mobile or email id, so that people can contact.
- **Green vehicles:** Using of electric scooters an small electric cars. pollution free and fuel saving market.
- **Green Appliances.**



1. Green foods: Green Business ideas allow people to grow garden parks or small seeded trays. Green foods are an extremely important part of a healthy diet. There are numerous options to choose from and they can easily be incorporated into meals.

2. Green consulting: An increasing number of individuals, families and business are starting to look for ways to reduce the carbon footprint and decrease their use of the earth's resources.

3. Green Vehicles: Green Vehicles are nothing but clean vehicles or eco friendly vehicles or environmentally friendly vehicles which produce less harmful impacts to the environment than the conventional one's which run on Diesel or gasoline or some other.

- i. Fuel Efficient Cars
- ii. Alternative Fuel Vehicles
- iii. Hybrid Electric Cars
- iv. Electric Vehicles

5. Green appliances: The more efficient the appliance, the less energy it will use. Lower energy use, means less pollution.

1.5 IMPORTANCE OF GREEN MANAGEMENT

1. **Reduced Energy Use:** Green Management often include measures to reduce energy use by increasing the efficiency of the organization building envelope by using renewable efficiency windows, doors, ceilings and floors.
2. **Cost Saving:** Companies that focus on reducing energy consumption not only help the environment but also reduce their costs in the form of lower energy bills. Smaller businesses can also benefit from reduced energy costs by taking simple steps like switching off lights and fans when they are not required for usage.

IMPORTANCE

- ❑ Green business is smart business. Going green provides bottom line cost savings, as well as a competitive advantage in the marketplace.
- ❖ Improve Profitability with Cost Savings
- ❖ Capitalize on Competitive Advantage
- ❖ Mitigate Risk
- ❖ Retain and Attract Top Talent.



3. **Healthier Workplace:** Companies that promote a healthier workplace have a decrease in the number of sick days used by employees. This benefits the companies through increased productivity and less money paid out through medical benefits.
4. **Reduced Waste:** Green Management also seeks to reduce **waste** of energy, water and materials in many ways like; in construction phase to reduce the amount of materials going to landfills; By collecting human waste at the source and running it to a semi-centralized bio-gas with other biological waste, liquid fertilizer can be produced.
5. **Tax Credits:** Tax Credits are available to companies that utilize environmentally friendly business practices such as switching to renewable energy source like solar power and using electric or hybrid automobiles and trucks as fleet vehicles.
6. **Decreased Productivity:** If any organization adds green process, company can see a slight decrease in worker productivity because green process like

recycling requires lot of human resources to segregate waste and it takes lot of time.

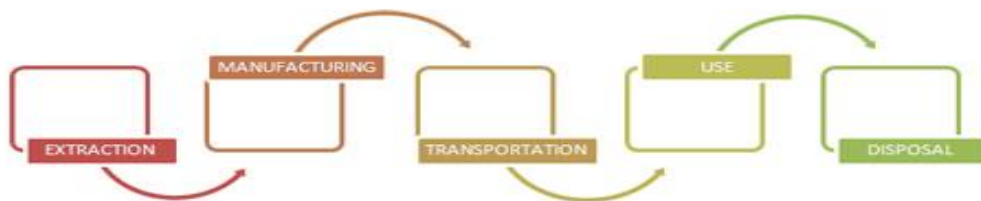
- 7. Improved Public Image:** Anytime companies can add a green initiative to the workplace. Companies can use the event to generate positive public relations. They can also include green initiatives on product packaging, advertisements and marketing materials to appeal to consumers who prefer green products.
- 8. Increased Capital Outflows:** Green conversions in business require initial cash investments but finally this can increase the company's earnings on annual profits.
- 9. Increased Business Opportunities:** Some Government agencies, Commercial businesses and non-profit institutions mandate that only businesses that meet specific green standards can bid on their contracts. Not all standards are government mandated with the office of the management and budget directing federal agencies to look for companies that meet voluntarily rather than Government standards when possible.
- 10. Green businesses are socially and environmentally responsible:** Green companies adopt principles and practices that protect people and the planet. They challenge themselves to bring the goals of social and economic justice, environmental sustainability, as well as community health and development, into all of their activities-from production and supply chain management to employee relations and customer service.
- 11. Green businesses care for their workers:**
Green businesses ensure they don't use child labor. Everyone who works directly for them or their suppliers earns a living wage and works in healthy conditions. They create jobs that empower workers and honor their humanity. They also serve as models in the transformation of our society that is socially and environmentally sustainable.
- 12. Green businesses protect their customers and clients:**
Green businesses ensure that they use the safest ingredients, to keep their customers and clients and their families healthy. They also provide green living alternatives to improve quality of life, with products and services that help in areas like affordable housing, sustainable agriculture, education, clean energy and efficiency, fair trade, healthy air, clean water, and more. They follow the green strategy -reduce, reuse and recycle, which sets as a good example.
- 13. Green businesses improve their communities:** Green businesses improve their communities by controlling the pollution, by creating healthy

environmental conditions, bring respect and dignity to their employees and the wider neighborhood.

1.6 TYPES OF GREEN MANAGEMENT

1. Green Supply Chain Management (GSCM): It can be defined as integrating environmental thinking into **supply-chain management**, including product design, material sourcing and selection, manufacturing processes, delivery of the final product as well as end-of-life (**management** of the product after its useful life). This concept gains popularity because the customers are concerned with environment improvement which encourages the supplier to make environment friendly product.

Companies which adopted Green Supply Chain Management are British Telecom, Nike, Toyota and so on.



2. Green Marketing: It refers to the process of selling products and/or services based on their environmental benefits. Such a product or service may be environmentally friendly in itself or produced in an environmental friendly way, such as: Being manufactured in a sustainable fashion.

Green Marketing incorporates a broad range of activities including product modification, changes in production and packaging.

E.g., Bank of America reduced Paper usage by 32%

3. Green Production: It is a business strategy that focuses on profitability through environmentally friendly operating processes. With this type of production we could reduce all the harmful pollution to the environment and also reduce the cost from their starting step to finished product.

Companies that follow Green Production are: IKEA - Using Solar & Wind Energy, Nike - Using recycled aluminum frames and underground energy storage

4. Green Research and Development: With only proper Research and Development the customer can provide a suitable product.

Eg., Volkswagen Creating cars which follows environmental and safety standards to reduce carbon emissions.

5. Green Criminology: It is a branch of criminology that involves the study of harms and crimes against the environment broadly conceived, including the study of environmental law and policy, the study of corporate crimes against the environment and environmental justice from a criminologist perspective.

Criminology is referred to the study of Crime and Criminals whereas Green is related to environment issues.

Some of the Green Crimes are Deforestation, Animal Trafficking, Cutting of Shark fins for trading.

6. Green Human Resource Management:

The term Human Resource refers to the contribution of Human resource policies and practices towards the broader corporate environmental agendas of protection, prevention and conservation of natural resources.

Benefits of green HRM:

- ✓ Improve the health of workforce.(for example: car sharing, public transport etc.,)
- ✓ By creating Motivation to employees.
- ✓ It Create competitive advantage.
- ✓ The Green HRM may also help the employers, manufacturers in building brand image and reputation.
- ✓ Organizations have huge growth opportunities by being green and creating a new friendly environment which helps in enormous operational savings by reducing their carbon footprint.
- ✓ Helps in achieving higher employee job satisfaction and commitment which leads to higher productivity and sustainability.
- ✓ Create a culture of having concern for the wellbeing and health of fellow workers.
- ✓ Improvement in the retention rate of the employee.
- ✓ Improved public image.
- ✓ Promote employee morale.
- ✓ Reduction in the environmental impact of the company.
- ✓ Reduction of utility costs significantly. Even small businesses can significantly reduce their utility costs by using technologies that are energy-efficient and less wasteful.

- ✓ Rebates and Tax Benefits. Going green is easier with the assistance of governments, local municipalities, Water supply authority, and electric companies that offer tax incentives and rebates.
- ✓ Reduction of environmental damage by Encouraging employees, through training to find ways to reduce the use of environmentally damaging materials.

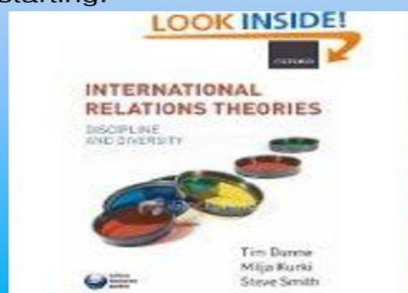
1.7 DEVELOPING A THEORY

In the **1960's** there was public recognition of the global environmental crisis arising from the “tragedy of the commons”, which is the idea that as self-interested individuals/humans will overuse shared resources such as land, fresh water, fish etc.,. In the **1970's** the first United Nations conference on the subject was held. In the **1980's** “green political parties” and “public policies” had emerged. This coincided with a demand for a green theory to help explain & understand these political issues. By the **1990's** international relations has come to recognize the importance of natural environment. By the **end of twentieth century**, a growing body of green IR theory had emerged that called into question some of the basic assumptions, units of study, frameworks of analysis, and implicit values of the discipline of IR (International relations).

The emergence of Green Theory:

Green Theory for humankind development, incl. production, consumption, resources, growth, economy, society, and environment

The environmental issues are only one part of fatal current global trends of real world. Since 1990s the process from environmental issues to green theories and next to green practices – green sciences, technologies and engineering, is starting.



Green theory and practice is based on the sustainable development (and reflexive modernization), **ecological security, environmental justice/law**, and **cost-effective approaches exclusive an incommensurability between an individual and an integral.**

Green Theory
ROBYN ECKERSLEY

THE EMERGENCE OF GREEN THEORY:

- ❖ Environmental degradation caused by human activity has a long & complex history. However, until the period of European global expansion and the

industrial revolution, environmental degradation generally remained uneven & relatively “localized”.

- ❖ The ‘modern ecological crisis’ emerged only in the latter half of the twentieth century.
- ❖ The United Nations environment program’s millennium ecosystem assessment, completed in March 2005, found that approximately 60% of the ecosystem services that support life on earth are being degraded or used unsustainably.

Green political theory has two branches

Normative branch

Political Economy branch

- i. **Normative branch** is concerned with questions of **Justice, Rights, Democracy, Citizenship, the state, and the environment.**
 - ii. **Political Economy Branch** is concerned with understanding the relationship between **the state, the economy & the environment.**
- ✓ The background challenge in green theory is to fit between people & their environment which brings up the topic of positive and a negative theory which has been arise as Healthy & Unhealthy, have seemed to replace the theology of good & evil.
 - ✓ Public health with prevention & health promotion are more consistent with green theory too.
 - ✓ Green theory does not always distinguish public space from private space. As for political ideologies and green theory, Timothy O’ Riordan (1990) in “Major Projects and the Environment” in Geographical Journal, indicates there to be “dry greens” (perhaps conservative and market centered). This, of course, may be an oversimplification. Dry Green may be the least appreciated environmentalists and might not even be given that title. However, a very good economic treatment is given in “The Plundered Planet” by Paul collier (2010), Collier may put the plight of the bottom billion (poorest and worst off people) on the planet above environmentalism.

- ✓ He believes protecting the viability of the planet and the bottom billion are equal to the top billion. How that works out is challenging. If the planet does need a billion less people, then there is no agreed upon way of choosing.
- ✓ Market solution would include rising food prices and only those with ability to pay survive. Each culture, religion, and academic discipline has developed and produced different solutions to be “Who survives?” conundrum.

1.8. GREEN MANAGEMENT IN INDIA:-INITIATIVES TOWARDS GREEN MANAGEMENT

The companies themselves are now more aware about the ways in which their factories often affect the ecosystem and have taken a greener path to success. With India making rapid progress in the field of industrialization, concerns have also been made by various sections of environmentalists regarding the repercussions on the environment.

Here are the top ten green companies in India, showing the sustainability path to others.

TOP 10 GREEN COMPANIES OF INDIA:

1. LG
 2. HCL(Hindustan Computers Limited)
 3. Haier
 4. Samsung
 5. Tata Consultancy Services (TCS)
 6. Oil and Natural Gas Company (ONGC)
 7. IndusInd Bank
 8. ITC Limited
 9. Wipro
 - 10.MRF Tyres
1. **LG:** LG India has been a pioneer is making electronic gadgets that are eco-friendly. Recently, it has launched a LED E60 and E90 series monitor for the Indian market. Its USP is that it consumes 40% less energy than conventional LED monitors. Also, they hardly used halogen or mercury, trying to keep down the use of hazardous materials in their products.



LG
Life's Good

2. **HCL (Hindustan Computers Limited):** HCL is another brand that is trying to introduce eco- friendly products in the market and it has recently launched the HCL ME 40 notebooks. These notebooks do not use any polyvinyl chloride (PVC) material or other harmful chemicals and the Bureau of Energy Efficiency already given it a five star rating.
3. **Haier:** Eco branding is a part of Haier's new green initiative and they have launched the Eco Life Series. They have semi automatic and automatic refrigerators and washing machines, split and window air conditioners and a lot more.



4. **Samsung:** Samsung India has always had a roaring range of LED TV screens and now they have come up with eco- friendly LED backlight. They use 40% less electricity have also no harmful chemicals like mercury and lead.
5. **Tata Consultancy Services: TCS** has a globally recognized Sustainability practice and has already topped the Newsweek's top World's Greenest Company title. It also has a global green score of 80.4% and this has mainly happened due their initiative of creating technology for agricultural and community benefits.
6. **Oil and Natural Gas Company: ONGC,** India's largest oil producer is all set to change the way with the invention of green crematoriums that would serve as a perfect replacement for the funeral pyres that emit so much smoke and uses up excess oxygen.
7. **IndusInd Bank:** One of the first banks in India to discourage the use of paper for the counterfoils in ATMs, and sending electronic messages, it has contributed a lot towards saving paper and reducing deforestation.
8. **ITC Limited:** ITC has adopted a Low Carbon Growth Path and a Cleaner Environment Approach and has already introduced ozone treated elemental chlorine free bleaching technology that has improved the lives of millions worldwide.

9. **Wipro:** Wipro, has not only helped in the creation of technology that helps in saving energy and preventing wastes, but its corporate headquarters in Pune is the most eco friendly building in this sector all over India.
10. **MRF Tyres:** MRF has launched the ZSLK series and this is all about creating eco- friendly tubeless tyres made from unique silica- based rubber and also offers extra fuel efficiency to those who drive their vehicles.



SOME OF THE ECO FRIENDLY PRODUCTS USED IN INDIA ARE:

- Cotton Shopping Bags
- Rechargeable Batteries
- Reusable Papers/Books
- Reusable Water Bottles
- Solar Powered Outdoors speakers
- Solar Phone Charges
- Eco Friendly Umbrella
- Led Bulbs
- Eco Friendly Chair
- Bio degradable pots
- Bamboo Desktop Dry erase board

Although there is a lot of ground still to be covered, here have a look at some of the success stories.

ACC CEMENTING THE FUTURE

- ✚ Cement major ACC is a good case in point when it comes to green building initiatives. Step into its Mumbai headquarters near Churchgate and you will be hard-pressed to believe the building spread across 68,000 sq ft is 75 years old.
- ✚ In 2009, the building received the LEED gold certification and 5-star energy efficiency status from the Bureau of Energy Efficiency.

- ✚ Another 50-year-old ACC building, the La Residency in Thane, and the Central Control Room building inside its new Chandrapur cement plant received platinum certification from the Indian Green Building Council. A fourth green building is under construction in ACC's upcoming project in Jamul, Chhattisgarh.
- ✚ According to ACC officials, the company has reduced its specific carbon footprint by more than 33 per cent since 1990, and as per its Low Carbon Technology Roadmap, this will further reduce by 20 per cent by 2040.

1.9 RELEVANCE OF GREEN MANAGEMENT IN TWENTY FIRST CENTURY (OR) PRESENT STATUS OF GREEN MANAGEMENT

Preparing new business leaders to adapt to green management will meet the growing demand for –

1. Managers
2. Entrepreneurs
3. Leaders &
4. Professionals

Who are skilled at planning for the long term.

Already most of the business schools scramble to integrate sustainably studies throughout their MBA curriculum to aware the students.

Most of the business worldwide is switching on to adopting green philosophy in management function.

SOME REASON OR FORCES FOR DRIVING SUCH MOVEMENTS ARE:

1. **Corporate Social Responsibility:** It is a management concept whereby companies integrate **social** and **environmental** concerns in their business operations and interactions with their stakeholders.
2. **International Standard Norm:** The International Organization for Standardization (ISO) is a specialized International agency for standardization and at present comprises the national standard bodies of all 91 countries. It facilitates International trade of goods and services. It obtains competitiveness by obtaining required quantity in a cost effective way. It also promotes a single third party assessment of quality standard.

3. Statutory Law: It is the law that's written by a legislative body. It's a law that a government deliberately creates through elected legislators and an official legislative process. Statutory Law is the term used to define written laws usually enacted by legislative bodies.

4. Growth and Opportunity: With the sustainable practices there were a lot of growth and opportunities which supports a strong economy, fiscal accountability, competitive tax rates and domestic energy plan.

5. Competition: One of the major forces that strive to adopt green management into their corporate structure was face overwhelming competition and desires to maintain their competitive position in the market. Green practices helps to maintain better brand and to create better image in the eye of the society.

6. Improved Public Image: The perception people have of your business when they hear your company's name; a business image is composed of an infinite variety of facts, events, personal history, advertising and goals that work together to make an impression on the public. The public image can be improved by:

- Define your Brand
- Building an amazing website
- Value your employees and establish a healthy company culture
- Recycle, Reduce, Reuse
- expressing your company values
- Building trust and authenticity between your clients and your brand
- Focusing on creating high quality products or services.

7. Increases profit in the organization: A profitable organization is one that generates more money than it expends. Profitable organizations are businesses that use a variety of tactics to make a profit. Business may use different managerial skills and leadership approaches to increase employee motivation and satisfaction which has been shown to increase worker productivity calculating rate of investment will help business determine whether they are generating a profit.

8. Better Employee Retention Rate: *Employee retention refers to the various policies and practices which let the employees stick to an organization for a longer period of time.* Every organization invests time and money to groom a new joiner, make him a corporate ready material and bring him at par with the

existing employees. The organization is completely at loss when the employees leave their job once they are fully trained. Employee retention takes into account the various measures taken so that an individual stays in an organization for the maximum period of time.

9. Stimulates Innovation: Innovation is the process of taking a creative idea and turning it into a useful product, service, or method of operation. When managers talk about changing organization to make it more creative, they usually **means** that they want to **stimulate innovation**. As the leader you have to be willing to go out and take some risks to inspire self confidence and stimulate innovation from your team. Green Innovation can be used to achieve CSR goals but can also take place without the existence of CSR Innovation. Management is controlling and making decisions about Innovation process.

THE TOP EIGHT CHANGES IN COMPANIES DURING 21st CENTURY:

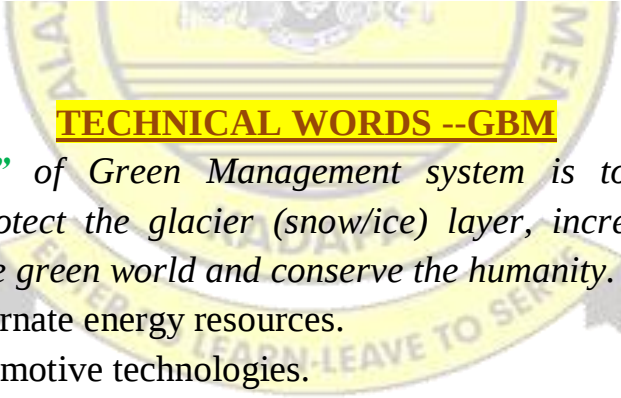
1. Companies now see that sustainability can be a catalyst for innovation and profit.
2. Companies' success is dependent on their understanding of societal changes and building sustainability-related solutions into their core business model.
3. Mainstream investors recognize that sustainability issues are no longer fringe issues but are central to a business's success.
4. Companies made compulsory to maintain environmental reporting. **Environmental reporting** is the communication of **environmental** performance information by an organisation to its stakeholders.
5. Risk management must include societal/environmental changes that are likely to impact or could possibly destroy their company, not just focus on legal liabilities.
6. The intense focus on operational efficiency of companies to reduce waste.
7. Companies were focusing to hire excellent technical skills persons who were able to decide the futuristic decisions of the company
8. Innovation is happening rapidly, and the internet speeds up. It also significantly changes the way information is exchanged and the ways companies must respond to stakeholders.

ENTERING INTO THE NEW CENTURY

Few companies have fully integrated into their decision making regarding sustainability processes to have a positive impact on environment. Sustainability must shift from the drawbacks like risk management, environmental reporting, and efficiency exercise to its rightful place as a main driver of innovation.

Sustainability focused innovation will enable companies to survive and thrive in the complex decades to come. Example: Nike, Amazon, and IKEA are beating the market by following the sustainability practices.

Don't be stuck in the last century with outdated practices. Societal changes, including changes in technology and business models, are creating opportunities for businesses that develop breakthroughs. Putting concern for dramatic societal changes and sustainability at the core of your innovation and corporate strategy is critical. Move to the new century. That's how every organization will succeed.



TECHNICAL WORDS --GBM

- The *“vision”* of Green Management system is to decrease global warming, protect the glacier (snow/ice) layer, increase ground water level, to make green world and conserve the humanity.
- Develop Alternate energy resources.
- Develop automotive technologies.
- Develop waste disposal technologies.
- No negative impact on local or global environment, community, society, or economy.
- Control carbon footprint emission (measured in terms of amount of green house gases).
- Environment & Human right policies.
- Principles of sustainability / Green business profit.
- Three-legged stool-people, planet, profit.
- Atmosphere CO₂ levels.
- Clean energy (solar, wind, geothermal etc.,)
- Reduction of Greenhouse gases.

- Less waste production.
- Non-hazardous to human & environmental health.
- Healthy communities.
- Going paperless.
- Electronic Goods.
- Renewable domestic energy.
- Eco friendly or environmental friendly products.
- Non toxic Packaging
- Training employee on green management.
- Healthy workers, Health air, clean water.
- Reduce, Reuse & Recycle, Repurchasing, Substitution of Materials.
- Improve Quality or life.
- Think globally & at totally.
- Green Theory.
- Vision-Global warming, present show /ice glacier) loyal, ground water level, to make green world & conserve the humanity.
- Green tax, Green loans.
- The use of resources on earth.
- Environmental law & policy.
- Green Packaging
- Green Movement related to protection of environment & serves the planet earth from future disasters
- Green supply chain Management –Green Extraction + Green Manufacturing +Green Transportation +Green Use +Green Disposal.

GBM PREVIOUS YEAR QUESTIONS-----UNIT-1

1. Discuss the growth of green management in India. **(May-2019-supply)**
2. Explain the importance of green management in today's world. **(May-2019-supply)**
3. Discuss the evolution of green management. **(December-2018-regular)**
4. Explain the nature, scope, importance and types of green management. **(December-2018-regular)**
5. Explain the concept and need of green management in business. **(December-2018-supply)**

6. Discuss the various types of green management practices in use today. **(December-2018-supply)**
7. Discuss the evolution of green business management. **(May-2018-regular)**
8. Explain the nature and scope of green business management. **(May-2018-regular)**
9. Explain the concept and importance of green management. **(December-2017-supply)**
10. Describe the relevance of green management in India in 21st century. **(December-2017-supply)**
11. What do you understand by green management? Describe the evolution of green management briefly. **(May-2017-regular)**
12. Discuss the present status of green management in India. **(May-2017-regular)**
13. Describe the nature and scope of green management in business. **(November-2016-supply)**
14. Discuss the importance and types of green management practices. **(November-2016-supply)**
15. Explain the concept and need of green management in business. **(July-2016-regular)**
16. Describe five most disturbing trends that are damaging the environment in India today. **(July-2016-regular)**

“The harder you work for something, the greater you'll feel when you achieve it.”

Prepared By

L.Nikhila B.Tech, MBA, P.hD

Assistant professor

BALAJI INSTITUTE OF IT & MANAGEMENT, KADAPA

Icet code: BIMK

SUBJECT: GREEN BUSINESS MANAGEMENT

Regulation: R17

HOW TO WRITE A CASE STUDY:

The purpose of a case study is to walk the reader through a situation where a problem is presented, background information provided and a description of the solution given, along with how it was derived. A case study can be written to encourage the reader to come up with his or her own solution or to review the solution that was already implemented. The goal of the writer is to give the reader experiences similar to those the writer had as he or she researched the situation presented.

Case Study-1: LOEBIS JIN BABEKU (Bag and Accessories Creations Made from Secondhand Jeans)

Q) Loebis Jin Babeku is a fashion enterprise specialized in the up-cycling of used jeans and other fashion fabrics to create new products. In their business concept the founders try to combine waste reduction measures with creative product development. Recycling and up cycling are the key words of this endeavor.

The fashion world and our society create a constant need for adolescents to always appear fashionable, trendy and up-to-date with the clothing they wear. The fashion industry hereby serves this need by always providing new suitable products. Various models and types of clothing that fill the latest trends of interest are continuously purchased by the teenagers and the amount of clothes produced and sold is enormous. This constant renewal leads to the fact that when a trend has gone out of fashion old clothes are mostly not used anymore. Clothes consequently tend to be stored in a closet or even thrown away as waste because of being outdated, not matching the right size, being ripped and torn, or showing faded colors. Waste of clothes is piling up more and more in our society, which poses various social and environmental problems in Indonesia. Mountains of fabric waste are taking away space in landfills, oil based colorings can dissolve and wash out into the groundwater and rivers, posing a threat to the environment and people's health and therefore harming the society at large. Basically, selling, renting or donating second hand clothes, which are still in good shape is an alternate option and can even be a source of income. Clothes which are torn and cannot directly be worn anymore usually get thrown in the garbage. When attempting to create a new product, even pieces of fabric can be

used and with some creativity one can re-make the used clothing into new customer goods with an even higher selling price.

SOLUTION TO THE CASE:

Idea and startup phase

Recycling and up-cycling of waste materials was the idea behind creating the business. When looking for suitable products, they came across the option of taking advantage of used clothing to make the bags and other consumer products. For them bags represent a key fashion item, which more than only serving as a storage device are also used to support the whole individual appearance even to indicate social class. Along with the development of fashion, accessories have always been part of the lifestyle and bags closely follow the trend. New items and innovations are in high demand such as bags made of jeans that appear as new creations, girly and casual.

Regarding the raw material for the new products, Jeans are a type of cloth made of cotton, coarse and durable. This popular material has originally been used for workers and has become a huge and never ending trend all over the world. Jeans are acceptable among all levels of society and every age from children, adolescents, adults and senior citizens both male and female. The jeans fabric is a universal fabric.

The business opportunity arises by leveraging the used pants/skirts made from jeans into new bags with a girly and casual style. Besides being able to save the big portion of costs of raw materials, this effort also contributes to the reduction of waste.

Product development and growth

Following the ITS Program of Student Entrepreneurial Creativity in 2012, the owners raised venture capital by applying for a grant with the PKMK (Entrepreneurship Student Creativity Program) from the Directorate General of Higher Education. In order to obtain such assistance, a full business proposal consisting of a business plan had to be submitted. The capital then was used to purchase the first raw materials, the sewing machine, for promotion and labor costs. Originally the founders started making sewing bags from jeans at home but could not expand to bigger production or a diversified product range. Over time, with the growing success, more products were developed apart from

handbags, also jeans trousers, skirts, patchwork jeans, and other fashion accessories all made of used jeans, such as wallets, hand phone cases, pencil cases, pouches, brooches, hair ribbons and more introduced into the product range. These are offered to the fashion shops and directly promoted to retail customers through online marketing and met great interest from the customers. Although made of second hand “waste” materials, the products are guaranteed to be clean and the business owners campaign for upgrading the image of recycled and up cycled consumer products. There are a few additional applications to beautify the look of the products such as patchworks, embroideries and painting. The advantages of the products are the practical and fashionable appearance and the uniqueness of the goods, since every piece is unique and handmade and therefore of special value to the customers. However, as of today the production of jeans bags is still limited, but demand is growing. Therefore, the owners have decided to improve their production management and enhance marketing while keeping stable financing as an imperative. Furthermore Loebis is now in the process of expansion and exploring new ways to market their products of recycled jeans fashion including a coordinated sales network system to deliver to fashion retail shops regularly.

Why is it Green?

The Jeans bags are products contributing to environmental sustainability. Most users of jeans are not aware under which conditions they are produced using pesticides for the raw cotton plants and chemicals for the processing of the product. This way of production with chemicals can interfere with the health of the workers, especially the organs, lungs, make washouts and contribute to the pollution of rivers and ground water. At the end of the life cycle, decomposition when stored in landfills releases the chemicals again, which had been locked within the coloring and bleaching. Bags made out of jeans help on the one hand businesses reduce their immediate waste by providing the cut away for new products as well as private users when giving away their second hand jeans for a new product. At the same time the idea of using recycled jeans materials can also incite other jeans manufacturers to further investigate the options for using recycled material.

Challenges

The main problem that the founders had to face from the beginning was the issue of human resources, especially to find skilled people able to perform the work and live up to the quality standards of the products. For some time they were not able find employees who matched their needs. Recycling bags are always handmade bags and cannot be mass-produced because all pants/jeans that are procured as materials come from different models and therefore the end products are unique as well. To solve this initial problem they used quite an unconventional approach. They invited housewives from their CREATIVE INDUSTRY - INDONESIA neighborhood to help produce the bags, however their skills in sewing turned out to be not good enough to keep a stable quality. Therefore they turned to outsourcing some of the production and for the highly demanded models they use special bag stitches, which have very good skills. However, such outsourcing options do only pay with amount of around min 50 pieces for one model.

Lessons Learnt

For people who are interested in becoming self employed entrepreneurs the founders and owners of Loebis Jeans bags suggest that previous experience and a knowledgeable background are of advantage. In their opinion the success of a business lies in the details of the products and also the management and operations. Decisions may never be rushed and a solid team is needed in order to conduct the tasks properly.

TIPS

“Previous experience and a knowledgeable background are definitely of advantage.”

“Success of a business lies in the details of the products and also the management and operations.”

“Remember Sustainability begins with you so act locally & think globally.”

(17E00302) GREEN BUSINESS MANAGEMENT

Objective: The objective of the course is to impart students in understanding of green business, its advantages, issues and opportunities and to provide knowledge over the strategies for building eco-business.

1. Introduction to Green Management: The Concept of Green Management; Evolution; nature, scope, importance and types; Developing a theory; Green Management in India; Relevance in twenty first century.

2. Organizational Environment: Indian Corporate Structure and Environment; How to go green; spreading the concept in organization; Environmental and sustainability issues for the production of high-tech components and materials, Life Cycle Analysis of materials, sustainable production and its role in corporate environmental responsibility (CER).

3. Approaches from Ecological Economics; Indicators of sustainability; Eco-system services and their sustainable use; Bio-diversity; Indian perspective; Alternate theories

4. Environmental Reporting and ISO 14001; Climate change business and ISO 14064; Green financing; Financial initiative by UNEP; Green energy management; Green product management

5. Green Techniques and Methods; Green tax incentives and rebates (to green projects and companies); Green project management in action; Business redesign; Eco-commerce models

Text Books:

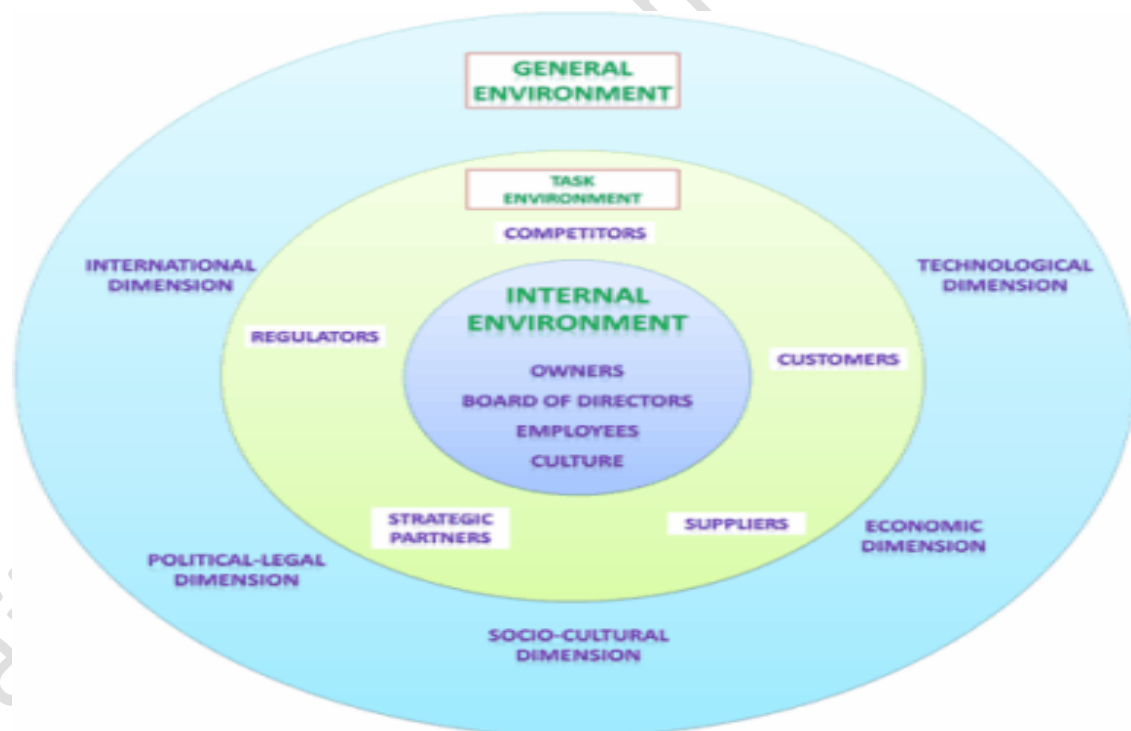
- Green Management and Green Technologies: Exploring the Causal Relationship by Jazmin SeijasNogarida , ZEW Publications.
- The Green Energy Management Book by Leo A. Meyer, LAMA books

References:

- Green Marketing and Management: A global Perspective by John F. Whaik, Qbase Technologies.
- Green Project Management by Richard Maltzman And David Shiden, CRC Press Books.
- Green and World by Andrew S. Winston, Yale Press B

UNIT-2**ORGANIZATIONAL ENVIRONMENT****2.1 INTRODUCTION TO ORGANIZATIONAL ENVIRONMENT**

Organizational environment may be considered as a set of factors (Internal and external factors) that influence the functioning & effectiveness of an organization. Interacting & transacting with the environment is the basic need of every business organization. Thus, there is a mutual interdependence between organization & environment. The nature of organizational environment is ever changing and unstable. The future of any organization is dependent and determined by the relevant risks and opportunities. The risks and opportunities are those factors which lie beyond the control of an organizations management system. The customers, competitors, stakeholders, brokers, business trends, policies, government activities, social and economic factors and technological advancements are all the components of an organization which combine to form the organizational environment.

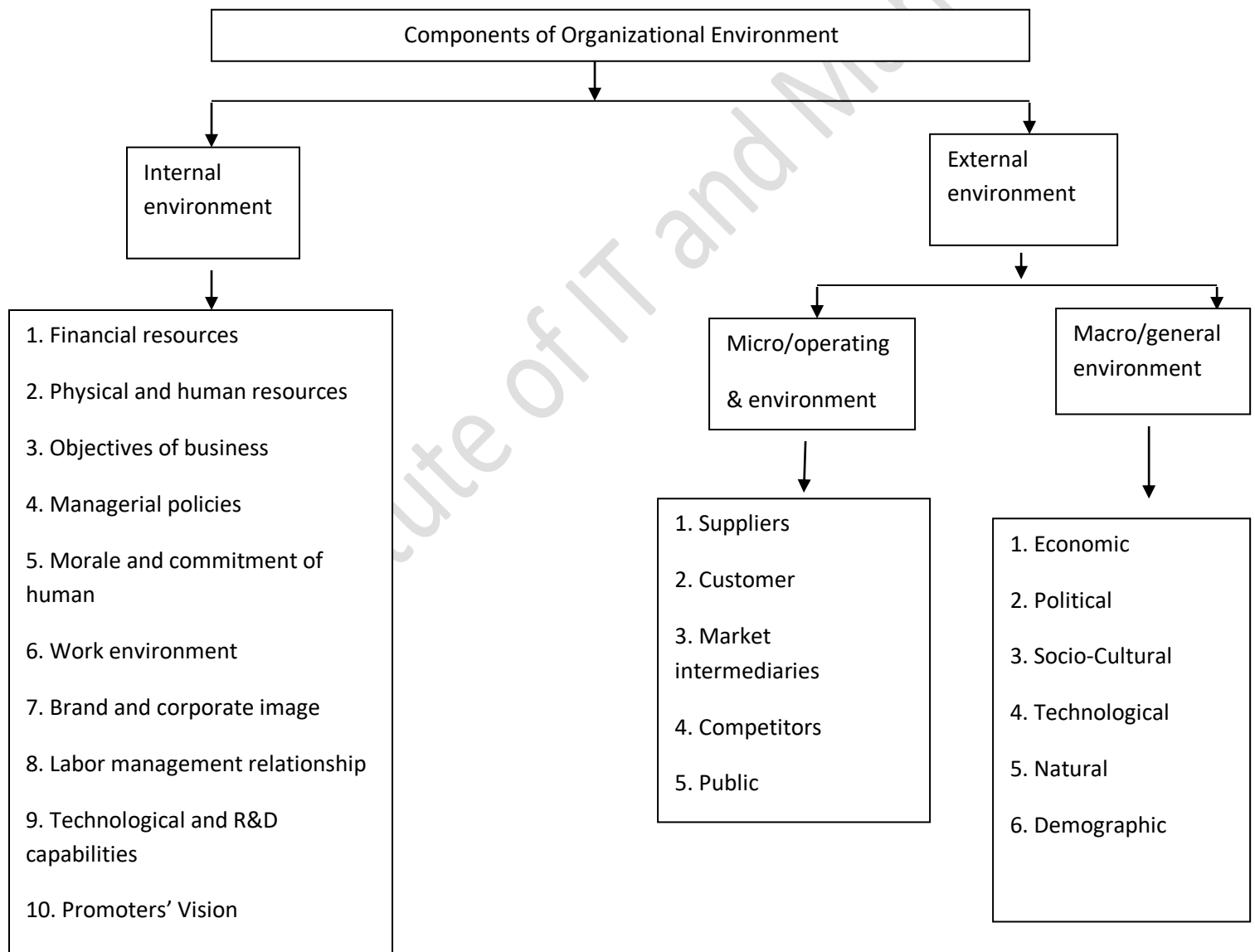
**DEFINITION:**

According to Andrews, “The organizational Environment is the environment of a company as the pattern of all external influences that affect its life and development.”

According to W.F. Glueck and Lawrence R.Jauch, “The environment includes factors outside the firm, which can lead to opportunities or threats to the firm. Although there are many factors, the most important of these factors are socio-economic, technological, supplier, competitors and government.”

2.1.1 FACTORS/COMPONENTS OF ORGANISATIONAL ENVIRONMENT:

1. **Internal factors (environment) --within the organization; can be controlled by organization and**
2. **External factors (environment)--outside of the organization; cannot be controlled by organization**



2.1.2 NATURE OF ORGANISATIONAL ENVIRONMENT:

1. Environment is Inseparable from Organization:

- ✓ No organization can function without its environment –legal, political, social, culture and economic environment.
- ✓ There is a mutual relationship between the organization and environment.
- ✓ Therefore, the success and failure of organization is influenced by the changes in the environment.
- ✓ The enterprise/organization comprises of an interactive process which collects the inputs like raw materials, capital, manpower, energy, etc., from the environment, converts them into finished goods and returns them back to the environment.

2. Environment is Dynamic:

- ✓ The environmental factors undergo changes according to the tastes and preference of the customer, amendments made in the government policies, up-gradation in technology, etc. All these factors affect the organization in their decision-making process.
- ✓ Hence, the ability of adapting the changes and implementing them into action leads to success and growth of the organization.

3. Organization Lacks Control over Environment: (We can influence internal environmental factors but not external factors)

- ✓ Organizational environment keeps on changing continuously.
- ✓ Organization can influence the internal environment but not the external environment.

4. Internal and External factors:

- ✓ There are internal and external factors which influence the organizational environment.
- ✓ The factors such as organizational objectives, policies, staff members, etc., combine to form the internal environment.
- ✓ The external environment comprises of micro and macro factors. The micro factors involve consumers, competitors, suppliers, society, etc. Macro factors include economic, legal, political, cultural, technological and other external factors.

5. Environment is complex and unstable in nature:

- ✓ There are several difficult situations in organizational environment which the enterprise must be aware of and must make the best use of them.
- ✓ In comparison with the traditional form, the modern organization is much more complex and unstable in nature.
- ✓ The scope and size of modern organization is as wider as its environment.
- ✓ The changes like increasing government interference and social awareness unfavorably affects the organization.

6. Environment is Multifaceted: (positives and negative outcomes at a time to people i.e., it may be opportunity to some and threat to others)

- ✓ There is always a positive and negative outcome to the changes made in the environment.
- ✓ Different people perceive differently upon the changes.

7. Opportunities and Obstacles:

- ✓ The organizational environment is flexible in nature.
- ✓ Therefore, the business may act as an opportunity or an obstacle to organization depending on the situation.
- ✓ Opportunity provides scope for expansion whereas obstacle curbs(stops or decreases) growth of the organization.

8. Long Lasting Impact:

- ✓ Business can be affected by the environment either positively or negatively.
- ✓ This can bring in a long lasting impact on the conduct of organizational activities.
- ✓ Therefore, marketers undergo business analysis and diagnosis to identify the strength and opportunities and formulate strategies and policies to avoid risks and threats of the environment.

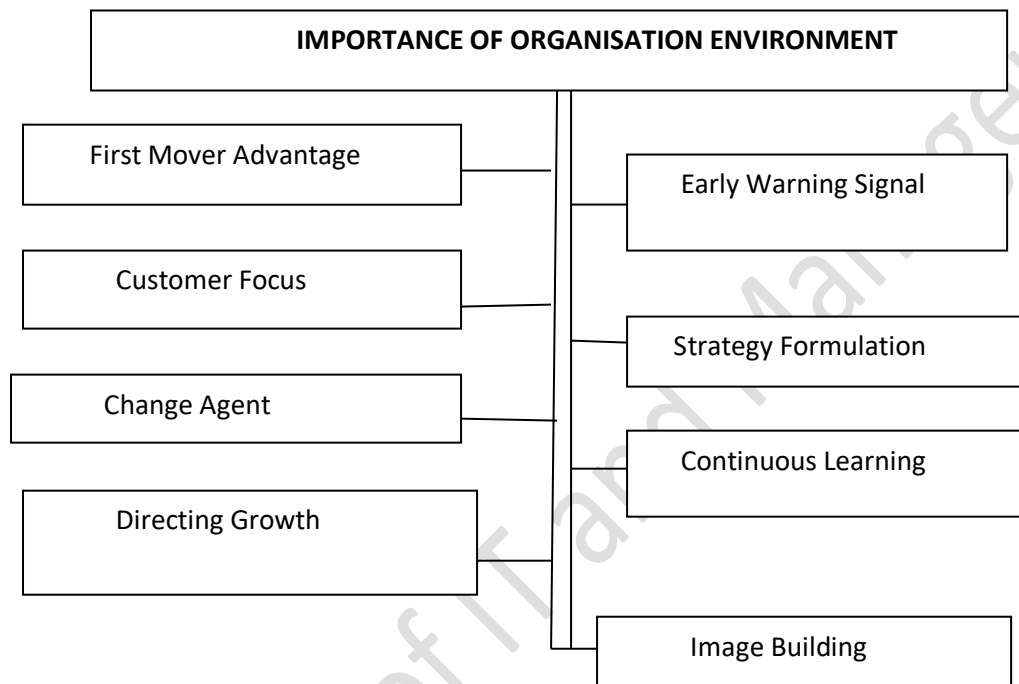
10. Uncertainty:

- ✓ There is always a possibility of frequent changes in the organizational environment.
- ✓ These changes are highly uncertain.
- ✓ Thus, it becomes difficult for the business to forecast its future events.

- ✓ The business must constantly keep a check on the environmental changes in order to improve not just the present as well as its future performance.

2.1.3 IMPORTANCE OF ORGANISATIONAL ENVIRONMENT

The importance of organizational environment can be understood with the help of following points:

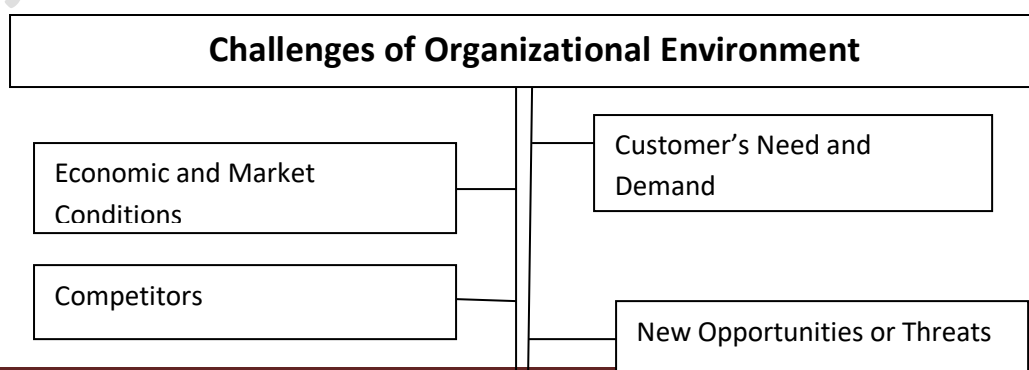


1. **First Mover Advantage:** The study of business environment helps an enterprise to grab the early opportunities in the market. This allows the enterprise to stay ahead from their competitors. **For example**, Maruti Udyog took the first mover advantage and became the first manufacture of small cars by identifying the need of middle class people, keeping in mind the increasing rates of petrol.
2. **Early Warning Signal:** Environmental awareness helps the business enterprise to take cautions steps to reduce the threats and issues. It acts as an early warning signal to the business enterprise against upcoming threats.
3. **Customer Focus:** Business environment facilitates the company to cater the changing tastes and preferences of the customers. For example, Hindustan Unilever introduced shampoo in small sachets for lower class segment, recognizing the interests of customers. This resulted in high sales volume and customer loyalty.

4. **Strategy Formulation:** The environmental analysis provides relevant information regarding the business environment. The strategies utilize this information in formulating market strategies and future plans. For example, the study of business environment enabled ITC to recognize wide scope in travel and tourism. This encouraged ITC to open new hotels in India and abroad as well.
5. **Change Agent:** To survive in the market, business enterprises need to adapt necessary changes occurring due to various environmental factors. Business environment helps the managers to determine the nature and direction of these changes by using different measures of environmental analysis. Therefore, there is an organizational need to encourage staff participation in decision making process to make prompt and correct decision.
6. **Continuous Learning:** Business executives need to be aware of the environmental changes. This helps the executives to understand the environment and apply the appropriate changes in an efficient manner. Environment analysis is used to guide managers and executives in dealing with the business challengers easily.
7. **Directing Growth:** The study of environment directs the company to expand its boundaries for stating new ventures. This enhances growth and development of business firms.
8. **Image Building:** Environmental understanding by the management builds company's positive image in the minds of the people. They feel that the company is sensitive and responsive to their needs and problems. For example, Big Bazaar responds to the changing customer needs and environmental factors by selling goods and services at reasonable prices.

2.1.4 CHALLENGES OF ORGANISATIONAL ENVIRONMENT:

Organization environment is dynamic in nature. It varies continually. The company should be ready to face internal and external market challenges. These challenges can be



1. **Economic and Market Conditions:** There are various external factors which adversely affect the business environment. **The economic factors such as government policies, economic system, economic structures, business cycles, factor endowment, etc.** helps to analyze the existing market conditions and make reasonable changes. By doing this, business firms can achieve maximum production at minimum cost.
2. **Customer's Need and Demand:** Customer is the king of the market. The first and foremost motive of the company is the satisfaction of its customers. Traditionally, product-selling approach was used to create demand and become a successful salesperson. But now days, salesperson have to identify the demand, target the potential customers and sell the products which satisfy the needs and wants of the customer.
3. **Competitors:** Competitors act as a motivator to all business firms. The success and growth of a firm depends on the desirability to obtain high targets with respect to its competitors to secure huge market share. The company should focus on the choice of customers and provide the same quality and quantity they want. The products offered by the firm should always be better and reasonable from its competitors. Other than the choice of a product, its promotion is also important. The promotion of a product should be influential and attractive. The company can also offer festive discounts and schemes in order to hike sales.
4. **New Opportunities or Threats:** Business firms come across various opportunities and threats on a daily basis. This led the firms to discover and grab new markets in order to increase their sales volume and profit margins. Firms must take advantage of these opportunities because opportunities do not wait for any strategy and plan formulation.

2.2 INDIAN CORPORATE STRUCTURE AND ENVIRONMENT

Corporate structure or organizational structure refers to how a business is organized to accomplish its objectives. The Corporate structure of a business

is important because it determines the ownership, control, and authority of the organization. In a corporation, these characteristics are represented by three groups: **Shareholders, directors, and officers**. Ownership belongs to the shareholders; control is exercised by the board of directors on behalf of the shareholders, while authority over the day-to-day operations is vested in the officers.

ownership ▼	Control ▼	Authority ▼
Share holders	Directors	Officers

Business has two relationships with natural environment. **First**, the environment is the source of resources as raw material and **secondly**, it can cause damage to the environment in the process of production. Industries can be seen as the destroyer of the natural environment, as they bring economic prosperity but they even increase the social cost. Therefore, the position is not very simple. Due to the environmentalists and awareness about the degradation and the bad effects, the businessmen cannot just escape from their responsibility. A Normal Corporate Structure consists of various departments include marketing, finance, operations, human resource and IT that contribute to the companies over all mission and goals.

The Indian Business Environment has altered radically since 1991 with the changes in the world. While befitting from decontrol and deregulation has now begun to feel the effect of these changes, those most affected are the promoters who are today threatened by the possibility of hostile takeovers. At the same time, financial institutions, which have a significant stake in many companies, have started demanding for better corporate governance.

It is a well known fact that the way to growth is either through **Greenfield** expansions leading to Organic growth in one's own unit or **Brownfield** expansions leading to inorganic growth.

Green field	Organic growth
Brown field	Inorganic growth

Since the world is moving at a rapid pace and corporate are in a hurry to expand restructuring is the name of the game all over the globe. Indian companies too

have learnt that this faster mechanism of intensification. Restructuring through amalgamation and acquisitions if suitably chosen and implemented can permit an organization to leaping into a novel orbit of markets, customers, products and technologies almost overnight. Changes in the business environment ensuring from liberalization and globalization have contributed to dynamism in the Indian Economy. The new environment poses challenges to the methods of operations practiced under the controlled economy.

Conceptual scaffold for corporate restructuring and reorganization consists of the following:

- a) Management of Assets
- b) Construing new ownership relationships
- c) Reorganizing financial claims
- d) Corporate strategies
- e) Powerful Competition is another key element for giving rise to corporate restructuring.
- f) Increase pressure on margins have necessitated higher of business, ensuring mergers and acquisitions has led to demergers of non-profitable businesses.
- g) All round resource optimization in active businesses to reorganize functioning profit and to stay fit in competition.

1. MERGER: Merger is said to occur when **two or more companies are united into one company** where one survives and the other lose its corporate. The survivor attains the assets as well as liabilities of the merger company of companies. Merger is also the synthesis of two or more existing companies.

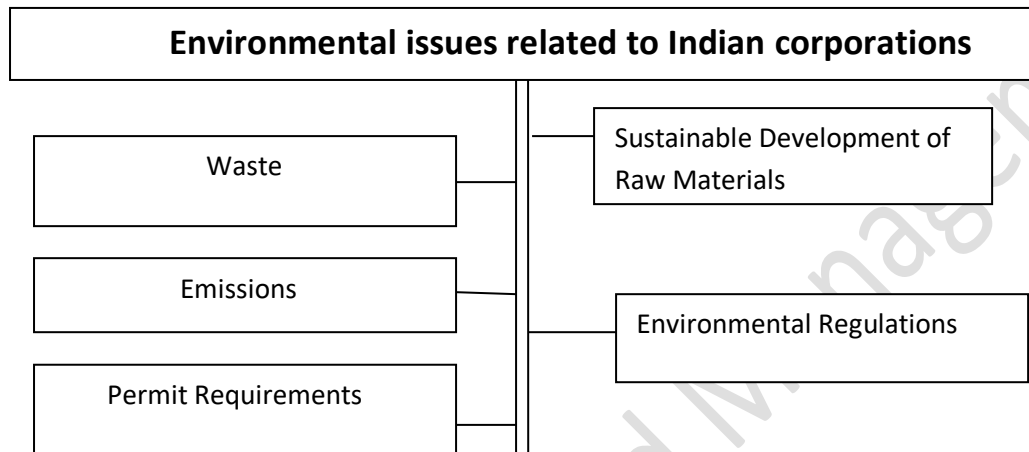
2. ACQUISITION: An acquisition takes place **when one company purchases another company or a part of it**. The company completely buys out another company and the former company remains.

3. DEMERGER: A business strategy in which a **single business is broken into components** either to operate on their own to be sold or to be dissolved. A demerger allows a large company to split off its various brands to invite or prevent an acquisition to raise capital by selling off components that are no longer part of the business' care product line or to create separate legal entities to handle different operations.

4. RESTRUCTURING: A Considerable **alteration** made to the debt operations or arrangement of a company. This kind of business actions is usually made when there are significance troubles in a organization which are causing some form of financial damage and putting the overall business in danger, the hope is

that through restructuring an organization can reduce financial harm and improve the business.

2.2.1 ENVIRONMENTAL ISSUES RELATED TO INDIAN CORPORATIONS:



1. Waste:

Businesses that manufacture products create waste at some point in the manufacturing process. So business must decide how best to dispense waste. Many organizations implement recycling programmes; others sell waste to other manufacturers who use it in their own manufacturing processes as raw material. Either way, the effect is additional cost to the business in man hours, procedures, equipment and handling all specific to moving the waste products out of the business manufacturing process and facilities.

2. Sustainable Development of Raw materials: (measures to replace the raw material)

All manufacturers use natural raw materials to manufacture new goods, so measures (like planting of trees, usage of renewable resources) should be taken to replace the natural resources. Again, these measures will require some amount and man power to spend.

3. Emissions:

Manufacturing processes often generate chemical-filled smoke and/ or water emissions, ash and particles and chemicals that seep into ground water through run-off. Environmental protection laws require business to protect the

environment from exposure to these emissions. Remedial process include placing screens of specified gauges over smoke stacks, filtration of waste water and lining of retention ponds with clay and poly liners. All these measures are costly and decreases profit margins.

4. Environmental Regulations:

Regulating business activities is the one way for government agencies to protect the environment. Business must certain standards that help to reduce any adverse effects a company's activities have on the environment. As a result, natural environmental factors, such as clean water and clean air, dictate how companies conduct their day-to-day operations.

5. Permit Requirements:

Companies involved in activities that impact their surrounding environment typically have to file for operating **permits through a local, state or federal government agency**. Business permit requirements enable government agencies to regulate and keep track of business activities. These permits serve different purposes, some of which include setting minimal standards for any air emissions, dictating certain procedures for handling waste and hazardous materials and regulating how a company's day-to-day operations interact with nearby water supplies. In effect, natural environmental factors determine the types of operations a company can engage in within a particular locale or region.

2.2.2 NEED FOR ENVIRONMENTAL STUDIES FOR INDIAN CORPORATIONS:

'Environmental studies' is the interdisciplinary study of how humans interact with their environment. This field examines all aspects of the natural environments, politics. Ecology, etc., and how they all work together.

'Environmental studies' involves scientific study of the environmental system and the status of its inherent or induced changes on organisms. In addition to study of physical and biological characters of environment, it also describes the social and cultural factors and the impact of man on environment.

Green entrepreneurs gain numerous advantages in their markets. **Below are a few of the ways in which environmental awareness and action contribute to business management success:**

1. **Green building--lower overhead costs:** Green buildings, as many know, have less negative impact on the environment than standard buildings. Their construction minimizes on-site grading, saves natural resources by using alternative building materials, and recycles construction waste rather than sending truck after truck to landfills. A majority of a green building's interior spaces have natural lighting and outdoor views, while highly efficient HVAC (heating, ventilating, and air-conditioning) systems and low-VOC (volatile organic compound) materials like paint, flooring, and furniture create a superior indoor air quality.
2. **Energy certificates can diminish the power businesses use:**
 - ✓ When business green their buildings, they can avoid a significant portion of their electricity, gas and water usage.
 - ✓ For the natural resources, they must employ, they can offset the environmental impact with renewable energy certificates.
 - ✓ For example, a business could offset power used by its servers with wind-power certificates.
 - ✓ These let entrepreneurs not only balance out their environmental impact, but also present a more compelling case to customers, investors and others about their dedication to environmental responsibility.
3. **Composting and recycling can reduce the cost of waste removal:**
 - ✓ Composting and recycling can help a business significantly divert its solid waste.
 - ✓ Achieving noticeable results requires businesses to work towards building an internal culture of sustainability.
 - ✓ With employees on board for daily composting and recycling, companies gain a sense of cohesion and purpose among their teams that positively impacts other collaborative efforts.
4. **Environmental action helps businesses celebrate their customers:**

A simple **action** like planting a tree in honor of every new **customer** presents only a modest cost and can **help** an organization increase loyalty and repeat **business**. Paperless processes are faster, easier and cheaper.

5. Paperless Processes are Faster, Easier and Cheaper:

- a) Time Saved
- b) Better Access
- c) Saved Space
- d) Stronger Security
- e) Less Money
- f) Eco-Friendly

2.3 HOW TO GO GREEN

A “green” business strives to have a positive impact on the environment and community. It develops and practices business strategies that go beyond regulation and demonstrate commitment to a healthy and sustainable future. A green business adopts principles, policies, and practices that improve the quality of life for its customers and employees.

Green business is practically everywhere around us, for example, magazine covers from time to vanity fair are focusing on going green, movies such as “An inconvenient Truth” are hitting Hollywood. Companies such as wal-mart and general electric are transforming their business practices into green ones.

DIFFERENT WAYS TO MAKE BUSINESS GREENER

Several different ways to make a business greener are as follow:

1. **Save Power and Energy:** Replace the normal bulbs and tubes with compact Fluorescent Bulbs (CFL), Light –Emitting Diode Bulbs (LED), and Leadership in Energy Environmental Design (LEED) and install automatic technology to turn-off lights.
2. **Use Paperless Technology (Go Digital):** Try to use e-mail, e-recruitment, e-billing, e-filing, etc., so that one can reduce the use of paper. For example, use of hand dryers instead of paper towel.
3. **Avoid Transport:** Try to reduce the use of non-renewable resources (petroleum) by adopting videoconferencing and teleconferencing.
4. **Save Water:** Save water by checking regularly sinks, toilets and faucets for leakage. Use rain water harvesting with helps in reducing the use of ground water.
5. **Biodegradable Products:** Use biodegradable products such as jute bags, biodegradable plastic bags instead of using normal plastic bags.
6. **Implement Green Policies:** By implementing the green policies one can reuse, reduce and recycle the products and also follows up time to time by implementing the green practices properly or not.
7. **Motivate The Staff Members:** Encourage and motivate the staff members to take active part regarding green management practices in organizations.
8. **Switch lights off:** One of the simplest ways to reduce energy consumption is to switch lights off when you leave a room. If it's sunny outside open up the blinds and make the most of natural light instead.
9. **Reuse before recycle:** Before you go for recycling think about can you re-use items.
10. **Get sharing:** Does everyone in the office or service need their own stapler, hole punch, scissors, etc., Of course not! Save money and unnecessary manufacture by using less in the first place. Rather than buying new stationery, see if you can get refills instead.
11. **Switch computers off when not in use:**
Both in services and offices make sure computers are switched off when you're not using them rather than just leaving them on standby – you'd be amazed how much energy this saves.
12. **Save water:**
Only use as much water as you need, saving both water and the energy.

13. Bring your own lunch:

Bringing lunches to work in reusable containers is probably the greenest (and healthiest) way to eat at work. Buying lunches everyday almost inevitably ends up with a miniature mountain of packaging waste and is way more expensive than making your own too.

2.4 SPREADING THE GREEN CONCEPT IN ORGANISATION

Sustainable business, or a **green** business, is an enterprise that has minimal negative impact, or potentially a positive effect, on the global or local environment, community, society, or economy—a business that strives to meet the triple bottom line.

A shift is taking place. Organizations across the globe were awakening about the importance of green business practices. The green business practices can provide competitive advantages while simultaneously producing world benefit. As larger organizations begin integrating green practices into their strategic agendas, tens of thousands of supply chain organizations will need to adjust how they do business. Many organizations, with a desire to “go green”, lacks the know-how to materialise desired change without external help.

The business sector is increasingly called upon to be one of the key drivers of the green movement. Without the help of business, governments and non-profit organizations, it is not possible to create a healthy planet and society. Business leaders are increasingly recognizing the important of their involvement.

By “**Green Organizational development**” people are referring to organizational development work that focuses on organizations seeking to change core practices so that they benefit society and environment while also adding value to the organization. Implicit in the term Green organizational development is sustainability form the environmental side, meaning nature, preservation and societal good; and the businesses value side, meaning reputation, stock prices, and viability.

Effective Green organizational development requires trust, learning, empowerment, buy-in, and relational capacity. The organizational development approach to organization change seems aligned with these requirements. If green business is to be aligned with the goals of organizations, and every

organization has its own unique goals, then Green Organizational development approaches must be unique to every organization as well. Organizational development already focuses on customized approaches to change and is well suited to be of service.

2.4.1 PROPOSITIONS FOR SPREADING GREEN PRACTICES:

Description of area where green business concept is being practiced is given below:

1. **Value Chain:** Typically companies have approach the value chain and more often the supply chain from a purely cost-cutting and logistics efficiency approach. However, when a “green lens” is used, there is enormous potential for the value chain to collaborate and produce goods that are of value to the consumer and the earth, Green Electric has invested \$1 billion in this area, working with the value chain through cutting-edge technology.
2. **Energy Efficiency:** DuPont has saved \$3 billion from reducing carbon emissions, showing how a chemicals company can go from being harmful to the environment to one that is increasingly becoming a green company. The solutions that lead to energy efficiently rarely come from expert consultants alone because they lack covert knowledge of the client system. On the other hand, the client system may have difficulty creating solutions alone due to employees getting stuck in silos, daily routines, and not thinking on a systems level about potential solutions. Therein lays the opportunity for green organizational development.
3. **Product Design:** Numerous examples exist in bottom-of-the pyramid approaches where a new product is needed that serves the needs of those in poverty while also generating profit. **For example**, the Jaipur Foot was developed as a response to the lack of prosthetics in India due to cost. The new prosthetic that was developed costs hundreds of times less, can be produced in 30 minutes with far fewer resources, creates job opportunities for villagers producing them, looks more like a leg than competing products, and has much better mobility, allowing a level of mobilization that cannot be attained with the typical prosthetic from the west.

4. **Employees:** Organizational development practitioners (employees) have often focused on vision-building processes for companies. When combined with green practices, there is potential for Green organizational development initiatives to increase employee engagement. **For example**, a division at parker-Hannifin found ways to shift its products so that it addresses what it identified as the top 10 problems in society. It is no surprise that the division had the most empowered employees in the company.

2.5 PRODUCTION OF HIGH-TECH COMPONENTS AND MATERIALS IN ORGANISATIONS:

High technology, often abbreviated to high tech is technology that is at the cutting edge –the most advanced technology available. Now-a-days high tech Products were considered as the **most advanced computer electronics**. However, there is no specific class of technology that is high tech – the definition shifts and evolves over time. Even the small companies benefits a lot in terms of sales volume, financial issues etc.,

Different environmental threats are posed to our environment due to these high-tech productions. A suitable and universal solution is required to deal with such problem at global level.

2.5.1 TECHNOLOGIES AND SECTORS RELEVANT TO HIGH-TECH PRODCUTION

Different **technologies** used for the production of high-tech materials are as follows:

- a. Computer technologies (e.g., CAD, CAE, CAM),
- b. High performance Computing (HPC) for modeling, simulation and analysis,
- c. Rapid prototyping (additive manufacturing),
- d. High precision technologies,
- e. Information technologies(IT),
- f. Advanced robotics and other intelligent production systems,
- g. Control systems to monitor processes,
- h. Thin-film deposition technology, and
- i. Responsive material and coating technology.

2.5.2 INDUSTRIAL SECTORS FOCUSING ON PRODUCING HIGH-TECH COMPONENTS AND MATERIALS INCLUDE:

1. **Aerospace:** It is the human effort in science, engineering and business to fly in the atmosphere of Earth (aeronautics) and surrounding space (astronautics). Aerospace organizations perform research, design, and manufacture, operate, or maintain aircraft and/or spacecraft. Aerospace activity is very diverse, with a multiple of commercial, industrial and military applications.(multi works)
2. **Automotive:** The automotive industry is a wide range of companies and organizations involved in the design, development, manufacturing, marketing, and selling of motor vehicles.
3. **Artificial Intelligence:** Artificial Intelligence (AI) is the intelligence exhibited by machines or software. It is also the name of the academic field of study which studies how to create computers and computer software that are capable of intelligent behavior.
4. **Computer Engineering:** It is a discipline that integrates several fields of electrical engineering and computer science required to develop computer hardware and software.
5. **Information Technology:** The technology involving the development, maintenance, and use of computer systems, software, and networks for the processing and distribution of data. IT is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise.
6. **Nanotechnology:** The manipulation of materials on an atomic or molecular scale especially to build microscopic devices (such as robots).An area of science that deals with developing and producing extremely small tools and machines by controlling the arrangement of separate atoms. Nanotechnology is the engineering of functional systems at the molecular scale. This covers both current work and concepts that are more advanced. In its original sense, nanotechnology refers to the projected ability to construct items from the bottom up, using techniques and tools being developed today to make complete, high performance products.
7. **Robotic Technology:** It is the branch of mechanical engineering, electrical engineering and computer science that deals with the design, construction, operation, and application of robots, as well as computer systems for their

control, sensory feedback, and information processing. These technologies deal with automated machines that can take the place of humans in dangerous environments or manufacturing processes, or resemble humans in appearance, behavior, or cognition.

2.5.3 ENVIRONMENTAL AND SUSTAINABILITY ISSUES FOR THE PRODUCTION OF HIGH-TECH COMPONENTS AND MATERIALS:

The different environmental issues are as follows:

1. **Pollution:** Air, water, heat and noise pollution can all be caused by producing and using high-technology materials and components. Pollution of the environment is one of the most serious ecological crisis to which we are subjected today. The three basic amenities for living organisms are air, land/soil and water. In the past, these amenities were pure, Undisturbed, uncontaminated and basically most sustainable for living organisms. But today, the situation is just reversed, because progress in science and technology is also leading to pollution of environment and serious ecological imbalance which in the long-run, may prove disastrous for mankind. Environmental pollution is the result of urban industrial technological revolution and speedy exploitation of every bit of natural resource.
2. **Consuming Resources:** Non-renewable resources, including precious metals like gold, are used to make technology. Many others, such as coal, are consumed to generate the electricity to use technology. Even some renewable resources, like trees and water, are becoming contaminated or are used up faster than they can renew themselves because of production of high-technology materials and components.
3. **E-Waste:** *E-waste or electronic waste is created when an electronic product is discarded after the end of its useful life. The rapid expansion of technology and the consumption driven society results in the creation of a very large amount of e-waste in every minute.* E-waste contains over 1,000 different substances and chemicals, many of which are toxic and are likely to create serious problems for the environment and human health if not handled properly. E-waste contains many toxics such as heavy metals, including lead, cadmium, mercury, polychlorinated Biphenyls (PCBs), Poly Vinyl Chloride (PVC), etc., in some components. Lead exerts toxic effects on various

systems in the body such as the central (organic affective syndrome) and peripheral nervous systems, the haemopoietic system (anaemia), the genitourinary system (capable of causing damage to all parts of nephron) and the reproductive systems (male and female).

4. **Health hazards – improper e-waste disposal effects:** Improper handling of e-waste is detrimental to the environment and mankind. Since this waste is nothing but a combination of plastics and toxic chemicals, these get released into the environment. Pollutants such as dioxins and furans from polyvinyl chloride, lead, beryllium, cadmium, mercury, etc. get into our environment and cause the following health hazards:

- ✓ Reproductive issues
- ✓ Developmental problems
- ✓ Damage to the immune system
- ✓ Interference with regulatory hormones
- ✓ Damage to the nervous system
- ✓ Kidney damage
- ✓ May lead to lung cancer
- ✓ Chronic beryllium disease
- ✓ Skin ailments
- ✓ Cadmium accumulations on liver and kidney
- ✓ Asthmatic bronchitis
- ✓ DNA damage
- ✓ Muscle weakness
- ✓ Endocrine system disruption

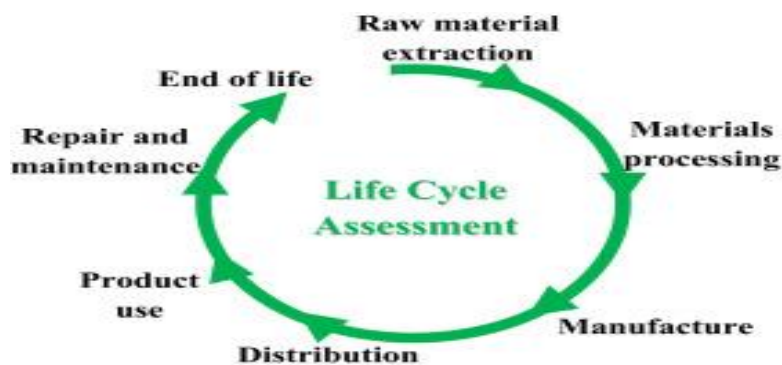
Exposure to harmful chemicals present in e-waste can lead to severe health hazards that are at times fatal. These toxins enter our body through inhalation, skin absorption, or ingestion. After that, humans run the risk of developing any of the above-mentioned conditions.

2.6 LIFE CYCLE ANALYSIS OF MATERIALS

*Life cycle analysis (LCA, also known as life cycle assessment (or) life cycle calculation (or) eco balance) is a **technique to assess environmental impacts** associated with all the stages of a product's life from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance and disposal or recycling.*

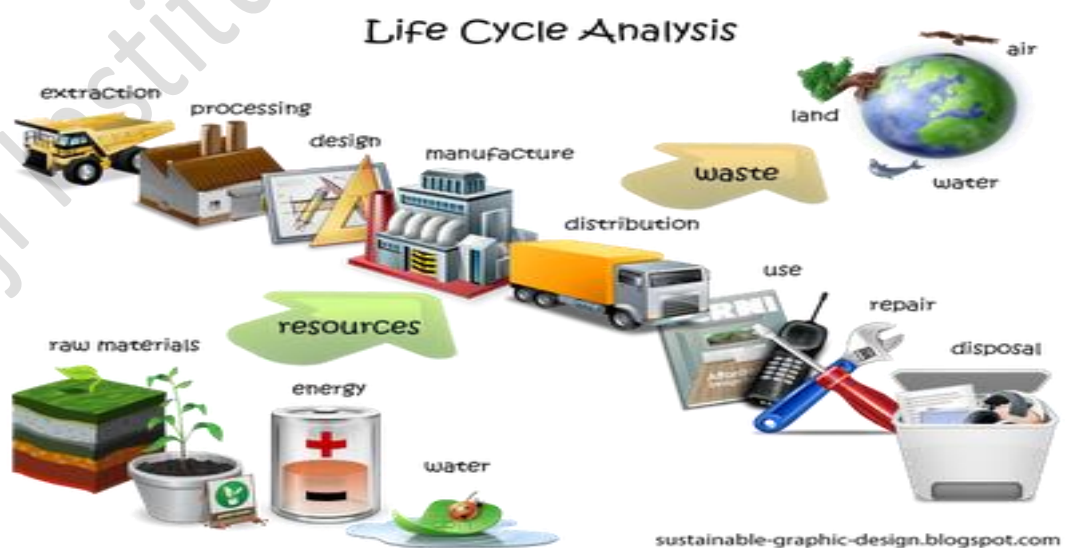
Developing a product can be very complex. Raw materials come from many different sources, and obtaining each one of those materials involves a different series of inputs, outputs and processes, each of which has impacts on the environment.

To identify the total environmental impact of a product it is necessary to do a life cycle analysis.

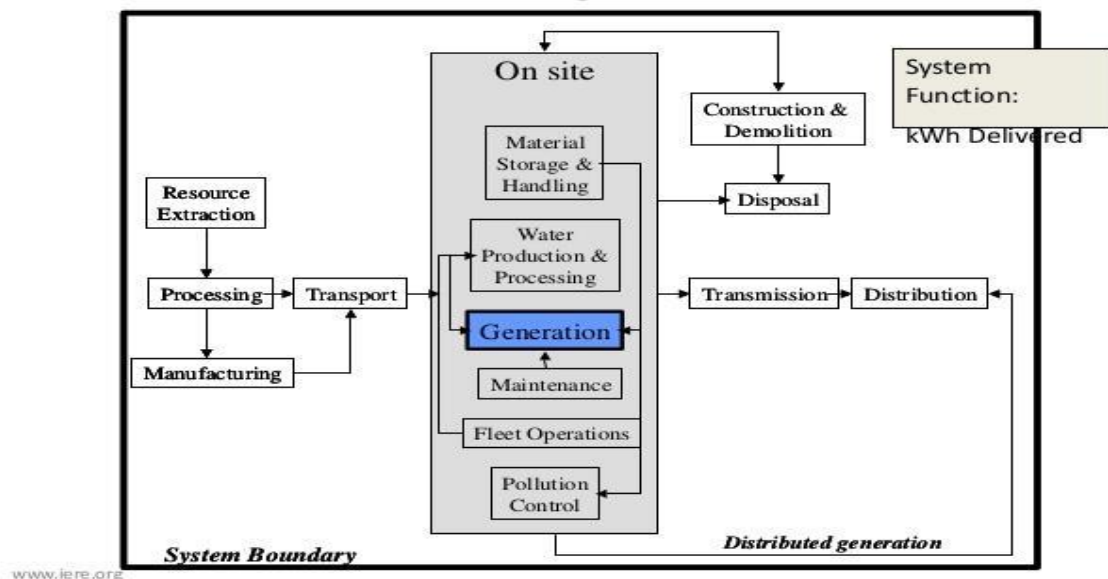


Life cycle analysis refers to a framework for the appraisal of alternative products, production processes, or infrastructure investments, which focuses particular attention on the challenges associated with defining the boundaries of the industrial, or policy systems under scrutiny. Rather than looking at positive effects or broader social and economic issues, lifecycle analysis usually restricts attention to the negative environmental or health impacts.

A number of procedures have been developed for systematically tracking the magnitude of the impacts associated with the full resources chains and facility “lifecycles” associated with the products or processes under scrutiny.



Life diagram



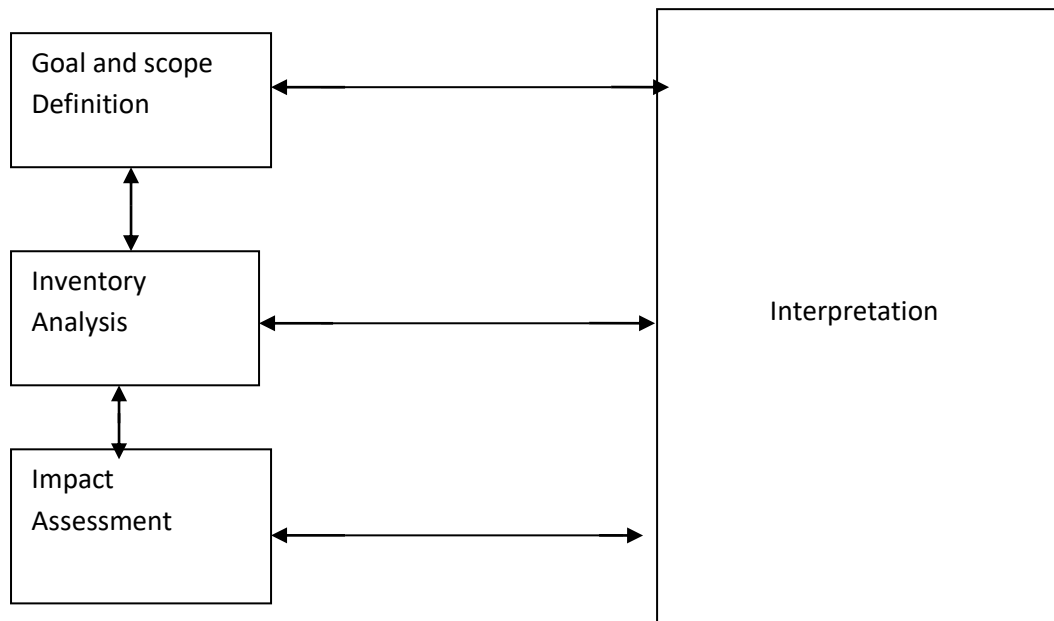
2.6.1 OBJECTIVES OF LIFE CYCLE ANALYSIS OF MATERIALS:

Some basic objectives of life cycle analysis are:

- To minimize the magnitude of pollution.
- To conserve non-renewable resources.
- To conserve ecological systems.
- To develop and utilize cleaner technologies.
- To maximize recycling of materials and waste.
- To apply the most appropriate pollution prevention techniques.

2.6.2 PROCESS OF LIFE CYCLE ANALYSIS OF MATERIALS:

- Life cycle Assessment is carried out in four distinct phases as illustrated in the figure below. The phases are often interdependent, in that the results of one phase will inform how other phases are completed. It presents the four basic stages of conducting an LCA:
- Lifecycle Assessment is carried –out in four distinct phases as illustrated in the figure 2.1 below:
- The phases are often interdependent in that the results of one phase will inform how other phases are completed. It presents the four basic stages of conducting an LCA:

**FIGURE: 2.1 LIFE CYCLE ANALYSIS****PHASE-1. Goal and scope:**

An LCA starts with an explicit statement of the goal and scope of the study, which sets out of the study and explains how and to whom the results are to be communicated. The goal and scope document therefore includes technical details that guide subsequent work:

- ✓ The functional unit.
- ✓ Any assumptions and limitations.
- ✓ The system boundaries.
- ✓ The allocation methods.
- ✓ The impact categories.

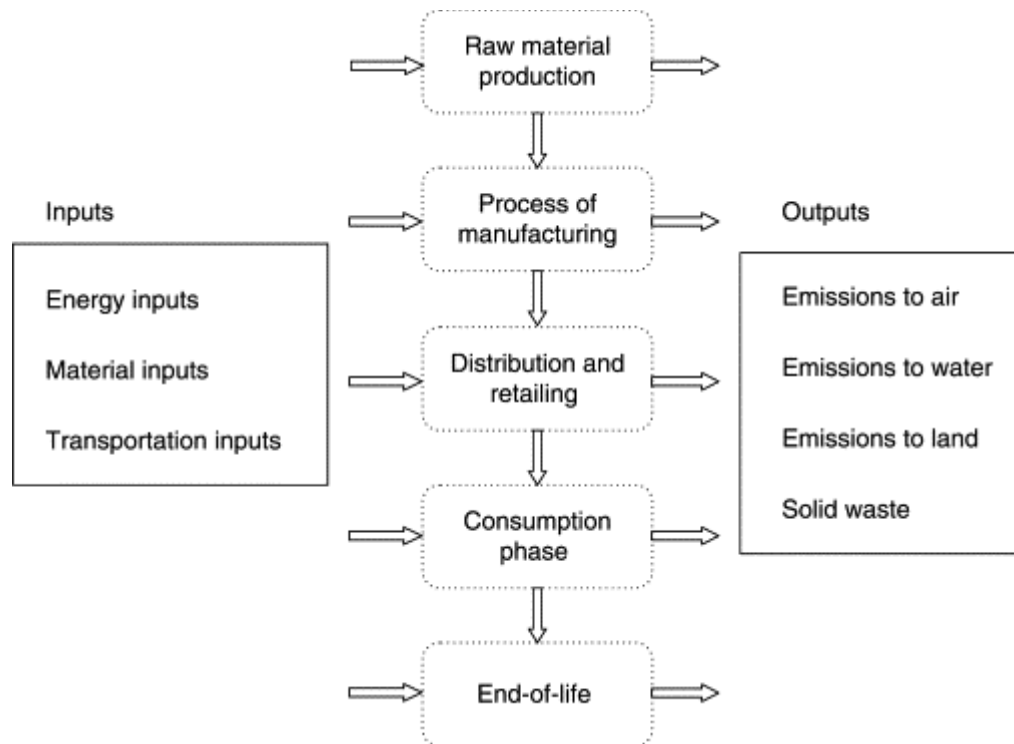
PHASE-2. Life cycle inventory:

Life cycle inventory (LCI) analysis involves creating an inventory of flows from nature for a product system. Inventory flows include inputs of water, energy and raw materials, and release to air, land, and water. The flow model is typically illustrated with a flow chart that includes the activities that are going to be assessed in the relevant supply chain and gives a clear picture of the technical system boundaries.

Inventory flows can number in the hundreds depending on the system boundary.

Some of the LCI methods are

- Process LCA
- Economic input output LCA
- Hybrid Approach



PHASE-3. Life cycle impact assessment:

Inventory analysis is followed by impact assessment. This phase of LCA is aimed at evaluating the significance of potential environmental impacts based on the LCI flow results. Classical Life Cycle Impact Assessment (LCIA) consists of the following mandatory elements:

- a) Selection of impact categories, category indicators, and characterization models.
- b) Life cycle impacts can also be categorized under the several phases of the development, production, use, and disposal of a product.
- c) First impacts include extraction of raw materials, manufacturing (conversion of raw materials into a product).

PHASE-4. Interpretation:

Life cycle interpretation is a systematic technique to identify, quantify, check and evaluate information from the results of the life cycle inventory and / or the life cycle impact assessment.

According to ISO14040:2006, the interpretation should include:

- a) Identification of significant issues based on the results of the LCI and LCIA phase of an LCA
- b) Evaluation of the study considering completeness, sensitivity and consistency checks; and
- c) Conclusions, limitations and recommendations.

A Key purpose of performing life cycle interpretation is to determine the level of confidence in the final results and communicate them in a fair, complete, and accurate manner.

2.6.3 APPLICATION/USES OF LIFECYCLE ANALYSIS OF MATERIALS:

Lifecycle assessment should calculate both direct and indirect environmental impacts, such as given below:

1. Used in calculating direct and indirect environmental impacts from the products and processes in the growth, harvesting, processing and transport of raw materials.
2. Direct energy, water, fuel consumption as well as energy and heat loss calculated through energy balancing. Emissions such as direct release of gases and particulars as well as calculation of embodied emissions using mass balancing and carbon equivalence.
3. Used in calculating of energy consumption and emissions of various methods of disposal – burning versus landfill versus composting versus reuse.
4. Find opportunities for process and product improvement.
5. Compare and analyze several processes based on their environmental impacts.
6. Quantitatively justify a change in a process or product.

2.7 SUSTAINABLE PRODUCTION AND ITS ROLE IN CORPORATE ENVIRONMENTAL RESPONSIBILITY(C.E.R):

Sustainable Production is the creation of goods and services using processes and system that are:

- a) Non – Polluting, Conserving of energy and natural resources
- b) Economically viable
- c) Safe and healthful for workers, communities and consumers.

Sustainable Production describes the design, development, production and supply of goods & services in a manner that works within the finite limits of the planetary systems people rely upon.

2.7.1 PRINCIPLES OF SUSTAINABLE PRODUCTION:

1. Products and Services:

In light of increasing pressures to adopt a more sustainable approach to product design and manufacture, the requirement to develop sustainable products is one of the key challenges facing industry in the 21st century. Hence, the concept of developing sustainable products as well as services is evolving as a key element of Cleaner Production. Sustainable product development initiatives (mainly through eco-design) have been evolving for some time to support companies develop more sustainable products.

- a) These should be Safe and ecologically sound throughout their life cycle.
- b) As appropriate, designed to be durable, repairable readily recycled, compostable or easily biodegradable.
- c) Produced and packaged using the minimal amount of material and energy possible.

2. Processes are Designed and Operated such that:

- a) Waste and ecologically incompatible by products are reduced eliminated or recycled on site.
- b) Chemical substances or physical agents and conditions that present hazards to human health or the environment are eliminated;
- c) Energy and materials are conserved, and the forms of energy and materials used are most appropriate for the desired ends;

- d) Work spaces are designed to minimize or eliminate chemical, ergonomic and physical hazard.

3. Workers are Valued and:

- a) Their work is organized to conserve and enhance their efficiency and creativity;
- b) Their security and well-being is a priority;
- c) They are encouraged and helped to continuously develop of their talents and capacities;
- d) Their input to and participation in the decision making process is openly accepted.

2.7.2 WAYS OF SUSTAINABLE PRODUCTION:

Products are made from Sustainable materials while waste is reduced through re-manufacturing, reuse and recycling.

1. Process Modeling and Material Assessment: Pursing Clean Production and the Manufacturing of green products are very beneficial to the environment. Thus establishing an assessment model for manufacturing process in terms of environmental impact is necessary for quantitative evaluation of product design.

2. Chemical Process and Recycling: The Primary objective for the process engineering in this field is, to develop tools for process simulations that can reduce time for development of processes and equipment from years to months. Another aim deals with the investigation of possible pyro chemicals recycling routes for both manufacturing waste as well as the end of life product.

3. Energy audit:

An energy audit is an inspection, survey and analysis of energy flows for energy conservation in building, processor system to reduce the amount of energy input into the system without negatively affecting the output

- a) Analysis of Energy usage
- b) Identification of Energy project



4. Renewable Energy: Renewable energy is energy that is collected from renewable resources which are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves and geo thermal, heat. Renewable energy often provides energy in four important areas: electricity generation, air and water heating/cooling, transportation and rural energy services.

5. Waste Reduction: Waste reduction also known as source reduction is the practice of using less material and energy to minimize waste generation and preserve natural resources. Waste reduction is broader in scope than recycling and incorporates ways to prevent materials from ending up as waste reduction includes reusing products such as plastic and glass containers. Waste reduction also means economic savings. Fewer materials and less energy is used when waste reduction practices are applied.

2.7.3 STEPS OF SUSTAINABLE PRODUCTION:

1. Map your impact and set priorities

4. Assess operation of your facility

2. Select useful performance indicators

5. Evaluate your products

3. Measure the inputs used in production

6. Understand measured results

7. Take action to improve performance

1. Map Your Impact and Set Priorities:

In Step1, we focus on where you are starting and where you want to end up. The aim of this first step is to establish a general understanding of your positive and negative environmental impact by mapping your activities and determining which ones affect your performance the most.

2. Select Useful Performance Indicators: Identify indicators that are important for your business and what data should be collected to help drive continuous improvement. Some companies will benefit from adding more indicators overtime, while other companies may also want to use a handful of the indicators provided.

3. Measure the Inputs Used in Production: Identify how materials and components used into your production process influence environmental performance. The first set of indicators related to the raw materials and intermediate products used in your production processes to make your products. Take a closer look at the impact that material inputs can have on your environmental performance.

4. Assess Operations of Your Facility: Consider the impact and efficiency of the operations in your facility (e.g., energy intensity, green house gas generation, emissions to air and water) transform a variety of inputs (step 3) into end products for delivery and sale and manufacturing functions and design of your facility and the related back office functions.

5. Evaluate Measured Results: Evaluate measured results or evaluate your products, identify factors such as energy consumption in use, recyclability and use of hazardous substances that help determine how sustainable your end products. These are the items or goods that you deliver to market and that in their own right will have a range of environmental qualities and impact arising from their composition and use.

6. Understand Measured Results: Read and interpret your indicators and understand trends in your performance. **The next step is to understand the performance.** The next step is to understand the different ways to review and

analyze the information generated by the indicators to identify options for improving the performance of your facility.

7. Take Action to Improve Performance: Choose opportunities to improve your performance and create action plans to implement them. By reviewed the data you can take decisions for improving performance. Now you need to make your decisions happen by setting clear targets and creating a tangible action plan.

The seven steps are not necessarily a one way journey. We recommend that you apply them for a cyclical management process. It **will help you measure and understand your environment impact as well as improve your performance on an ongoing basis.**

2.8. CORPORATE ENVIRONMENTAL RESPONSIBILITY

Corporate Environmental Responsibility (CER) refers to a company's duties to abstain from damaging natural environments. The term derives from corporate social responsibility (CSR). CSR is how companies manage their business processes to produce an overall positive impact on society. It covers sustainability, social impact and ethics. CSR is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society. The duty that a company has to operate in a way that protects the environment. Many institutional investors evaluate a company's environmental responsibility before investing in its stock.

The environmental aspect of CSR has been debated over the past few decades, as stakeholders increasingly require organizations to become more environmentally aware and socially responsible. In the traditional business model, environmental protection was considered only in relation to the "public interest". The public sector has been focused on the development of regulations and the imposition of sanctions as a means to facilitating environmental protection. Recently, the private sector has adopted the approach of co-responsibility towards the prevention and alleviation of environmental damage. The sectors and their roles have been changing, with the private sector

becoming more active in the protection of the environment. Many governments, corporations, and big companies are now providing strategies for environmental protection and economic growth. The World Commission on Environment published the Brundtland Report in 1987 to address sustainable development. Since then, managers, scholars, and business owners have tried to determine why and how big corporations should incorporate environmental aspects into their own policies. In recent years, an increasing number of companies have pledged to protect natural environments. Here are different perceptions of CSR between government, the private sector, non-governmental organizations (NGOs) and society in general, and thus, the concept has no single definition.

NOTE: CSR =Corporate Social Responsibility

2.8.1 MAIN ELEMENTS:

These cover the environmental implications of a company's operations:

- Eliminate waste and emissions
- Maximize the efficient use of resources and productivity
- Minimize activities that might impair the enjoyment of resources by future generations.

2.8.2 DRIVERS AND CHALLENGES

- ✓ Among the main drivers for CER are government policies and regulations. Many states provide their own legislation, regulations and policies, which are important in creating a positive environmental attitude within companies. Subsidies, tariffs and taxes play a vital role in the implementation of these policies.
- ✓ Another significant factor is the competitive environment among companies generated by media, public, shareholder and NGO awareness, which are also major drivers of CER.
- ✓ Challenges include the cost of regulation and difficulties in predicting economic gains, which could become problematic for a company's management. Additionally, new technologies are frequently too expensive for a lot of companies.
- ✓ Another challenge is the lack of harmonization of regulations among different states—often there is a mosaic of propositions, leading to

unclear strategies for environmental behavior, especially in multinational corporations.

2.8.3 BENEFITS OF CORPORATE ENVIRONMENTAL RESPONSIBILITY

- ✓ Corporate social responsibility can prove to be **more profitable** for companies and to extend its survivability in markets because of greater awareness on this topic, in both social and business markets.
- ✓ Customers have responded with **overall satisfaction and loyalty** when companies have a better CSR, especially in countries like Spain and Brazil.
- ✓ Culture has an impact on the CSR ratings and studies, as well as human values across different nations. It can also be found under sustainable development. This area is concerned with **not only protecting the environment but maintaining economical growth**.
- ✓ The idea of corporate environmental responsibility (CER) is for humans to be **more aware of the environmental impact and counteract their pollution/carbon footprint on the natural resources**. One of the main factors is to reduce carbon footprint and carbon emission is to balance between economic growth and reducing waste and cleaner environments.

2.8.4 SUMMARY:

The environmental security has increasingly become a major issue. The process of securitization has a big impact in creating a new understanding of security. Globalization also plays a key role in the adoption of new environmental strategies as a multi-faceted process influencing modern societies, and creating interconnected and multidimensional environments.

CER is used by multinational corporations as well as small, local organizations. It is highlighted and more institutionalized because of stakeholder's awareness of the huge impacts of business activities on the environment. To understand CER, its relations with CSR strategies need to be recognized. CER and CSR are the main strategies that help in the creation of efficient and environmentally sustainable businesses.

UNIT-2 PREVIOUS YEAR QUESTIONS

1. Discuss the various environmental and sustainable issues for production of High-tech components and materials.(MAY-2019 SUPPLY)
2. Outline the life cycle analysis of materials and their role in sustainability management. (MAY-2019 SUPPLY)
3. Describe the steps to follow to go green. (DECEMBER-2018 REGULAR)
4. How will you spread the concept of green management in an organization(DECEMBER-2018 REGULAR)
5. Describe the steps that an organization is to take to go green.(DECEMBER-2018 SUPPLY)
6. Explain the role of sustainable production in corporate social responsibility. (DECEMBER-2018 SUPPLY)
7. Discuss the various environmental and sustainability issues related to high tech components. (MAY-2018 REGULAR)
8. Explain the steps involved in spreading the concept of green management with an organization. . (MAY-2018 REGULAR)
9. What factors are responsible for growth of green business in Indian Industry. (DECEMBER-2017 SUPPLY)
- 10.Outline the environmental issues involved in green management. (DECEMBER-2017 SUPPLY)
- 11.What are the environmental issues involved in developing green management concept? (MAY-2017 REGULAR)
- 12.Suggest some important measures for the promotion of green business management. (MAY-2017 REGULAR)
- 13.Explain the steps to be taken for any organization to go green. (NOVEMBER-2016 SUPPLY)
- 14.Outline the role of life cycle analysis of materials in sustainable production. . (NOVEMBER-2016 SUPPLY)
- 15.Discuss the Indian corporate structure and environment concerning sustainability. (JULY-2016 REGULAR)
- 16.Outline the concept of corporate environmental responsibility. . (JULY-2016 REGULAR)

Suffering is the essence of success!

Prepared By

L.Nikhila B.Tech, MBA, P.hD

Assistant professor

BALAJI INSTITUTE OF IT & MANAGEMENT, KADAPA

Icet code: BIMK

SUBJECT: GREEN BUSINESS MANAGEMENT

Regulation: R17

CASE STUDY: Q-SUKSES (CREATIVE AND GREEN MANAGEMENT CONSULTING)

Q) Heru Sriwidodo, founder of Q-Sukses Management Consulting is an environmental activist. Raised from a farmer family, Mr. Heru always used to make the environment around his residence green with many kinds of plants and if possible even renewable energy sources. In one of the places he used to stay, Mr. Heru built solar power, wind power, and micro hydro generators.

Meanwhile, Mr. Guntar, now CEO of the company was exposed to the idea of sustainability when he took his graduate degree at Institut Teknologi Sepuluh Nopember Surabaya. Inspired and assisted by Dr. Maria Anityasari, Guntar developed a Sustainable Manufacturing Capability Maturity Model (SMCMM). This model can assist companies in adopting sustainability initiatives in gradual steps according to their own ability, from ad-hoc into best-practice conditions with continuous improvement.

SOLUTION TO THE CASE:

STARTUP PHASE AND BUSINESS PROFILE

Due to his strong background in environmental sustainability, Mr. Heru founded PT Q-Sukses Manajemen Indonesia (Q-Sukses), a consulting services firm that helps organizations transform its people to reach the intended business goals. By utilizing an organization's culture, knowledge, and technology while applying sustainable approaches. Q-Sukses offers a diverse line of services derived from its customers' specific needs which take the form of training, coaching, focus group discussions, outbound experiential learning, employee performance exploration (nature and nurture talents), knowledge management

programme, performance management programme, executive reporting (business intelligence), and change management roadmap development.

In its People Transformation Programme, Q-Sukses sees its mission based on 2 main elements. Firstly, assisting people in identifying their hidden resources and releasing these to their full potential in order that the person may achieve everything that they desire in life - physically, emotionally, financially and professionally. Secondly, enabling them to recognize the path they want to take and the aims they wish to fulfill, and then to equip them with the knowledge, skills, and means by which they will accomplish these aims.

When Q-Sukses delivers its training and seminar programme, they present the following competitive advantages:

- ✓ Full exploration of personal and team talent
- ✓ Whole-brain, whole-body involvement
- ✓ Attractive multimedia presentations
- ✓ Variety to appeal to all learning styles
- ✓ Partner-based and team-based learning projects
- ✓ Problem solving exercises and activities
- ✓ Real-world, contextual learning experience
- ✓ Insightful games and experiential learning (with performance measurement)

WHY IS IT GREEN AND SUSTAINABLE?

Q-Sukses has specialized in providing advisory services for green-initiative implementation for some of its customers. PT PJB UP Brantas (Government-owned Hydro Power Installation Company) in East Java is one of Q-Sukses clients who have built micro-hydro, solar, wind power, and biomass installations. The installation is made for educational purposes, along with outbound game installation built there. Another Q-Sukses' client, PT PJB UP Cirata (also government owned hydro power installation company), has been aided by Q-Success in designing a renewable-energy initiative roadmap which in turn gave birth to the so-called Cirata Green Energy Campus (C-GEN Campus). In 2012, SWA magazine has selected PT PJB UP Cirata as one of the most green companies (top 25) in Indonesia.

PJB Cirata C-GEN Campus is a place of learning, research, and application of green energy technology and sustainable asset management. All of them are presented in an inspiring learning experience, fun, holistic, and effective. The audience of this programme are students, private sector and government, research institutions, and the public in general. C-GEN Campus aspires to build a community of practitioners, researchers and innovators in the field of green energy, inviting participation and providing various forms of appreciation. Challenges As a consulting firm, one is selling a special and intangible product, which is often not clear for the clients. Trying to sell terms such as “outbound experiential learning” to clients is not easy. People like to buy what they can see, touch, feel. Consulting firms therefore need to develop well targetted marketing strategies making their intangible product somehow tangible by well describing the actual outcomes and benefits for the client.

LESSONS LEARNT

Q-Sukses Management Consulting has achieved a market niche, providing consultancy services to companies with a focus on sustainability and green approaches. In their approach they focus on the high potential of the people in the company as the agents of change. Successful and sustainable approaches in a business can only be achieved if the staff fully understands and supports the concept and its implementation.

TIPS “The potential for change lies with the people and can only be realized through the people.”

(17E00302) GREEN BUSINESS MANAGEMENT

Objective: The objective of the course is to impart students in understanding of green business, its advantages, issues and opportunities and to provide knowledge over the strategies for building eco-business.

1. Introduction to Green Management: The Concept of Green Management; Evolution; nature, scope, importance and types; Developing a theory; Green Management in India; Relevance in twenty first century

2. Organizational Environment; Indian Corporate Structure and Environment; How to go green; spreading the concept in organization; Environmental and sustainability issues for the production of high-tech components and materials, Life Cycle Analysis of materials, sustainable production and its role in corporate environmental responsibility (CER).

3. Approaches from Ecological Economics; Indicators of sustainability; Eco-system services and their sustainable use; Bio-diversity; Indian perspective; Alternate theories

4. Environmental Reporting and ISO 14001; Climate change business and ISO 14064; Green financing; Financial initiative by UNEP; Green energy management; Green product management

5. Green Techniques and Methods; Green tax incentives and rebates (to green projects and companies); Green project management in action; Business redesign; Eco-commerce models

Text Books:

- Green Management and Green Technologies: Exploring the Causal Relationship by Jazmin SeijasNogarida , ZEW Publications.
- The Green Energy Management Book by Leo A. Meyer, LAMA books

References:

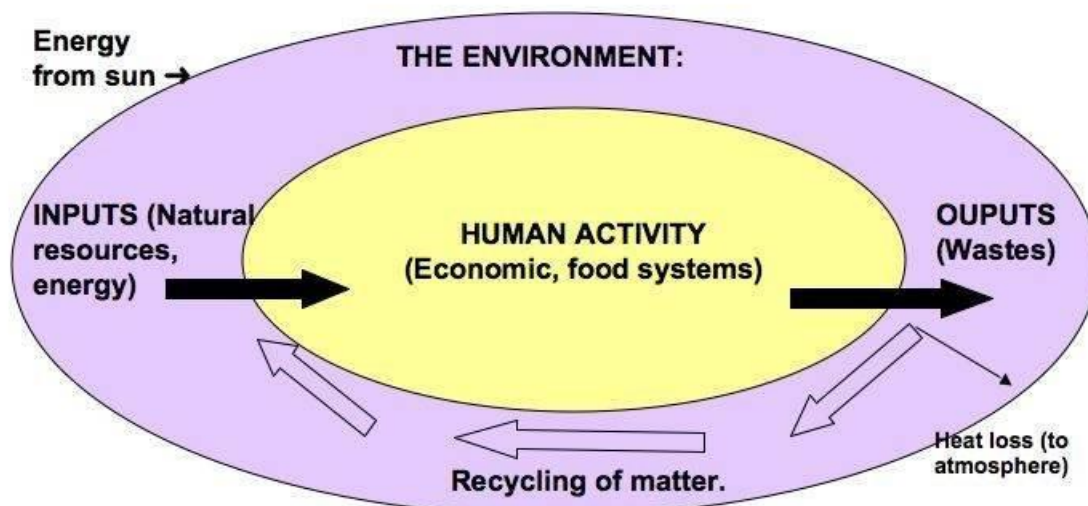
- Green Marketing and Management: A global Perspective by John F. Whaik, Qbase Technologies.
- Green Project Management by Richard Maltzman And David Shiden, CRC Press Books.
- Green and World by Andrew S. Winston, Yale Press B

UNIT-3**APPROACHES FROM ECOLOGICAL ECONOMICS****3.1 INTRODUCTION TO ENVIRONMENTAL ECONOMICS**

Environmental/Ecological economics teaches us how to promote economic growth of nations with least environmental damage. Environmental Economics is an emerging area in the realm of economic science. Today, people all over the world have realized that environment is not just the study of flora and fauna, but a synthesis of study of various branches of knowledge like Science, Economics, Philosophy, Ethics, Anthropology, etc. Therefore, a study of environmental economics calls for a detailed understanding about various environmental factors, their influence in the economy, their functions upon the environment, and their impacts upon the life of the people of the present and future.

Environmental economics is a sub-field of **economics** concerned with **environmental** issues. ... Particular issues include the costs and benefits of alternative **environmental** policies to deal with air pollution, water quality, toxic substances, solid waste, and global warming.

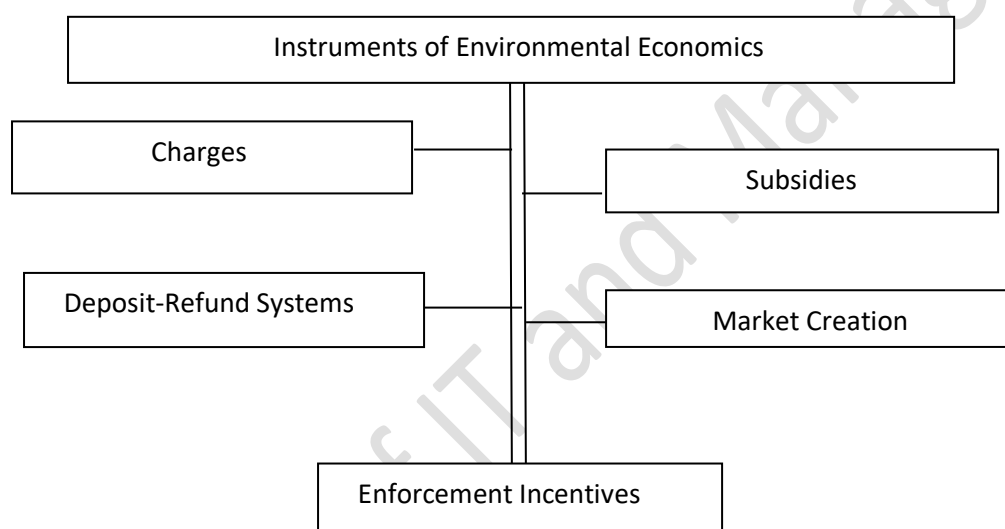
Ecological Economics Model: All human activity is embedded in the environment



Environmental economics is concerned with the analysis of the **impact of the economy on the environment**, the significance of the environment to the

economy and appropriate way of regulation economic activity so that balance is achieved among environmental, economic, and other social objectives. Environmental economics can therefore be defined as that “part of economics which deals with **interrelationship** between environment and economic development and studies the ways and means by which the former is not impaired nor the latter impeded”. It is thus a branch of economics which discusses about the impacts of **interaction between men and nature** and finds human solutions to maintain harmony between men and nature.

3.1.1 INSTRUMENTS OF ENVIRONMENTAL ECONOMICS:



1) Charges: Charges establish a ‘Price’ for pollution and natural resource use. They may include:

i) Emission Charges:

- These charges establish an **additional charge** per unit of production that is designed to reflect the external costs associated with that production.
- A charge system may be structured to achieve a given ambient pollution standard; to achieve an optimal pollution level; or to raise revenues beyond the necessary clean-up costs to finance other environmental and social investments.

ii) Product Charges:

- These charges are economic incentives that raise revenue and promote a lifecycle approach to production; these costs are levied directly on

consumers, and are especially appropriate for non-point sources of pollution.

- For Example, Norway and Sweden apply product charges to batteries, fertilizers and pesticides.

iii) User Fees: This may be levied to collect payment for the costs of collective treatment of effluents, or to raise the prices for the use of natural resources.

iv) Tax Differentiation:

- Taxes were less for 'environmentally-friendly' products when compared to environmentally-destruction products.
- Existing tax structures may be amended to incorporate environmental considerations by differentially taxing final products (consumption taxes) and intermediate products (input taxes).

2) Subsidies: *A subsidy is a benefit given to an individual, business, or institution, usually by the government.* These provide financial incentives for polluters to adopt with environmental standards. Subsidies are utilized by large number of countries, including India, to encourage pollution control. Financial incentives may include:

i) Grants: Non-repayable grants may be issued to polluters, contingent on their action to take steps to reduce their pollution.

ii) Soft Loans: Loans may be provided at low of interest to polluters to finance environmental investments.

iii) Tax Allowances: A sum to be deducted from gross income in the calculation of taxable income. The amount a person can earn without being subject to income tax.

3) Deposit-Refund Systems: A **deposit-refund system** combines a tax on product consumption with a rebate when the product or its packaging is returned for **recycling**. **Deposit-refunds** are used for beverage containers, lead-acid batteries, motor oil, tires, various hazardous materials, electronics, and more.

4) Market Creation: **Creation of markets** refers to "the removal of barriers to trade and the assignment of well-defined property rights to create **markets** where environmental goods and services with privately-appropriate values can be traded to realize their full potential values. Generates

incentives for the sustainable use of resources." Artificial markets for 'pollution rights' may be created to enable manufacturers to trade consents to pollute in critically polluted or sensitive areas.

3.2 SUSTAINABLE DEVELOPMENT

According to Brundtland Commission, "Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

According to E.Barbier, "The primary objective of sustainable development is to reduce the absolute poverty of the world's poor through providing lasting and secure livelihoods that minimize resource depletion, environmental degradation, cultural disruption and social instability."

3.2.1 OBJECTIVES OF SUSTAINABLE DEVELOPMENT:

The objectives of sustainable development are as follows:

- 1) To prevent excessive depletion and degradation of all natural resources.
- 2) To use energy more efficiently and improve quality of human life,
- 3) To shift from polluting fossil fuels to renewable sources of energy, as derived from the sun.
- 4) To stall the pace of renewable resources to the rate at which they can be regenerated and replaced.
- 5) To promote equity and fairness in utilization of resources,
- 6) To install measure for protecting ecosystem,
- 7) Economic and environmental considerations while taking decisions,
- 8) To curtail all wastage of non-renewable resources and to recycle and re-use materials.
- 9) To fulfill the international obligations related to environmental issues.
- 10) To reduce waste and pollution generation to levels at which they can be biodegraded and rendered harmless.

- 11) To slowdown and ultimately stabilize population growth, and
- 12) To reduce poverty that leads people to use resources unsustainably.

3.2.2 REASONS FOR UNSUSTAINABILITY:

The main cause of unsustainability is short-term thinking. When people fail to plan for the long haul and focus only on immediate gain, the result is unsustainability, regardless of the context.

The factors responsible for Global unsustainability are as follows:

- 1) The rapidly increasing population and the consequent increasing pressure on natural resources and life support systems of the earth, and
- 2) The declining physical resources of the Earth, the regeneration of which is unable to match the pace of indiscriminate use of environment.

The above two reasons are diverged into following factors which added to global unsustainability:

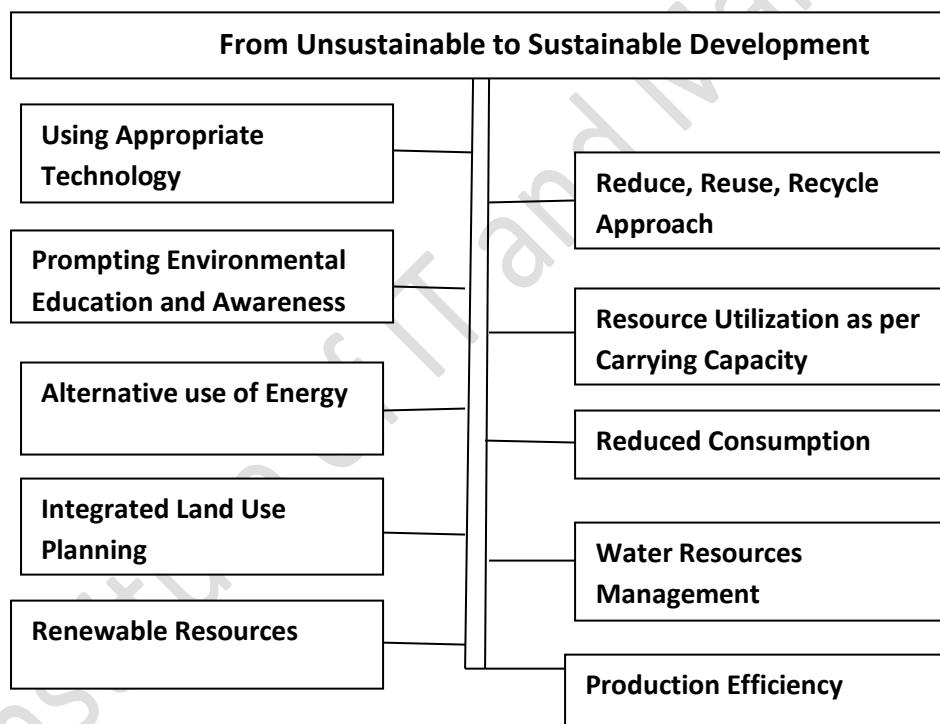
- 1) Uncontrolled exploitation of limited natural resources.
- 2) Unchecked industrial growth.
- 3) Deforestation.
- 4) Building of large dams.
- 5) Immense growth in population.
- 6) Terrible increase in all types of pollutions, which is due to the overgrowing population and their demands.
- 7) Unchecked disposal of toxic and nuclear wastes into the water bodies.
- 9) Manufacture of goods like polyethene, etc., which are made up of highly toxic chemicals, etc.

3.2.3 FROM UNSUSTAINABLE TO SUSTAINABLE DEVELOPMENT:

In today's world, all the nations are broadly classified into major categories:

- 1) Firstly, the nations which are economically well developed or the countries in which majority of the population are rich are categorized as developed nations.
- 2) Secondly, those nations which are economically backward or the majority of population in these countries are under the poverty line are placed into other category as developing countries.

Following measures can be taken to foster sustainable development of the countries



1) Using Appropriate Technology: Appropriate technology is one which is locally adaptable, eco-friendly – efficient and culturally suitable. It mostly involves local resources and local labor. Indigenous technologies are more useful, cost-effective and sustainable. Nature is often taken as a model, using the natural conditions of that region as its components. This concept is known as “design with nature”.

2) Reduce, Reuse and Recycle Approach: The 3R approach advocating minimization of resources use, using them again and again instead of passing it on to the waste stream and recycling the materials goes a long way in achieving

the goals of sustainability. It reduces pressure on our resources as well as reduces waste generation and pollution.

3) **Prompting Environmental Education and Awareness:** Making environmental education the centre of all learning process will greatly help in changing the thinking and attitude of people towards our earth and the environment. Introducing the subject right from the school stage will inculcate a feeling of belongingness to earth in the small children.

4) **Resources Utilization as Per Carrying Capacity:** Sustainability of a system depends largely upon the carrying capacity of the system. If the carrying capacity of a system is crossed (say, by over exploitation of a resources), environmental degradation starts and continues till it reaches a point of no return. In order to attain sustainability it is very important to utilize the resources based upon the above two properties of the system.

5) **Alternative Use of Energy:** People should turn to alternate energy sources as soon as possible and as much as possible. The main forms of alternative sources of energy are solar and wind energy, biogas from municipal solid waste and agro waste, etc. these are far less polluting than conventional sources.

6) **Reduced Consumption:** Values of life should be shifted to honour lesser consumption and simpler lifestyles. Mental development should gain more respect than material pomp.

7) **Integrated Land Use Planning:** Relative priorities among different land uses like agriculture, forestry, fodder cultivation, urban and industrial growths, traffic, etc., should be planned and managed judiciously.

8) **Water Resource Management:** River flooding and meandering, silting-up of natural and man-made reservoirs, over exploitation of ground water, water logging by over irrigation and poor drainage and pollution of the water bodies are some of the consequences of poor water resource management.

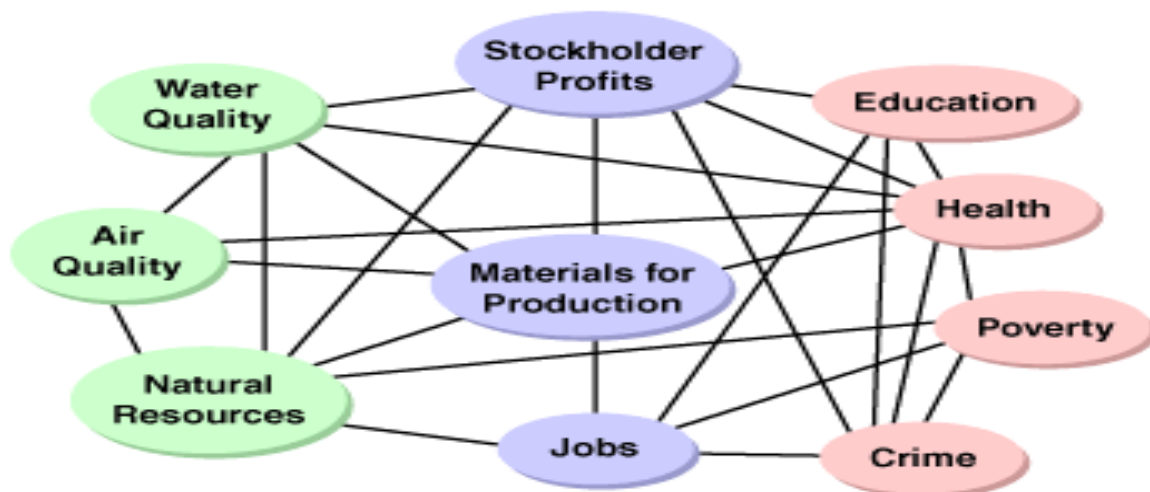
9) **Renewable Resources:** Future development should be based on material resources that can be renewed or recycled, or resources that cannot be depleted in the near future, **For example**, wood can be consumed and can be grown maintaining a balance between the two.

10) **Production Efficiency:** The current production processes involve wastage, which can be reduced or avoided. Better planning and improved technology can lead to better yields from given resources. Genetic, hybrids, drip irrigation, pest control, soil-crop-fertility management, etc., are examples of improving agricultural productivity.

3.3 INDICATORS OF SUSTAINABILITY

An Indicator helps understand where we are, which way we are going and how far we are from our goal. It alerts us to a problem before it gets too bad and helps recognize solutions to fix the problem. Indicators of Sustainability are different from traditional indicators of economic, social and environmental progress.

- ✚ Jobs affect the poverty rate and the poverty rate is related to crime.
- ✚ Air quality, water quality and materials used for production have an effect on health.
- ✚ They may also have an effect on stockholder profits: if a process requires clean water as an input, cleaning up poor quality water prior to processing is an extra expense, which reduces profits.



As this figure illustrates, the natural resource base provides the materials for production on which jobs and stockholder profits depend.

- + Likewise, health problems, whether due to general air quality problems or exposure to toxic materials, have an effect on worker productivity and contribute to the rising costs of health insurance.
- + Sustainability requires this type of integrated view of the world -- it requires **multidimensional indicators** that show the links among a community's economy, environment, and society.

For example, the Gross Domestic Product (GDP), a well-publicized traditional indicator, measures the amount of money being spent in a country.

- + It is generally reported as a measure of the country's economic well-being: the more money being spent, the higher the GDP and the better the overall economic well-being is assumed to be.
- + However, because GDP reflects only the amount of economic activity, regardless of the effect of that activity on the community's social and environmental health, GDP can go up when overall community health goes down.

For example, when there is a ten-car pileup on the highway, the GDP goes up because of the money spent on medical fees and repair costs. On the other hand, if ten people decide not to buy cars and instead walk to work, their health and wealth may increase but the GDP goes down.

Thus, the indicators of sustainability point to an issue or condition. The following are certain characteristics that are the sustainability indicators have in common:

1. Alert a problem before it gets too bad
2. Helps recognize what needs to be done to fix the problem
3. Build clarity and accountability
4. Reflect a sense of purpose
5. Illustrate relationships
6. Show Trends

Such Multidimensional sustainability indicators that possess all these characteristics and show the links among a community's economy, environment, and society are described below:

1. **Gross National Happiness (GNH):** It is an attempt to define quality of life in more holistic and psychological terms than Gross National Product. It serves as a Unifying vision for the Five Year Planning process and all the

derived planning documents that guide the economic and development plans of a country. GNH is based on the assertion that true development of human society takes place when material and spiritual development occur side by side to complement and reinforce each other.

2. **Human Development Index (HDI):** It is the measure of life expectancy, literacy, education and standard of living for countries worldwide. It is a standard means of measuring well-being, especially child welfare. It is used to determine and indicate whether a country is developed, developing or underdeveloped country and also to measure the impact of economic policies on quality of life.
3. **Ecological Footprint (EF):** It compares human consumption of natural resources with Earth's ecological capacity to regenerate them. It is an estimate of the amount of biologically productive land and sea area needed to regenerate the resources human population consumes and to absorb the corresponding waste, given prevailing technology and current understanding. Using this assessment, it is possible to estimate how many planet Earths it would take to support humanity if everybody lived a given lifestyle. Per Capita EF is a means of comparing consumption and lifestyles, and check this against nature's ability to provide for this consumption.
4. **The Happy Planet Index (HPI):** It is an index of human well being and environmental impact. The index challenges other well-established indices such as Gross Domestic Product (GDP) and the Human Development Index (HDI). The HPI is based on the principle that most people want to live long and fulfilling lives, and the country which is doing the best is the one that allows its citizens to do so, whilst avoiding infringing on the opportunity of future people and people in other countries to do the same.

3.4 ECOSYSTEM SERVICES & THEIR SUSTAINABLE USE

Ecosystem services are the benefits that humans derive from ecosystems.

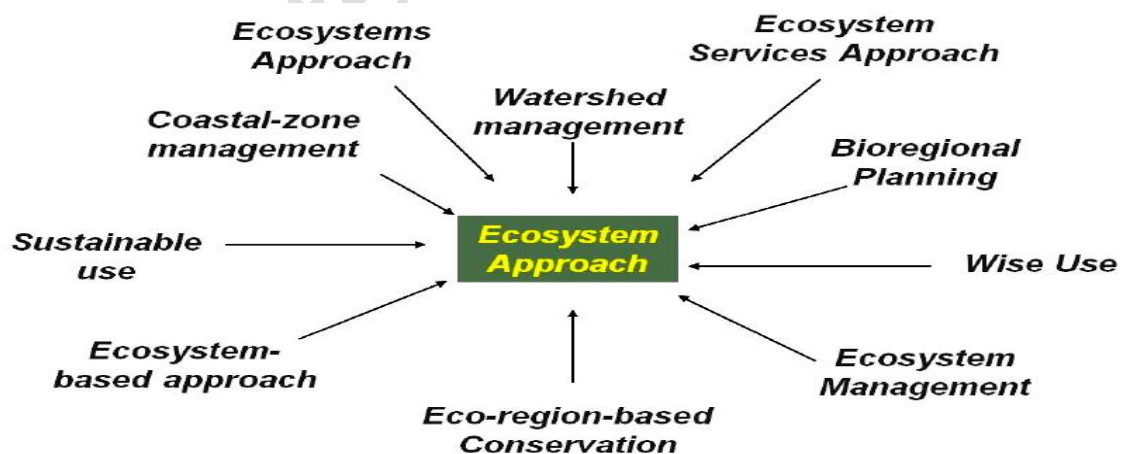
Ecosystem was disturbed by natural and human disturbances. Ecosystem services are sets of environmental properties deriving from ecosystem structures and processes which are arranged from an anthropocentric (considering human beings as the most significant entity of the universe) point of view. They describe those products and outcomes from complex ecological interrelations

which are useful and necessary for human well-being. Recently, the importance of research into ecosystem services has been widely recognized and many advances are being made in its field. Ecosystem services are the benefits people obtain from ecosystems, and thus they can be used to represent the environmental interrelations between the different sectors of sustainability. From an economic viewpoint they can be understood as “flows of value to human societies as a result of the state and quantity of the natural capital”.

According to Fisher and Turner, “Ecosystem services are aspects of ecosystem utilized (actively or passively) to produce human well-being.”

According to Boyd and Banzhaf, “Ecosystem services are components of nature, directly enjoyed, consumed or used to yield human well-being.”

- ✚ The dynamics of an Ecosystem are strongly affected by natural and human disturbances and such changes can have direct and cascading effects on spatial and temporal variations in the composition, structure and processes of ecosystems.
- ✚ In developing countries, where short-term economic growth and social delivery are more important than conservation, placing a monetary value on ecosystems services is the only way to ensure intervention.
- ✚ Sustainability science is motivated by fundamental questions about interactions between nature and society as well as compelling and urgent social needs.



- ✚ The purpose of **sustainable development** is to create and maintain prosperous social, economic and ecological systems.

- ✚ These systems are intimately linked with each other: humanity depends on services that are provided by ecosystems for wealth and security.

3.4.1 TYPES OF ECOSYSTEM SERVICES:

1. **Regulating Services:** These are the benefits people obtain due to the regulation of natural processes and the control or modifications of biotic factors (living organisms like humans, animals, plants, Bacteria, pathogens, fungus) and abiotic factors (Nonliving organisms like temperature, air currents, minerals, air, soil, water, etc.). Being hardly visible and comparably difficult to understand, these services are not widely acknowledged by the society.
2. **Provisioning Services:** It comprises all material outputs from ecosystem processes that are used for human nutrition, processing and energy use. These products can be traded and consumed or used directly, thus they are the desired 'end-products' of nature providing clearly visible benefits to society. Provisioning services can be divided into the sub-categories of food, materials and energy.
3. **Cultural Ecosystem Services:** These are the intangible benefits people obtain from ecosystems in form of non-material *spiritual, religious, inspirational and educational experience*. These services provide benefits for human recreation and mental and physical health, experience by tourism, aesthetic appreciation and inspiration for culture, art and design, spiritual experience and sense of place.

3.4.2 IMPORTANCE OF SUSTAINABLE DEVELOPMENT:

1. **Communities:** Sustainable Development has a major impact on communities that work together toward sustainable living. Residential homes can benefit from sustainable development through the conservation of energy, water and other resources. Green spaces are created in urban areas that residents can use for conserve the natural environment. These green spaces also help to conserve the natural environment.
2. **Enhancing the Environment:** Much of sustainable development works toward preserving wildlife, including both plants and animals. Development can often push native species from the homes, but with sustainable development, humans and nature should live in harmony, while affecting the ecosystem as little as possible.
3. **Growing Green:** Sustainable Development still aims to help communities grow, but to do so in a manner that is green and good for the environment. In

this way, people can help to improve air and water quality, redevelop properties that may have been contaminated or run-down, and help to preserve the natural environment.

4. **Global Impact:** Sustainable Development expands past the community level, since all communities affect one another. There are global benefits for the environment, such as the upkeep of biodiversity, forest and the ozone layer all of which are important at global level.
5. **Accommodate City Development:** As populations rise, cities will need to become larger to accommodate the influx of new residents. If these cities are developed non-sustainably, they will become more and more expensive to build and maintain over time. If cities use sustainable development practices, they can conceivably make way for new housing and business developments indefinitely.
6. **Provide Financial Stability:** Sustainable Development can also produce more financially sustainable economies throughout the world. Resource-poor economies will gain access to free and accessible energy through renewable while also having the opportunity the opportunity to train workers for jobs that won't be displaced by the basic reality of finite resources.
7. **Sustain Biodiversity:** Biodiversity suffers through over consumption and unsustainable development practices. Beyond the basic ethical quandary presented by this fact, there is the further concern that these species are a part of a food web that humans rely on.

3.4.3 CHALLENGES IN SUSTAINABLE DEVELOPMENT:

Although the idea of Sustainable Development has often been used by people such as environmentalists, sociologists and politicians in their speeches and various agreements, the pace of achieving this sustainability, so far, has been quite poor. Many challenges have been attributed to this failure. These include the following:

1. **Disagreements between Stakeholders:** In a society, there exist many stakeholders such as men, women, children, youth, non-governmental organizations, local authorities, workers and trade unions and agricultural and technological communities. Before implementing any decision, all these stakeholders have to be considered.
2. **Uncertainty:** There is always an uncertainty regarding different global environmental issues and the manner in which they interact with the global

ecosystem. There is also uncertainty regarding how the implementation of new policies will affect the normal functioning of the biosphere.

3. **Consumption and Life Style:** Level of Consumption and lifestyles of different people of the area are upheld in any programme to achieve sustainable development. Developing Countries aspire to achieve a more comfortable living standard.
4. **Arguments over Cause and Responsibility:** Global Warming, a problem attributed to the wealthy developed nations of the west, has led to a rise in the sea level causing large portions of coastal area to submerge. The victims are inhabitants of low lying coastal areas and islands. The vision of sustainable development will not be realized unless people around the world and their governments share sustainability a common concern and work towards it.
5. **Globalization:** It also took the form of the spread of new technologies including genetic engineering that has the potential of impacting significantly on the environment and human health. The competition between the two paradigms, with globalization running away as the winner and moreover a winner whose speed direction and effects seem to be uncontrollable, has resulted in more unsustainable development.
6. **Gender Equity:** In many of the developing countries, women are still considered second class citizens. It is important that the role of the women as legitimate owners, users and producers of the built environment is recognized.
7. **Education:** Ignorance and lack of information on Sustainable Issues and Solutions is a major obstacle that needs to be overcome. To bridge this gap, it will require interventions at all three levels of education, continued education programmes for professionals and technicians, education and awareness raising programmes for government officials and politicians and a concerted public education programme.
8. **Urbanization and Rural Development:** There are several interlinked issues as people and government are not paying enough attention to the linkages between urban development and investment strategies and the impact this has on rural areas, as well as the possible synergies that can be developed through, e.g., transportation links and tourism.

3.5 BIODIVERSITY

Meaning and Definition of Biodiversity:

The variety of life (plants, animals and other organisms) that exist on earth is known as biodiversity. The richness of biodiversity depends on the climatic conditions of the region.

Bio Diversity can be defined as vast array (collection) of species of microorganisms, algae, fungi, plants and animals, occurring on earth either in terrestrial (land) or aquatic (water) habitats.

Biodiversity generally refers to the variety and variability of life on Earth. The term biodiversity was coined by **Walter G. Rosen in 1985**.

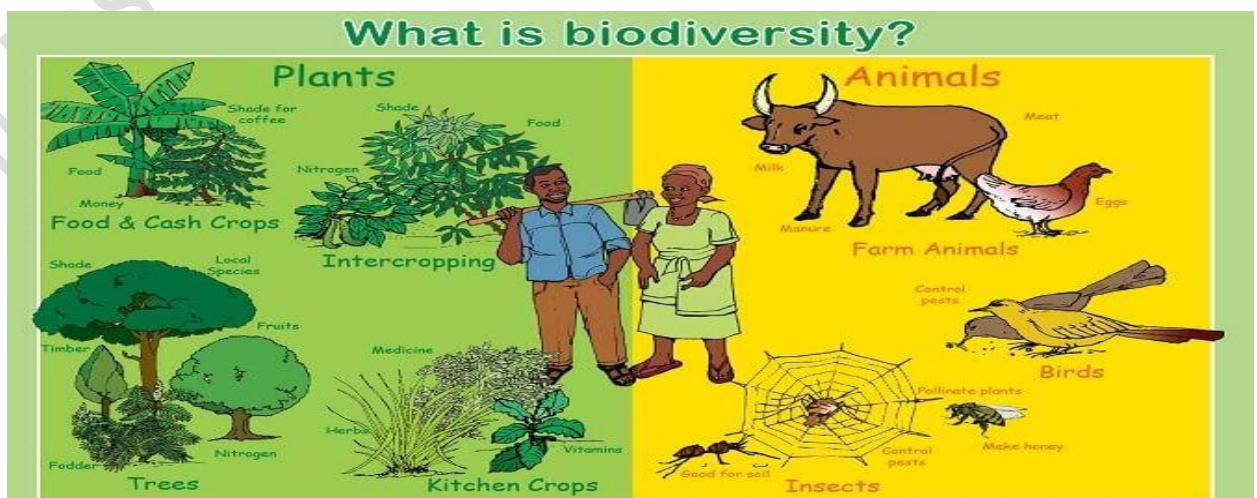
According to the world Resource Institute, “Biodiversity is the variety of the world’s organisms, including their genetic diversity and the assemblage they form”.

According to the U.S. Office of Technology Assessment, “Biological diversity is the variety and variability among living organisms and the ecological complexes in which they occur”.

A concise definition of biodiversity is “the totality of genes, species, and ecosystem in a region”.

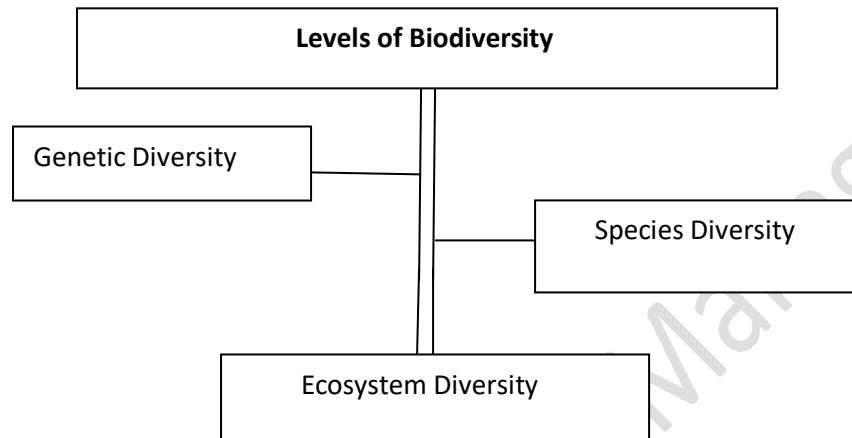
The word biodiversity is derived from-bios meaning life and diversity meaning variety.

Biodiversity = Bios (Life) + Diversity (Variability)



It is the blanket term for natural biological wealth that supports human life and well-being. The breadth of the concept reflects the inter-relatedness of genes, species and ecosystems. Because genes are the components of species, and species are the components of ecosystems.

3.5.1. LEVELS OF BIODIVERSITY:



1) **Genetic Diversity:** *It is the combination of different genes found within a population of a single species.* It refers to variation of genes within species.

Genes: These are the Carriers of heredity from parents to off-springs and contain information that determines the characteristics of each organism.

Example: Mango, human beings, cheetah etc.,

Genetic diversity, the level of biodiversity refers to the total number of genetic characteristics in the genetic makeup of a species.

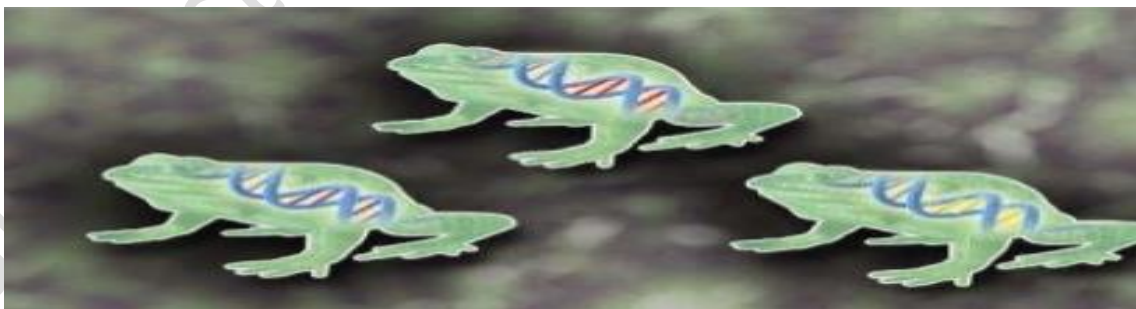


Figure: Genetic Diversity

It leads to various species. Genetic diversity is a concept of the variability within a species, as measured by the variation in genes.

Genetic diversity is important for the chances of survival for a particular species of plants and animals, such as a snapdragon or a polar bear. This is due to the fact that species with greater genetic diversity generally have more tools to adapt to changes within its environment. For example, species experience changes such as a warming environment and then the fittest members of the species will survive and pass on their "superior" genetic code to their offspring.

Example: Cheetahs-Low Genetic Diversity

The cheetah is an example of a species lacking genetic diversity. According to the Cheetah Conservation Fund, there used to be several Cheetah species tens of thousands of years ago, and it was a genetically diverse animal. However, as the climate across the globe changed, all but the one species of the Cheetah remaining on the Earth today became extinct. This species, called the jubatus, suffers from drastically reduced numbers and has had to resort to inbreeding (sexual reproducing with closely related family members) to survive. This inbreeding has greatly minimized the genetic diversity within the population, making it susceptible to becoming extinct.

2) Species Diversity: *Species Diversity is the effective number of different species that are represented in a collection of individuals.*



Figure: Species Diversity

Species diversity is a measurement of biological diversity to be found in a specific ecological community. It represents the species richness or number of species found in an ecological community, the abundance (or number of individuals per species), and the distribution or evenness of species. Species diversity is a benchmark that can be used to evaluate the health of ecosystems. In a healthy ecosystem, a diverse and balanced number of species exist and maintain the equilibrium of the ecosystem.

NOTE: Species Diversity is the product of species richness (Number of individuals per area) and Species even-ness (Number of species in a particular area).

Example: Insects, crabs, worms, snails etc.,

3) **Ecosystem Diversity:** It deals with the variations in ecosystems within a geographical location and its overall impact on human existence and the environment.



Figure: Ecosystem Diversity

Ecosystem diversity is a type of biodiversity. It is the variation in the ecosystems found in a region or the variation in ecosystems over the whole planet. Biodiversity is important because it clears out our water, changes out climate, and provides us with food. Ecological diversity includes the variation in both terrestrial and aquatic ecosystems. Ecological diversity can also take into account the variation in the complexity of a biological community, including the number of different niches, the number of trophic levels and other ecological processes. An example of ecological diversity on a global scale would be the variation in ecosystems, such as deserts, forests, grasslands, wetlands and oceans. Ecological diversity is the largest scale of biodiversity, and within each ecosystem, there is a great deal of both species and genetic diversity.

3.5.2. IMPORTANCE OF BIODIVERSITY:

A healthy biodiversity provides a number of natural services for everyone:

1. Ecosystem services, such as

- Protection of water resources
- Soils formation and protection
- Nutrient storage and recycling
- Pollution breakdown and absorption
- Contribution to climate stability

- Maintenance of ecosystems
- Recovery from unpredictable events

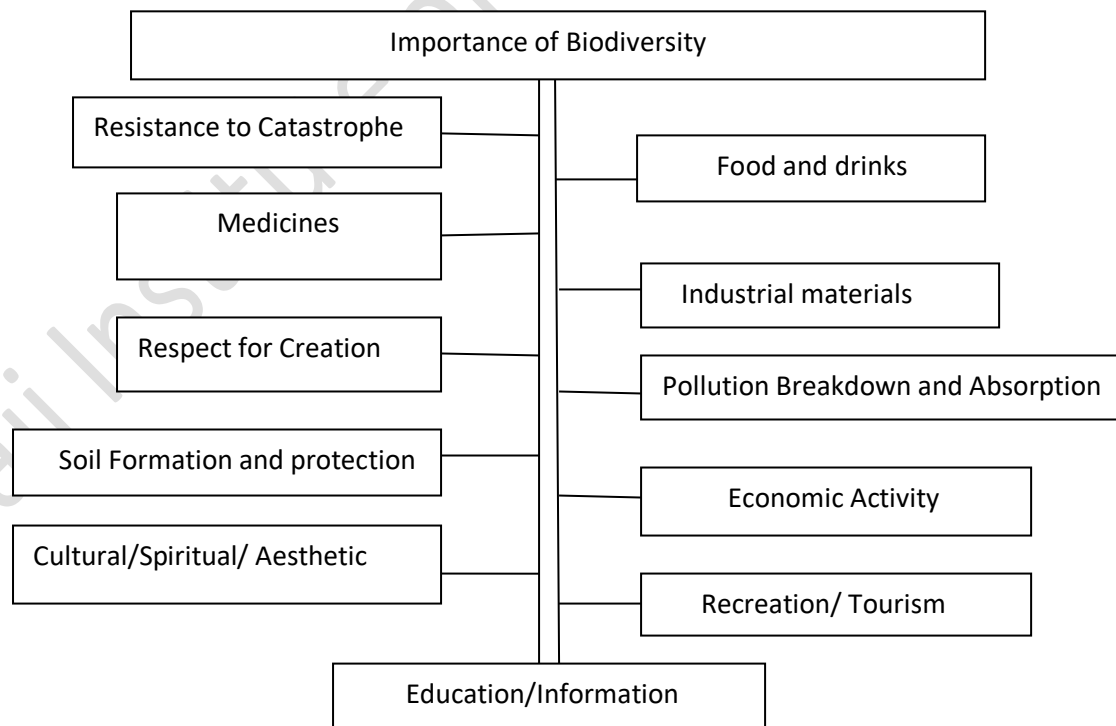
2. Biological resources, such as

- Food
- Medicinal resources and pharmaceutical drugs
- Wood products
- Ornamental plants
- Breeding stocks, population reservoirs
- Future resources
- Diversity in genes, species and ecosystems

3. Social benefits, such as

- Research, education and monitoring
- Recreation and tourism
- Cultural values

Importance of biodiversity is explained below:



3.5.3 THREATS TO BIO DIVERSITY (extinction/the elimination of species)

1. Environmental risk(Variation of environment leads to extinction)
2. Man-wild life conflicts(Wild life faces extinction)
3. Population Risk(Variation in birth and death rates)
4. Natural catastrophe(Sudden change in environment naturally like fires, floods, earthquakes, volcanic eruptions etc.,)
5. Habitat loss and deforestation
6. Climate change
7. Environmental Pollution
8. Human actions
 - a) **Poaching of wild life** (Poaching means illegal taking of wild plants or animals).A number of wild life species are becoming extinct due to poaching and hunting.
 - b) **Shifting/Jhum Cultivation**(by poor tribal people greatly affects the forest structure) a form of agriculture, used especially in tropical Africa, in which an area of ground is cleared of vegetation and cultivated for a few years and then abandoned for a new area until its fertility has been naturally restored.
 - c) **Diseases**(The human activities increases the diseases in species and leads to extinction)
 - d) **Over Exploitation of resources**(The natural resources are over exploited to meet growing rural poverty)

The United Nations designated 2011–2020 as the United Nations Decade on Biodiversity.

3.6 INDIA PERSPECTIVE OF BIO DIVERSITY

India is a mega diverse nation, housing around 10% of world's species. It also has a rich cultural heritage going back thousands of years. Much of Indian biodiversity is intricately related to the socio-cultural practices of the land.

India is one of the Mega diversity centers in the world and has two of the world's 18 "biodiversity Hotspots" located in Western Ghats and in the Eastern

Himalayas. The forest cover in these areas is very dense and diverse and of pristine beauty, and incredible biodiversity. The sacred groves of India for some of the areas in the country where the richness of biodiversity has been well preserved. The **Thar Desert and the Himalayas** are two regions rich in Biodiversity in India. There are 89 national parks and 504 Wildlife sanctuaries in the country, the Chilika Lake being one of them. This lake is also an important wet land area.

India is the seventh largest country in the world and Asia's second largest nation with an area of 32,87,273 sq.km, and encompassing a varied landscape rich in natural resources.



Within India, the classification recognizes 10 zones, divided into 27 provinces. The country has 10 different biogeographic zones and 27 biotic provinces.

BIOGEOGRAPHIC ZONES AND BIOTIC PROVINCE OF INDIA.

S.no	Biogeographic Zones	Biotic Provinces
1.	Trans –Himalaya	Ladakh mountains, Tibetan plateau
2.	Himalaya	North-west, west central and east himalayas
3.	Desert	Thar, kutch
4.	Semi-arid	Punjab plains, Gujarat raiputana
5.	Western Ghats	Malabar plains, western ghats
6.	Deccan peninsula	Central highlands, chotta-nagpur, eastern highlands, central plateau, deccan south
7.	Gangetic plains	Upper and lower gangetic plains
8.	Coast	West and east coast , Lakshadweep

9.	North-east	Bhramhaputhra valley,north-east hills
10.	islands	Andaman and nicobar

3.6.1 BIODIVERSITY AND ITS CONSERVATION IN INDIA:

Conservations of Biodiversity: In-Situ Conservation and Ex-Situ Conservation

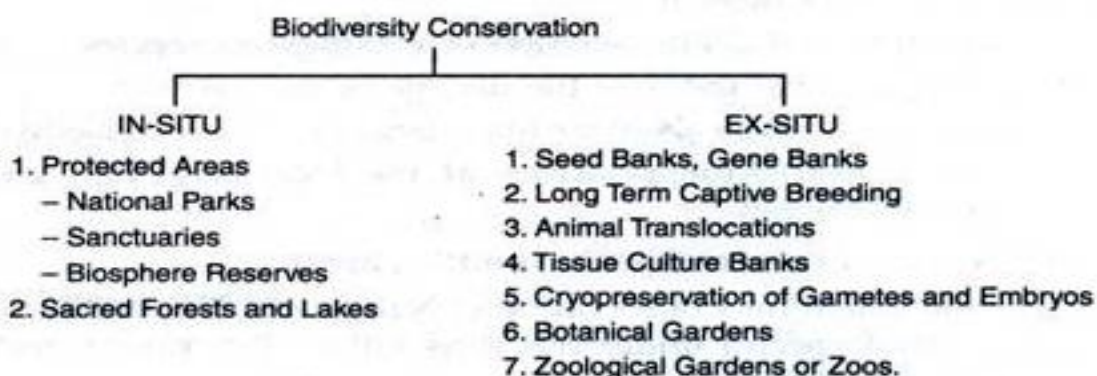
Conservation is the protection, preservation, management, or restoration of wildlife and natural resources such as forests and water. Through the conservation of biodiversity and the survival of many species and habitats which are threatened due to human activities can be ensured. There is an urgent need, not only to manage and conserve the biotic wealth, but also restore the degraded ecosystems.

Humans have been directly or indirectly dependent on biodiversity for sustenance to a considerable extent. However, increasing population pressure and developmental activities have led to large scale depletion of the natural resources.

TYPES OF CONSERVATION:

Conservation can broadly be divided into two types:

1. In-situ conservation and 2. Ex-situ conservation



1. IN-SITU CONSERVATION:

In-situ conservation is on site conservation or the conservation of genetic resources in natural populations of plant or animal species, such as forest genetic resources in natural populations of tree species.

It is the process of protecting an endangered plant or animal species in its natural habitat, either by protecting or cleaning up the habitat itself, or by defending the species from predators.

It is applied to conservation of agricultural biodiversity in agro forestry by farmers, especially those using unconventional farming practices. In-situ conservation is being done by declaring area as protected area.

In India following types of natural habitats are being maintained:

1. National parks
2. Wildlife sanctuaries
3. Biosphere reserves

INDIA has over 600 protected areas, which includes over 90 national parks, over 500 animal sanctuaries and 15 biosphere reserves.

1. National Parks:

A national park is an area which is strictly reserved for the betterment of the wildlife and where activities like forestry, grazing on cultivation are not permitted. In these parks, even private ownership rights are not allowed.

Their boundaries are well marked and circumscribed. They are usually small reserves spreading in an area of 100 Sq. km. to 500 sq. km. In national parks, the emphasis is on the preservation of a single plant or animal species.

2. Wildlife Sanctuaries:

A sanctuary is a protected area which is reserved for the conservation of only animals and human activities like harvesting of timber, collecting minor forest products and private ownership rights are allowed as long as they do not interfere with well-being of animals. Boundaries of sanctuaries are not well defined and controlled biotic interference is permitted, e.g., tourist activity.

3. Biosphere Reserves:

It is a special category of protected areas where human population also forms a part of the system. They are large protected area of usually more than 5000 sq.km. A biosphere reserves has 3 parts- core, buffer and transition zone.

- a. Core zone is the inner zone; this is undisturbed and legally protected area.
- b. Buffer zone lies between the core and transition zone. Some research and educational activities are permitted here.
- c. Transition zone is the outermost part of biosphere reserves. Here cropping, forestry, recreation, fishery and other activities are allowed.

THE MAIN FUNCTIONS OF BIODIVERSITY RESERVES ARE:**1. Conservation:**

To ensure the conservation of ecosystem, species and genetic resources.

2. Development:

To promote economic development, while maintaining cultural, social and ecological identity.

3. Scientific Research:

To provide support for research related to monitoring and education, local, national and global issues.

Biosphere reserves serve in some ways as 'living laboratories' for testing out and demonstrating integrated management of land, water and biodiversity.

ADVANTAGES OF IN-SITU CONSERVATION:

1. The flora and fauna live in natural habitats without human interference.
2. The life cycles of the organisms and their evolution progresses in a natural way.
3. In-situ conservation provides the required green cover and its associated benefits to our environment.
4. It is less expensive and easy to manage.

5. The interests of the indigenous people are also protected.

2. EX-SITU CONSERVATION:

Ex-situ conservation is the preservation of components of biological diversity outside their natural habitats. This involves conservation of genetic resources, as well as wild and cultivated or species, and draws on a diverse body of techniques and facilities. Such strategies include establishment of botanical gardens, zoos, conservation strands and gene, pollen seed, seedling, tissue culture and DNA banks.

i. Seed gene bank:

These are cold storages where seeds are kept under controlled temperature and humidity for storage and this is easiest way to store the germ plasma of plants at low temperature. Seeds preserved under controlled conditions (minus temperature) remain viable for long durations of time.

ii. Gene bank:

Genetic variability also is preserved by gene bank under normal growing conditions. These are cold storages where germ plasm are kept under controlled temperature and humidity for storage; this is an important way of preserving the genetic resources.

iii. Cryopreservation:

This is the newest application of technology for preservation of biotic parts. This type of conservation is done at very low temperature (-196°C) in liquid nitrogen. The metabolic activities of the organisms are suspended under low temperature, which are later used for research purposes.

iv. Tissue culture bank:

Cryopreservation of disease free meristems is very helpful. Long term culture of excised roots and shoots are maintained. Meristem culture is very popular in plant propagation as it's a virus and disease free method of multiplication.

v. Long term captive breeding:

The method involves capture, maintenance and captive breeding on long term basis of individuals of the endangered species which have lost their habitat permanently or certain highly unfavorable conditions are present in their habitat.

vi. Botanical gardens:

A botanical garden is a place where flowers, fruits and vegetables are grown. The botanical gardens provide beauty and calm environment. Most of them have started keeping exotic plants for educational and research purposes.

vii. Animal Translocation:

Release of animals in a new locality which come from anywhere else.

Translocation is carried in following cases:

1. When a species on which an animal is dependent becomes rare.
2. When a species is endemic or restricted to a particular area.
3. Due to habit destruction and unfavorable environment conditions.
4. Increase in population in an area.

viii. Zoological Gardens:

In zoos wild animals are maintained in captivity and conservation of wild animals (rare, endangered species). The oldest zoo, the Schonbrunn zoo which exists today also, was established in VIENNA in 1759.

In India, the 1st zoo came into existence at BARRACKPORE in 1800. In world there are about 800 zoos. Such zoos have about 3000 species of vertebrates. Some zoos have undertaken captive breeding programmes.

ADVANTAGES OF EX-SITU PRESERVATION:

1. It is useful for declining population of species.
2. Endangered animals on the verge of extinction are successfully bred.
3. Threatened species are bred in captivity and then released in the natural habitats.
4. Ex-situ centres offer the possibilities of observing wild animals, which is otherwise not possible.
5. It is extremely useful for conducting research and scientific work on different species.

3.6.2 BIO DIVERSITY HOTSPOTS:

- Bio Diversity Hotspots are the bio geographic regions that contain significant reservoir of bio diversity and is under threat and Destructions.
- The main criteria for determining a hotspot are endemism(the presence of species found nowhere else on earth and it indicates degree of threat)
- India has 4 biodiversity hotspots out of 34 identified globally:
 - a) Himalaya
 - b) Indo-Burma
 - c) Sunderland's
 - d) Western Ghats and Srilanka

LIST OF MOST ENDANGERED WILD ANIMALS OF INDIA

1. Bengal tiger
2. The Ganges river dolphin
3. The gharial
4. The **Indian** bustard
5. **Indian** rhino
6. Blackbuck
7. **Indian** wild ass
8. The red panda

IUCN(International Union for Conservation of Nature) started in the year 1948.It indicates the Red list of Threatened Species.

1400 members worked in IUCN. In “1969” India became a state member of IUCN, Head Quarter in New Delhi, established in 2007.

India Perspectives is the flagship publication of the Ministry of External Affairs. Richly illustrated, this magazine provides our readers with an insight into India's culture and tradition along with elements of contemporary India.

3.7 ALTERNATIVE THEORIES

APPROACHES OF ENVIRONMENTAL ECONOMICS:

Environmental economics is one of the fields where there are varied approaches of how to deal with the different components. There are two extreme views in this aspect of economics, namely

1. THE NEOCLASSICAL APPROACH

2. THE ECOLOGICAL APPROACH

1. NEOCLASSICAL APPROACH:

Neoclassical economics is a set of solutions to economic focusing on the determination of goods, outputs, and income distributions in markets through supply and demand. This determination is often mediated through a hypothesized maximization of utility by income-constrained individuals and of profits by firms facing production costs and employing available information and factors of production, in accordance with rational choice theory.

Neoclassical economics dominates micro economics, and together with Keynesian economics forms the neoclassical synthesis which dominates mainstreams economics today. Although neoclassical economics has gained widespread acceptance by contemporary economists, there have been many critiques of neoclassical economics, often incorporated into newer versions of neoclassical theory.

ASSUMPTIONS OF NEOCLASSICAL THEORY:

It was expressed by **E. ROY WEINTRAUB** that neoclassical economics rests on three assumptions, although certain branches of neoclassical theory may have different approaches:

- 1) People have rational preferences between outcomes that can be identified associated with values.
- 2) Individuals maximise utility and firms maximise profits.
- 3) People act independently on the basis of full and relevant information.

From these three assumptions, neoclassical economists have built a structure to understand the allocation of scarce resources among alternative ends-in fact

understanding such allocation is often considered the definition of economics to neoclassical theorists.

OBJECTIONS TO NEO-CLASSICAL THEORY:

There are a number of objections to the key assumptions on which neoclassic theory is based. The main objections include, but are not limited to, the one dimensional view of the environment, the assumptions that the price system correctly reflects relevant information and assumptions of perfect substitutability between natural and manufactured capital.

- 1) **One Dimensional View:** Neoclassical economics views the social and biological environment in a one dimensional view namely, in the market place. At such a level, all decisions are not made in a holistic manner. Neoclassic theory therefore not only generates poor framework for general social and environmental economic theory required for long-term human existence, but if the functioning of natural capital, other than the anthropogenic ones are to be accounted for, then economic efficiency will not suffice for sustainability.
- 2) **Pricing:** Even if natural resources are viewed one dimensionally, difficulties are experienced in attempting to establish correct prices for manufactured capital and more so when dealing with natural capital. The calculations of the total capital stock value does not account for reduction of fossil fuels, decline in biodiversity are the environmental regulating role of many natural resources. Natural resources play radically different functions in comparison with manufactured capital within the economy and this is not accounted for in the market generated capital prices. The neoclassical view that sustainability is achieved provided the capital stock is maintained is therefore detrimental to the survival of animals, plants and the natural environment. A further problem in attaining numerical values is the method of estimate the depreciation rate of natural capital and how to value the degradation of the environment.
- 3) **Discounting:** Discounting, not only neoclassical theory, has attracted a large share of controversy. Discounting is acknowledged as being required to determine relative prices in the market place, but, it places a prejudice on stocks of resources in favour of monetary funds. Georgescu-Roegen (1976, p. 31). Furthermore, discounting is based on individuals time preferences' which is largely subjective therefore unlikely to result in a sustainable

outcome being reached. Discounting allows the exhaustion of resources and environmental damage to be considered acceptable and in some cases optimal, according to the neoclassical criteria of economic efficiency. Current generations preferences are given undue weight when considering environmental issues that usually take many years to form.

Alternate Theories to Neo-Classical Economics:

- i. Austrian Economics**
- ii. Green Economics**
- iii. Ecological Economics**

i. Austrian Economics:

It lacks a formalised, self-conscious theory of environment economics. But in fact all of the major elements of such a theory already exist and in that sense that since what is needed is to piece together the relevant aspects of Austrian economics in order to draw out and focus a theory that is already there.

In particular, environmental economics is an outgrowth of the theory of externalities and is primarily focused on maximising the social value of resource usage. This is defined as that allocation of resources obtained in a perfectly competitive general equilibrium. Social inefficiency arises when the social costs associated with external effects, such as air or water pollution, are not incorporated into the cost of producing the pollution generating product or its market price. From this perspective, the overall value of production can be increased to society by conforming the output of the pollution-generating product to the level that would be generated if the pollution costs were being reflected to its price. Under such a circumstance there would be an efficient re-allocation of resources where less of the offending product and more of other goods and services would be produced.

ii. Green Economics:

It is an influential approach in which an economic system is considered to be a component of the ecosystem. The main contributors to Green Economic theory are E.F Schumacher, Murry Bookchin, Lewis Mumford, Miriam Kennet, Rachel Carson, Brian Tokar, Robert Cosyanza, David Korten, Buckminster Fuller, Huerman Daly, Paul Hawken, Amory Lovins, Jane Jacobs, and Robin Hanson.

Like the Austrian economists, Green economists also claim that their view is fundamentally different from the Neo-classical Economic view. They argue that even though Neo-classical Economics represents the main body of modern economics today, Green Economics shares broader ecological and social concerns, including rejecting capitalism itself. For this reason, Green Economics goes beyond the narrower concerns of Neo-classical Environmental Economics, Resource Economics, and Sustainable Development, which are considered as subsets of Green Economics. Many Green economists have been heavily influenced by Marxian views to develop an understanding of ecological issues and ecological economic alternatives.

iii. Ecological Economics:

It is a newly adopted branch of economics that addresses the interdependence and co-evolution between human economics and natural ecosystems. The main scholars in this field are Robert Costanza, Herman Daly, Nicholas Georgescu-Roegen, David Harvey, and John Bellamy Foster. It has similarities to Green Economics, but it also differs from this theory in its distinctive objective, which combines economic thinking, knowledge of biology, and the laws of physics. In other words, it is a mixture of social science and scientific principles. Therefore, its goal is to improve human welfare through economic development, which is based on a balance between ecology and human needs. Similarly, the main differences, principles, and solutions of Ecological Economics will be examined closely in order to understand the basic conceptual framework.

Main Differences between Ecological Economics and Neo-Classical Environmental Economics

Like other schools and approaches, Ecological Economics criticises Neo-classical environmental economics for being myopic and close-minded to environmental facts and for believing that the environment is a subset of human economy. Ecological economists claim that it is unfair for Neo-classicists to suggest that economic pollution and its harmful impacts on human health can be eliminated easily by paying compensations. Nevertheless, the Ecological Economic Theory combines ecology with human economy, and Ecological economists suggest that it offers better solutions to the problems.

2. THE ECOLOGICAL APPROACH

Ecological economic theory is based on the interrelations and inseparability between the functions of nature, an insight into the biophysical constraints that exist, the continual combined evolution between the economy and environment that occurs at a number of levels, as well as an acknowledgement of complexity and scientific uncertainties that exist within the environment.

Ecological theory views natural capital as encompassing certain characteristics that cannot be substituted by manufactured capital. Natural capital can be broken down into two types. A portion of natural capital can be substituted by manufactured capital and may in fact be perfect substitutes, but there also exists a portion that is irreplaceable, that is often referred to as 'critical natural capital'. Ecological economists highlight that complexities that exist within the biosphere, therefore seemingly small changes may result in larger impacts. The use of marginal analysis can fail to spot such impacts. Furthermore, performance of an economy should not be purely assessed on an efficiency criterion; factors such as distributional and ethical considerations should be taken into account, both from a human and non-human perspective.

ASSUMPTIONS OF ECOLOGICAL ECONOMICS:

Ecological economic theory is based on a number of key principles; these include, but are limited to:

- i. The environmental resources that exist within the border biosphere are finite and therefore relatively scarce.
- ii. The survival of the biosphere is dependent on the acknowledgement that a mutual interdependence amongst the components exists.
- iii. The economy is a division of the larger biosphere and to assume that its purpose is a merely an input in the production process is 'dangerously misleading'.
- iv. The natural trend of technology towards simplification if the natural systems ultimately reduce the stability, resilience and reduce the diversity of ecological systems.

DON'T WAIT FOR OPPORTUNITY. CREATE IT.

Unit-3**PREVIOUS YEAR QUESTIONS**

1. Describe the concept of biodiversity and how it is being impacted by current business practices. **(May 2019 Supply)**
2. Discuss the various theories of biodiversity. **(May 2019 Supply)**
3. Elaborate on the indicators of sustainability. **(December 2018 Regular)**
4. List out the various ecosystem damaging practices followed by modern business. **(December 2018 Regular)**
5. Discuss the various indicators of sustainability. **(December 2018 Supply)**
6. Outline the nature and role of ecosystem services. **(December 2018 Supply)**
7. Write short notes on biodiversity in India. **(May 2018 Regular)**
8. Discuss any two theories from ecological economics. **(May 2018 Regular)**
9. What are the indicators of sustainability? Explain them. **(December 2017 Supply)**
10. Discuss the importance of Eco-system services in Indian economy. **(December 2017 Supply)**
11. What is sustainability? What are its indicators. **(May 2017 Regular)**
12. What are eco system services? Explain with examples. **(May 2017 Regular)**
13. Write a note on bio diversity and why it needs to be managed. **(November 2016 Supply)**
14. Discuss any two approaches to ecological economics. **.(November 2016 Supply)**
15. Describe the various indicators of sustainability. **(July 2016 Regular)**
16. Explain the role of ecosystem services in today's business environment. **(July 2016 Regular)**

Prepared By

L.Nikhila B.Tech, MBA, P.hD

Assistant professor

BALAJI INSTITUTE OF IT & MANAGEMENT, KADAPA

Icet code: BIMK

SUBJECT: GREEN BUSINESS MANAGEMENT; Regulation: R17

UNIT-3 -APPROACHES FROM ECOLOGICAL ECONOMICS SUBJECT: G.B.M Page 34

CASE STUDY: GREEN FINANCING

In October 2011, climate policy initiative and the World bank group, in collaboration with CLP (China light and power) and the organisation for economic cooperation and development(OECD), hosted the inaugural meeting of the San Giorgio group(SGG), a new working group of key financial intermediaries and Institutions actively engaged in green, low emissions finance. To address the scarcity of systematic , ‘on the ground’ information about what makes investments successful from financial, environmental, organisational, and political perspectives the sangiorgio group decided to support the development of rigorously analysed case studies. Drawing on the experience of its members and their organisations, the group is conducting detailed analysis of the goals and Governance of public investment portfolios, and their effect upon Real world projects. The analysis aims to provide information about how to align public and private incentives, manage risks and co-ordinate different actors to most effectively deploy and scale up green, low emissions funding. The core objective of the sangirgio group is to understand how to mobilize and deploy adequate and effective finance to achieve low carbon ,climate resilient development.

First year of sangorgio group case studies:

Querzazate is a large-scale concentrating solar power (CSP) plant in Morocco. It is being financed with support from the clean Technology fund investments in the Middle East and North Africa.

The walney offshore wind farms (walney) project is the world’s largest offshore wind form located in the United Kingdom. Led by Danish utility DONG energy the project managed to attract institutional investors.

Programme solaire (prosol) is a financing mechanism that is supporting the penetration of solar water heaters in the Tunisian residential sector. Prosol is a joint initiative of Tunisia ,Italy, and the United Nations environmental program

(UNEP).The risk gap reveals there are gaps in risk coverage, particularly for policy risks and financing risk(including investment liquidity/exit risk). Two types of instruments can address some of these risk coverage gaps. First loss protection instruments and policy risk insurance.

Question:

Analyse the case and answer what Sangiorgio group case studies reveal?

One possible solution:

Climate policy initiatives(CPI) landscape of climate finance provided some early insights about the Global climate finance flows. The key message was that private investment made up the Lion's share of financial resources across the Global climate finance landscape, with clear implications that public resources play potentially crucial role catalysing private instruments. To shed light on the role of public finance in unlocking private Finance,CPI, in collaboration with the world bank group,CLP and the OECD,has established the sangiorgio group a new working group of key financial intermediaries and Institutions actively engaged in green,low emissions finance. The core objective of the group is to analyse how to mobilize and deploy adequate and effective finance to achieve low carbon ,climate resilient development.To address poor understanding about climate finance effectiveness, CPI has initiated, within the Sangeorgia group,a work stream comprised of case studies to build up knowledge on elements that make investments successful from financial, environmental, organisational, and political perspective. By building up an evidence base about what works and what does not we aim to learn from the wide range of existing and evolving financing practices ,to provide insights on how to scale up climate finance and spend available resources more wisely.

Sangiorgio group case studies reveal that well articulated policy frameworks that provide appropriate incentives are essential to provide private money with a rationale for investing in low carbon energy generation. Three public policies

can compensate investors for the incremental cost of renewable Technologies or pay for Risk premia that privates actors are unwilling or unable to bear. In all three case studies, the public financing instrument was part of a border policy framework.

Walney was commissioned against the backdrop of the United kingdom's target to reduce emissions by 80% by 2050. The UK Government policy framework is designed specifically to reward generators of cost effective renewable electricity.

Prosol took place within the context of Long term Policies dating back almost 30 years aimed at shifting energy supply away from imported sources and exploiting tunisia's renewable energy potential.

Quarzazate is the first step of the ambitious Moroccan Solar Plant(2009) which aims to install 2000 MW of CSP capacity by 2020. The government committed to finance the cost of the plan and established the moroccon solar energy agency to develop the projects. The 2010 energy strategy established complementary long-term public policy goals including reducing Reliance on oil to 40% of energy consumption by 2030, increasing energy efficiency, and increasing renewable power generating capacity to 42% by 2020.

Sangiorgio group case studies show that money is spent wisely if it substantially aligns the interest of parties, resulting in viable projects that take concrete steps to achieve public policy outcomes.

(17E00302) GREEN BUSINESS MANAGEMENT

Objective: The objective of the course is to impart students in understanding of green business, its advantages, issues and opportunities and to provide knowledge over the strategies for building eco-business.

1. Introduction to Green Management: The Concept of Green Management; Evolution; nature, scope, importance and types; Developing a theory; Green Management in India; Relevance in twenty first century

2. Organizational Environment; Indian Corporate Structure and Environment; How to go green; spreading the concept in organization; Environmental and sustainability issues for the production of high-tech components and materials, Life Cycle Analysis of materials, sustainable production and its role in corporate environmental responsibility (CER).

3. Approaches from Ecological Economics; Indicators of sustainability; Eco-system services and their sustainable use; Bio-diversity; Indian perspective; Alternate theories

4. Environmental Reporting and ISO 14001; Climate change business and ISO 14064; Green financing; Financial initiative by UNEP; Green energy management; Green product management

5. Green Techniques and Methods; Green tax incentives and rebates (to green projects and companies); Green project management in action; Business redesign; Eco-commerce models

Text Books:

- Green Management and Green Technologies: Exploring the Causal Relationship by Jazmin SeijasNogarida , ZEW Publications.
- The Green Energy Management Book by Leo A. Meyer, LAMA books

References:

- Green Marketing and Management: A global Perspective by John F. Whaik, Qbase Technologies.
- Green Project Management by Richard Maltzman And David Shiden, CRC Press Books.
- Green and World by Andrew S. Winston, Yale Press B

UNIT-4

ENVIRONMENTAL REPORTING AND ISO 14001

4.1 ENVIRONMENTAL REPORTING

- ✚ Reporting in the corporate world first began in the form of financial reporting, and was used as a means of informing share holders about the financial performance of a company.
- ✚ Additional types of corporate reporting are now being used to gather a wider range of information, including health and safety reporting, quality reporting, environmental reporting, social responsibility reporting, and most recently sustainable reporting.
- ✚ These newer types of reporting are typically used to inform stakeholders (who include customers, employees, neighbours, investors, government, Non-Governmental Organizations (NGOs), civic association and the public) about the overall performance of the organisation.
- ✚ Corporate environmental reporting began in response to community and NGO pressure on companies to show move towards greater environmental practice. Corporate environmental reporting was traditionally a voluntary process but from the mid 1990's, a number of countries began to introduce mandatory reporting requirements.
- ✚ Environmental Reporting is the communication of **environmental** performance information by an organisation to its stakeholders. Information on **environmental** performance includes among others: Impacts on the **environment**, Performance in managing those impacts, and Contribution to ecological and sustainable development.
- ✚ A sustainability Report is an organizational Report that gives information about economic, environmental, social and governance performance.
- ✚ Sustainability Reporting is not just report generation from collected data; instead it is a method to internalize and improve an organizations commitment to sustainable development in a way that can be demonstrated to both internal and external stakeholders.
- ✚ This report was first started in Chemical Industry, then by tobacco industry in the year 1980.
- ✚ Environmental reporting is a non-financial reporting.

- ✚ Non-Financial reporting, such as sustainability and CSR reporting, is a fairly recent trend which has expanded over the last 20 years.
- ✚ This reporting is a vessel of transparency and accountability.
- ✚ Organizations can improve their sustainability performance by measuring, monitoring and reporting on it, helping them to have a positive impact on society, the economy and a sustainable future.
- ✚ It access the assets and liabilities of a company regarding environment.
- ✚ Many companies, now a day's voluntarily disclose information in their annual reports on the impact of their business on society and the environment.
- ✚ presentation of unbiased scientific data and information relating to the environment, providing insights into the state of the environment, to provide the basis for informed decision making so that individuals and policy-makers can take positive action.
- ✚ Corporate environmental reports are used by investors to check whether there are environmental liabilities if which not properly managed could cost them heavy losses in dividends and returns on their investments.
- ✚ There are indications that the contents of environmental reports are being used more extensively by NGO's and pressure groups to encourage greater responsibility towards the environment.
- ✚ In some cases there is opposition to certain types of environmental reports because it is believed that they release information which could be used by other parties for their own gain.

For example, companies, by analysing the environmental statistics of their competitors, could gain valuable insights to their technology being used and gain competitive advantage. There are also calls from some quarters for more information in environmental reports to enable a better picture to be built of environmental performance. As with any form of 97 reporting the cost of generating the information and producing the reports must be carefully weighed against the benefits gained from the reports.

- ✚ Corporate environmental reporting becomes a crucial issue in today's corporate reporting. The present status and future focus gives every indication that it is going to capture a permanent position in the bundle of general purpose financial statement.

- Because, the corporate reporting is for the stakeholders show a keen interest on such disclosure. Protecting the environment is the social responsibility and commitment of corporations towards the society.

4.2 ISO 14001

INTRODUCTION

- The ISO 14001 is the world most acceptance EMS (Environmental Management System).
- Different countries and groups are already setting environmental standards individually. The ISO 14001 makes it possible to set a common internationally accepted standard.
- It was developed in 1996 as an international standard to guide organisations worldwide in improving their environmental performance.

It is defined as:

“That part of the overall management system that includes organisational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy” (ISO 14001: 1996)

- ISO 14001 is the internationally recognised standard for the environmental management of businesses. It prescribes controls for those activities that have an effect on the environment. These include the use of natural resources, handling and treatment of waste and energy consumption.
- The ISO 14001 is meant for application in organisations across the world irrespective of their culture and social background.
- The implementation of ISO 14001 standards is voluntary, in that it is left to the organisation to embrace and adhere to the ISO standard of legislations and regulations.
- However, organisations might be interested in implementing ISO 14001 for different reasons like improving process efficiency, meeting customer requirements, and pressure from local environmental groups or concern for the environment.

- The ISO 14001 can be applied to any area of an organisation like production, services, operations, facilities, and transportation.

4.2.1 REQUIREMENTS OF ISO 14001-EMS MODEL

- 1. General Requirements:** The organization shall establish, document, implement and continually improve an environmental management system in accordance with the requirements of this international standard and determine how it will fulfill these requirements. The organization shall define and document the scope of its environment management system.
- 2. Environmental Policy:** Top Management shall define the organizations environmental policy and ensure that, within the defined scope of its environmental management system, it:
 - a) Is appropriate to the nature, scale and environmental impacts of its activities, products and services,
 - b) Includes a commitment to continual improvement and prevention of pollution.
 - c) Includes a commitment to comply with applicable legal requirements.
 - d) Provides the framework for setting and reviewing environmental objectives and targets.
 - e) Is documented ,implemented and maintained,
 - f) Is communicated to all persons working for or on behalf of the organization, and
 - g) Is available to the public.
- 3. Planning:**
 - a) Environmental Aspects
 - b) Legal and other requirements
 - c) Objectives, Targets and Programme

4. Implementation and Operation:

- a) Resources, Roles, Responsibility & Authority
- b) Competence, Training & Awareness
- c) Communication
- d) Documentation
- e) Control of Documents
- f) Operational Control
- g) Emergency Preparedness & Response

5. Checking & Corrective Action:

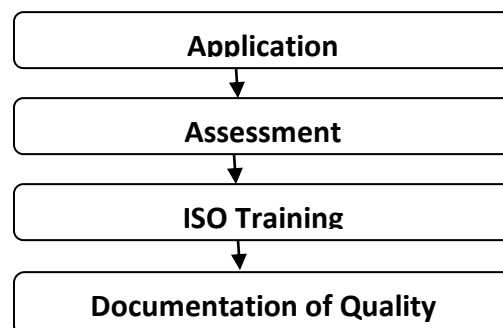
- a) Monitoring and Corrective actions
- b) Evaluation of Compliance (It is the systematic review of a firm activity and practices to determine whether it meets the desired regulatory stipulations)
- c) Non-conformity, Corrective Action and Preventive Action
- d) Control of Records
- e) Internal Audit

6. Management Review :

- a) Results of internal audits
- b) Communication from external interested parties, including complaints
- c) The environment performance of the organization
- d) The extent to which objectives and targets have been met
- e) Status of corrective and preventive actions
- f) Follow-up actions from previous management reviews
- g) Recommendations for improvement

4.2.2 ISO 14001 CERTIFICATION PROCESS

Basic steps in obtaining ISO 14001 certification are as follows:



Step 1: Application: Organisations are strongly advised to thoroughly research the core principles of ISO 14001 and carry out a detailed cost benefit analysis. Specific attention needs to address the level of companywide commitment, in particular, strong leadership and a full appreciation certification status is required.

An application needs to be requested and completed from a registered body such as BSi. This will invariably involve a site visit to clarify and/or re-assure the above expectations and registration costs. A formal contract is then signed and provisional date is booked for a document review/assessment.

Step 2: ISO Assessment: This involves a pre-assessment to benchmark the organisation's systems against ISO 14001 requirements. In addition, the registering body will formalise the scope of certification with the organisation. The assessment and advice will often not involve a complete re-write of the organisation's systems but is more akin to a re-drafting of current systems in line with the recognized ISO 14001 format.

Step 3: Training: Training to all members in organization, is fundamental in the certification process and involves a holistic organisations-wide approach. All staff, including senior management, require training in two key aspects:

- 1) A thorough understanding of ISO, its terminology and vocabulary, proceduesal requirements, documentation, manuals, auditing procedures, and potential benefits is required.
- 2) The second area of training involves a *clear insight* into the operational challanges of the certification process. Selected personnel will also need to be deemed competent in document design and/or completion and first party auditing skills. Effective monitoring procedures must be established to ensure that the support mechanisms are both adequate and realistic in order to achieve the set deadlines. It is uncommon for organisations to seek the advice and expertise of "second-party" consultants to aid the process. Organisations need to assess the expenditure involved and the support systems provided. A key attribute of consultancy services is that they can provide an independent assessment of an organisation's systems prior yo the formal assessment. This process is commonly referred to as the second part audit.

Step 4: ISO Documentation of quality procedures: Trained personnel will systematically document the assessment scope, manuals, procedures, and work instructions in line with ISO standards. In addition, an audit plan and/or schedule are designed in which all of the procedures are audited and can be traced through an audit trail. This process is pivotal in the certification process. If the final third party certification/assessment process identifies non-conformances between documented systems and audited procedures, then the accrediting party may defer or suspend certification.

4.3 CLIMATE CHANGE BUSINESS

Introduction

Climate is inherently variable. Climate differs from place to place. It varies with time. As we go back through millions and millions of years that constitute geological time, the climate record becomes extremely fragmented and unreliable.

Human Civilizations have adapted mankind to live in a wide variety of climates from the hot tropic to the cold arctic, in deserts, marshlands and in the high mountains. Both climate and weather have a powerful impact on human life and health issues. Climate change poses unique challenges to human health. Unlike health threats caused by a particular toxin or disease pathogen, there are many ways that climate change can lead to potentially harmful health effects. There are direct health impacts from heat waves and severe Storms, ailments caused or exacerbated by air pollution and airborne allergens, and many climate-sensitive infectious diseases.

Climate change today is less of a natural process. It is rapidly occurring due to the ill effects of human actions responsible for disturbing and harmful outcomes such as global warming, greenhouse effect, urban heat, coal industry etc. climate change is not only changing the overall weather scenario, but has larger and harmful effects. Some of these include: melting of Polar regions, occurrence of new diseases and permanent inhibition in growth of certain plants essential for human survival.

4.3.1 NATURAL CAUSES OF CLIMATE CHANGE:

The earth's climate is dynamic and always changing through natural cycle. Changes that are occurring today have been speeded-up because of man's activities. These changes are being studied by scientist all over the world who are finding evidence from tree rings, pollen samples, ice cores and sea sediments. There are a number of natural factors responsible for climate change. Some of the more prominent one are *Continental drift, volcanoes, ocean currents, the earth's tilt, and comets and meteorites.*

These are as follows:

1. Continental drift:

The continental were formed when the landmass began gradually drafting apart, millions of years back. This drift also had an impact on the climate because it **changed the physical features** of the land mass, thier position and the position of water bodies. The separation of the land masses changed the flow of ocean currents and winds, which affected the climate. This drift of the continents continues even today; the Himalayan range is rising by about 1 mm (millimeter) every year because the Indian land mass is moving towards the Asian landmass, slowly but steadily.

2. Volcanoes:

When a Volcano erupt it throws out large volumes of sulphur dioxide (SO₂), water vapour, dust, and ash into the atmosphere. Although the volcanic activity may last only a few days, yet the large volumes of gases and ash can influence climatic patterns for years. Volcanic eruptions of magnitude can reduce the amount of solar radiation reaching the Earth's surface, lowering temperatures in the lower levels of the atmosphere (called the troposphere), and changing atmospheric circulation patterns.

3. Earth's tilt:

The earth makes one full Orbit around the sun each year. It is tilted at an angle of 23.5° to the perpendicular plane of its orbital path. For one half of the year when it is summer, the northern hemisphere tilts towards the sun. In the other half when it is winter, the earth is tilted away from the sun. If there was no tilt we would not have experienced seasons. Changes in the tilt of the earth can affect the severity of

the seasons and more tilt means warmer summer and colder winters, less tilt means cooler summers and milder winters.

4. Ocean currents:

The oceans are a major component of the climate system. They cover about 71% of the earth and absorb about twice as much of the sun's radiation as the temperature or the land surface. Ocean currents move vast amounts of heat across the plane-roughly the same amount as the atmosphere does. But the oceans are surrounded by land masses, so heat transport through the water is through channels. Ocean currents have been known to change direction or slow down. Much of the heat that escapes from the ocean is in the form of water vapour, the most abundant greenhouse gas on Earth.

4.3.2 HUMAN CAUSES OF CLIMATE CHANGE

All human beings contribute to the change in the climate. These contributions are as follows:

1. Agriculture:

During agricultural practices, methane gas (a GHG) is produced when bacteria decomposes of organic matter. It has been estimated that close to a quarter of methane gas from human activities result from livestock and the decomposition of animals manure. Paddy rice farming, land use, and wetland changes are also agriculture processes that contribute to the release of methane to the atmosphere.

2. Deforestation:

With the growth of industrial activities, more and more trees are felled (example., in wood industry, paper industry, etc.). These trees are felled without replanting new ones. This practice, over the centuries, has led to worldwide deforestation. Deforestation increases the amount of carbon dioxide in the atmosphere. During photosynthetic process, trees take in carbon dioxide from the atmosphere and release oxygen back to the atmosphere. With deforestation, the number of trees available to take in CO₂ from the atmosphere has greatly reduced, leading to more available CO₂ and increased greenhouse effect.

3. Fossil Fuels:

Fossil fuels (coals, natural gases, and oil) are widely used to power our modern day engines and automobiles. The burning of fossil fuel yields most of the energy used to produce electricity, heat houses, run automobiles, and power factories. The burning of fossil fuel to obtain energy to drive these engines leads to production of tremendous amount of CO₂ which is released to our environment and increases the concentration of CO₂ in the atmosphere. It is believed that CO₂ generated from the burning of fossil fuel accounts for about three-quarters of the total CO₂ emissions from human activities.

4. Refrigeration/fire suppression/manufacturing:

Establishments and industries used to use chlorofluorocarbons (CFCs) in refrigeration systems, and CFCs and halons in fire suppression systems and manufacturing processes. These substances are GHGs that are capable of adding to the phenomenon of climate change.

4.3.3 IMPACT OF CLIMATE CHANGE:

Global climate change would affect human health in the following ways:

- 1) Monsoon
- 2) Agriculture
- 3) Health
- 4) Weather
- 5) Sea level rise
- 6) Increase UV(Ultra-Violet) radiation
- 7) Changes in temperature

4.4 ISO 14064 [GREEN HOUSE GAS MANAGEMENT SYSTEM]

- Climate change has been identified as one of the greatest challenges facing nations, governments, business and citizens over future decades.
- Climate change has implications for both human and natural systems and could lead to significant changes in resource use, production and economic activity.
- In response, international, regional, national and local initiatives are being developed and implemented to limit Green House Gas (GHG) concentrations in

the Earth's atmosphere. Such GHG initiatives rely on the quantification, monitoring, reporting and verification of GHG emissions or removals.

- It specifies principals and requirements at the organization level for quantification and reporting of GHG emissions and removals.
- ISO 14064 includes requirements for the design, development, management, Reporting and verification of an organizations GHG inventory.
- ***ISO 14064 is expected to benefit organizations, governments, project proponents and stake holders worldwide by providing clarity and consistency for quantifying, monitoring, reporting and validating or verifying GHG inventories or projects.***
- The **ISO 14064** standard (published in 2006) is part of the ISO 14000 series of International Standards for environmental management.
- The ISO 14064 standard provides governments, businesses, regions and other organisations with a complimentary set of tools for programs to quantify, monitor, report and verify Green House Gas (GHG) emissions.
- The ISO 14064 standard supports organisations to participate in both regulated and voluntary programs such as emissions trading schemes and public reporting using a globally recognised standard.

4.4.1 PARTS OF ISO 14064

The standard is published in three parts:

- 1) This part of ISO 14064 details principles and requirements for designing, developing, managing and reporting organization- or company level GHG inventories. It includes requirement for determining GHG emission boundaries, quantifying an Organisation's GHG emission and removals, and identifying specific company actions or activities aimed at improving GHG management. It also includes requirement and guidance on inventory quality management, reporting, internal auditing and the organisation's responsibilities for verification activities.
- 2) ISO 14064-2 focuses on GHG projects or project-based activities specifically designed to reduce GHG emissions or increase GHG removals. It includes principles and requirements for determining project baseline scenarios and for monitoring, quantifying and reporting project performance relative to the baseline scenario and provides the basis for GHG projects to be validated and verified.

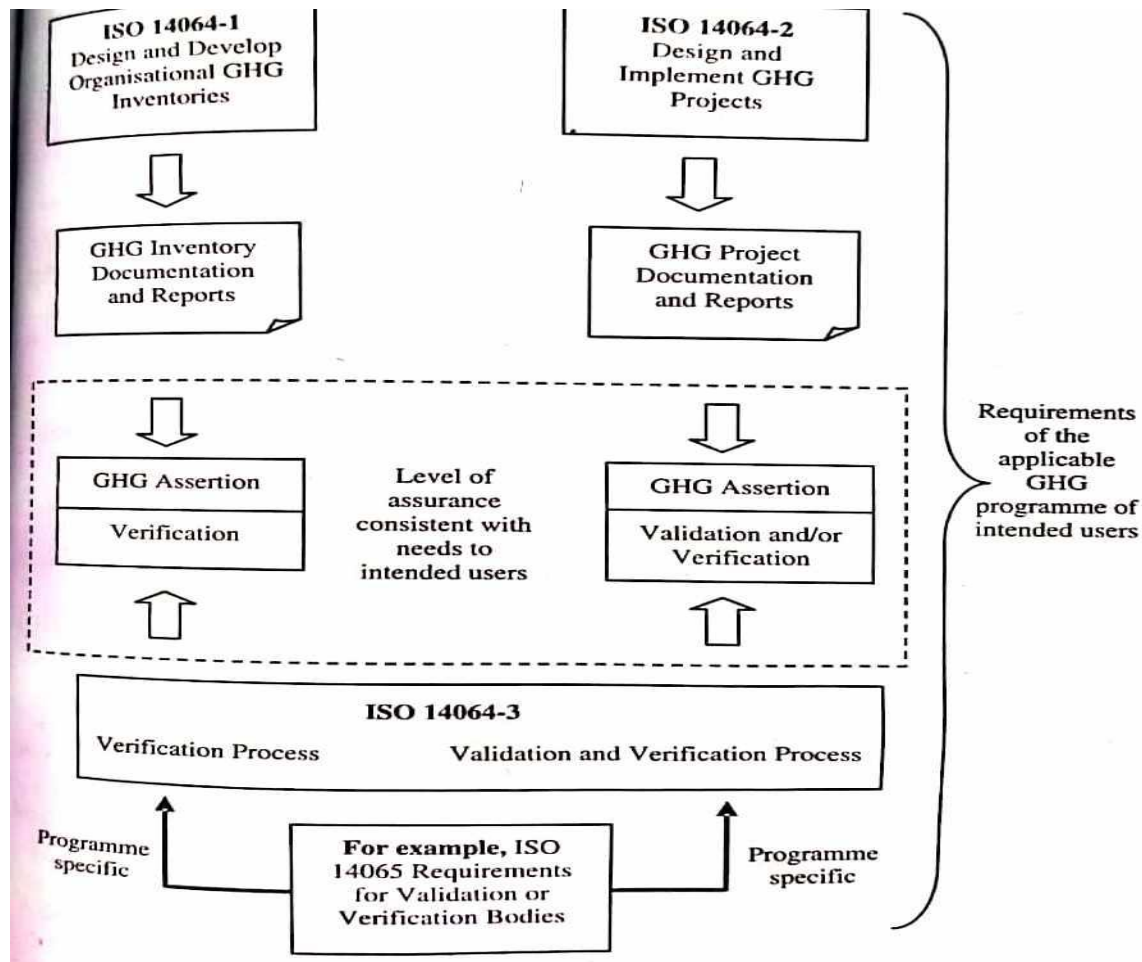


Figure: Relationship between the parts of ISO 14064

- 3) ISO 14064-3 details principles and requirement for verifying GHG inventories and validating or verifying GHG projects. It describes the process of GHG-related validation or verification and specifies components such as validation or verification planning, assessment procedures and the evaluation of organisation of project GHG assertions. ISO 14064-3 can be used by organisations or independent parties to validate or verify GHG assertions.

4.4.2 OUTCOMES OF ISO 14064:

A management system should have:

- 1) An effective Audit program.
- 2) Scheduled audits on the basis of risk and importance of processes.
- 3) Effective Audit Checklists.
- 4) Review and follow up corrective actions.

5) Management Review Meetings.

4.4.3 OBJECTIVES OF ISO 14064

- 1) Enhance environmental integrity by promoting consistency, transparency and credibility in GHG quantification, monitoring, reporting and verification;
- 2) Enable organisations to identify and manage GHG related liabilities, assets and risks;
- 3) Facilitate the trade of GHG allowances for credits; and
- 4) Support the design, development and implementation of comparable and consistent schemes or programmes.

4.4.4 NEED OF ISO 14064

Implement the ISO 14064 standard within the organisation and one will be able to:

- 1) Promote consistency, transparency and credibility in GHG quantification, monitoring, reporting and reduction.
- 2) Identify and manage GHG-related liabilities, assets and risks.
- 3) Facilitate the trade of GHG allowances or credits.
- 4) Support the design, development and implementation of comparable and consistent GHG schemes or programmes.
- 5) Develop robust internal mechanism for quantifying, managing and reporting GHG emission.
- 6) Build trust with stakeholders.
- 7) Facilitate the development and implementation of organisations GHG management Strategies and plans for the future
- 8) Provide the ability to track performance and process in the reduction of GHG emission and/or the increase in GHG removals.

4.4.5 APPLICATION OF ISO 14064

ISO 14064 has applications for both private and the public sector. For businesses, the standard provides the steps to developing an inventory that is not only able to be easily verified but can be compared to the inventories of other organisations. By using the standard as a guide these businesses can reduce cost of conducting and verifying an inventory. Because the standard represents consensus on technical GHG inventory best practices, these businesses can also have greater confidence in

the inventories that are produced and these inventories have more credibility with stakeholders.

For government entities, ISO 14064 provides a base technical structure for conducting inventories and conducting verification and this structure can form the foundation of voluntary or regulatory programmes. This approach allows effect of agencies to focus on identifying additional requirements of the programme to reach policy objectives.

4.5 GREEN FINANCING

Introduction

- ✚ Green financing is the core part of green economy, as it is the link between the financial industry, environmental protection and economic growth.
- ✚ ***Green financing or green finance refers to financial support for green growth.***
- ✚ The term broadly refers to, investment activities that address any aspect related to the environment, climate change, resource scarcity or sustainability.
- ✚ Green finance thereby recognises the importance and the value of the environment and its natural capital, and seeks to improve human well-being and social equity while reducing environmental risks and improving ecological integrity.
- ✚ In a narrower sense, it refers to specific financial products, such as loans, insurance or bonds as they relate to Green activities.

According to Hohne, Khosla, Fekete and Gilbert, “Green finance is a broad term that can refer to financial investments flowing into sustainable development projects and initiatives, environmental products, and policies that encourage the development of a more sustainable economy”.

“The growing energy challenge – particularly in Asia – will lead and sustain future growth in clean energy investments”

As long as the world's energy needs keep growing at a feverish pace, the future outlook of clean energy investments will continue to burn brightly. According to the Chinese government's forecasts, the country's demand for electricity is expected to double by 2020; with the IEA (International Energy

Agency) estimating that China will pass the United States around 2025, becoming the world's biggest spender on oil and gas imports to meet its burgeoning energy needs. No wonder, already in 2009, China replaced the United States to emerge as the leader in clean energy finance and investments for the first time.

This trend is only expected to continue with China leading the way in attracting clean energy investments in the near future. Along with China, India, Japan and South Korea will account for the lion's share of investments in 2020 with the Americas and Europe trailing. While the United States will lose its leadership position, it does maintain the potential to attract \$ 342 billion in private clean energy investments over the next decade. Similarly, given its early leadership in clean energy development, the European marketplace is expected to mature, with growth opportunities strongest in Southern Europe and offshore wind.

Realizing the twin goals of growth and sustainability

Whichever way you look at it: green financing offers the right answer to the challenges of rising global energy demand, *limiting the use of fossil fuel and depletion of natural resources*. By tapping renewable energy sources and other environmentally – friendly technologies, *it not only facilitates sustainable socio-economic growth but also offers an attractive opportunity to investors around the world*. Increasing environmental consciousness across the globe and government support will keep the spotlight on clean energy, driving it into the mainstream in the foreseeable future.

4.5.1 ELEMENTS OF GREEN FINANCING

Green finance comprises of the following:

- 1) The financing of public and private green investments (including preparatory and capital costs) in the following area of:
 - i. Environmental goods and services (such as water management or protection of biodiversity and landscapes), and
 - ii. Prevention, minimisation and compensation of damages to the environment and to the climate (such as energy efficiency or dams).

- 2) The financing of public policies (including operational cost) that encourage the implementation of environmental and environmental-damage mitigation or adaptation projects and initiatives (example feed-in-tariffs for renewable energies).
- 3) Components of the financial system that deals specifically with green investments, such as the Green Climate Fund or financial instruments for green investments (e.g., green bonds and structured green funds), including their specific legal, economic and institutional framework conditions.

4.5.2 CATEGORIES OF GREEN FINANCIAL PRODUCTS:

1. Green lending:

Green lending policy usually refers to supportive products such as ***preferential interest rates offered by banks for environmentally friendly projects*** or restriction of project with negative environmental performance **example:** Green lending includes personal housing mortgage loans, motor vehicle loans and green credit card services, along with project financing, Construction lending and equipment leasing for enterprises.

2. Green Private Equity and Venture Investment Fund:

Large scale green direct investments are currently dominated by well-known financial conglomerates with the participation of some professional investors. There have also been several experiments in investment targeted at scaling up investment in environmentally sustainable entrepreneurship.

3. Green Insurance:

Green insurance is also known as ecological insurance and serves as a ***tool for managing environmental risk*** in market-based economy. Generally speaking, environmental insurance policies cover potential liabilities arising from the pollution of water, land or air by the policyholder. The significance of this type of insurance is **two-fold**. **Firstly**, without ecological insurance, many companies will be unable to provide indemnities and restore the environment after an accidental pollution event. **Secondly**, compulsory insurance for certain Industries will help internalise the environmental cost and curb investment activities which excessive environmental risks.

4. Green Investment Bank:

The green investment bank evaluates a potential project on its investment robustness, leverage effect and green effect, with priorities is given to highly commercial green infrastructure projects. Atleast 80% of such investment will go to such sectors as offshore wind power, waste recycling energy recycling from wastes and non-residential energy efficiency. The Green Investment Bank can make investments through such means as shares, bonds and guarantees, but does not provide soft loans, venture Investments or subsidies.

5. Green Bonds:

Green Bonds are bonds issued by financial organisations and government-banked financial institutions. Due to their high credit ratings, such issuers can raise funds at lower interest rates to support green Projects. Green bonds are attractive to investors for the following reasons:

- i. Their green vision and social value;
- ii. Their relatively short maturity and high liquidity. Most green bonds have a maturity between three to seven years and can be readily traded in a secondary markets;
- iii. Many green bonds for tax-exempt and thus present good investment returns;
- iv. They have relatively low risk.

By investing in green bonds, investors can avoid the investment risk associated with individual environmental project. The issuer of a green bond will also have a stringent screening process for its candidate investment projects.

4.5.3 GREEN FINANCING INITIATIVES IN INDIA:

At the outset, it is imperative to elaborate the concept of *clean production and green financing*. Cleaner production is emerging as an important medium to attain sustainable development. It enables the manufacturer or service provider to adapt green, energy efficient technologies which helps in lesser waste, positive impact on environmental and thus, leading to Greater sustainability.

Green financing is a potent instrument to accelerate the process of cleaner production. Green financing is essence, incorporates environmental protection norms in lending decisions.

Following are the various initiatives taken by government of India and Indian banks including SIDBI:

1) Initiatives by GOI: Following are the green financing Initiatives taken by GOI:

a. Shift of investment focus from capital formation to Energy Efficiency:

The 1980s and 1990s era of globalisation and privatisation has witnessed increased capital investment in the developing countries. This capital has flown through all channels such as, international financing agencies, Development Banks, Donor agencies, private Sector Investment, etc. The Indian Government has shifted the focus of investment from capital formation to Energy Efficiency. Now, developing countries are promoting green Mutual Funds, which invest in companies whose activities, projects and investment are beneficial or at least supportive for the environment. The Government of India has also increased its plan outlay by 61% to 1000 crore for Ministry of New and Renewable Energy. These steps indicate the Government of India's commitment towards Energy Efficiency.

b. Government of India's focus on clean Technology:

Realizing the importance of appropriate and affordable state of art Technology, the Government of India has identified niche sectors for global competitiveness. By launching specified funds/ Schemes such as Textile Upgradation Fund, Credit Linked Capital Subsidy Scheme, Tannery Modernisation Scheme etc., GOI showed its earnest desire to move Indian enterprises towards cleaner production. In the recent Union budget 2010 to 2012 it has been proposed to set up a 'National Clean Energy fund' for funding Research and innovative projects in Clean Energy.

2) Initiatives By Banks:

Following are the green financial Initiatives taken by Indian banks:

a. SIDBI'S Financing Scheme for Energy Saving:

The Japan International Cooperation Agency (JICA) has extended a Line of Credit to SIDBI for financing Energy Saving Project in MSMEs. Under this scheme, financial assistance is provided to MSMEs through SIDBI as well as through refinance to banks/ SFCs and NBFCs to encourage MSMEs units to undertake energy saving investment in plant and machinery/ production process to reduce energy consumption, enhance Energy Efficiency, reduce carbon dioxide emission and improve profitability in the long run. The interest rate is attractive.

b. IDBI Bank Environmental Services:

IDBI bank has created an exclusive group working on climate change and more specifically on carbon Credit advisory service to the client to deal with Clean Development Mechanism (CDM)/ Carbon Credits of Kyoto Protocol and Voluntary Emission Reduction(VERs) authorities. This group has devised a structured product for providing upfront finance against the carbon Credit receivables. The product is well accepted by the Indian project developers.

c. Electronic Waste Recycle Facility in Bangalore:

SIDBI assisted E-Parisara Private Limited Bangalore for electronic waste recycling project. The project caters to wastes generated by IT, Telecom and Electronic Industries, in and around Bangalore. The advantages accruing from the project includes helping more than hundred MSMEs to become compliant with regulatory requirement/ environment audit, reduction in waste treatment cost and reuse and recycling of treated metals/ materials.

d. Green Ratings:

With support under MSME FDP, SME Rating Agency(SMERA)- an Associate of SIDBI is gradually introducing rating variant and the latest is “Green Rating” model. This initiative is aimed to encourage MSMEs engaged in industrial activity to adopt better Technologies and processes to prevent un-mitigated environmental damage. It will act as a risk mitigation tools for MSMEs to effectively face business continuity risk associated with rapidly changing regulatory prescriptions on environment governance and compliances.

4.5.4 CHALLENGES TO GREEN FINANCING:

- 1. Return on Green Investments:** Low returns on green investments are one of the major challenges to Green financing. Investors in green financing wants to increase the rate of return on green investments, and sometimes low returns acts as hurdle in green financing.
- 2. Perceived Risk of Green Investments:** The perceived risk of green investments is generally high, due to which many investors resist in green investing. This risk of green investments tends to increase and the investors in green financing wants it to be low as much as possible.
- 3. Profitability may not Extend to the Private Sphere:** Green investments entail private costs but the benefits will accrue globally, so while they may be socially

profitable, this profitability May not extend to the private sphere. The exact inverse is true of ‘dirty’ investments where private benefits exceed social ones.

4. **Return on Dirty Investments:** Another hurdle is the return on dirty investments which many investors expect it to fall. High returns on dirty investments are not desirable for investors in green financing.
5. **No Short Term Benefits:** Green financing involves no short-term benefits. Many green investments, **example:** In Renewable Energy, entail significant upfront costs but the benefits only accrue in the long-term.
6. **Uncertainties:** Even when investors may want to put money into green investments, they face serious hurdles in channeling their money, not least :
 - i. Which financial mechanism to invest through.
 - ii. What kind of green investments to focus on.
 - iii. How to make sure that the money is effectively deployed and that the investments actually help tackle climate change.

4.6 UNEP FI: FINANCIAL INITIATIVES BY UNEP

Introduction

Founded in 1992 in the context of the Earth Summit in Rio, and based in Geneva, Switzerland, the United Nations Environment Programme Finance Initiative (UNEP FI) was established as a platform associating the United Nations and the financial sector globally. The need for this unique United Nations partnership arose from the growing recognition of the links between finance and Environmental, Social, and Governance (ESG) challenges, and the role of Financial Institutions could play for more sustainable world.

UNEP FI is continuously building its membership, and works closely with over 200 members, who have signed the UNEP FI statement of commitment. The membership is made up of public and private financial institutions from around the world and is balanced between developed and developing countries. They recognise sustainability as part of a collective responsibility and support approaches to anticipate and prevent potential negative impacts on the environment and society.

Banking, insurance and investment, the three main factors of finance, are represented and brought together in this unique partnership. In addition, UNEP FI

develops selective collaboration, UN-driven and finance sector-driven, with other partner organization, In order to increase awareness and rise support for critical activities. UNEP FI contributes the perspectives of Financial institutions to the various United Nations and global activities on sustainable Finance.

The initiatives work includes:

1. Capacity building and the sharing of best practices;
2. Pioneering Research and tools;
3. Setting Global standards and principles;
4. Engaging stakeholders, both public and private; and
5. Facilitating the networking of members and stakeholders through global events and regional activities.

UNEP's cross-cutting themes are embedded throughout UNEP FI's activities, specifically in its thematic work areas of Climate Change, Ecosystems Management, Energy Efficiency and Social Issues. UNEP FI has contributed to the launch of the Principles for Responsible Investment(PRI) and has developed the Principles for Sustainable Insurance (PSI).

Its motto changing Finance, Financing Change reflects a vision of a Sustainable world economy that need to be supported by a sustainable financial system:

1. **Changing Finance:** Promoting the integration of sustainability concerns into mainstream financial system, and financial institutions, operations and decisions in all markets, as well as in their general business and governance.
2. **Financing Change:** Mobilizing finance to foster a more sustainable economy.

4.6.1 UNEP STATEMENT OF COMMITMENT BY FINANCIAL INSTITUTIONS (FI) ON SUSTAINABLE DEVELOPMENT:

The UNEP statement of commitment by financial institutions on sustainable development represents the backbone of the initiative. By signing up to the statement, Financial Institutions openly recognise the role of the financial services sector in making our economy and lifestyles sustainable and commit s to the integration of environmental and social considerations into all aspects of their operations.

All financial institutions wishing to join the UNEP Finance Initiative must adhere to the statement:

1) Commitment to Sustainable Development:

- a. The institutions regard sustainable development- defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs-as a fundamental aspect of sound business management.
- b. They believe that sustainable development is best achieved by allowing markets to work within an appropriate framework of cost efficient regulations and economic instruments. Governments have a leadership role in establishing and enforcing long-term priorities and values.
- c. Institutions also regard financial institutions to be important contributors to sustainable development, through their interaction with other economic sectors and consumers and through their own financing, investment and trading activities.
- d. The financial institutions recognise that sustainable development is an institutional commitment and an internal part of our pursuit of both good corporate citizenship and the fundamentals of sound business practices.
- e. They recognise that the sustainable development agenda is becoming increasingly inter-linked with humanitarian and social issues as the global environment agenda broadens and as climate change brings greater developmental and security challenges.

2) Sustainability Management:

- a. Financial Institutions support a precautionary approach to environmental and social issues, which strives to anticipate and prevent potential negative impacts on the environmental and Society.
- b. The Institutions comply with all applicable Local, National and International regulations on environmental and social issues. Beyond compliance, it works towards integrating environmental and social considerations into our operations and business decisions in all markets.
- c. They recognise that identifying and qualifying environmental and social risk should be part of the normal process of risk assessment and management, both in domestic and international operations.
- d. They endeavour to pursue the best practice in environmental management, including energy and water efficiency, recycling and waste reduction. It

seeks to form business relations with customers, partners, suppliers and sub-contractors who follow similarly high environmental standards.

- e. The institutions intend to update our practices periodically to incorporate relevant developments in sustainability management. It also encourages the Industry to undertake research accordingly.
- f. Financial Institutions also recognise the need to conduct regular internal reviews and to measure our progress against our sustainability goals.
- g. They recognise the need for the financial services sectors to adopt and develop products and services which will promote the principles of sustainable development.

3) **Public Awareness and Communication:**

- a. The Financial Institutions recommends that Financial Institutions develop and publish a statement of their sustainability policy and periodically report on the steps they have taken to promote the integration of environmental and social considerations into this operations.
- b. They are committed to share relevant information with customers, as appropriate, so that they may strengthen their own capacity to reduce environmental and social risk and promote sustainable development.
- c. It fosters openness and dialogue relating to sustainability matters with relevant stakeholders, including shareholders, employees, customers regulators, policy-makers and the public.
- d. The program works with the United Nations Environment Programme (UNEP) to further the principles and goals of this statement, and seek UNEPs active support in providing relevant information relating to sustainable development.
- e. It encourages other Financial Institutions to support this statement. and is also committed to share with them our experiences and knowledge in order to extend best practices.
- f. They recognise the importance of other initiatives by the financial services sector in forwarding the aims and objectives of Sustainable finance and will seek to assist such initiatives in an appropriate manner.
- g. The Financial Institutions work with UNEP periodically to review the success in implementing this statement and expect all signatories to make real progress.

Financial Institutions (FIs) are under closer scrutiny than ever before. Investors and regulators are increasingly asking challenging questions about corporate governance, the social and environmental impacts of operations and investments and how FIs support their local communities.

4.6.2 TERMS AND CONDITIONS OF JOINING UNEP FI

Salient terms and conditions of joining UNEP FI are as follows:

- 1. Show commitment to the principles of Sustainable Finance:** Sign the UN EP statement of commitment by financial Institutions on sustainable development.
- 2. Get Actively Involved in the UNEP FI Network and the Initiatives Activities:** Availability to exchange experiences/ best practice and to participate in the Initiatives groups/activities (one or several focal points should be established, with availability and authority to participate in meetings, conference calls as well as to travel to relevant events , in particular UNEP FIs Annual General Meetings).
- 3. Report about the Progress:** Submit a brief report annually, on implemented or planned sustainable development policies and measures, as well as the most updated reports that the company has produced on these issues, including sustainability and /or other related reports(the information will not be divulged).
- 4. Pay a Membership Fee:** Membership fees are annual .They are calculated based on the total assets of the company, or “ Asset Under Management(AUM)” ,if an asset management company. Subsidiaries of existing UNEP FI members are welcome to join as independent members. Subsidiary members annual contribution fees are determined taking into account the total assets of the subsidiary itself, excluding those of the parent company.

4.6.3WORK STREAMS OF UNEP FI:

- 1) Core Activities:** UNEP FIs strategic work program is focused on current and emergent issues which are relevant to the signatories. They work collaboratively to find innovative approaches to issues around finance and sustainability:

- a. **Banking:** Finding innovative ways of addressing sustainability issues in the banking sector.
 - b. **Climate Change:** Through its Climate Change Working Group, UNEP FIs work in focused on policy and strategy, outreach, and tools and training.
 - c. **Insurance:** Promoting the Global adoption and implementation of the principles for sustainable insurance.
 - d. **Investment:** Exploring how material, social, environmental and governance considerations can best be incorporated into investment practice.
 - e. **Property:** New building development and existing structures contribute significantly to global carbon emissions, pollution and energy use. The Property Working Group analyses the role of Financial Institutions in promoting sustainable development in the real estate and property finance sectors.
 - f. **Sustainability management and reporting:**
 - i. Developing the Global Reporting Initiative Financial Services Sector Supplement(Environmental Performance).
 - ii. Building the business case for sustainability management and reporting in emerging economics.
- 2) **Other Activities:** other activities of UNEP FI are as follows:
- a. **Biodiversity and Eco-System Services:** Assisting the financial services sector to address the challenges arising from the loss of biodiversity and the degradation of eco-system services.
 - b. **Finance and Conflict:** Developing and promoting the business case for conflict prevention within the financial sector and raising awareness of the opportunities of engaging proactively with the issue of conflict prevention.
 - c. **Human Rights and Finance:** Driving socially and environmentally sustainable development by seeking to understand and clarify how human rights relate to the activities of financial institutions worldwide, so financial professionals can make responsible decisions within their spheres of influence.
 - d. **Water and Finance:** Promoting a proactive approach by Financial Institutions when it comes to water-related challenges and opportunities through awareness rising and capacity building.

4.6.3 BENEFITS OF JOINING UNEP FI:

Membership in UNEP FI is not only about surviving this public scrutiny; it is also about learning how to turn it into an opportunity for growth and shaping the sustainable finance agenda as it develops.

Members enjoy a range of benefits from their involvement with UNEP FI:

1. Keep abreast of the latest trends, tools and practices relating to sustainable finance.
2. Be part of an international network of financial institutions and engage in peer-to-peer information and experience sharing.
3. Take part in shaping the global sustainable finance agenda by participating in the Initiative's various thematic, sectorial and regional groups.
4. Show leadership on a global level by endorsing and participating in UNEP FI's various conferences, seminars and training workshops.
5. Gain preferential access to the ground-breaking research, implementation tools and capacity-building offered by UNEP FI.
6. Gain access to key stakeholders from the government and civil society.

4.7 GREEN ENERGY MANAGEMENT

Introduction

Green energy (or renewable energy) is derived from natural processes that are replenished constantly. In its various forms, it derives directly from the sun, or from heat generated deep within the earth. It is the energy that can be produced in a way that protects the natural environment.

Green energy is the term used to cover those source of energy, other than fossil fuel or nuclear fuel, which are continuously and sustainably available in our environment. Green energy comes from natural sources such as sunlight, wind, rain, tides, plants, algae and geothermal heat that are developed and promoted as alternative sources that make little or no contribution to climate change. These energy resources are renewable, meaning they are naturally replenished.

Green energy can replace fossil fuels in all major areas of use including electricity, water and space heating and fuel for motor vehicles. Even nuclear energy is sometimes considered a green energy source, because some types of nuclear technology produce much less waste than oil and coal.

The primary goal of developing green sources of energy is to generate power while minimising both waste and pollution, to thereby reduce the impact of energy production on the environment. Scientists who advocate the use of green energy say that using such sources will reduce the rate at which climate change occur, although it cannot stop or reverse the temperature increase. Another important objective is creating energy sources that are renewable. This is contrast to fossil fuel sources, which are finite and estimated to be depleted before the end of the 22nd century.

4.7.1 NEED OF GREEN ENERGY:

Following points explains the need of green energy:

1. **Fossil Fuels are a Finite Resource:** There are hundreds of years of just a few decades left of non-renewable resource, the fact remains that it is a finite resource. At some point, fossil fuels are going to become too expensive to realistically use. Hence, there is an immense need of green energy for sustainable life. If the world was entirely reliant upon solar energy, that would be fine because sunlight is a perpetual resource. However, at the current state of things, humanity is in a dangerous position due to its complete reliance upon one single finite input.
2. **Fossil Fuels Contribute to Climate Change:** It is a fact that the climate is changing and that fossil fuel emissions are contributing greatly to that change. By contrast, solar energy panels and wind turbines generate zero emissions in their generation of electricity. However, the manufacturing process by which the components of these renewable energy systems are created is entirely reliant on fossil fuel inputs. This stands as an even more poignant example of the necessity of green energy development. Society can benefit not only from shifting electricity generation off of a finite resource, but it can also benefit from shifting its manufacturing system away from them.

3. **Vast and Inexhaustible Energy Supply:** Strong winds, Sunny skies, plant residues, heat from earth, and fast-moving water can each provide a vast and constantly replenished energy resource supply. These diverse sources of renewable energy have the technical potential to provide all the electricity the nation needs many times over. Green energy can be rapidly developed to provide a significant share of future electricity needs even after accounting for potential constraints.

4.7.2 APPLICATIONS OF GREEN ENERGY:

The uses of green energy are as follows:

1. **Green Vehicles:** In response to its critics, and as a way of developing a sustainable future for itself, the automobile industry has long been active in fuel- saving technologies and green vehicle designs. Currently the main focus of research, development and commercialisation is on battery-power electric vehicles, hybrid electric vehicles, and fuel cell electric vehicles, together with internal combustion engine alternatives such as compressed natural gas vehicles and ethanol-and methanol-fuelled vehicles.
2. **Green Buildings:** perhaps the area with the greatest potential is green buildings, defined as those with minimal adverse impact on the environment, including the buildings themselves, their immediate surroundings, and the broader urban, regional and global settings. Five often cited objectives for sustainable buildings are resource efficiency, energy efficiency, pollution prevention, harmonisation with the environment, and integrated and systematic approaches. Many practices can contribute to making buildings greener, e.g., utilising renewable energy and environmentally friendly building materials.
3. **Green Manufacturing Processes:** Globally the manufacturing sector accounts for about 40% of primary energy use. Thus, green manufacturing processes hold great promise as a way to attain sustainable economic growth while preserving the environment. Increasing Industrial energy efficiency will not only reduce the use of energy but also bring additional productivity benefits,

such as lower maintenance costs, increased production yield, and safer working conditions.

4. **Green Lighting:** Green lighting is widely regarded as an important potential contributor to energy efficiency and environmental protection. Actions in this area span the entire value chain and life cycle of lighting products, including design, installation, and use. However, as important as energy efficiency is, it must be achieved without endangering the overall quality of the lighting to ensure productive and safe home, workplace, and transportation environments.
5. **Green Household Appliances:** Finally, green household appliances are a key area because such devices account for about 20% of total energy consumption. The use of appliances in the home shapes household electricity requirements, a form of direct energy use, and involves indirect energy use as well, such as production, transportation, and disposal. To develop and promote energy-efficient household appliances is an obvious way to improve household energy conversation, but possible side effects such as safety considerations also need to take into account.
6. **Green Waste Management:** Besides green recycling and packaging, green waste management can make important contributions to sustainability. New techniques and practices can help avoid water, soil and air contamination. Some of the most common waste management practices include landfill, incineration, recycling and composting, and the actual adoption varies among different countries. Currently, about 20% of MSW is recycled in United States, Japan, the U.K., and France. More cost-effective and environmentally friendly technologies are needed to alleviate the impact of waste on the environment.
7. **Green Packaging:** Green packaging also harbours great potential, given that virtually all customer products, and many services require containers to protect, preserve, transport or use them. Packaging waste accounted for 78.8 million tonnes or nearly 32% of total Municipal Soiled Waste (MSW) in 2003 in the United States. The dominant disposal method is still landfill, which occupies valuable space and creates adverse environmental effects. Promising solutions

to reduce MSW include recycling the commonly used packaging materials, such as steel, aluminum, paper, and plastic and composting some of the conventional materials with advanced materials, such as biopolymers.

8. **Green Plastics:** An exciting area of research, development and commercialisation is green plastics or bioplastics. A biopolymer is a special polymer that involves living organisms in its synthesis process. Bioplastics, therefore, are defined as materials that contain biopolymers in various percentages and can be shaped by heat and pressure, and they are thus considered potential alternatives to conversational thermoplastic polymers of petrochemical origin. Although the bioplastics industry is still in its infancy, it has made enormous progress and a strong expansion is expected in the near future.

4.7.3 ADVANTAGES OF GREEN ENERGY:

The advantages of using green energy are as follows:

- 1) **No Global Warming Emissions:** Human activity is overloading our atmosphere with carbon dioxide and other global warming emissions, which trap heat, steadily drive up the planet's temperature and create significant and harmful impacts on our health, and environment, and our climate. Increasing the supply of renewable energy would allow the company to replace carbon-intensive energy sources and significantly reduce global warming emissions. Many researchers have found that global warming emissions from using green energy could be reduced by approximately 81%.
- 2) **Never Ending Energy:** One major advantage with the use of green energy is that as it is renewable, it is therefore sustainable and so will never run out. Hence, green energy is a never ending energy. This means it has infinity of sustainability and the company will never run of it. Other sources of energy like coal, Oil and gas are limited and will run out some day.
- 3) **Less Maintenance Required:** Renewable energy facilities generally require less maintenance than traditional generators. Their fuel being derived from natural and available resources reduce the costs of operations.

- 4) **Economic Benefits:** Renewable energy is also cheaper and more economically sound than other sources of generated energy. It is estimated that as a result of renewable energy manufacturing, hundreds of thousands of stable jobs will be created. Green energy amenities require a less amount of maintenance, which reduces the costs. Switching to green energy sources also mean that the future of company's energy is returned back to the people- to communities, families, farmers and individuals.
- 5) **Stabilize Energy Prices:** Switching to renewable energy sources also means steady pricing on energy. Since the cost of renewable energy is dependent on the invested money and not the increasing or decreasing or inflated cost of the nature resource, governments would only pay a small amount in comparison to the needlessly heavy prices of the energy prices the company is witnessing currently.
- 6) **Reliable Energy Source:** Company's dependence on fossil fuels has increased considerably in last few decades. The result is that the national security continues to be threatened by the company's dependence on fossil fuels which are vulnerable to political instabilities, trade, disputes, wars, and high prices. This Impacts more than just their national energy policy. Also, solar and wind plants are distributed over large geographical area and weather disruptions in one area will not cut off power to an entire region.

4.7.4 DISADVANTAGES OF GREEN ENERGY

Following are the disadvantages of green energy:

1. **Reliability of supply:** One shortcoming is that green energy relies heavily upon the weather for sources of supply- rain, wind and sunshine. In the event of weather that does not produce these kinds of climate conditions, renewable energy sources lack the capacity to make energy. Since it may be difficult to generate the necessary energy due to the unpredictable weather patterns, the company may need to reduce the amount of energy they use.

2. **Difficult to Generate in Large Quantity:** Another disadvantage of green energy is that it is difficult to generate large amount of energy as those produced by coal powered plants. This means that either the company needs to set-up more such facilities to match up with the growing demand or look out for ways to reduce their energy consumption.
3. **Large Capital Cost:** Initial investments are quite high in case of building green energy plants. These plants require upfront investments to build, have high maintenance expenses and require careful planning and implementation.
4. **Large Tracts of Land Required:** To meet up with the large quantities of electricity produced by fossil fuels, large amount of solar panels and wind farms need to be set-up. For this, large tracts of land are required to produce energy quantities competitive with future fuel burning.

4.7.5 MANAGING GREEN ENERGY

Energy is an essential input for economic development and improving the quality of life. The Government of India has formulated an energy policy with the objectives of ensuring adequate energy supply at minimum cost achieving self-sufficiency in energy supplies and protecting the environment from adverse impact of utilising energy resources in an injudicious manner.

Energy Management helps companies improve their productivity and increase their product or service quality. This is done through implementing new energy efficiency technologies; new materials and new manufacturing processes; and the use of new technologies in equipment and materials for business and industry.

Energy management skills are important to people in many organizations, and certainly to people who perform duties such as energy auditing, facility or building management, energy and economic analysis, and maintenance. If employees have energy management training, that can make informed decisions and recommendations about energy operating costs.

Energy management has been an important tool to help organizations meet these critical objectives for their short-term survival and long-term success. Hence, Energy Management helps improve environmental quality.

The steps in managing green energy are as follows:

1. Green Energy Planning: Each industry has to plan its energy requirement well in advance. The functions of energy planning are:

- i. To provide direction,
- ii. To provide opportunity to analyse alternative courses of action,
- iii. To reduce Uncertainties,
- iv. To minimize impulsive and arbitrary decisions,
- v. To king-pin function of Energy Management,
- vi. Resources allocation,
- vii. Resource use efficiency, and
- viii. Adaptive response.

2. Green Energy Staffing: The energy staffing includes such activities as manpower or human resources, planning, recruitment, selection ,placement, training and development, remuneration, performance appraisal, promotion, transfers, and so on.

For energy management department, staffing is a continuous function of energy managers. This is because the organisation's need to retain and maintain its personnel is a never-ending process.

3. Green Energy Organization: Energy organization process involves:

- i. Determination of objective/purpose
- ii. Identification and grouping of activities,
- iii. Allotment of Duties,
- iv. Developing relationships, and
- v. Interaction of group of activities- horizontally, vertically and laterally.

Organisation of certain groups of activities is done with a view to implementing these activities. However, the primary requirement for implementation is an organisation structure. The organisation structure has to be built with the following considerations:

- i. Formal relationships with well-defined duties and responsibilities.

- ii. Hierarchical relationships between superior and subordinates within the organization.
 - iii. Tasks or activities assigned to different persons and the department.
 - iv. Coordination of the various tasks and activities.
 - v. List of policies, procedures, standards and methods of evaluation of performance which are formulated with respect to the people and their activities.
 - vi. Arrangement which is deliberately planned is a formal structure of the organisation and avoids informal structure.
4. **Green Energy Requirement:** Energy requirement must be controlled and optimised so that nowhere the objective suffers and ensures fulfillment of the very purpose for which energy is required. It is in conformity with the objective of production, etc.
- It is to be observed that there must not be any wastage/misuse of energy requirement. The purpose of energy control is to see that industry norms, industry standards, nominal standards are maintained for quality and performance.
5. **Green Energy Costing:** Energy costing is an important action in energy management. Realistic cost components are prepared to find out the total energy cost with respect to a particular level of production. This is only possible by an experienced accountant with the help of the user department.
6. **Green energy budgeting:** A budget is a finance control mechanism. Energy budget is to be prepared for each financial year and each quarter. All inputs of the budgetary function must be received from the user department, production and utility department who are in a position to supply data for energy consumption linked with production. Fulfillment of the energy budget is the responsibility of the energy manager with support from the staff of the energy department. The energy manager must have the objective and key result area for energy budget.
7. **Green energy monitoring:** The energy manager must monitor the energy with reference to the energy consumption, energy purchase, energy distribution,

energy losses, energy conversions, energy budget, etc., to find out the instantaneous position regarding energy. For this purpose of monitoring, the energy manager must:

- i. Set standards,
- ii. Measure the performance,
- iii. Compare the performance with standards and ascertain the causes of difference. and
- iv. Adopt corrective measures.

The energy manager shall not only monitor, but also has to take corrective measures in case of deviation from the standards. The corrective measures may be physical control, control over actual and anticipated performance, control over activities or areas of operations, control over organization, control over personnel, control over costs, control over methods and manpower, etc.

4.8 GREEN PRODUCT MANAGEMENT

Introduction:

The products have to be developed depending on the needs of the customers who prefer environment friendly products. Products can be made from recycled materials or from used goods. Efficient products not only save water, energy and money, but also reduce harmful effects on the environment. Green Chemistry forms the growing focus of product development. The marketer's role in product management includes providing product designers with market-driven trends and customer requests for green product attributes such as energy saving, organic, green chemicals, local Sourcing, etc.

For example, Nike is the first among the shoe companies to market itself as green. It is marketing its Air Jordan shoes as environment- friendly, as it has significantly reduced the usage of harmful glue adhesives. It has designed this variety of shoes to emphasise that it has reduced wastage and used environmental-friendly materials.

4.8.1 ATTRIBUTES OF GREEN PRODUCTS:

To create a significantly greener economy requires a number of new and mostly greener products and technologies- 'Green technology' Sustainable solutions are product changes, service changes or changes in systems that minimise negative and maximise positive impact on sustainability(economic, environmental, social and ethical). one of the criteria for the production of new products is a concept design for the environment. Measurement and understanding of eco-product characteristics is important for all companies regardless of whether there remote green strategy or not.

Green products should consist of a number of attributes, which can be divided into two basic categories:

1. Attributes associated with social and biological wastage of the products such as the effective of utilisation of energy composition safety and recyclability product after it useful life create an interesting perspective on green product management use of this perspective supplied the implementation of Atheist some or all the 5R:
 - a) **Repair:** Designing the product to be easily and effectively affected in the future without the need to purchase a new product.
 - b) **Reconditioning:** Repair parts from malfunctioning products and their subsequent sale.
 - c) **Reuse:** Reuse parts of a products, such as returnable packaging.
 - d) **Recycling:**Necessary waste processing after use of the product and subsequent production of other goods or identical goods.
 - e) **Re-manufacture:** Used, Old, Worn, non-modern and otherwise unnecessary products collection, their subsequent use in the manufacture of new products.
2. Attributes related to the process by which the product was produced and also attributes of the company that manufactures these products.

In the green Products production, it is important to have regard for the product in addition to the green concerns,and comparable with competing products,in terms of functionality and price .This is not an easy task.However,it can reduce atleast the difficulty of packaging the product with respect to the environment without

costly changes to the properties of the product and the production process and also without risk of discouraging consumers.

4.8.2 GREEN PRODUCT LIFE CYCLE:

Products, services, and processes all have a life cycle. For products, the life cycle begins when raw materials are extracted or harvested. Raw materials then go through a number of manufacturing steps until the product is delivered to a customer. The product is used, then disposed of or recycled. These product life cycle stages are illustrated in figure 4.3, along the horizontal Axis. As shown in the figure energy is consumed and wastes and emission are generated in all of these life cycle stages.

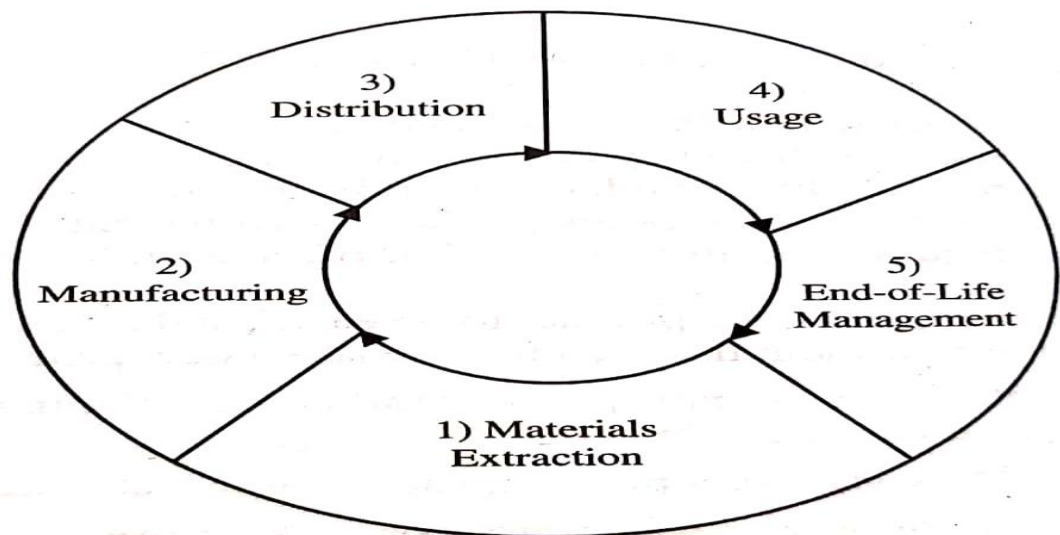


Figure: Green Product Life Cycle

Stage 1: Materials Extraction:

All products are made from materials found in or on the earth. “virgin” or “raw material”, such as trees or ore, are harvested directly from the Earth, then transported and processed. These activities use a large amount of energy, and burning fossil fuels to supply this energy results in greenhouse gas emissions. Recycling generally uses less energy than extracting and processing raw materials, so, making new product from materials that have already been used (recycled materials) can save energy and reduce Greenhouse gas emissions.

Stage 2: Manufacturing:

Products often require a great deal of energy to create, which result in greenhouse gases emissions. When a product is made with less material or materials made with recycled content, less energy is needed to extract, transport and process raw materials.

Stage: 3 Distribution:

Finished products needed to be transported to a distribution Centre or warehouse, then to store and homes. In addition, each stage of the life cycle of a product requires some form of transportation. Transportation by plane, truck or rail all require the use of fossil fuels for energy which can contribute to global climate change.

Stage: 4 Usage:

Simply using a product may require energy, so it makes sense to purchase appliances that are energy efficient-such as products with the **Energy Star** label .some appliances and electronics called “**energy vampires**” continually use power when plugged the into an outlet whenever there are turned off. Some consumable products are formulated to reduce energy use, such as detergents that are formulated to work well in cold water.

This reduces the demand for energy needed to heat water.

Stage 5: End-of-Life Management:

End of life management is what happens to our stuff after it has been used. How we manage our goods at the end of their current life can make a big difference in our environmental footprint. Ways of managing green products are:

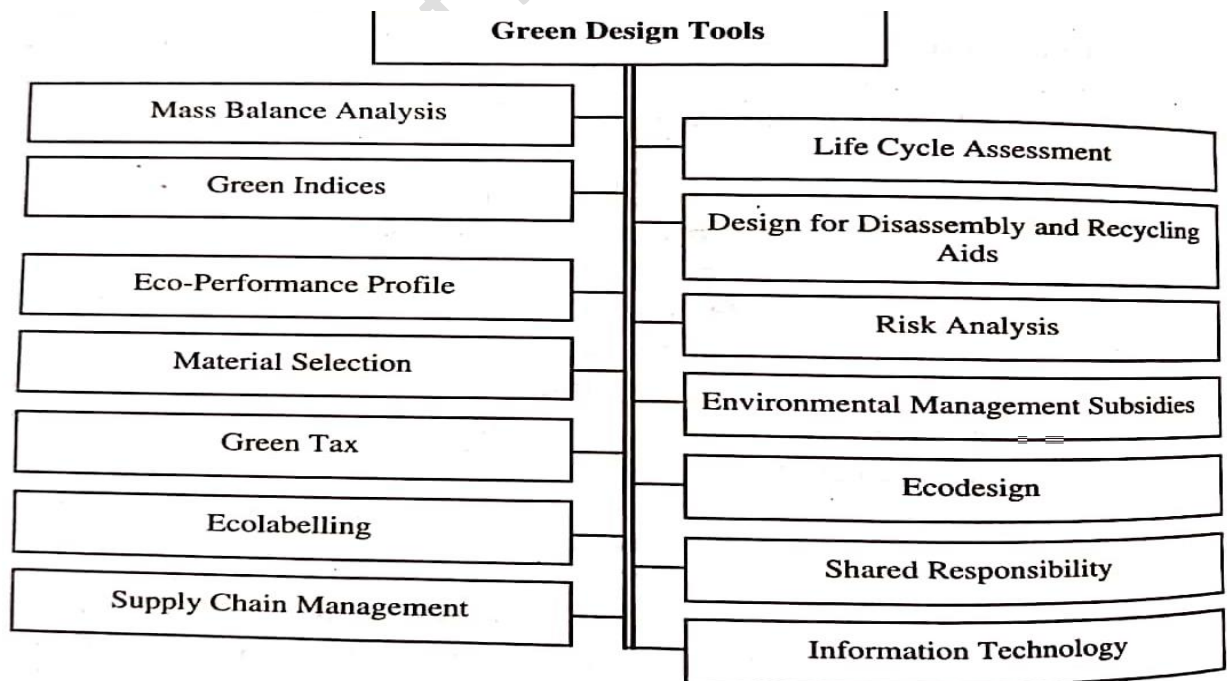
- 1) **Reuse:** Reuse, or using a product more than once, prevents the need to create the product from scratch, which saves resources and energy while also preventing pollution.
- 2) **Recycle:** Recycling saves energy. Manufacturing goods from recycled materials typically requires less energy than producing goods from virgin materials. Recycling Paper Products also preserve forest so they can continue to remove carbon dioxide from the atmosphere.
- 3) **Compost:** composting diverse organic waste from landfills. When organic materials like food scraps decompose in the anaerobic conditions of a landfill,

they produce methane, a greenhouse gas over 20 times more potent than carbon dioxide. During composting, the material decomposers in the presence of oxygen, avoiding methane production.

- 4) **Energy Recovery:** Energy recovery from wastage is the conversion of non recyclable waste materials into usable heat, electricity, or fuel through a variety of processes. Converting non recyclable waste materials into electricity and heat generally through combustion or landfill gas recovery generates a renewable energy source and reduces carbon emission by avoiding the need for energy from fossil sources. In addition, these methods reduce generation of methane, a potent Greenhouse gas, from landfills
- 5) **Landfill:** When organic materials go to landfill ,they decompose and produce methane gas, a greenhouse gas over 20 times more potent than carbon dioxide. Many landfills collect landfill gas and use it to generate electricity or as a fuel for equipment such as boilers.

4.8.3 GREEN DESIGN TOOLS:

Following are definitions of some terms common to Green methods and tolls:



1. Mass Balance Analysis:

Mass balance analysis involves tracing the materials or energy in and out of a process or an analyses area, such as a manufacturing station or a plant. Ideally, Mass balances are based on measurements of inflows, inventories, and outflows including products, wastage and emissions.

2. Life cycle assessment:

Life cycle assessment is used to determine the total environmental effect of a products throughout its life cycle (i.e., from cradle to Grave, or the more recent cradle to cradle).

3. Green indices:

Green indices or ranking system attempt to summarise various environmental impacts into a simple scale. The designer or decision maker can then compare the green score of alternatives such as materials, processes, and so on, and choose the one with the minimal environmental impact.

4. Design for disassembly and recycling aids:

Design for disability and recycling aids means making products that can be taken apart easily for subsequent recycling and parts reuse. Design for disability and recycling aids software tools generally calculate potential disassembly pathways, point out the fastest pathway, and reveal obstacles to disassembly then can be “designed out.”

5. Eco performance profile:

It is an identification of energy and material related environmental impact s generated by the company and along the products lifecycle.

6. Risk analysis:

Risk analysis is a means for tracing the changes of different effects occurring in a particular area or process or product.

7. Material selection:

Material selection guides attempt to guide designers towards the environmentally preferred material and green alternatives. Manuals are intended to provide information for users about how to use, maintain and dispose of products. Companies need management information system that reveals the cost to the company of decisions about materials, products, and manufacturing process.

8. Environmental management subsidies:

These are intended to provide subsidies for the development and marketing of cleaner products including the creation of know –how, methods, product development processes, greener purchasing, and waste/recycling systems

9. Green tax :

It refers to a policy that introduces tax intended to promote ecologically sustainable activities via economic incentives.

10.Ecodesign:

It has been used in companies as a tool to incorporate environmental consideration into product design and development process of enterprises.

11. Ecolabelling:

It refers to a label that identifies overall environmental preference of a product or service within a specific product/service category based on life cycle considerations. These labels are awarded by an impartial third party in relation to certain products or services that are independently determined to meet the environmental leadership category.

12. Shared responsibility:

It is the sharing of different tasks by different stakeholders along the product life cycle. The field of green design is more in favour of this approach, rather than passing all the responsibility to the producer.

13. Supply Chain Management:

It refers to technology partnerships in which reuse or recycling in relationships and supplier evaluation can also be used to manage supplier chains for environmental quality.

14. Information Technology:

With recognition of information technology in this field, various supportive databases and software can also be used for product design.

UNIT-4 PREVIOUS YEAR QUESTIONS

1. Explain the components of an ISO 14064 System. (May 2019 supply)
2. Outline the steps involved in green product management. (May 2019 supply)
3. Explain the principles of the ISO 14001 Standards.(Nov 2018 Reg)

4. Describe the scope and principles of green energy management.(Nov 2018 Reg)
5. Describe the climate change business and its link to ISO 14064(Nov 2018 Supply)
6. Explain the various documents that fall under ISO 14001. (Nov 2018 Supply)
7. Discuss the concept of green financing.(May 2018 Reg)
8. Explain the principles of ISO 14001. (May 2018 Reg)
9. What is green financing. what are the sources of green financing.(Nov 2017 Supply)
- 10.What are green products Explain with help of some examples. .(Nov 2017 Supply)
- 11.Examine the need and importance of green financing.(May 2017 Supply)
- 12.Write a brief note on ISO 14064. .(May 2017 Supply)
- 13..Explain the provisions in the ISO 14064 framework to promote environmental focus in business.(Nov 2016 Supply)
- 14.Describe the various stages in green product management(Nov 2016 Supply)
- 15.Discuss the points involved in green financing(June 2016 Reg)
- 16.Describe the financial initiatives taken by UNEP for promoting green practices(June 2016 Reg)

Prepared By

L.Nikhila B.Tech, MBA, P.hD

Assistant professor

BALAJI INSTITUTE OF IT & MANAGEMENT, KADAPA

Icet code: BIMK

SUBJECT: GREEN BUSINESS MANAGEMENT

Regulation: R17

“DON'T COMPARE YOURSELF WITH ANYONE IN THIS WORLD.IF YOU DO SO YOU ARE INSULTING YOURSELF”- BILL GATES

CASE STUDY

ENERGY RESOURCES

1.GREEN ENERGY: In 1998 the 4400 residence of Brundby on a Danish Island decided that they would give up fossil fuels in 10 years. There are now more than 20 wind turbines generating as much energy as the island consumes from fossil fuels. Home heating, which is necessary in Denmark, is through hot water made from burning straw.

over six years, the island cut its energy consumption by 25 percentage, drastically reducing emissions of nitrous oxide, sulphuric acid, and carbon dioxide. The European Union (EU) plans to replicate their initiative in 100 other communities so that to 12% of the total energy in the EU would come from renewable sources by 2010.

Denmark has been making huge investments in developing green technologies. 20 percentage of its electricity is now generated renewable sources. It is also a world leader in wind power. It's windmills and generators are exported to many countries including India. The Danish wind power company, vestas, has set-up a manufacturing unit in Chennai. The path to Sustainable energy use,however,is always difficult. The latest news is that the new Danish government has cut its investment on renewable energy.

2.GREY ENERGY: An important threshold was reached in early 2004 China exceeded Japan in oil imports becoming the second largest importer of oil. It is also the fastest growing oil consumer in the world. 2 million cars with put on the road in China in 2003 which was 70 percentage more than in 2002. Today there are 10 million cars in China and the number is rapidly growing. If China starts consuming at US levels it will need 80 million barrels of oil per day which is 10 million more than the entire world production in 1997 even at current levels of growth , China would need at least 10 million barrels a day by 2025

China, however, has huge oil coal reserves enough to last the country 300 years. The environmental cost of burning all that coal would surely be very heavy.

Question : Analyse the case and tell about the problems associated with energy resources.

ONE POSSIBLE SOLUTION

Problems Associated With Energy Resources

Environmental problems associated with energy use span a spectrum of pollutant emissions, hazards and accidents as well as the degradation of environmental quality and natural ecosystems. Over the past few decades, energy related environmental concerns have expanded from the primarily local or regional issues, to the international and global nature of major energy related environmental problems.

Particularly in developing or newly industrialized countries, where energy consumption growth rates are typically extremely high and where environmental management has not yet been fully incorporated into the infrastructure, environmental problems are becoming apparent or already exist. Problems associated with renewable and non renewable energy resources are discussed below:

1. problem with grey energy resources

Major problems associated with non renewable energy resources are as follows :

- a) Grey energy sources are finite and will run out one day, as they start to run out the cost of extraction rises steeply making them much more expensive.
- b) Nations with reserves of non renewable energy can exercise economic, political power over those that do not. User Nations lack energy security
- c) The high cost of imported non renewable energy means that massive amount of money flow out of the country affecting its balance of trade and the value of its currency.
- d) Most grey energy sources create atmospheric pollution during consumption. This contributes to smog, acid rain and global climate change.
- e) The extraction of Grey energy sources is potentially hazardous for the workers not all countries have adequate safety procedures.

2. problems with green energy resources :

Major problems associated with green energy resources are as follows

- a) It is difficult to generate the quantities of electricity that are as large as those produced by traditional fossil fuel generators.
- b) Green energy often relies on the weather for its source of power.

- c) Hydro generator need rain to fill dams to supply flowing water. Wind turbines need wind to turn the blades and Solar collectors need clear skies and Sunshine to collect heat and make electricity.
- d) The current cost of greens energy technology is also far in excess of traditional fossil fuel generation. This is because it is a new technology and as such has extremely large capital cost.
- e) The environmental impacts associated with solar power can include land use and Habitat loss water use and the use of hazardous materials in manufacturing, through the types of impacts very greatly depending on the scale of the system and the technology used photo voltaic (PV) solar cells or concentrating solar thermal plants.(CSP).

(17E00302) GREEN BUSINESS MANAGEMENT

Objective: The objective of the course is to impart students in understanding of green business, its advantages, issues and opportunities and to provide knowledge over the strategies for building eco-business.

1. Introduction to Green Management: The Concept of Green Management; Evolution; nature, scope, importance and types; Developing a theory; Green Management in India; Relevance in twenty first century

2. Organizational Environment; Indian Corporate Structure and Environment; How to go green; spreading the concept in organization; Environmental and sustainability issues for the production of high-tech components and materials, Life Cycle Analysis of materials, sustainable production and its role in corporate environmental responsibility (CER).

3. Approaches from Ecological Economics; Indicators of sustainability; Eco-system services and their sustainable use; Bio-diversity; Indian perspective; Alternate theories

4. Environmental Reporting and ISO 14001; Climate change business and ISO 14064; Green financing; Financial initiative by UNEP; Green energy management; Green product management

5. Green Techniques and Methods; Green tax incentives and rebates (to green projects and companies); Green project management in action; Business redesign; Eco-commerce models

Text Books:

- Green Management and Green Technologies: Exploring the Causal Relationship by Jazmin SeijasNogarida , ZEW Publications.
- The Green Energy Management Book by Leo A. Meyer, LAMA books

References:

- Green Marketing and Management: A global Perspective by John F. Whaik, Qbase Technologies.
- Green Project Management by Richard Maltzman And David Shiden, CRC Press Books.
- Green and World by Andrew S. Winston, Yale Press B

UNIT-5

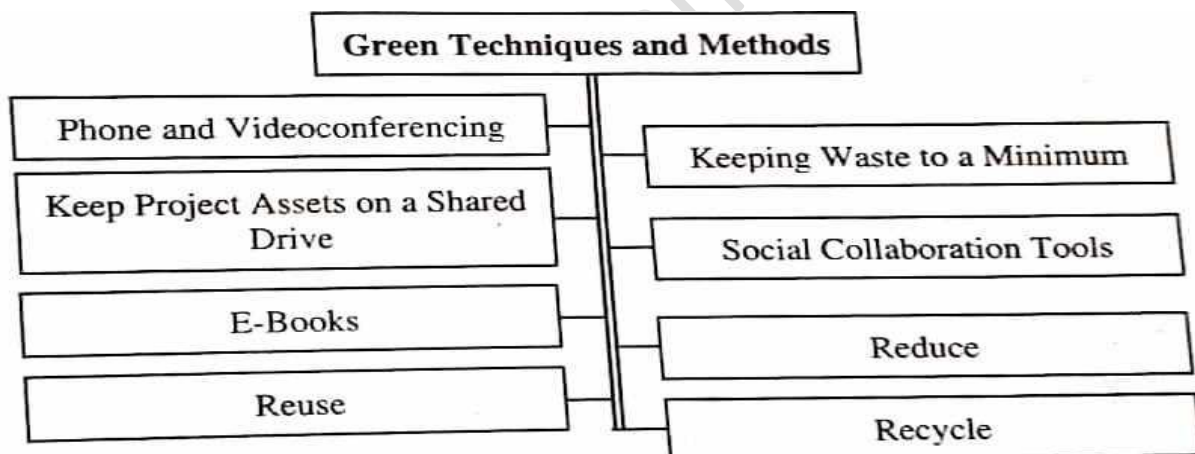
GREEN TECHNIQUES AND METHODS

5.1 GREEN TECHNIQUES AND METHODS

Green technology, also known as sustainable technology, takes into account the long-term and short-term impact on the environment. Green products are nothing but environmentally friendly products. The green product technology includes Energy efficiency, recycling, health and safety concerns, renewable resources etc.,

Our planet has suffered rapid changes in climate, that include increasingly severe droughts, increases depletion of ground water reserves, sea water acidification, rising sea water levels, the rapid speed of diseases and macro-parasites and the extinction of species. **Green Technology offers us the best hope to counteract the effects of climate change and pollution.**

Green Techniques and methods are as follows:



- 1. Phone and Video conferencing:** If feasible, using phone and video conferencing tools to bring remote resources together on a project is a *cleaner alternative* to having everyone travel to be on-site and it is a major perk for employees. One of the absolute worst things the company can do for the environment, is travel. While business trips have long been a staple of active and successful organizations, this is not always a practical reason to make the trip. For meetings with clients, customers, or investors, companies can use video conferencing to handle everything. While it certainly take small amounts of electricity to maintain an internet connection and power videoconferencing software, the expenditure is relatively small. This

contrasts remarkably with the huge amount of fossil fuel that is expended when participants in a traditional conference have to travel to a Central location by car, train or aeroplane.

2. **Keeping waste to minimum:** As a project manager, keeping waste to a minimum has always been the mantra. Encourage the team to rely on soft-copy documents. **For example**, when signing off on documents like charters and requirements, rely on e-signatures or e-mail confirmation and do not print if do not have to.
3. **Keep project Assets on a shared drive:** When closing out a project, keep project assets on shared drive instead of in a file cabinet. And do not throw those hard copies in the trash- shred and recycle.
4. **Social Collaboration Tools:** Social collaboration tools are essentially virtual (or online) tools that help employees and businesses interact and share information in an effort to accomplish a common goal. They are like virtual meeting rooms that allow as many people as necessary to join without distractions and regardless of physical barriers. It is next-level project management and there is no paper trail- making it as eco-friendly as one can get.
5. **E-Books:** A considerable amount of paper can be saved by a company if it chooses to e-mail the documents and prepare company manual as e-books, as opposed to printing them. While most people think about books and novels when they consider e-books, that truth is that they are equally valuable for internal use. There is little advantage to using e-books rather than traditional print books; the reality is organisations can save time, money, paper and ink when opting to use digital copies.
6. **Reduce:**
 - a. Consolidate multi-functional devices to reduce energy consumption.
 - b. Go Digital for project planning calendars.
 - c. Lobby for a water cooler rather than bottled water provisions to reduce plastic purchases.
 - d. Choose networked digital storage devices rather than CDs for archiving files. Network storage drives hold much more information with less manufactured material and can be configured for automatic backing up of information. Plus, they reduce the time required to search for needed files.
 - e. Print on front and back of paper.
 - f. Make digital presentations in power point and distribute PDF file for review or reference rather than bound reports.

- g. Switch to laptop computers rather than desktops as they require less energy.
- h. Run the laptop and other rechargeable devices on battery power as much as possible to reduce the consumption of electricity and extend the life of batteries.
- i. Turn off office equipment, computers, and lights when not in use. Unplug if possible.
- j. Consolidate shipment of purchases and use local vendors and suppliers whenever possible.
- k. E-mail rather than fax or mail proposals, invoices, and other project paper work whenever possible.
- l. Bring lunch rather than going out.

7. Reuse

- a. Repurpose unused printouts for note sheets.
- b. Purchase paper which atleast particle recycled content.
- c. If shredding of documents is required, work with the shipping department to use shredded material for packing.
- d. Ask project team members to bring their ceramic or insulated coffee mugs and drinking cups. Wash them rather than using paper or plastic disposable options.

8. Recycle:

- a. Schedule regular visits to the recycling Centre for paper and plastics.
- b. Contact copy machine and ink for toner cartridge manufacturers to inquire about cartridge recycling. Many offer reward programmes for recycling cartridges.
- c. Recycle all cell phone, digital camera, and other digital device rechargeable batteries.
- d. Donate unused computers that are in good condition to schools, charities and Public Service agencies.
- e. Donate outdated computers to computer recycling offices for refurbishing.

5.2 GREEN TAX INCENTIVES AND REBATES (TO GREEN PROJECTS AND COMPANIES):

5.2.1 INTRODUCTION:

- Companies are seeking ways to exhibit their corporate citizenship towards a green future.

- This “green” focus is being followed by the government, which is using tax incentives to drive corporate behavior.
- Both federal and state government are expanding tax credits ,incentives and grant programs to help companies producing energy from renewable sources and to encourage businesses to “**go green**”.
- Many of these credits and incentives are designed to foster sustainability programs.
- Green taxes (also called “environmental taxes” or “pollution taxes”) are excise taxes on environmental pollutants. Economic theory suggests that taxes on polluting emissions will reduce environmental harm in the least costly manners, by encouraging changes in behaviour by those firms and households that can reduce their pollution at the lowest cost.
- It is the tax paid by consumers for products or services that are not environmentally friendly.
- Intended propose of the green tax is to offset the negative impact resulting from the use of non-green products and services.
- ***Tax incentive is a deduction, exclusion or exemption from tax liability***, offered as an enticement to engage in a specified activity (such as investment in capital goods) for a certain period.
- A wide range of tax incentives are often offered to businesses and consumers, that invest in Environmental projects (such as solar, wind, geothermal, hybrid vehicles and biofuels).
- *Incentives are also given to those investing in energy efficiency solutions.* Generally, the principal aim of tax incentives is to either reduce the cost of the investment or increase the investors net revenue from the sales of the output via tax breaks on returns from investments in environmentally sound initiatives.
- Tax incentives offered to environmental projects are prevalent in both developed as well as emerging and developing countries.
- **For example**, in some European countries, such as the Netherlands, Germany, Belgium and the Nordic bloc, tax rebates are offered with the sole objective of promoting investment in energy-efficient equipment and environmental protection. These include allowances for accelerated depreciation of capital investments in technologies that reduce environmental stress; allowances which target investment in energy-saving equipment; and those which promote capital investment in Environmental

Protection. Here again, the tax incentives are aimed at lowering the sunk costs of green investment.

5.2.2 TAX INCENTIVES AT VARIOUS AREAS:

Areas	Items
Primary sector activities	Tax exemption for all agricultural activities; higher rate of depreciation for certain assets relating to environmental protections.
Investments in environmentally friendly equipment	Compensations from multilateral fund of Montreal Protocol; tax exemptions for collecting and processing or treating of biodegradable waste water; deduction of profits derived from infrastructure related to water and from biotechnology
Other activities	Tax holiday for industrial undertaking, producing refined mineral oil; tax holiday for infrastructure project/power/ housing; tax incentives for free trade zone, special economic zone and 100% export-oriented units; tax incentives for units in specified states, undertakings engaged in export of handmade articles, or in the business of handling, storage and transportation of food grains.

5.2.3 TAX BENEFITS FOR SOLAR ENERGY PRODUCERS OR CONSUMERS IN INDIA:

- The ITC(Investment Tax Credit) allows you to deduct 30% of the cost of installing a solar energy system from your Federal taxes.(30% of amount will be paid back)
- If you own your solar panel system, you are eligible for the ITC. However, you aren't eligible if you lease your solar panels or if you signed a power purchase agreement.
- There is no cap on how much you can claim with the ITC, but because it is a credit and not a refund, you can't get more back in a single year.

Example: If your system cost \$20000, then you are eligible for 30% of that i.e.,\$6000 as a tax credit, but if you get \$5000 in Federal taxes that year, then you will eliminate all of those taxes, and still have \$1000 left over for the next year.

- But the incentives were strinks from 30% to 26% in 2020 and disappears altogether for homeowners in 2022.
- Take advantage of it today, and start shopping for solar energy system.
- The central government pays 30% of installation cost for rooftop PV systems.
- Some States like Uttarakhand, Sikkim, Himachal Pradesh, Jammu and Kashmir ,Lakshadweep offers 70% subsidy.

5.2.4 APPLICATION PROCESS FOR THE SCHEME:

1. Interested people can contact electricity provider.
2. Concerned officials visit site.
3. Then users got approval for installation from officials.
4. Customer calls electricity provider for inspection, after completion of installation.
5. Next officer will inspect and give their approval for subsidy.
6. Then, customers can avail the Subsidy amount, They can also get tariff details of the excessive units that will be sold to the government.

5.2.5 SOME OF THE TYPES OF GREEN TAX INCENTIVES AND REBATES:

1. Energy-efficient commercial business deductions
2. Business energy investment tax credit
3. Vehicle Credits(to encourage to buy alternative and fuel-efficient vehicles)
4. Alternative refueling property credit
5. Qualified reuse and recycling property
6. Fringe benefits for employees
7. Incentives for specific manufacturers and developers Energy efficient appliance credit
8. Energy- efficient new homes credit(Green houses)
9. Renewable electricity production credit
- 10.Advanced energy manufacturing credit
- 11.Alternative fuel credit(Liquefied petroleum gas, compressed or liquefied gas from biomass etc.,)
- 12.Residential energy efficient home improvements credit(water heaters, Furnaces, Boilers, Building insulation, windows, doors and roofs etc.,)
- 13.Residential energy-efficient property credit(Solar water heaters, Geothermal heat pumps, Fuel cells, Wind turbines)

- 14.State and local initiatives
- 15.Incentives for businesses(to develop renewable energy and to improve energy efficiency)
- 16.Personal incentives for individuals(To encourage the use of alternative fuel vehicles, states offer credits, grants, loans, rebate programs ,incentives and exemptions)

5.3 GREEN PROJECT MANAGEMENT IN ACTION

5.3.1 INTRODUCTION, MEANING &DEFINITION:

The degree to which an organization considers the environmental (green) aspects of their project throughout the project life cycle and beyond.

In some projects, it is easy to see the impact of being green like

- ✓ Consuming less energy
- ✓ Manufacturing using recycled materials
- ✓ Reduced scrap
- ✓ Constructing eco-friendly building.

Green projects are unique activities organised on the temporary basis to create a specific green deliverables and tangible results. These deliverables are achieved in a constrained environment where scarce resources are deployed to achieve green results.

Projects in green business will relate to green activities undertaken in a firm. Green business, at an enterprise level, entails performing the following green activities in a firm- looking at the energy use, water use, waste management practices, transportation methods and costs, nature of office equipment used and their costs, purchasing and supply chain patterns, building designs, product design, product eco-labeling needs, creation of an enterprise-wide environmental management system, compliance and reporting to environmental regulations, calculating carbon footprint etc. Most of these activities can be performed utilising modern Project management processes, knowledge areas, tools and techniques to achieve specific tangible results, outputs, end products that can be measured based on the defined criterion.

Green Project management starts with establishing a culture of responsibility and sustainability in the requirements from project team members. Not only are paper documents a pain to file, but they are also wasteful on the environment. In fact, 69 million tones of paper and paperboard are used every year.

Most of that paper is consumed by businesses that use their fair share of paper for managing projects. The secret to green project management is stepping away from paper products and travel and moving entirely towards **online or virtual** tools. In an effect to help to turn the business from wasteful into resourceful, there are various eco-friendly project management methods which can be used to increase company productivity.

Green Project Management is *defined* as “the degree to which an organisation has considered environmental (green) factors that affect its project during the entire project lifecycle and beyond”.

It contains two Project Management processes:

- 1) creating a plan to minimise the environmental impacts of projects (this includes efforts to simply run the project more effectively and efficiently), and
- 2) The monitoring and controlling of the environmental impacts of the product of the project.

According to **Bridgit Koller**, “Green Project Management (GPM) refers to “the inclusion of Sustainable methods to the process by which projects are defined, planned, monitored, controlled and delivered”.

According to **Dr Joel Carboni**, “ Green Project Management aims to miximise the social, economic and environmental value that the Project’s objective or resulting asset brings. It also aims to minimise negative impact (economic, i.e., micro or macro, social and environmental) from the method and technique.”

Green Project Management fuses environmental-friendly standards with project management methodologies and processes. It helps the project manager to explore risk mitigation measures before taking a decision on the future of the project.

5.3.2 GREEN PROJECT MANAGEMENT IN ACTION:

Process of Green Project Management includes following stages:

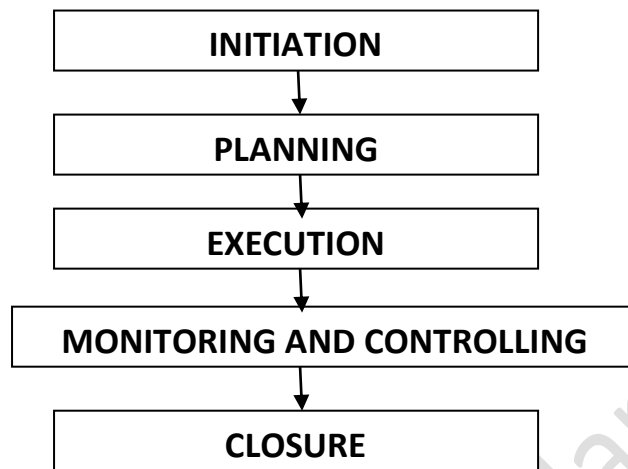


Figure: Process of Green Project Management

Step-1: Initiation

This is perhaps the most important stage of any project as it sets the terms of reference within which the project will be run. If this is not done well, the project will have a high probability of failure. ***Initiation involves thinking about green projects and identifying the stakeholders in the initiation phase.***

The project manager is assigned to the project and the project charter is created. A Project Charter (PC) is defined as a document that states a project exists and provides the project manager with written authority to begin work. The document helps the project manager to communicate his authority and explain to project participants and stakeholders why the project is needed, who it involves, how long the project will take to complete, how much it will cost what resources are needed and how successful completion of the project will help the organization.

The initiation stage is where the business case is declared, the project goal, need or problem is identified, scope of the project decided and stockholder expectations set. Time spent on planning, refining the business case and communicating the expected benefits will help phase improve the probability of success. It is tempting to start work quickly, but a poor initiation Stage often leads to problems and even failure.

Several points Considered in initiation phase include:

- 1) Incorporating environmental cost/benefit in business cases and proposals.
- 2) Adding 'effect on environment' as an element in all project charters.

- 3) Incorporating applicable corporate green programme goals into project's goals.
- 4) Defining/aligning green project objectives and measures that will drive the behavior, to those goals.
- 5) Bringing in the corporate environmental department as a Project stockholder.
- 6) Obtaining e-sign offs unless required for legal purposes.

Step-2: Planning

The key to a successful project is in the planning. Creating a green project management plan is the first task one should do when undertaking any project. It includes all other subsidiary plans coming out of each knowledge area.

The project planning processes are iterative in nature and it is expected that planning will happen often throughout the project. **Planning phase considerations include:**

- 1) Appointing a green champion for the project.
- 2) soliciting suggestions from project team and stakeholders for green ideas.
- 3) Including environmental impact/sustainability in purchasing/procurement process.
- 4) Turning to recycling as an alternative for tear-down and disposal.
- 5) Planning a project recycle day to help reprocess personal PCs, cell phones and other electronics planning phase.

Step-3: Execution

Once the project plan has been created, the project team goes about executing the project plan to create the deliverables of the project. The project can shift to project planning as needed throughout project execution. This is where the work to delivery the product, service or wanted result is carried-out. Most of the work related to the project is realised at this stage and needs complete attention from the project manager. In this step, the green project managers implement the strategy based on the charter, shareholder expectation and management plan. Moreover, execution phase is also subdivided into several key p steps which are as follows:

1. Printing: It includes

- a. Making project documentation 'soft' to the extent possible.

- b. Recycling used paper, batteries etc.
 - c. Encouraging team to reduce printing of e-mails and project related documentation.
 - d. Discouraging printing of meeting notices; using smartphones/ Blackberry's to sync-up calendars.
 - e. Using double sided printing and photo copying.
 - f. Utilising the black and white printer more than colour one.
- 2. Meeting:** It is comprised of following considerations:
- a. Balancing the use of face-to-face meetings and using conference calls and video conferencing.
 - b. E-mailing meeting related documentation to all attendees instead of printing paper copies for everyone.
 - c. Avoiding printing more than needed paper copies of documentation for meetings
 - d. Promoting use of projectors when walking through reports and records instead of using hard copies meetings.
- 3. Travel:** It involves
- a. Reducing project related travel; conference calls and video conferencing.
 - b. Setting up e-training instead of traditional classroom setting.
 - c. Car-pooling for off-site meetings travel.
- 4. Recycle:** It includes
- a. Recycling water and pop bottles; donating refund money to a Charity.
 - b. Encouraging project team to participate in corporate annual clean-up day.
 - c. Purchasing recyclables papers for printing if possible recycle.
- 5. Energy use:** It involves
- a. Ensuring all project desktops and laptops follow Energy Management policy.
 - b. Persuading team members to switch off lights/fans and PCs when away for an extended period or at the end of the day.
 - c. Sharing work spaces so that in total project team utilises less real estate.
 - d. Considering staggering work hours for team members to avoid commuting during rush hours.
 - e. Supporting telecommuting.

Step-4: Monitoring and Controlling

As the project is being executed by the project team, that green project manager monitors and controls the work from time, cost, scope, quality, risk and other factors of the project. Monitoring and controlling is also an ongoing process to ensure that the project addresses its targets for each project objective. Once the project is running it is important that green project manager keeps control. This is achieved by regular reporting of issues, risks, progress and the constant checking of the business case to make sure that the expected benefits will be delivered and are still valid. Here, green Project managers control the outputs from each plan to ensure it adheres to the plan. Monitoring and controlling phase considerations include:

- 1) Collecting and openly sharing project metrics on environmental stewardship and sustainability.
- 2) Identifying 'green' proposals as part of solution alternatives when managing change.
- 3) Holding quarterly 'Green, review meeting to assess process against green objectives/metrics and for fostering innovative ideas.
- 4) Making certain project is completed on time and budget so that more resources are not used than planned.

Step-5 Closure:

At the end of each phase and at the end of the entire project, project closure happens to ensure that all of the work has been completed, is approved, and ultimately transferred ownership from the project team to operations. Here, Green Project manager hand over the end product to the user group and document lessons learned. Often neglected, it is important to make sure the project is closed properly.

Many projects do not have a clear end-point because there is no formal sign-off. It is important to get the customer's agreement that the project has ended, and no more work will be carried-out. Once closed, the project manager should review the project and record the good and bad points, so that in the future, successes can be repeated and failures avoided. Moreover, projects that are not closed will continue to consume resources. Closing phase consideration involves:

- 1) Reusing project documents and equipment for the next project.
- 2) Adding 'green' measures as a review category for lessons learned reviews.

- 3) Sharing projects green contribution metrics to corporate 'green' initiatives.

5.3.3 CHALLENGES IN GREEN PROJECT MANAGEMENT

In Green Project Management, there are various challenges each project manager has to confront while constructing green projects. They are as follows:

- 1. Higher cost for Green Construction Practices and Materials:** As compared to conventional projects, green projects tend to cost more to construct. According to an estimate, capital costs for green Projects range from 1 to 25% higher. The higher costs are due to design complexity and the modelling costs needed to integrate green practices into projects. Higher costs are also associated with green materials and using green construction technologies. Using green materials costs from 3 to 4% more than conventional construction materials. Some green materials cost significantly more than their conventional counterparts, compressed wheat board costs about 10 times more than ordinary plywood. The higher costs of green construction directly affect the project manager, because they are responsible for managing and delivering their products within an allocated budget.
- 2. Technical Difficulty during the construction process:** A project manager implements a project plan by authorising the execution of activities to produce project deliverables. Often, green technologies require complicated techniques and construction processes. If complexities are not addressed well then it may affect the project manager's performance. It is suggested that one of the main challenges in green building in the technical difficulties experienced during the construction process. Similarly, design can be more complicated than that of the conventional building due to the evaluation of alternative materials and systems.
- 3. Risk due to Different Contract Forms of Project Delivery:** The success of developing and implementing a green design depended greatly on the type of contract selected for the delivery of the project. The type of contract used in green projects must incorporate the details of a fully integrated green design. This creates a problem if the design is locked before being developed fully. Multiple changes of significant scale are likely if green features are incorporated at a later stage, resulting in a greater overall project cost.

- 4. Lengthy Approval Process for New Green Technologies and Recycled Materials:** The market environment suggests that the planning process can be protracted as the process of approving the use of new green Technologies and recycled materials can be ordered to gain approval. A lengthy approval process presents a challenge to project managers as they must develop the schedule and approve progress payments to vendors and suppliers.
- 5. Unfamiliarity with Green Technologies:** Many studies have verified that green technologies pose certain challenges for developers, clients and contractors. Two reasons are insufficient knowledge or technical expertise, and unfamiliarity with the green technologies are usually more complicated and are different from conventional technologies. A project manager has to deliver the project with the required performance specified by the client and unfamiliarity with the performance of green technologies may affect the performance outcome.
- 6. Greater Communication and Interest Required amongst Project Team Members:** To be successful, the project manager must manage a large number of suppliers, sub-contractors and team members. Communication is especially critical for the green project in order to convey the sustainable practices expected from the team members. Interest amongst team members is important. It is found that the initial enthusiasm for separating waste materials amongst sub-contractors dissipated as the projects progresses and the recycling skips were found to contain a mix of materials.
- 7. More Time Required to Implement Green Construction Practices Onsite:** Random checks and onsite visits by project managers are usually required to ensure that sustainable practices are implemented onsite. This is essential because workers may tend to forgo time-consuming sustainable practices when they are time pressures to complete a project

5.4 BUSINESS REDESIGN

Business redesign or Business Process Reengineering (BPR) involves changes in structures and in processes within the business environment. The entire technological, human, and organisational dimensions may be changed in BPR. Information Technology plays a major role in business process re engineering

as it provides office automation. It allows the business to be conducted in different locations, provides flexibility in manufacturing, permits quicker delivery to customer and supports Rapid and paperless transactions. In general it allows an efficient and effective change in the manner in which work is performed.

A green environment is a social as well as business issue. Business Enterprises, as a large part of the Global community, are obliged to make endeavours towards an environmentally sustainable operation that reflects their corporate social responsibility. One of the effective approaches of making business operation more environmental friendly is to undertake business process reengineering with the strategy focus on screen perspective.

The detailed framework to be developed as a part of this study in reengineering businesses is made of 5 phases. They are:

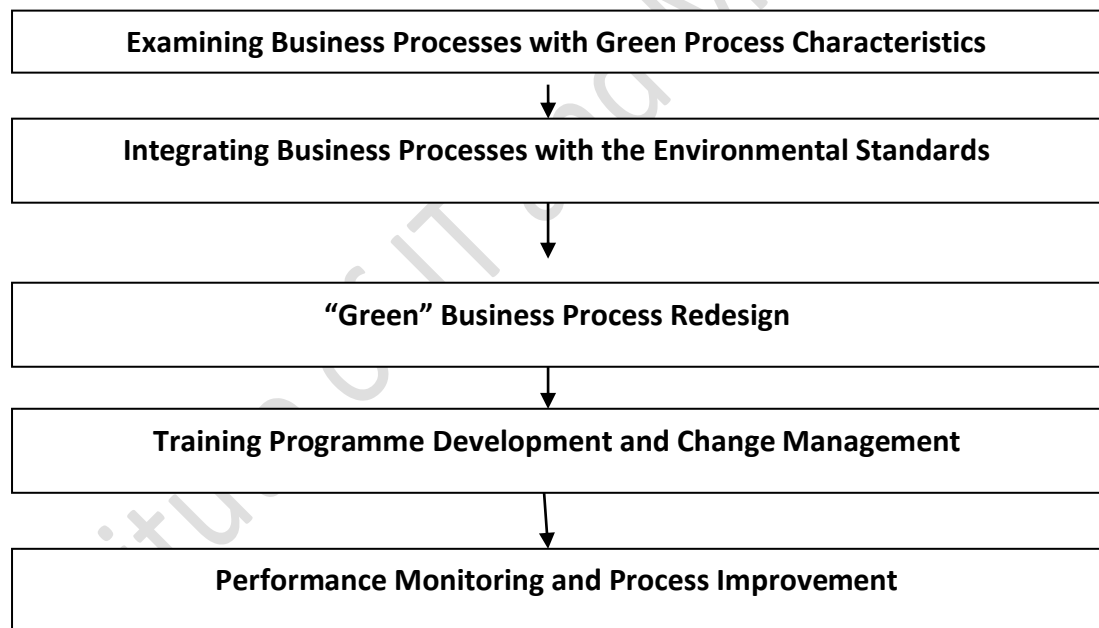


Figure: Business Redesign

Phase 1: Examining business processes with Green Process Characteristics :

This is the preliminary but an important phase of the life cycle. This phase focuses on investigating business processes based on the underlying green characteristics. Total suite of process is examined and validated with five dimensions of green business characteristics namely necessary, efficient, effective, agile, and measurable. By the end of the first phase, all business processes are tested and only those meet the criteria of green process characteristics will be transformed into the next phase. Business process do not pass the examination will be reported to the firm's executive for review.

Phase 2: Integrating Business Process with the Environmental Standards:

The second phase centres on integrating the business processes of a firm and the environmental standards. This is considered a Complex phase since it requires not only a comprehensive and insightful understanding of the firms business processes and how it helps the firm to compete and achieve corporate objectives, but also engaging the environmental standards- ISO 14064 with each activity in the various business processes.

Phase 3: “Green” Business Process Redesign:

This phase involves a comprehensive process analysis where individual tasks or activities of each business process are future decomposed into smaller elements to identify the energy intensity of each element, their criticality and extent of contribution towards the effective functioning of the business process, the feasibility of modifying the elements with a low-carbon focus, and developing alternative process designs. Work flows of each business process are also checked against required resources, time, and budget.

Phase 4: Training Programmes Development and Change Management:

The fourth phase focuses on the development and implementation of training programmes and change management. As soon as the selected business processes are redesigned to fit green specification, the organisation will have to start handling change and preparing training programs. Training programs will provide pedagogical and professional development to leaders and business performance engineers in the relevant government agencies for skills and knowledge development in green business process redesign initiative. Participants will gain essential skills and knowledge in green business process and continue carrying out the training programme to Enterprises.

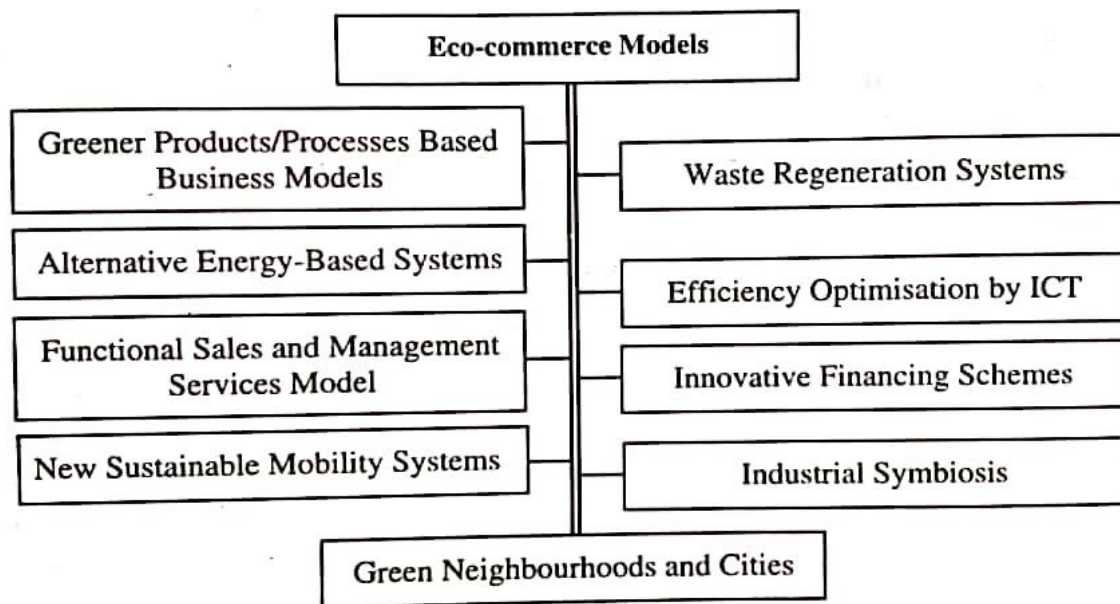
Phase 5: Performance monitoring and process improvement:

The phase stresses on performance monitoring and continuous improvement of business process through updating relevant services and facilities. This is to verify redesigned process are implemented in accordance with specifications.

5.5 ECO COMMERCE MODELS

Eco commerce models or green Business models are defined as Business models which support the development of products and services (systems) with environmental benefits, reduce the resources use/waste and which are

economically viable. These business models have a lower environmental impact than traditional Business models. The Eco-Commerce model types are described as follows:



1. Greener Products/Processes Based Business Models:

These models provide the buyers with economic and environmental benefits during its use. This group contain a very diverse set of innovation products and processes applied in companies that have better environmental performance as, example they save resources and minimize emissions and waste.

2. Waste Regeneration Systems:

These are based on waste, reuse or recycling as new products. The business model here is focused on valuing waste, or using it as an input for producing a product to be sold in the market.

3. Alternative Energy-Based Systems:

It represents a wide variety of applications, product and Systems based on renewable energy deployment. Business models using these systems can be focused on sales or offer a technical service.

4. Efficiency Optimisation by ICT: ICT (Information and Communication Technologies) provide a wide range of solutions for energy and resource use control, establishment of smart grids, cloud computing, as the less tele-conferencing and online shopping. ICT solutions based models generally can be of **two types- ICT service -based models**, which include companies ensuring the monitoring of the consumption or redistribution of resources and **ICT-product based models**, which are basically the ICT systems or

Software and Hardware packages that are offered and sold to customers. Once the system is installed, customers learn to use it to monitor their resource use.

5. Functional Sales and Management Service model:

This is a Generic model with common characteristics for all Service based Business models. In general, in all models there is a focus on providing the functions and benefits of the product instead of the physical product as such. The simplest model are based on delivering service using the environmentally superior materials and techniques. In the more developed models, instead of paying for the product per se a part of the transaction is a payment for the functions of the product. The service provider takes over the control of the use phase of the product. By improving the control of use phase of the product, the producer has an incentive to improve the output yield and to extend the lifespan of the product by making the product more durable, reducing the need for spare parts, making it more energy efficient and improving the maintenance of the product. These models can also encourage the re-manufacturing and reuse of the product.

6. Innovative Financing Schemes:

These represents long and medium term investment arrangements often focused on the improvement of environmental performance, which is also linked to economic performance. The best known example is ESCO which provides Energy Efficiency related and other value added services and assumes performance risk for its project or products. The compensation and profits are tied to Energy Efficiency improvements and saving energy costs. The DBFO model is similar type of scheme. It is a contractual relationship between a customer and a private contractor that is used in construction project that required long term investments.

7. New Sustainable Mobility Systems:

These are alternative transportation schemes with a lower environmental impact. Examples can include more efficient and cleaner public transport systems, car or bike sharing/renting models and schemes for increasing the application of electric or biogas based vehicles.

8. Industrial Symbiosis:

Here the core of industrial Symbiosis is sharing the use of resources and by products amongst industrial actors on a commercial basis through inter-firm Recycling linkages. In industrial symbiosis, traditionally separate Industries

engage in an exchange of materials and energy through shared facilities. The waste of one company becomes another's raw material.

9. Green Neighborhood and Cities:

These are a complex and geographically wide system combining many Eco innovative solutions and involving large range of actors. Green neighborhoods and cities are redesigned with a consideration of environmental impact, inhabited by people dedicated to the minimization of inputs of energy, water and food, and waste outputs of heat, air, water and other pollution. Such a city can feed itself with minimal reliance on the surrounding countryside, and power itself with renewable sources of energy. The Crux is to create the smallest possible ecological footprint and to produce the lowest amount of pollution possible, to efficiently use land, compost used materials, recycle them or convert waste to energy.

GBM PREVIOUS YEAR QUESTIONS

UNIT-5

1. what are the principles of business re design for green management (**May 2019 supply**)
2. Discuss any two Eco-commerce models in use for green management (**May 2019 supply**)
3. Outline the various green tax incentives available in India. Explain any one example of green management used by any one Indian corporate house. (**Nov 2018 Reg**)
4. Write a note on various eco commerce models . (**Nov 2018 Reg**)
5. How should a business be re designed to accommodate green business practices (**Nov 2018 Supply**)
6. List out various government motivations for companies to go green. (**May 2018 Reg**)
7. Describe the principles of green project management green . (**May 2018 Reg**)
8. Outline the tax incentives and rebates available for green companies. (**Nov 2017 Supply**)
9. What is Eco-commerce, briefly explain about the models of Eco-commerce . (**Nov 2017 Supply**)
10. What are tax incentives available for green companies in India (**May 2017 Supply**)
11. Write a note on various eco commerce models (**May 2017 Supply**)

12. Out line the various key points in green project management. How is it different from regular manufacturing setup (**Nov 2016 Supply**)
13. List out various government motivations for companies to go green (**June 2016 Reg**)
14. Narrate any two eco business models in successful use today . (**June 2016 Reg**)

“PUSH YOURSELF BECAUSE NO ONE ELSE IS GOING TO DO IT FOR YOU”

Prepared By

L.Nikhila B.Tech, MBA, P.hD

Assistant professor

BALAJI INSTITUTE OF IT & MANAGEMENT, KADAPA

Icet code: BIMK

SUBJECT: GREEN BUSINESS MANAGEMENT

Regulation: R17

CASE STUDY

SUSTAINABLE DEVELOPMENT:

Background

We are private family company which carries out developments in and around Sydney. The development which I have analysed for the purpose of this paper is as follows:

Address : 376-382 New South Head Road, Double Bay

Date of settlement : 25th October 2004

Architectural design finalized : April 2005

DA lodged with woollahra Council : 16th April 2005

DA granted by woollahra Council : November 2005

Date of practical completion of project: 3rd March 2007

Pre DA Issues:

The development involves a 4-storey sustainable commercial (ground floor retail and 3 levels of commercial office space) development that harvests rainwater on-site, recycles sewage for non potable water uses, and ,as a result, the base building has no connection to mains water or sewage, uses passive

solar design features, low wattage light fittings, maximizes natural light fittings to each tenancy, uses only non rainforest wood, low VOC Paints, Carpet tiles, will have a productive roof Garden, was built using sustainable construction methodologies, and critically provides no onsite basement parking. Michael Mobs, the ecological sustainability coach for the project rated the building as equivalent to a 6 star rated development.

When Fivex purchased the site, there was approved DA for a mixed use residential scheme of 4 –storeys in height (ground floor retail and 3 levels of residential apartments) and the basement car park underneath. The first hurdle we had with Woollahra council was that it would not accept as met any of its criteria for the new development, which had been provided under the old development.

DA issues

DA's are no longer merely approval for the design concept, and the DA process is no longer just about town planning. Since the introduction of the private certification system, councils require construction information such as geo-technical analysis, structural engineers reports, acid sulphate soil test, and even a work method statement to be submitted at the DA stage. Providing all of these reports is not only expensive without knowing whether or not development will be approved, but it is also time consuming to prepare these reports and time is a large part of the cost in construction.

Woollahra Council took 7 months to process our DA however the DA should have been processed significantly faster for the following reasons:

1. There were no objections to our development.
2. The building envelope we sought was almost identical to the previously approved development consent.
3. Unlike the previously approved DA, we were committed to making our development sustainable.

Requirement for an electricity substation

Energy Australia made it clear to Fivex that Double Bay had a limited electricity supply and Energy Australia initially indicated that Fivex would need to provide an electricity substation on our property. Energy Australia offered no compensation to take our land.

We suggested two alternatives to Energy Australia:

- 1) That fivex provide an underground electricity substation on our property, which would cost in the order of \$70,000. I was then advised that it would take Energy Australia 12 months to assess fivex's proposal. This equates to an additional years holding costs, which would have cost us in the order of \$1 million . I was further advised by an officer of Energy Australia that it has a policy of not approving underground electricity substations outside the Sydney CBD as a result of Work Cover issues; and
- 2) Fivex was prepared to install a gas fire powered air-conditioning systems, which would have meant fivex would have drawn on only 140 ampere of power for the site. To put this in context, the connection to the former 2-storey Westpac bank building on the site was for 200amperes. Energy Australia did not believe fivex, and assessed that fivex would need 400 amperes of electricity, assuming fivex built a conventional building.

So, without any rights of appeal, and without any financial compensation, fivex was forced to give energy Australia 400 square metres of prime retail space for the provision of an electricity kiosk substation. Since the majority of the supply provided by the kiosk substation would be provided to other users in Double Bay, Energy Australia paid for the actual installation of the kiosk substation. The capital value of the land taken by Energy Australia is, conservatively speaking, valued at \$700000.

Disconnection from Mains Water

Normally when you build a development, you make an application at the time of the construction Phase to connect to mains water and sewage with Sydney water. As part of this is a Section 73 applications needs to be made for Sydney water to assess any additional load on the system and access development costs. Since fivex was not connected to mains water and sewage, we did not need to make a section 73 application, nor pay the associated fee to Sydney water, however, when my plumber approached Sydney water to make an application to connect the fire hose reel he was asked to produce the section 73 application.

In short, Sydney water refused to improve our fire hose reel connection to mains water because they wanted us to lodge a section 73 application to demonstrate that fivex were not connected to mains water. After 3 months of negotiation at all levels of Sydney water, including receiving assistance from the Minister's

office, Sydney water came to the realisation that a Section 73 application is only required when you are connecting to mains water and sewage, not in circumstances where you are Not connected to mains water and sewage. The technical section understood, and accepted, the proposal from an early stage, the section whose role it was to collect the developer contributions from the section 73 application were reluctant to accept the concept.

Question:

Why is not sustainable development the standard form of development?

One possible solution

In my view, sustainable development is not the standard form of development for the following reasons:

1. It costs more to build a sustainable development rather than a conventional building.
2. Building occupants and purchasers are not willing to pay more to buy, or occupy, a sustainable building.
3. The decision to develop a sustainable development necessarily means a reduction in the profitability of the development project.
4. There are significantly more regulatory hurdles to overcome if you wish to build sustainable development, especially for water treatment systems.
5. The current regulatory system has no means of identifying, and prioritising a sustainable development as compared to conventional development.

Government provide few tangible financial incentives for developers to build sustainability. If governments are serious about sustainable development then they need to offer a fast tracking system for the DA assessment of sustainable developments, and they need to offer bonus floor space as quid pro for building a sustainable building of course, if a developer takes advantage of these systems then the developer must have a legal obligation to build these systems and not scam the system.

**“BELIEVE IN YOURSELF AND THE WORLD WILL BE
AT YOUR FEET”**

ALL THE BEST