9.1 Introduction

The study shows that only a small number of hotels have documented/written environmental policies. Environmental Management System (EMS), in totality, is hardly followed in the hotels studied. This finding indicates that an effective Environmental Management System is a necessity and hence should be made an integral part of management of resources in hotels. Abiding by the Environmental Working Model and adopting EMS increases efficiency, enhances the image, helps in conserving resources, improves government as well as industrial relations and works as an important cost cutting factor. In the hospitality industry, EMS deals with environmental commitment, water conservation-preservation, energy efficiency and solid waste management. Even though the initial investment is high, adopting EMS ensures hike in revenues, reduction in expenses and increase in profits in the long run. Analysis of past and present data would be possible only when the hotel has documented environmental policies governed by Environmental Management System (EMS). This will help hospitality businesses to assess, administer and minimize their adverse environmental impacts by offering a method to incorporate environmental management into organizational procedures in an orderly approach. Through the survey it was obvious that maximum hotels are not even aware of the amount of regular consumption of their resources. Carrying out environmental appraisal would identify all resource inputs as well as waste outputs and detail on environmental operations to staff, consumers, stakeholders and the public, at large. Environmental management system would facilitate firms to minimize and preclude environmental damage, whilst affirming and escalating productivity. Unlike other business, Indian Hospitality Industry lacks an efficient Environmental Management System, which is essential to conserve resources.

Abiding by the standards followed by other businesses, working on the best practices of Ecotels and environment conscious hotels as well as obtaining suggestions from green engineers-experts-hoteliers-tourists-accreditation councils, the subsequent plan of EMS, adapted from United Nations Environment Programme, is accordingly framed in this chapter to fit as a fundamental part of the Environmental Working Model of Indian Hospitality Industry.
The plan is divided into six segments as follows:

**Segment 1**
- An introduction to Environmental Management System (EMS)

**Segment 2**
- Development of EMS

**Segment 3**
- Stages of EMS-
  - EMS Stage 1: Assigning Environmental Accountability and Carrying out Environmental Status Appraisal
  - EMS Stage 2: Developing Environmental Policies by Establishing Environmental Goals and Approaches
  - EMS Stage 3: Executing the Environmental Management Programme
  - EMS Stage 4: Carrying out the EMS Audit

**Segment 4**
- Report on Environmental Operation

**Segment 5**
- Environmental Management Contrivances and Concepts (Cleaner Production, Eco-Effectiveness, Business Ecosystem, Life Cycle Assessment)

**Segment 6**
- EMS in the future
9.2 Segment 1: An introduction to Environmental Management System (EMS)

9.2.1 Environmental Management System

Being ‘green’ should no longer be considered as only fashionable or glamorous; it should be considered as a reality of life. Recently regarded by all businesses to have a lead impact on profitability, EMS is slowly gaining entry into business practice. Hospitality industry also needs to gear up in the same arena.

9.2.2 The Initiation of EMS

EMS was built on the subsequent foundations-

- **Acquiescence and Due Diligence Auditing**
  Acquiescence audits were developed in the 1970’s in response to the expensive penalties businesses were incurring due to non-compliance with environmental legislation. Due diligence or pre-acquirement audits are carried out to detect the environmental problems of locations and establishments prior to them being regarded for investment or takeover (as cited in https://www.unep.org).

- **Total Quality Management (TQM)**
  EMS is rooted on the TQM process-
  Plan, Do, Check and Act

  ![Fig. 9.2 Total Quality Management](image)

9.2.3 The Advantages of Implementing EMS

- EMS would enable tourism ventures to fulfill and even surpass environmental legislation
• EMS would lower expenditures by minimizing resource use, enhancing operating competence, reducing waste output and averting non-compliance penalties.

• In recent times, along with increasing community environmental concerns, tourists often demand ‘environmentally friendly’ business advantages. EMS would enable companies to encounter challenges. Worldwide development of tourism eco-labels and environmental honours are convincing indications that these might lead to environmentally responsible services.

• EMS could make a business a secure and better setting for workers and guests. Job associated calamities, professional hazards and associated absenteeism could therefore be minimized.

• Banks and insurance companies need information on environmental functioning to make lending and coverage decisions. In 1997, United Nations Environment Programme (UNEP) negotiated the report by Financial Institutions on Environment and Sustainable Development. This was a commitment by 104 signatories to advance environmental management and embrace industry best practice in credit risk management; decrease energy and matter use as well as efficiently manage wastes. The signatories comprise an array of financial institutions- commercial and investment banks, venture capitalists, asset managers and multilateral development banks. As a spin-off from this proposal, over 70 insurance companies from 25 nations have come together under UNEP to form UNEP Insurance Industry Initiative for the Environment (United Nations Environment Programme- Annual Programme Performance Report, 2012).

• At present, Corporate Social Responsibility (CSR) is an emergent schedule. Overseas, businesses are no more evaluated by their revenues and escalating demands alone to partake in enriching the quality of life of their consumers, workers and the community with whom they operate. The same is expected in Indian hospitality industry in the near future. EMS would thus be the first significant stride in this course.
9.3 Segment 2: Development of EMS.
Expounding a typical EMS in the hospitality industry should consist of the following activities

- Carrying out a pilot appraisal of the environment to recognize all resource inputs and discarded outputs. In the hospitality industry, it should necessarily include environmental commitment, water conservation & preservation, energy efficiency, and solid waste management.
- Establishing a set of environmental policies based on the pilot appraisal
- Identifying environmental goals and approaches
- Executing EMS following Environmental Working Model
- Establishing EMS practices in all sections and departments
- Establishing uniform environmental operation control as well as information compilation processes so as to holistically integrate all the departments of the organization
- Introducing internal environmental communication, delegation and training to improve on green information and requirement of the hotel
- Conveying eco-associated communiqué to guests
- Carrying out the EMS audit
- Comparing actual functioning against goals and approaches
- Reviewing goals and approaches for continual improvement
- Reporting on environmental practice to staff, consumers, stakeholders, and the community

9.4 Segment 3: Stages of EMS

9.4.1 EMS Stage 1
Assigning Environmental Accountability and Carrying out Environmental Status Appraisal

Assigning Environmental Accountability
In any venture, accountability for an assignment must be allotted to someone to make certain that it is executed. Accountability for EMS could be allotted to one employee or to a team. Hospitality enterprises could appoint an ‘eco-leader’, assisted by an
environment/green management crew. The environment management crew must incorporate delegates from top management as well as from all sections. This would make certain that the entire environment load of the firm are categorized and incorporated in the EMS.

The eco-leader and the green management crew must have the ability to-

- Realize the significance of EMS
- Comprehend legislative obligations and the consequences of noncompliance
- Understand the intricacies of EMS so that main concerns could be pinpointed
- Execute EMS, which comprises collecting data, organizing dialogues, analyzing collected information and detailing/documenting

**Carrying out Environmental Status Appraisal**

- Carrying out pilot environmental status appraisal to evaluate the quantity of resource/substance use and waste output, as also acquiescence with environmental legislation
- Assessing existing environmental performance
- Reviewing current and impending environmental legislation
- Establishing goals and approaches and instituting environmental policies
- Developing Environmental Management Plan (EMP)
- Training staff to integrate environmental activities into regular chores
- Communicating to the guests regarding environmental policies and ongoing environmental improvements
- Monitoring and documenting environmental functioning/performance
- Comparing environmental functioning against that of preceding year in addition to the set goals and approaches. This could operate as Environmental Performance Improvement (EPI) initiative
- Modifying goals and approaches for persistent environmental performance enhancement
- Reporting on environmental operation

It is important that consultants work in close quarters with the workers to impart training and build in-house skill during the course of appraisal.
An environmental status appraisal is similar to a SWOC analysis. It recognizes the environment-related strengths, weaknesses, opportunities and challenges of an organization so as to gather baseline data by assessing-

- Process and location of resource utilization
- Process and location of waste generation
- Norms and regulations infringed in regular organizational performances

Elaborated below is the Status Appraisal providing factual information regarding the common requirements, emission and wastes of hospitality industry.

Environmental Status Appraisal on Environmental Commitment

Hospitality industry is a sizeable purchaser of consumer goods and benefits, and hence, has considerable control on vendors and dealers. The sectors could be building, interior, operation or services. Appraisal gives a clear idea regarding the existing processes and procedures as also that needs to be followed according to standard.

Suppliers

Appraisal suggests whether the following are considered-

- Goods made exclusively or partially with recycled substances
- Goods made exclusively or partially from waste
- Goods with minimized noxious levels like water-based paints and non-solvent cleaners
- Goods that are more stable and long-lasting
- Goods produced through cleaner manufacturing procedure
- Goods entailing less energy during production and operation
- Reusable or recyclable goods
- Goods that include minimum amount of packaging
- Environmentally verified and certified goods
- Goods produced in the local community, not necessitating long-distance shipping.

The usage of environmentally friendly goods could be a priceless platform to encourage corporate environmental commitment. Purchase practices driven by
environmental perception avert and minimize waste. Modified purchasing practices need to be carried out in association with contractors to make certain that the most cost-efficient and green substitute is preferred.

**Indoor Environment**

- Indoor environment quality is of immense significance for the wellbeing and health of residents. Inferior indoor air quality could cause undesirable health consequences, from irritation and headaches to respiratory inflammations and allergic reactions. Staying in such conditions for long span of time (in situations where tourists reside for long duration/hospitality employees) could induce serious illnesses. Ample aeration is essential to enhance interior atmospheric quality. Clean air is required to revive oxygen, get rid of microorganisms, odours and vapours, as well as extra humidity and heat. Hospitality industry being a service industry, should take special care to avoid such pollution. Majority of small hotels are more prone to use motorized aeration techniques, whereas the utilization of assimilated light, heat and aeration system is more cost-effective as well as convenient for bigger properties.

- Emissions from hospitality industry usually consist of-
  - Combustion gases as carbon dioxide, nitrous oxide and hydrocarbons from fossil fuel as well as gas-operated cisterns-stoves-generators
  - Chloro-fluro-carbons (CFCs) from refrigerators and air-conditioners
  - Halons in fire-extinguishers
  - Vapours from dry cleaning solvents
  - Automobile discharges
  - Tobacco smoke
  - Volatile Organic Compound (VOC) vapours from cleaning solvents, paints, varnishes, photocopy emissions and pesticides
  - Dust and particulate matter
Noise

- Noise pollution might be described as objectionable sound that is unwanted, intolerable and could at times be harmful to human wellbeing. Detrimental noise could be earsplitting music, traffic, mob and work area associated noise from appliances and machineries. A diminutive increase in decibels amplifies the magnitude of sound by several folds. Vibration is an important cause of transmission of noise. Uninterrupted exposure to extreme intensities of noise could have undesirable health consequences like irritations, headaches, circulatory disturbances, high blood pressure etc.

- Excessive noise in hotel businesses could diminish the worth of the property and result in loss of business. In addition, it could affect staff efficiency. Quarters that produce maximum noise in hospitality industry are power-driven rooms with compressors, fans, generators, cisterns, kitchens, laundries as well as functional areas comprising garages, nightclubs, party rooms, reception regions and bars. The most noise-susceptible regions in hotels are tourist rooms, convention and summit rooms, as well as workstations.

- All probable causes of noise from inside and outside the property should be identified and then worked upon to reduce the same. Noise thresholds are generally stated in occupational health and safety laws.

Environmental Status Appraisal on Water and Wastewater

- Water could account for a considerable fraction of acquisition costs in hospitality business

- Majority of properties are sourced with municipal water who disinfect the water prior to allocation. Others might pull sources right from surface waters (lentic or lotic water bodies as lakes or streams, rivers etc.) or even aquifers. In such cases, water purification might be required to be carried out on-site.

- The diverse usage of water in hotel industry involves -
  - Hot and cold water for kitchen, laundry and bathrooms
  - Hot and cold water for washrooms
  - Hot and cold water for Heat Ventilation and Air Conditioning (HVAC)
  - Cold water for consumption
Cold water for fire combating

- Maximum water is utilized in visitor’s rooms and kitchens. Furthermore water is also used in laundries and public restrooms.
- Hot water is stored, and dispensed from hot-water collection reservoirs. In bigger properties, individual reservoirs and storage containers might be used to heat and store water reserves at separate temperatures.
- Much energy is required to heat and stock hot water; hence reducing hot water utilization would lessen water-heating charges.
- Wastewater ought to be led to sewage treatment plants for treatment prior to releasing into the environment.
- Microbial treatment plants could be set up if municipal sewer is not accessible.

**Environmental Status Appraisal on Energy**

- Energy reports for the leading portion of functioning expenses in hospitality properties.
- Energy is employed for illuminating, heating-cooling, aeration, and powering machineries.
- Majority of hospitality ventures draw electricity from the national grid whose power is produced from different sources as fossil fuels, natural gas, nuclear power and hydropower; non-conventional sources such as solar, wind and bio-fuels are harnessed in minimum levels in India.
- The level of utilization of energy in a hospitality business depends on construction plans, climatic situations, heating and cooling conditions, heights of occupancy and action, energy supplies utilized and the energy-effectiveness of machineries.
- Being such an important resource, it is essential to save energy whether by means of advanced architectural plan, technological advancement or using alternative sources.

**Environmental Status Appraisal for Solid Waste**

Waste removal is an important financial and environmental dispute confronted by all societies.
Waste created by hotel properties is huge and contains-

- Paper and cardboard articles such as stationery, throwaway articles and wrapping
- Aluminium goods as juice containers and cans
- Plastic articles as wrapping, bottles and non-reusable articles
- Construction materials, furnishings and electronic waste
- Organic waste as food waste and garden trims
- Perilous waste such as batteries, solvents, paints and anti-fouling agents
- End-of-life machineries and paraphernalia

Municipal waste is recycled, incinerated or land filled. Landfill locations have considerable adverse environmental impacts. In an endeavor to minimize landfill amounts, efforts could be put in to augment the recycling of paper, plastic and aluminium wastes. The incineration of waste with heat recovery could as well be advocated. The waste management hierarchy essentially in the hospitality industry should be-

- Avoid/Evade
- Reduce
- Reuse
- Recycle
- Isolate

9.4.2 EMS Stage 2
Developing Environmental Policies and Establishing Environmental Goals and Approaches

Compiling the Pilot Environmental Status Report
For entirely analyzing and realizing the facts and figures collected through the environmental status appraisal, it needs to be gathered together into an environmental status report. This report should detail on-

- Quantities and charges of water and energy utilized
- Quantities and costs of waste discarded
- Stock register of all goods purchased
- Stages of acquiescence
- Existing environmental enhancement endeavors
- Management and maneuvering processes that could assist/impede EMS execution
- Community inventiveness which might aid EMS execution as business tie-ups on environment, ecolabeling schemes, credit or funding for environmental enhancements etc.
- Staff concern regarding EMS
- Prospective guest reaction to EMS
- Recommendations on EMS goals and approaches in the pipeline

**Verifying Acquiescence with Existing and Future Environmental Legislation**

- The environmental status report details quarters where legislation is being dishonored. It moreover helps to challenge future legislation, as the EMS can be mapped to experience and surpass the requisites.

**The environmental status and legislation statement needs to present the data required for instituting**

1. **EMS goals and approaches**
The goals must state environmental objectives, and the approaches should suggest the intensity of progress required to achieve the same. Goals and approaches should be determined with contribution from all sections and departments of the hotel and authorized by the lead management. They should be holistic, pragmatic and attainable from an organizational as well as environmental viewpoint. An over-assertive approach could daunt activities, decrease fervor and pursuit, while an under-assertive one might not give a feeling of accomplishment and desire for persistent progress.

2. **Environmental Policies**
Environmental policies are public declaration of a business’s environmental dedication and accountability. It announces the manner in which the hotel responds to environmental confronts, and institutes the all-encompassing structure for attaining goals and approaches. It also authenticates the EMS. **The environmental policies**
should be built on the foundation of proclamations of the environmental status appraisal along with ascertained goals and approaches.

9.4.3 EMS Stage 3

Executing the Environmental Management Programme

An environmental management programme is essential to put the EMS into effect. It is the means by which environmental goals and approaches are attained and the environmental policies recognized.

An environmental management programme assimilates various environmental activities, minimizing use of resources into organizational actions via identification of the precise processes and technical enhancements that require to be incorporated into existing procedures of the hotel. It could be initiated by sketching an action plan, so that an entire impression of the environmental management programme could be glimpsed.

An environmental management programme for hotel properties should consist of the following activity zones-

- Buying environment-friendly merchandise/goods
- Reducing emissions comprising ozone-depleting materials
- Enhancing the internal atmosphere
- Reducing noise
- Reducing water use and wastewater production
- Reducing energy utilization
- Decreasing waste production
- Improving internal communication, delegation and training
- Encouraging environmental communiqué to visitors
- Enhancing supervision as well as record keeping process

*Environmental Management Programme for Commitment towards Environment*

Environmentally-Preferable Alternatives

Replacing in the following manner-

- Pesticides and herbicides by Biological pest-control alternatives
• Photocopy toners by Recycled toners
• Regular varnishes by varnishes with Lower Volatile Organic Compound (VOC) content
• Regular paints by Low VOC and Water-based paints
• Aerosols by Pump spray supplies
• Pool chemicals by Technologies such as ‘alternative’ salt, ionization and UV energy
• Moth balls by Cedar and Sandalwood chips and Oil

Emissions Control including Ozone-Depleting Substances (ODS)

• Frequent maintenance inspections could be carried out on heating containers as well as generators
• Filters and scrubbers need to be installed with exhaust fans. They should be frequently cleansed and taken care of to reduce excessive utilization of energy.
• Resident legislation on emission norms must be checked prior to installation of monitoring gadgets
• The usage of automobiles, containers and generators that could function on ethanol blends and bio diesel must also be mulled over
• Reduced use of ODS by proper maintenance of Air-Conditioning, Dry Cleaning and Fire-Extinguishers

Managing Indoor Air Quality
The global veto on the production of chloro-fluro-carbons (CFCs) came into effect in 1999 (United Nations Environment Programme- Annual Programme Performance Report, 2012). Interior environment quality depends upon certain pollutants and their degrees of intensity. Checking internal atmospheric quality would give the exact idea regarding the categories and concentration of contaminants in the atmosphere. This would require expert aid. Check and supervision must be carried out over an extended period to facilitate collection of variety of information. A single observation might not furnish with an exact estimation of atmospheric quality as pollution levels would differ daily and annually, being controlled by weather conditions, operation intensities and the air quality of the exterior environment.
• Endeavors to better interior environment could commence by decreasing the subsequent emissions-
  ➢ Carbon monoxide occurring due to partial burning of fossil fuels
  ➢ Carbon dioxide occurring due to burning and exhalation
  ➢ Nitrous oxides from gas burners
  ➢ Humidity occurring from anthropogenic activities
  ➢ Tobacco smoke
  ➢ Ozone drawn in from outside
• In warm weather conditions, a ceiling fan and an open casement are less energy demanding alternatives as compared to air conditioning
• Reduced use of paints with Volatile Organic Compounds (VOCs) are recommended
• Staff and visitor grievances about interior air quality could be documented and considered to recognize and categorize frequent occurrences

Noise Management
• Timely maintenance would help decrease intensity and occurrence of noise from machineries and utensils
• Rubber mountings could be used to soundproof isolated machineries
• Machinery located near guest rooms could be switched off at night
• Ear protection should be worn by workers working in noisy areas
• Noise-controllers could be installed
• Double/triple-glazed windows should be installed
• Sound-absorbing internal partitions, or insulating partitions and floors with fibre glass could be installed in conference and meeting rooms
• Sound-absorbing building materials could also be used

Environmental Management Programme for Water and Waste Water
Water management in hotel properties involves-
• Sustaining water quality- Familiar indicators of inferior quality of water are undissolved solids, discoloration due to corrosion, increasing pH levels, extreme hardness and high mineral substances along with bacterial infection.
Slight variation in water quality ought to be communicated to the water supply agency.

- **Supervising Water Storage and Allocation Work**
  
  **Water Storage**-
  - Repeated turnover of water must be ensured to shun growth of microorganisms
  - Storage reservoirs should have lids and shielded from dirt, bugs, and further causes of infection
  - Vent regulators should be fixed to shun the storage of stagnant water
  - Reservoirs ought to be cleansed frequently to prevent formation of external-internal scale
  - Reservoirs must be frequently monitored for leakages

  **Water Allocation**-
  - Regular maintenance to evade leakage as well as reverse-siphonage among potable and non-potable water reserve should be ascertained
  - Insulation on hot water reservoirs and pipes must be maintained and upgraded

- **Minimizing Water Use**
  - Less volume cisterns to be instated in all restrooms
  - Hot and cold water blenders and pressure flush valves should be instated in washrooms and urinals
  - Showers with aerators and photoelectric cells could also be instated in public washstands

- **Decontamination of Water in Swimming Pools**
  
  There are quite a few eco-friendly procedures employed to decontaminate water in swimming pools. These techniques do not use chlorine or related chemicals. One such procedure is ionization, whereby water is purified via the liberation of metallic ions (usually copper and silver) in water. A further procedure entails ozone, which has been used globally for industrial water decontamination and wastewater treatment plants. Also securing foundation is pool water purification by ultra violet radiation lamps, which radiate UV

- Monitoring Water Utilization
  As water is unequivocally linked to the number of tourists and their activities, water use could be monitored and benchmarked based on the number of occupants per night. Quantity of water utilized could be monitored by the help of water measuring devices or water meters. Though not common in India, separate sections of the property might be sub-metered for the compilation of further detailed information. Equating water utilization over previous year and comparing with different properties of more or less identical magnitude and echelon could offer useful data for further upgrading the technique of management of water

- Reuse of Treated Wastewater
  An eco-friendly exercise is to accumulate and reuse rainwater for gardening and other non-consumption requirements. Water accumulation reservoirs could be set up on the terrace or even at ground level.
  It is viable to supplement non-consumable water requirements by treating and reusing wastewater. The basic comprehension in wastewater reuse is to differentiate between ‘grey’ and ‘black’ water. Grey water is wastewater from bathrooms, laundries and kitchens; black water is wastewater from toilets. Black water includes pathogens and approximately ten times more nitrogen than grey water, and hence requires to undergo a two or three step microbial treatment before it could be reused (Graywater and Rainwater Use: University of Arizona, Water Resources Research Center, 2000).
  Grey water treatment is less exhaustive and could be safely carried out on-site. The treated water could be utilized for gardening, toilet flushing and other non-potable purposes. The extent to which grey water requires to be treated depends on the intensity of biological oxygen demand (BOD) of the wastewater and the intention of its reuse.
Environmental Management Programme for Energy

It is not just that energy effectiveness minimizes fuel consumption and electricity bills; in addition, it enhances the general coziness of the business. Energy management could be divided into two major sections-

Accountability and Maintenance
Repair and refurbishment decisions

Accountability and Maintenance

- Power should be shut down in areas of the lodging property that are not occupied
- Hot water reservoirs, pipes and heating cisterns ought to be insulated
- Crevices in walls, casements, doors, roof covering and flooring must be sealed
- Visitors should be made aware of the importance of energy conservation. They should be requested to shut down lights when not needed
- Oversized or undersized equipment wastes energy and should be avoided
- Food should be defrosted at room temperature and not with warm water
- Boilers and chillers should be regularly serviced to maximize efficiency
- Radiators and air-conditioners ought to be positioned below casements to avoid down-draughts
- Washing machines and dishwashers should be fully loaded prior to operation

Repair and refurbishment decisions

There could be numerous renovation and restoration alternatives which a hotel could use according to its convenience to save energy-

- Automatic load-shedding control systems
  This device is proposed to prevent customers from having huge crests and troughs in their energy requirement patterns. To minimize crests, overloads and rent costs, it is required to examine the reasons leading to load and, if required, curb the usage of some machinery during peak periods. Mechanical load-monitoring techniques incessantly keep a check on electricity usage.
• Controls for heating
  Room thermostats and timer switches, hot water cylinder thermostats, thermostatic radio valve and storage water controls are the various devices, which could be used by hotels as controls for heating.

• Double/triple-glazing
  The essential component in minimizing heat loss is not the width of the glass. The gap amid the films of glass ought to be approximately 20 mm to reduce heat loss. In addition, low-emissive glasses minimize heat loss to a greater extent.

• Sealing and Banding
  Poor-fitting doors and casements are the chief reasons for improper heating and cooling. Sealing and banding substances comprise silicon strips, blade seals, brush piles and fillers.

• Regulated ventilation
  While sealing and banding is important, so also is regulated ventilation. Sufficient ventilation is imperative to minimize precipitation and the consequential dampness. Adequate ventilation diminishes odours, carbon dioxide and musty air.

• Minimal-energy lighting
  Minimal-energy lighting is simple to instate and could minimize energy expenses. Minimal-energy lamps comprise Compact Fluorescent Lighting (CFLs), tungsten halogens or Light Emitting Diode (LED) as also fluorescent tubes.

• Covering and painting
  In tropical climates, weatherproof casing could be done with paints that reflect sunlight. This would minimize solar heat gain. Likewise, pastel shade paints for both external and internal walls decrease heat gain and enhance light reflection.

• Heat retrieval
  Hotel facilities could attain considerable economic gains by recuperating conscious and latent heat from kitchen, laundry, heating cistern, and other heat retrieval areas. This heat could be fed back for water heating. Heat retrieval
necessitates induction of heat exchangers to secede the heat from its source (water, gas or burning goods) and pass on to the water heating process.

- Building Energy Management Systems (BEMS)
  BEMS are computer-based energy-monitoring systems, which offer combined management of thermostats, heating cisterns and sector-wise energy monitors; every sector having its individual heating and cooling component. Not common in India, they facilitate several areas to be regulated individually as also shut down when not used. Link Panels and Infra-red Occupancy Detectors could switch power on or off depending on the occupancy and consequently save huge amount of energy (as cited in https://www.unep.org).

- Combined heat and power (CHP)
  CHP approaches produce electricity and direct the heat engendered in the process for heating water or surrounding air. As both electricity and heat are produced simultaneously, the effectiveness of CHP approaches could be quite prominent (as cited in https://www.unep.org).

- Replacing old machinery
  Old heating cisterns and chillers are more energy-demanding than recent models. Substituting machinery and appliances over 10 years old could minimize energy costs.

- Renewable energy options
  Renewable energy tools for hotel facilities comprise solar water heating, photovoltaic techniques, mini-hydro techniques, wind turbines, bio-fuels and possibly future geothermal heat pumps.

- Wall, roof, and floor insulation
  In combination with heating/cooling regulators, wall insulation minimizes moisture and dampness too. Recycled and eco-friendly insulating goods could be preferred.

**Environmental Management Programme for Solid Waste**

Minimizing and reprocessing waste is one of the effortless methods that could be initiated for environmental improvement. The pilot environmental status appraisal
documents a record of various wastes produced by the hotel facility. The data could be used to identify goods that could be-

- Substituted with unconventionals to evade or minimize waste
- Reused for similar or different operation
- Separated and gathered for recycling under municipal waste recycling systems
- Utilized for extended period

Waste management for hotel properties should follow the following order of the waste management hierarchy-

**Evading Waste at Source**

- Goods with reduced packaging should be favoured
- Contractors must be encouraged to take back wrapping and covering, particularly reusable cartons and crates
- Purchase in big volume should be preferred as compared to small packs

**Reducing Waste**

- Disposable cutlery and crockery should be avoided
- Garden and kitchen waste could be composted
- Single toiletries in tourist rooms should be exchanged with refillable fixed dispensers
- Either side of office paper could be used prior to throwing away
- Reusable laundry bags should be preferred
- Plants could be used to decorate restaurant tables instead of cut flowers

**Reuse Preferences**

- Packaging containers could be reused
- Leftover guest stationery could be reused in the back office

**Recycling Preferences**

- In-house separation and collection processes for recyclable waste could be established for the following-
  - Glass
  - Plastic
- Paper
- Cardboard
- Aluminium
- Batteries

Isolation of Waste in Hotel Facilities
- Individual labeled waste bins could be placed in rooms and visitors invited to use them as labeled
- Local authority’s discarding specifications should be respected while disposing hazardous waste such as solvents, chemicals, paints and chemical pesticides

Internal Environmental Communication, Delegation and Training
If an environmental management plan is to be successful, workers should be encouraged and instructed to minimize use of resources as well as generation of wastes. In hotel business, the staff come in direct communication with the consumer generating the happening and offering the service. If employees are properly updated and encouraged to attain environmental goals, the same would be reproduced in their functioning. Staff are the firm’s leading public relations channels. They are positioned well to update visitors regarding the environmental strategies of the business. This, in turn, ought to improve business impression and repute. Well-skilled workers should trouble shoot environmental problems more efficiently than professional consultants and executives.

The environmental status appraisal could be employed to notify staff about the environmental accountability of the hotel. Once the environmental policies are recognized, it ought to be conveyed to all employees, advertised as posters, included in in-house news bulletins and read out at employee assemblies. An unofficial gathering could be organized to pronounce the inauguration of the environmental programme. Entrustment and training turn out to be decisive factors at the time of execution of the environmental effort. Environmental precision and accountability ought to be incorporated at every stage and every sector. The environment leader or the green management crew should play the role of the green management entity. The
green management crew should include a delegate from each section of the hotel with the task to ensure that the Environmental Management Programme is executed in that section. Confirming implementation of environmental functioning department/sector-wise assists in proper entrustment of accountability.

Hospitality facilities should also partake in community environmental programmes such as green forums, joint-green-ventures, tree plantation and wildlife protection activities. Involvement in the environmental management programme must be made compulsory for eco-operation assessment. ‘Outstanding green initiatives’ and ‘exceptional environmental inputs’ could possibly be honoured with awards.

**Communicating Environmental Accomplishments to Visitors**

It practically makes no sense in instigating a brilliant green programme if customers are not made aware regarding it. Guest communiqué is vital in optimizing the advantages of EMS.

The pilot environmental status appraisal presents primary idea regarding environmental knowledge and needs of customers. Guests could be made aware by-

- Hanging a print of the environmental strategy statements at the lobby area
- Including the environmental policies and data regarding the existing environmental management programme in pamphlets, tourist directories, and telecasted on the internal television channel
- Providing knowledge on local environmental concerns
- Inviting tourists to take part in community protection endeavors as the master panel key used to increase the temperature of air conditioner by the guests in Ecotels

**Inspecting and Recording the Progress of the Environmental Management Programme**

Inspection should be done on a regular basis. A standardized environment-inspecting plan aids in compilation of information and recording the same. Inspecting and recording existing environmental effort would facilitate hospitality facility to-

- Evaluate whether goals and approaches are met in an on-going manner
- Single out proposals that are not productively implemented
• Single out remedial and deterrent measures required to enhance operation

9.4.4 EMS Stage 4

Carrying out the EMS Audit

Environmental Management System (EMS) Audit

The Environmental Audit is required to-

• Confirm the efficiency of the environmental management programme
• Make certain that environmental goals and approaches are met
• Appraise the process of improving the steps involved in EMS so that surfacing environmental problems with proper legalities could be addressed for better growth of hospitality sector

EMS audits are usually carried out annually. An audit could be carried out by the in-house green management crew, by an external environmental auditor, or by way of a combined internal-external venture. The auditors need to have adequate comprehension regarding environmental management systems as well as be independent of the activities they audit.

Ecotels often follow these procedures at selected levels and globes as and when they need to get themselves certified. Among non-Ecotels, those that are part of premium chain hotels, often conduct energy or water audits.

Audit Procedures

• The goals of the audit as well as the locations and operations of those areas that are to be audited are initially determined. This is particularly significant for bigger business properties, where quite a few workplaces and functioning locations require to be audited
• Important sites are established
• An opening meeting is arranged to conduct the audit in discussion with environmental operation evaluating body
• Findings are compiled into an audit statement
• The audit statement is presented to the business administration and the green management crew
9.5 Segment 4: Report on Environmental Operation

A hotel environmental report conveys the environmental operation of the business to all its stakeholders. This being an essential mode of evaluation of green performance, forms a significant device for building dialogue with society, green representatives, law-makers as well as non-government organizations (NGOs).

Business environmental statement details the outcome of EMS. It catalyzes environmental performances, corroborates green endeavors and reinforces environmental enhancement. The target audiences to be informed on hotel environmental operation might comprise workers, investors, legislators, consumers, financiers, insurers, immediate society, environmental organizations, contractors and trade-industry associates.

Environmental operation could be stated by various means
- news-circulars, press report, as a part in yearly financial report, or an individual environmental performance statement.

9.6 Segment 5: Environmental Management Contrivances and Concepts

9.6.1 Cleaner Production or Sustainable Development

Although the conventional environmental function believed in cleaning waste and contamination following its generation, cleaner production intends to shun the creation of waste and contamination as a priority action. Policies for cleaner production could comprise-

- Minimizing the utilization of energy and raw materials
- Minimizing the utilization of noxious untreated materials
- Minimizing contaminated waste production
- Minimizing environmental effects throughout the lifecycle of goods and services- from material input to developing, fabricating, stocking, disseminating, utilizing, reprocessing and/or ultimate discarding

In financial terms, cleaner production or sustainable development denotes minimizing matter as well as energy utilization and associated expenses; reviewing and implementing competent manufacturing procedures; reducing waste amounts, expenses, penalties, and thus creating superior output.
Cleaner production is the ceaseless effort of amalgamated approaches in relation to procedures, products and services to enhance effectiveness and lower possibilities of menace to individuals and the atmosphere.

### 9.6.2 Eco-Effectiveness

Eco-effectiveness explains on more output from less input. It is about utilizing equal or lesser amount of matter and energy to provide superior quality or quantity of supplies and services.

The World Business Council for Sustainable Development (WBCSD) depicts that Eco-effectiveness is attained by the delivery of reasonably valued supplies and services that gratify individual requirements and obtain sustainability to life; increasingly decreasing negative ecological influences and resource utilization all through the life cycle to a level that is at least in accordance with the earth’s carrying capacity (as cited in http://www.wbcsd.org).

### 9.6.3 Business Ecosystem (Schematic Thinking)

Business ecosystem refers to company functions that copy the biological ecosystem, wherein a business organization is controlled like an ecosystem- an uninterrupted and orderly surge of matter, energy and data. The two main models of business ecosystem- sealing the matter cycle and dematerialization could be used in hospitality industry too.

- **Sealing the matter cycle** conducts the process of manufacturing in closed circuits, in more or less similar manner as an ecological unit. For instance, through photosynthesis, plants generate carbohydrates/food. The herbivores thereafter feed on these plants, and carnivores in turn feed on herbivores. Waste of carnivores consequently form food for detritus organisms. In similar manner, hospitality organizations could possibly reuse waste as raw matter and reprocess or recycle end products after they have been utilized. Through this process, matter and waste would reposition themselves in closed circuits.

- **Ecological models** have methodologies for optimizing the usage of matter and energy. Dematerialization is about more output from less input. By optimizing the use of raw matter, service life of output might be expanded.

9.6.4 Life Cycle Assessment
Life Cycle Assessment (LCA) is a process of evaluating the ecological effects of a goods or service throughout its life cycle- extraction, handling, production, shipping-delivery, utilization, restoration, reuse-reprocess-recycling and ultimate removal.

LCA could be employed to-
- Manufacture innovative goods and services
- Advance manufacturing/service mode
- Offer customers with probable data on the green comportment of hospitality industry
- Cultivate green acquisition approaches
- Enhance the attribute of offered goods and services

Case Study: The LCA of a Vending Machine at Raintree, Chennai (as obtained from the hotel)
A study on LCA was conducted by the hotel on entirely mechanized hot drink supplying appliance for tea, coffee and chocolate. The LCA conclusions confirmed that-
- The power utilization was maximum for the processing of the input items as well as operating and servicing the appliance
- A major portion of the power utilized during the lifetime of the appliance was to keep it on reserve
- Bulk of throw away occurred from the operation and servicing of the appliance
- The matter input required for components (chocolate, coffee, tea, hot water, milk, and sugar) was much more than the matter input in the fabrication of the appliance
The following conclusions were then utilized by the hotel to execute progress-

- The components required by the appliance were substituted with eco-friendly alternatives
- The component holders were increased in size
- Regular servicing was reduced to weekly servicing
- The hot water boiler was insulated
- Component and power usage was minimized.

Along with the reduction of servicing expenditures, the cost of the hot drinks supplied could be slashed.

9.7 Segment 6: EMS in the Future
Continual improvement should be the key motivation of the future. Hotel management should continuously seek to improve on the effectiveness and efficiency of the environmental operations of its hotel, rather than waiting for an environmental problem to reveal opportunities of improvement. Environmental improvements can range from small-step ongoing continual improvement to strategic breakthrough improvement projects. It is an important component of organizational competitive behavior and should be made a permanent objective of the hospitality operation.

9.8 Conclusion
In conclusion it could be said that businesses should realize that if they are to continue profitable and competitive, they need to incorporate environmental control into regular procedures and performances. National legislation that makes EMS and environmental documenting obligatory is on the rise (as cited in https://www.unep.org). Taxes on emissions and waste are appending impetus to EMS execution. Non-observance of environmental performance is liable to be punished. Increased environmental proficiency, along with added competency and improved expertise would significantly aid environmental enhancement. Eco-effectiveness, cleaner production and business ecosystem, hence, should shift from being single accomplishments to frequent green performance. EMS objectives are progressing rapidly from mere environmental administration to sustainable development. In various businesses, the market and immediate stakeholders are insisting on better
precision. Near future foresees businesses not just performing eco-efforts, but also documenting and verifying on green performance. In hospitality business, hotel industry essentially requires working on EMS, especially the average-sized hospitality organizations which make up a significant segment of the industry in this country. In the fast approaching days, there would be greater accuracy on business performance and the duty of corporate in encouraging social responsibility and green strategy on sustainable development would be on the rise. The final chapter elaborates means of scaling up in future.