ENVIRONMENT MANAGEMENT SYSTEMS



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UNIT 4 ENVIRONMENT MANAGEMENT SYSTEMS

Unit Outline

Environment management systems enable businesses to minimise and avoid environment damage, whilst maintaining and increasing profitability.

This unit contains four sections:

Section 1

An introduction to environment management systems (EMS)

This section will define EMS, outline its origins and discuss the benefits of implementing it.

Section 2

Environment management systems

Developing and implementing EMS.

The approach is based on the EMS specifications of ISO 14001. Examples of good practice are included to demonstrate theory in practice.

EMS is discussed in four stages:

Assign environmental responsibility EMS Stage 1: Conduct the environment status review EMS Stage 2: Develop the environment policy Establish environment objectives and targets EMS Stage 3: Implement the environment management programme This involves: • Reducing water use; • Reducing energy use; • Reducing waste output; • Purchasing environmentally-preferable products; • Lowering emissions; • Improving indoor air quality; • Reusing waste water; • Reducing noise; Internal communication, delegation and training; • Communicating environment performance to guests; • Monitoring and documenting environment performance.

EMS Stage 4:

Report on environment performance

Conduct the EMS audit

Environment management checklists

- Rooms, housekeeping, front office;
- Administration, purchasing, back office;
- Food and beverage, kitchens;
- Pools;
- Gardens;
- Engineering and maintenance.

Section 4 EMS case studies in hospitality businesses

Section 5

An introduction to environment management tools and concepts

Cleaner Production, Eco-Efficiency, Industrial Ecology (Systems Thinking) and Life Cycle Assessment.

Section 6 EMS in the future

Learning Objectives

At the end of this unit, students should be able to:

- Define and outline EMS;
- Identify opportunities for EMS in the school, the workplace and the home;
- Appreciate that EMS approaches and priorities will vary according to the type and size of the business, local environmental problems and climate characteristics;
- Develop an EMS for a hospitality business;
- Discuss EMS options with engineers and environment specialists and participate in selecting the most cost-effective and environmentally-suitable improvements for a given situation.

"All this talk about jumping on the green bandwagon has died down. Being 'green' is no longer fashionable or glamorous, it is a fact of life. Now considered by all industries to have a direct impact on profitability, it has been absorbed in business practice. Having left the glamour and excitement, we are now at stage two – the detail of implementation."

David Henderson, Former Marketing Manager of Plysu Containers, UK

1.1 What is an Environment Management System (EMS)?

An environment management system (EMS) helps businesses to evaluate, manage and reduce their environment impacts by providing a methodology to integrate environment management into business operations in a systematic manner.

A typical EMS consists of the following actions:

- Conduct a preliminary environment review to identify all resource inputs and waste outputs;
- Establish an environment policy;
- Establish environment objectives/targets;
- Implement EMS through an environment management programme;
- Establish EMS procedures in all departments and divisions;
- Establish environment performance monitoring and data collection procedures;
- Internal environment communication, delegation and training;
- Environment-related communication to visitors;
- Conduct an EMS audit;
- Compare actual performance against objectives/targets;
- Review objectives/targets for continual improvement;
- Report on environment performance to employees, customers, stakeholders and the wider public.

1.2 The Origins of EMS

EMS was developed on the following bases:

- COMPLIANCE AND DUE DILIGENCE AUDITING
- Compliance audits were developed in the 1970's in response to the costly fines companies were incurring due to non-compliance with environment legislation. Due diligence or pre-acquisition audits are conducted to identify the environment issues of sites and businesses before they can be considered for investment or takeover.
- TOTAL QUALITY MANAGEMENT EMS is based on the TQM process:



THE BENEFITS OF EMS

- EMS enables tourism businesses to comply with, and even exceed, environment legislation.
- EMS lowers costs by reducing resource use, improving operating efficiency, lowering waste output and avoiding non-compliance fines.
- EMS makes a property a safer and healthier environment for employees and visitors. Work related accidents, occupational illnesses and related absenteeism can therefore be reduced.
- Along with the growth of public environment awareness, tourists are demanding 'greener' services. EMS enables businesses to meet this demand. The growth of tourism eco-labels and environment awards is a strong indication of the growing response of tourists to environmentally responsible services.
- Banks and insurance companies now require information on environment performance when making lending and coverage decisions. In 1997, UNEP brokered the Statement by Financial Institutions on Environment and Sustainable Development, a commitment by 104 signatories to improve environment management and adopt industry best practice in credit risk management, reduction of energy and materials use and waste management. The signatories include a range of financial institutions: commercial and investment banks, venture capitalists, asset managers and multilateral development banks. As a spin-off from this initiative, over 70 insurance companies from 25 countries have come together under UNEP to form UNEP Insurance Industry Initiative for the Environment.
- Corporate social responsibility is a growing agenda. Companies are no longer judged by their profit alone and face mounting pressure to participate in improving the quality of life of their customers, employees and the wider society within which they operate. EMS is the first critical step in this direction.

SECTION 2: DEVELOPING AND IMPLEMENTING EMS

Four stages of EMS

STAGE 1

Assign responsibility and conduct environment status review

STAGE 2

Establish policy, objectives and targets

STAGE 3

Implement EMS through the environment management programme

STAGE 4

Conduct the EMS audit and report on environment performance

 Assign responsibility. Appoint an environment 'champion' and establish an environment management team 073

- Conduct preliminary environment status review to assess the levels of resource/material use and waste output, and compliance with environment legislation
- Review current and impending environment legislation
- Assess current environment performance
- Establish objectives and targets
- Establish environment policy
- Develop environment management plan
- Implement environment management plan
- Train employees to incorporate environment action into daily tasks
- Communicate environment policy and ongoing environment improvement to guests
- Monitor and document environment performance
- Conduct EMS audit
- Compare performance against that of previous years as well as the set objectives and targets
- Modify objectives and targets for continued environment improvement (if needed)
- Report on environment performance

EMS STAGE 1: ASSIGN RESPONSIBILITY AND CONDUCT ENVIRONMENT STATUS REVIEW

Assign Environment Responsibility

In any business, responsibility for a task must be assigned to someone to ensure that it is performed and completed. Responsibility for EMS can be assigned to one employee or to a group. Most tourism businesses appoint an 'environment champion', supported by an environment management team. The environment management team should include representatives from top management and from all departments: this will ensure that the environment burdens of the entire business are identified and included in the EMS.

The environment champion and management team should have the skills to:

- Appreciate the importance of EMS;
- Understand legislative requirements and the implications of noncompliance;
- Appreciate the technicalities of EMS so that priority actions can be identified;
- Implement EMS, which includes gathering information, conducting interviews, data analysis and report writing.

COMMON QUESTION Are the services of external consultants required to set up EMS?

There is always the choice of using external consultants, especially at the early stages when adequate expertise may not be available in-house. While external consultants may facilitate the identification and implementation of cost-effective improvements, their services can be quite expensive, especially for a small business. External consultants must work closely with employees to provide training and build in-house expertise.

Conducting the Environment Status Review

An environment status review is similar to a SWOT analysis. It identifies the environment-related strengths, weakness, opportunities and threats of a business by assessing:

- How and where resources are used;
- How and where waste is generated;
- Which codes and standards are being violated in daily business practices.

The Environment Status Review involves data collection, interviews, inspection, observation, and review of existing documents and records on resource/materials use and waste output. The objective is to gather baseline data to:

- Establish environment management objectives and targets;
- Identify the best areas to start EMS that will bring both business and environment benefits.

It is best to begin with the documentary evidence and supplement this information with data gathered through interviews, observation and inspection.

EMS in a hospitality business is based on nine action areas:

- Reduce water use;
- Reduce waste water output;
- Reduce energy use;
- Reduce waste;
- Purchase environmentally-preferable products;
- Lower emissions, including ozone-depleting substances;
- Improve indoor air quality;
- Reduce noise;
- Monitor and document environment performance.

A series of fact sheets and environment status review checklists for each of the above areas are given below. (The fact sheets contain important background information for an environment review). Neither the fact sheets nor the review checklists are fully comprehensive; they have been developed to demonstrate the type of background data and issues that should be considered in an environment status review.

Environment Status Review on Water and Wastewater



WATER FACTSHEET

- Water can account for a significant part of purchasing costs in hospitality businesses.
- Most businesses are supplied with water by utility companies who purify the water before distribution. Some businesses (especially in rural areas) may draw supplies directly from surface waters (rivers, streams etc.) or aquifers. In this case, water purification may need to be conducted on-site.
- The various uses of water in hospitality businesses are:
 Hot and cold water for bathrooms, kitchen and laundry;
 Hot and cold water for toilets;
 - Cold and hot water for HVAC:
 - Cold water for drinking;
 - Cold water for fire fighting.
- In most businesses, drinking water is drawn from the mains, whilst non-drinking water is drawn from storage tanks.
- Over 50% of water is used in guestrooms and kitchens. Other major users are laundries and public toilets.
- Hot water is held in, and distributed from, hot-water storage tanks. In larger facilities, separate boilers and storage tanks may be used to heat and hold water supplies at different temperatures. An alternative is to use location-specific water heaters to increase temperatures as required.
- Much energy is needed to heat and store hot water, and lowering hot water consumption will reduce water-heating costs.
- Different degrees of hot water are required for different purposes. Typical water heating thresholds for hospitality businesses are:
 - Guest rooms 50°C
 - Laundry 40-80°C
 - Kitchens 60°C
- Wastewater should be directed to sewage treatment plants for treatment before discharge. Yet large volumes of wastewater are discharged without treatment in both industrialised and non-industrialised countries.
- Water treatment is expensive, and is usually charged by volume discharged.
- Biological treatment ponds could be set up if no municipal sewer is available.



Environment Status Review on Energy

ENERGY FACTSHEET

- Energy accounts for the largest share of operating costs in tourism facilities.
- Energy is used for lighting, heating and cooling, ventilation, and powering appliances.
- Most tourism businesses draw their electric energy from the national grid, whose power is generated from various sources: fossil fuels such as fuel oil and coal, hydropower, nuclear power, natural gas; and renewable sources such as solar, wind, bio-fuels and geothermal energy.
- Apart from grid electricity, hospitality businesses use a range of other fuel and energy sources for water and space heating and cooking. These include fuel oil, natural gas or propane, solar and wind power, bio-fuels and geothermal energy.
- What area of a hospitality business is the most energy-intensive? The answer depends on building configurations, climate conditions, heating and cooling requirements, levels of occupancy and activity, the energy sources used, and the energy-efficiency of appliances.
- While some activities may require high amounts of energy, associated costs may be relatively low. Apart from pricing distortions, this could be due to the high energy-efficiency of equipment or the high calorific value of the fuel used. The UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme, provided the following estimates on energy intensity and costs based on energy consumption data from hospitality facilities in the UK:

Estimates of energy intensity and costs in the UK				
	% OF TOTAL ENERGY VOLUME	% OF TOTAL ENERGY COSTS		
Space heating/cooling	48%	29%		
Kitchen and F&B outlets	15%	15%		
Water Heating	20%	12%		
Lighting	9%	11%		
Others	8%	23%		

- Energy management considerations differ in hot and cold climates. In hot climates air-conditioning is used to reduce temperatures and humidity, while in cold climates, heating systems are required to increase temperature and control ventilation and humidity.
- Degree-day thresholds provide guidance to property managers on heating and cooling levels. They differ from country to country. Comparing outside temperatures with the degree-day threshold will indicate the levels to which buildings have to be heated or cooled. Degree-day thresholds are published ahead of time in energy and property management literature.
- When carrying out energy audits it may be necessary to convert quantities of fuel into units of energy. The 'input values' for energy conversion of commonly used fuels are given in the table below. 'Input value' means the energy being converted in the power/heat generation process. These input values must therefore be multiplied by the energy efficiency of the appliance to obtain the actual output of energy. Accurate data of the exact calorific values of fuels and the efficiency of equipment can be obtained from suppliers.

Energy conversion

ENERGY CONVERSION DATA – INPUT VALUES		
Coal	1kWh = Kg x 8.05	
Liquid petroleum gas	1kWh = m ³ x 25	
Natural gas	1kWh = m ³ x 10.6	
Heavy fuel oil	1kWh = litres x 13.3	
Light fuel oil	1kWh = litres x 12.9	

• It will also be necessary to convert values from watt-hours to joules or vice versa. The calculation is:

1 kilo watt-hour (kWh) = 3,600 kilojoules (kJ) or 3.6 megajoules (MJ)

• Emissions from different fuels should be taken into account. The UK Department of the Environment, Transport and the Regions provides the following estimates:

Carbon dioxide estimates

CARBON DIOXIDE EMISSIONS PER L	UNIT OF DELIVERED ENERGY
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Coal	0.32
Oil	0.28
Gas	0.19
Electricity generated from an oil-fired power station ¹	0.63

¹ Though electricity is not a primary fuel, its production and distribution entail substantial energy losses and carbon dioxide emissions

• The potential savings linked to energy efficiency are significant. Repair and good housekeeping measures will reduce energy costs by 10%. Retrofit and refurbishment options bring savings of 30% or more.

ENERGY CHECKLIST



- How much power and fuel is used on the property every month/year?
- ✓ What fuel source is used to generate the electricity used?
- ✓ Have efforts been made to save power and energy?
- ✓ Is power supply shut down in areas that are not in use?
- ✓ Are temperature settings adjusted to ensure comfort levels and minimum energy use?
- ✓ Is the cheapest and most efficient fuel being used for each requirement?
- ✓ Is the energy plant and equipment over ten years old?
- ✓ Are energy-saving lightbulbs being used?
- ✓ Are employees encouraged to save energy in daily routines?
- ✓ Are visitors invited to save energy?
- ✓ Are appliances thermostatically controlled?
- ✓ What are fuel and power costs in proportion to total operating costs?
- Have fuel and power costs increased over the last three years?

Environment Status Review for Waste

WASTE FACTSHEET

Waste disposal is a major economic and environment challenge facing all societies.

- Waste generated by hospitality businesses include:
 - Paper and cardboard items such as stationery, disposable items and packaging;
 - Aluminium products such as beverage cans and tins;
 - Plastic items such as packaging, containers and disposable items;
 - Organic waste such as food waste and garden trimmings;
 - Hazardous waste such as batteries, solvents, paints and anti-fouling agents;
 - Building materials and furniture;
 - Oils and fat;
 - End-of-life appliances and furniture.
- Municipal waste (which includes the above) is recycled, incinerated or land filled. In most countries, most waste goes for landfill.
- Landfill sites have significant environment impacts. In an effort to reduce landfill volumes, many countries are enforcing landfill taxes and legislation to discourage new sites. Simultaneously, efforts are being made to increase the recycling of paper, plastic and aluminium wastes. The incineration of waste with heat recovery is also being promoted, though to lesser extent.
- For tourism businesses, the revenue gains through the sale of reusable and recyclable wastes can greatly offset the costs of waste separation, bailing and compacting.
- The waste management hierarchy is:
 - Avoid;
 - Reduce;
 - Reuse;
 - Recycle;
 - Recover.

See page 105 for details on each aspect of the hierarchy.

- Based on material use and recycling statistics from the US:
 - Recycling one aluminium can saves enough energy to run a TV for 3 hours;
 - Recycling one glass bottle saves enough energy to light a 100-watt bulb for 4 hours;
 - Every 3 weeks, Americans dispose of an amount of used motor oil equivalent to the Exxon Valdez oil spill;
 - Recycling one tonne of paper saves 1,400-kilowatt hours of energy, enough to heat an average American home for 6 months.

WASTE CHECKLIST



The first step in preparation for a preliminary waste status review is to compile an inventory of all materials disposed of by the business. The following should then be considered:

- ✓ How much waste is generated under the main waste categories: paper, plastic, aluminium, organic (kitchen and garden) and hazardous, every month/year?
- ✓ Which departments generate high volumes of waste?
- ✓ How much is known about waste disposal methods?
- ✓ Have initiatives been taken to separate waste?
- ✓ Is organic waste separated from other waste?
- ✓ Have initiatives been taken to reduce waste?
- ✓ What are waste disposal charges as a proportion of operating costs?
- ✓ Have waste disposal charges increased over the last 3 years?
- ✓ Are there items in the waste stream that have never been used?
- ✓ Has a waste audit been conducted?

Environment Status Review on Purchasing Environmentally-preferable
Products and Services

PURCHASING FACTSHEET

- The hospitality industry is a large buyer of consumer goods and services and can, therefore, have a significant influence on suppliers and contractors. On average, 26 five-star hotels purchase the same volume of goods as 1,200 families.
- Environmentally-preferable products include:
 - Products made entirely or partly with recycled materials;
 - Materials with reduced toxicity e.g. water-based paints and non-solvent cleaners;
 - Products manufactured through cleaner production processes e.g. unbleached paper;
 - Products that are more durable and last longer;
 - Products that require less energy during manufacture and use;
 - Reusable or recyclable products;
 - Products with reduced packaging most packaging ends up in the waste stream less than 9 months after manufacture;
 - Environmentally certified products;
 - Products manufactured locally not requiring long-distance transportation.
- The use of environmentally-preferable products can be a valuable showcase for corporate environment commitment.
- Environment-conscious purchasing practices avoid and reduce waste. For example, buying items with less packaging reduces packaging waste.
- Changing purchasing practices should be undertaken in close collaboration with suppliers to ensure that the most cost-effective and environmentally-preferable alternative is selected.



Purchasing Checklist



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The first step is to compile an inventory of all materials purchased by the business. This inventory can be used to assess:

- ✓ Which items can be replaced by a more environmentally-preferable alternative?
- ✓ Which can be reused for the same or another purpose?
- ✓ Are items being purchased that never get used?
- ✓ Have suppliers have been asked for environmentally-preferable alternatives?
- ✓ Have contractors been able to provide a more environmentally-preferable service?
- ✓ Which suppliers and contractors have an environment policy?
- ✓ Are efforts being made to reduce packaging?
- ✓ Is a conscious effort being made to buy environmentally-preferable products whenever possible?

Environment Status Review on Emissions and the Indoor Environment



- Emissions from tourism facilities include:
 - Combustion gases (carbon dioxide, nitrous oxide, hydrocarbons) from fossil fuel and gas-operated boilers, stoves and generators;
 - CFCs from refrigeration and air-conditioning equipment;
 - Halons in fire-extinguishing equipment;
 - Vapours from dry cleaning solvents;
 - Vehicle emissions.
- Indoor environment quality is of great importance to the comfort and well-being of occupants. Most people living and working in cities spend 90% of their time indoors.
- Indoor air quality depends on the activities and emissions within the building and the pollutants brought into it from the air outside. Common sources of indoor air quality contamination include:
 - Combustion gases from stoves, boilers and other combustion equipment;
 - Tobacco smoke;
 - VOC vapours from cleaning solvents, paints, varnishes, photocopy emissions and pesticides;
 - Asbestos fibres;
 - Ozone brought in from the outside;
 - Dust and particles;
 - CFCs from refrigeration and air-conditioning equipment;
 - Radon released from building materials.
- Poor indoor air quality can induce adverse health effects, from headaches and nausea to respiratory irritations and allergic reactions. Long-term exposure (in the case of hospitality employees) can induce more serious illnesses.
- The best-known indoor environment-related health issue is 'sick building syndrome', associated with continual exposure to fumes from paints, adhesives, varnishes, and chemical emissions from photocopiers, furnishings and fabrics. The World Health Organisation (WHO) estimates that 30% of new and refurbished buildings have registered complaints of sick building syndrome symptoms: headaches, dizziness, rashes, asthma, and allergies.
- Adequate ventilation is critical in improving indoor air quality. Fresh air is needed to renew oxygen, remove micro-organisms, vapours and odours, as well as excess heat and moisture.
- Most small hotels are likely to use mechanical ventilation systems, while the use of integrated heat, light and ventilation systems is both more efficient and more feasible for larger properties.

EMISSIONS AND INDOOR AIR QUALITY CHECKLIST



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The first step is to compile an inventory of all sources of emissions inside and outside the building. Then consider the following:

- ✓ Are emissions from boilers and stoves monitored?
- ✓ Is indoor air quality monitored?
- ✓ Are appliances and equipment serviced regularly?
- ✓ Are appliances over 10 years old being used?
- Have complaints about poor indoor air quality been received from guests or employees?
- ✓ Is the property free from asbestos?
- ✓ Have alternatives to CFCs been considered?
- ✓ Have efforts been made to reduce emissions?
- ✓ Are vehicles equipped with catalytic converters?
- ✓ Are there local initiatives to monitor prevailing (exterior) air quality, especially in urban areas?
- ✓ Is the air quality of the local environment considered to be good or bad?

Environment Status Review on Reducing Noise

NOISE FACTSHEET

- Noise pollution can be defined as undesirable sound that is disturbing, annoying and which may be detrimental to human health.
- Undesirable noise can include music, traffic, crowds, and workplace-related noise from machines and appliances.
- Noise is measured in decibels (dB), which follow a logarithmic scale. Therefore even a small increase in decibels means a large increase in the magnitude of the sound. For example, a sound of 30dB is ten times greater in intensity than 20dB, and a hundred times greater than 10dB.
- The frequency of noise is measured in Hertz (Hz).
- Vibration is a major source of noise transmission.

Sound intensity	
A home environment in an urban area	4odB
Office	50-6odB
City centre	70dB
A moving road transport container at a distance of 15 metres	90dB

- Continuous exposure to intensities of noise can have adverse health effects:
 - Noise levels between 7odB-12dB can induce migraines, circulatory disturbances, high blood pressure and ulcers;
 - Noise levels between 10dB and 12odB can cause loss of hearing;
 - Noise levels above 13odB can cause direct damage to the ear;
- High levels of noise in hospitality businesses can reduce the value of the property and lead to the loss of business. It also affects employee productivity and causes conflicts with neighbouring businesses and homes.
- Areas that generate the most noise in hospitality businesses are mechanical rooms with fans, compressors, boilers and generators, kitchens, laundries, delivery and waste output areas including compactors, garages, discotheques and function rooms, lobby areas and bars.
- The most noise-sensitive areas in hospitality properties are guestrooms, meeting and conference rooms, and offices.
- The US Occupational Safety and Health Act specifies the following:

Maximum permissible industrial workday noise levels			
SOUND LEVEL (dB)	DURATION (HOURS)		
90	8		
92	6		
95	4		
100	2		
105	1		
110	1/2		
115	1/4		

NOISE MANAGEMENT CHECKLIST



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Identify all possible sources of noise from within and outside the property:

- ✓ Verify national legislation for the maximum limit for noise in the workplace. Noise limits are usually included in occupational health and safety laws. In most countries the maximum noise level during an 8-hour working day is 85-90dB.
- Do guests complain regularly about noise? Does it come from inside or outside the property?
- ✓ Do employees complain about noise, especially those based in and around kitchens, laundries and maintenance areas?
- Have employees reported health problems that could be linked to high noise intensities?
- ✓ Are equipment and appliances regularly serviced to maintain low noise levels?
- ✓ Have steps been taken to reduce noise?
- ✓ Is it possible to identify days and times of the year that are particularly noisy?

Environment Status Review on the Potential Response of Visitors to the Impending Environment Effort

It is useful for a hospitality business to gain an insight into potential guest response to the impending environment effort:

- Have any guests inquired about the business's environment policy?
- Have tour operators and travel agents inquired about the businesses' environmental policy?
- Do competitors have an environment policy?

As part of the environment status review, a short guest survey could be conducted to evaluate visitor interest in environment issues and environmentally responsible service providers. For example:

Example of Good Practice

Treetops Hotel is committed to improving the environment and is working towards reducing environment impacts while providing you with a high- quality service. We would be pleased to have your comments on the following:

- Are you interested in environment issues?
- Would you consider giving preference to an environmentally responsible business?
- Would you agree to having your towel and linen changed every other day to save water and energy and to reduce wastewater?
- Would you agree to separating your glass, paper and metal waste if separate containers were provided in your room?
- Are you interested in receiving information on local environment initiatives and conservation programmes?

Further comments and suggestions:

Thank you very much for your time and participation.

EMS STAGE 2: ESTABLISH ENVIRONMENT POLICY AND SET ENVIRONMENT OBJECTIVES AND TARGETS

Compile the Environment Status Report

To fully analyse and appreciate the data gathered through the environment status review, it should be compiled into an environment status report. This report should include:

- Volume of costs of water and energy used;
- Volumes and charges of waste disposal;
- Inventory of all materials purchased;
- Levels of compliance;
- Environment improvement activities already in place;
- Management and operation procedures that could facilitate/obstruct EMS implementation;
- Local initiatives that could facilitate EMS implementation for example voluntary industry partnerships on the environment, ecolabelling schemes, loans or grants for environment improvement, environment help-lines, EMS literature produced by the national environment agency or local authorities, etc;
- Employee interest in the impending EMS;
- Potential visitor response to the impending EMS;
- Time spent on the review;
- Sources of information, including interviews and observations;
- Recommendations on EMS objectives and targets.

Verify Compliance with Current and Imminent Environment Legislation

A full review of relevant environment legislation needs to be undertaken at the same time as the environment status review. The environment status report will identify areas where legislation is being violated. It also helps to be aware of impending legislation, since the EMS can then be planned to meet and exceed the new requirements.

Set EMS Objectives and Targets

The environment status report should provide the information needed for establishing EMS objectives and targets. The objectives should specify environment goals, and the targets should indicate the level of improvement to be attained. For example:

Objective: Reduce carbon dioxide output

Target: Reduce carbon dioxide output by 12% of 1998 levels by 2001

Activities that are highly resource-intensive, generate large quantities of waste and emissions, violate legislation, are poor environment practice, and pose health hazards to employees and guests, should be given priority. A full review of relevant environment legislation needs to be undertaken at the same time as the environment status review. Objectives and targets should be established with input from all departments and approved by top management.

Good Practice Tip

Objectives and targets must be realistic and achievable from a business and environment perspective. An over-ambitious target can discourage action, reduce enthusiasm and interest, while an under-ambitious one will not provide a sense of achievement and impetus for continuous improvement.

Establish the Environment Policy

The environment policy is a public statement of a company's environmental commitment and responsibility. It declares how the business is responding to environment challenges, and establishes the overall framework for achieving objectives and targets. It also validates the EMS.

The policy should be developed on the basis of the findings of the environment status review and the objectives and targets established. It must have top management support. The policy statements of five businesses are reproduced below.

Bass Group's Environment Policy



With major hotel and leisure retailing activities around the world, Bass Recognises that it faces a wide range of environmental responsibilities.

Bass is committed to a policy of seeking continual improvement in environmental matters. Group companies have introduced environmental management programmes, which will deliver regulatory compliance in each country, commercial efficiency and good environment citizenship programmes. These programmes are an integral part of the proper management of group business and will help provide a safe and healthy environment for employees, contractors, customers and neighbours.

Bass will ensure that group companies:

- Undertake a thorough risk and hazard analysis;
- Are sensitive to environment issues and consider their potential impact on all new projects and developments;
- Implement their company environment policies;
- Have management accountability and responsibility for environment matters;
- Develop management programmes and set quantified targets where appropriate;
- Monitor and report on performance on a regular basis;
- Communicate with those affected by their actions, and train and involve employees at appropriate levels and function within the organisation.

You can visit the website at www.bass.com/environment

at large, both now and in the future. We conduct a proactive environment policy, called 'Golden Tulip Goes Greener', to reduce our environment load as much as possible. We do this without loss of comfort for our quests. We also maintain optimum safety for our staff, quests and other parties concerned without losing sight of sound business management. Golden Tulip and Tulip Inn Management Hotels oblige themselves to: • Conduct a proactive environment policy in all hotel departments Worldwide Hospitality and offices; Golden Tulip Meet environment requirements, rules and regulations; • Optimise use of energy, water and materials; Zoetermeer • Limit waste, and recycle when possible; • Limit the use of harmful materials; • Stimulate suppliers and guests to contribute to reducing the environment load; • Share knowledge and experience with other companies in the hospitality industry; • Provide hotel staff with the information and means to reach the Green Objectives; • Measure the level of implementation on a regular basis; • Evaluate and adjust the measures taken that should lead to an acceptable environment load; • Unceasingly introduce improvements to the Green Programme. Nestlé's Commitment to Environmentally-preferable Business Practices Nestlé respects the environment, supports sustainable development and is committed to environmentally sound business practices throughout the world. To fulfil this commitment, Nestlé: FONDATION NESTLÉ • Integrates environmental principles, programmes and practices into (SA) PRO GASTRONOMIA each business; Nestlé • Strives for the continuous improvement of its environmental performance through application of the Nestlé Environmental Management System (NEMS); • Complies with applicable environmental legislation. Where none exist, Nestlé's own internal rules are applied; • Provides appropriate information, communication and training to build internal and external understanding concerning the Company's environmental commitment. If you would like to know more about Nestlé's policy on the environment, please visit the Nestlé Website: www.nestle.com.

Golden Tulip Hotel's Environment Policy

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Golden Tulip and Tulip Inn Management Hotels focus on offering a high standard of services and products. Part of our policy is to promote the well-being of all parties concerned, as well as reduce health risks to our staff, guests and society at large, both now and in the future.

Hotel Nikko's Environment Policy

Hotel Nikko, Hongkong, is an environmentally-conscious hotel which not only aims to provide quality services for its quests, but is also committed to taking appropriate measures for pollution prevention and resources conservation. To fulfil the requirements of ISO14001 Standard, the environmental policy statement for Hotel Nikko Hongkong is as follows:

- The hotel is committed to complying with all local environmental 🗱 hotel nikko hongkong legislation and continuously seeks to improve its environmental performance;
 - The hotel's management and staff understand and support the Environment Policy and are committed to continuous improvement of environmental performance by identifying ways to minimise both wastage of natural resources and pollution to the environment;
 - The 'Green Innovator Award' will be presented to employees who devise the most innovative and practical environment improvement initiatives. These initiatives will be reviewed and included in the environment management programme;
 - The hotel will continuously identify ways to minimise waste arriving at source and develop and implement resource and waste management strategies that conform to its 6R policy - Reduce, Reuse, Replace, Repair, Refill and Recycle. The hotel will also adopt best environmental practices to control and minimise all wastewater discharges;
 - The hotel will identify and implement practices to optimise energy and water usage without affecting the quality of services provided to quests;
 - The hotel will take appropriate measures to eliminate environmental, occupational and health risks and is prepared to respond to emergencies at all times;
 - The hotel will support purchasing initiatives that are committed to sustainable environmental development, and continuously seek environmentally-friendly products and services that represent genuine value for money. The hotel will encourage and influence its suppliers to take part in the environment protection initiatives, to understand its purchasing policy, and to provide products and services that have the minimum adverse impact on the environment;
 - The hotel will carry out regular internal programmes of education and training to enhance environment awareness amongst staff. The hotel will also actively participate in external environmental activities, as well as various training and development programmes, to broaden its horizon:
 - The hotel will share its environment experience with other organisations in the community, raise the interests of its stakeholders by explaining the hotel's environment philosophy, and seek their co-operation in improving their own attitude towards environment concerns.

April 1999

on the harbour

The Orchid Mumbai, India Hotel's Environment Policy

We at The Orchid, Asia's first five star, certified Ecotel hotel, commit ourselves towards continually Improving our Environmental Management in the hospitality industry, so as to remain leaders by:

- Optimising the use of resources such as energy, perishable food products, water, paint and paper;
- Striving to go beyond the applicable environmental laws and other requirements;
- Enhancing the practice of waste management, which is to reduce, reuse and recycle;
- Implementing environmental awareness of our suppliers, team members, guests and the local community;
- Providing a hygienic and safe working environment in the hotel;
- Increasing and maintaining the green cover.

September, 2000

Example of Good Practice

The Plymouth College of Further Education, Plymouth, UK, undertook a preliminary environment review in 1999, with the objectives of implementing a comprehensive EMS. Manadon Associates of Plymouth carried out the review.

The review covered 4 areas:

1. An examination of existing environment practices and procedures:

This was done through a 78-point questionnaire/checklist covering corporate issues, management structure, staff awareness, training processes, public relations, investment, office/classroom/workshop-based activities, energy use and sources, water use and effluent discharge, waste minimisation and disposal, travel and transport, estate maintenance, major and minor works, and monitoring performance targets.

2. A review of relevant environment legislation and regulatory requirements: Activities already regulated by the local authorities' planning and development system and already enforced health and safety regulations were not included. The legislative areas reviewed were transport, airborne emissions, energy use, waste disposal and water use.

3. An evaluation and registration of significant environment effects: Although only sparse information was available, a register of effects (which records data on environment effects – resource inputs and waste outputs) was begun for atmospheric emissions, effluent discharge, waste and energy use.

4. Observed regulatory non-compliance.

On the basis of this review, PCFE was able to set realistic environment objectives and targets, establish a formal environment policy and develop a 90-activity environment management programme.

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EMS STAGE 3: IMPLEMENTING THE ENVIRONMENT MANAGEMENT PROGRAMME

An environment management programme is needed to implement the EMS. It is the mechanism through which environment objectives and targets are achieved and the environment policy realised.

An environment management programme works to integrate environment action – reducing resource use and waste output – into business activity through identifying the specific procedures and technological improvements that need to be incorporated into existing practices and operations. (An environment management programme is referred to as an 'environment action plan' in some sources.)

It helps to start by drawing up an activity plan, so that a complete overview of the environment management programme can be seen at a glance, perhaps in the form of a table. For example:

Objective/Target	Action	Budget	Deadline	Department Concerned

An environment management programme for hospitality facilities typically consists of the following action areas:

- · Reducing water use and wastewater output;
- Lowering energy consumption;
- Reducing waste output;
- Purchasing environment-preferable products;
- Lowering emissions, including of ozone-depleting substances;
- Improving the indoor environment;
- Lowering noise;
- Internal communication, delegation and training;
- Environment communication to guests;
- Monitoring and documenting progress.

A range of environment management options for each of the above action areas will now be discussed. It will help to bear in mind these considerations:

- What procedural or process changes might be needed for environment improvement?
- What technology could be used to facilitate environment management?
- What changes will increase efficiency?
- What improvements will require substantial capital investment?
- Will better training help address some of the issues?

ENVIRONMENT MANAGEMENT PROGRAMME FOR WATER AND WASTE WATER

Water management in hospitality facilities includes:

- Maintaining water quality;
- Managing water storage and distribution works;
- Reducing water use;
- Reducing wastewater output;
- Purifying water for swimming-pools;
- Monitoring water consumption;
- Reusing treated wastewater;
- Maintaining water supply quality.

Most countries have water quality standards, and ensuring compliance with them is important. The WHO and the EU have their own standards, which can be referred to for additional guidance.

The most common indicators of poor water quality are: suspended solids, discolouring due to corrosion, rising pH levels, excessive hardness, high mineral content and bacterial contamination, especially legionnella pneumophilia. Any change in water quality should be brought to the attention of the water supply company/authority. A quick review of the on-site water storage and distribution works should then be conducted to find out if the source of the contamination is on or off the property.

Managing Water Storage and Distribution Works

WATER STORAGE

- Ensure a frequent turnover of water to avoid the build-up of bacteria such as legionnella pneumophilia;
- Storage tank openings should be covered and protected from dust, pests, and other sources of contamination;
- Inlet and outlet valves should be placed to avoid the build-up of stagnant water;
- Tanks should be cleaned every six months, and exterior and interior scale build-up removed;
- Tanks should be regularly checked for leaks.

WATER DISTRIBUTION

- Ensure regular maintenance to avoid leaks, spills and back siphonage between drinking and non-drinking supplies;
- Vacuum breakers and calibrated systems can be used to control flow, reduce pressure and optimise cost savings;
- Maintain and upgrade insulation on hot water tanks and pipes.

Reducing Water Use

GOOD HOUSEKEEPING AND MAINTENANCE OPTIONS FOR REDUCING WATER USE

- Repair leaks and dripping pipes;
- Run washing machines and dishwashers only when fully loaded;

- When watering gardens, direct flow to the roots of plants;
- Place plastic containers filled with water in toilet cisterns to reduce flush water volume;
- Encourage employees to save water;
- Collect rainwater for watering gardens and other non-drinking uses;
- Avoid rinsing under running taps: use buckets or bowls instead;
- Place tent cards in bathrooms inviting guests to save water;
- Invite guests to reuse their towels and linen.

REPAIR AND RETROFIT OPTIONS FOR REDUCING WATER USE

- Place volume reducers in toilet cisterns;
- Install hot and cold water mixers in all outlets;
- Install pressure flush valves on toilets and urinals. This can reduce flush water by 30-50%;
- Retrofit taps and showers with aerators. This can reduce water volume by 35%;

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- Install photoelectric cells in public washstands;
- Install chemically purified urinals that do not use water.

REFURBISHMENT OPTIONS FOR WATER

- Replace baths with showers;
- Fit low-flow showerheads and toilets.

COMMON QUESTIONS How much water can be saved through low-flow showerheads?

A conventional showerhead uses 15-30 litres per minute. A low-flow fitting gives a flow of 7-10 litres per minute. Thus, flow volume reduced by at least half.

How much water does a low-flush toilet save?

A low-flush toilet uses six litres of water per flush. A conventional system uses up to twelve.

Purification of Water in Swimming Pools

There are several environment-preferable techniques used to purify swimming pool water that do not use chlorine or other chemicals.

One such technique is ionisation, the release of metallic ions (usually copper and silver) into the water. Before release, low-voltage electricity is passed through electrodes to generate positive and negative ions. They kill algae, bacteria, and other micro-organisms. A small amount of chlorine (or other oxidiser such as bromine) is however needed to eliminate water-clouding elements such as suntan oil and dust, which are not affected by ions. Ionisation reduces chlorine use by almost 80%, and eliminates eye-sting and beaching effects.

Another technique involves ozone, which has been used for many years in industrial water purification and wastewater treatment plants throughout the world. Ozone is a very reactive form of oxygen which can destroy a variety of liquid waste materials, toxins, micro-organisms such as viruses, bacteria, spores, and some chemical impurities. Ozone can be created through:

- The UV, or photochemical method, which passes air through UV lamps, the UV rays turning the oxygen molecules into ozone, just as in the stratosphere;
- High-voltage electricity being passed through dry air in a vacuum.

The ozone obtained is then introduced into the water via a compressor or similar device.

Also gaining ground is pool water purification by UVC radiation lamps, which radiate UV energy at 240-280 nanometres per second. The light is absorbed by the DNA of bacteria, moulds, viruses and yeast, which then leads to a change in the genetic material so that they are no longer able to multiply. Some chlorine (about 10% of conventional quantities) is then needed to provide residual bacterial control. A second benefit of this method is that UVC light has a photochemical effect, which can destroy chloramines² and other by-products of chlorine. 'Free' chlorine is then released back into the water to perform its intended task of disinfection. Not only are water quality and atmospheric conditions considerably improved, but also much less chlorine has to be added to provide the residual bacterial control.

Monitoring Water Consumption

Since water is directly linked to the level of occupancy/activity, it is best to monitor and benchmark water use on the basis of guest nights or visitor numbers.

Water meters are essential for the monitoring of water use. Different areas of the business could be sub-metered for the collection of more specific data. Comparing water use over the years and benchmarking with other facilities of similar size and standing can provide valuable information for improved water management and increased savings on water and energy costs. When benchmarking with other properties it must be remembered that water use will vary greatly depending on the size of the property, services offered, level of activity and climatic conditions.

Reuse of Treated Wastewater

It is good environment and business practice to collect and reuse rainwater for irrigation and other non-drinking uses. Water collection tanks can be installed on the roof or at ground level. If the water is to be used in-house it may require a minimum level of treatment. The collection and use of rainwater is discussed in more detail in Unit 5.

It is possible to supplement non-drinking water needs by treating and reusing wastewater. The first consideration in wastewater reuse is to distinguish between 'grey' and 'black' water. Grey water is wastewater from bathrooms, laundries and kitchens; black water is wastewater from toilets. Black water contains pathogens and almost ten times more nitrogen than grey water, and therefore needs to go through a two- or three-stage biological treatment process before it can be reused. Grey water treatment is less intensive and can be safely conducted on-site. The treated water can be used for irrigation, toilet flushing and other non-drinking uses.

Over the last ten years, many national water supply and plumbing regulations have been modified to accommodate the reuse of grey water. They are most easily incorporated in the initial design process of a building, as separate drains and septic tanks have to be built. In the case of existing buildings, retrofitting drainage ² When chlorine and ammonia are both present in water, they react to form 'combined chlorine' products called chloramines. They are less effective disinfectants than 'free' chlorine.

> Since water is directly linked to the level of occupancy/ activity, it is best to monitor and benchmark water use on the basis of guest nights or visitor numbers.

systems may be expensive, and a cost-benefit analysis must be conducted to determine if the effort is worthwhile.

The level to which grey water needs to be treated depends on the level of biological oxygen demand, or BOD, of the wastewater and the purpose for which it will be reused. The BOD level is the level of oxygen extracted from the water by bacteria when pollutants decompose. The more organic materials there are in wastewater, the more oxygen is needed for pollutant decomposition.

In most hospitality businesses, grey water can be reused for irrigation or flushing toilets, and in this case it may be enough to pass the wastewater through a sand filter. To maximise sand filter efficiency, it is important to minimise the suspended solids in the wastewater. Bathroom, laundry and kitchen outlets should therefore be fitted with filters, and additional grease traps should be added to kitchen outlets.

But if grey water is to be used for drinking, it must go through a complete biological treatment process:

- Preliminary filtration process to remove grit and large suspended solids;
- Preliminary sedimentation process during which 55% of suspended solids are allowed to settle and are subsequently removed from the wastewater;
- Biological treatment process, either activated sludge or a percolating filter to oxidise the effluent, and reduce BOD;

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• Secondary sedimentation process to remove all suspended matter and render the effluent suitable for reuse.

Good Practice Tip

The treatment of wastewater should not be undertaken without the services of wastewater treatment specialists. Plumbing codes and discharge regulations should also be consulted.

Examples of Good Practice

At the Cama Rajputna Club Resort, Rajasthan, India, ten to twenty thousand litres of grey water are first passed through a gravel and sand filter bed and then used for watering the garden. Water use and water bills have further decreased by changing towels and bed linen every three days.

At the Steigenberger Kurhaus Hotel, Amsterdam, Netherlands, a calibrated water pressure control system together with water-saving pressure nozzles on washbasins, sinks, and toilet cisterns is bringing substantial water savings. The new dishwasher unit is programmed to reuse water from the previous wash.

A wastewater treatment works has been installed at the Taj Residency, Indore, India, through which 40,000 litres of wastewater are treated and reused every day. The treated water is used to water the garden. Further water conservation was made possible by changing watering times from during the day to dawn and dusk. Losses from evaporation, which used to account for 8,000 litres per day, are thus reduced. The Hong Kong Hotel, Hong Kong has reduced water consumption by 20% by installing aerators in bathroom outlets and eliminating the use of running water for cleaning.

In Canadian Pacific Hotel and Resorts hotels, water outlets and distribution pipes are regularly checked for leaks, aerators are installed in taps, low-flow showerheads and low-volume cisterns are used in bathrooms, and photoelectriccell-operated toilets and washbasins are used in public facilities. At one of the chain's hotels, the Hotel Vancouver, a solution based on baking soda and salt is used to purify swimming-pool water. This has reduced chemical use and associated costs, and made handling and disposal easier.

ENVIRONMENT MANAGEMENT PROGRAMME FOR ENERGY

Energy efficiency not only reduces fuel and electricity bills, it also increases the overall comfort of the property. Energy management may be divided into two main areas:

- Maintenance or good housekeeping options;
- Repair, retrofit and refurbishment options.

Maintenance or 'Good Housekeeping' Options

- Loft insulation can help prevent condensation and mould, and can reduce heating bills by almost 20%. Insulation materials include mineral wool and brown cellulose fibres. A thickness of 15 to 20 cm should be ensured for maximum energy efficiency. As insulation makes the loft area colder, hot water tanks and pipes in this area must also be insulated.
- Shut down power in sections of the building that are not in use. This can be done through the use of Building Management Systems (BEMS), discussed later in this section.
- Insulate all hot water tanks, pipes and boilers.
- Seal gaps in walls, windows, doors, roofs and floor to control heating/ cooling loss and penetrating damp.
- Make visitors aware of the importance of energy conservation. Invite them to switch off equipment and lights when not required.
- Match the size of the appliances to demand requirements. Oversized or undersized equipment wastes energy.
- Train staff to use less hot water and to save energy by switching off equipment when not needed.
- In the kitchen, match pan size to hot plate/burner size. Defrost food at room temperature and not in hot water.
- Maintain hot water in taps at 50°C.
- Use translucent lampshades to optimise light output.
- Open and close curtains to maximise and minimise heat gain as required.
- Ensure timers and controllers are set according to the degree-day thresholds and levels of activity inside the property.
- Ensure boilers and chillers are regularly serviced to maximise efficiency.

- Do not place furniture in front of heating or cooling units.
- Radiators and air-conditioning units should be placed below windows to prevent down-draughts; curtains should therefore not be allowed to drape over them.
- Select the most energy-efficient cycles and fully load washing machines and dishwashers before use.

Repair, Retrofit and Refurbishment Options

A number of repair, retrofit and refurbishment options are presented below:

- Automatic load-shedding control systems;
- Controls for heating and hot water;
- Double-glazing;
- Sealing and stripping;
- Controlled ventilation;
- Low energy lighting;
- Covering and coatings;
- Heat recovery;
- Building Energy Management Systems (BEMS);
- Combined heat and power;
- Replacing old equipment;
- Renewable energy options;
- Wall, roof, and floor insulation.

Automatic Load-Shedding Control Systems

Most electricity suppliers require that hospitality businesses pay a maximum demand tariff based on peak demand loads. This is designed to discourage users from having large peaks and falls in their energy demand patterns. To reduce peak demand loads and tariffs, it is first necessary to investigate the causes of loading and to check if the use of some appliances can be avoided during peak periods. Automatic load-control systems continuously monitor electricity use. When demand rises to the maximum threshold, they automatically switch off the appliances programmed into the system. They also allow the user to choose which appliances get switched off first. Large hospitality businesses have found that automatic load-shedding control systems can greatly reduce peak demand loads and bring significant cost savings.

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Controls for Heating and Hot Water

The right controls are crucial for the efficient operation of hot water and heating/ cooling systems. These include:

- Room thermostats, which switch-off boilers when rooms are heated to a set temperature;
- Programmer and timer switches, which switch off space and water heating at required times;
- Zone controls, allowing one or more zones to be controlled separately
- Hot water cylinder thermostats to switch off boilers when water is heated to a given temperature;

- A thermostatic radio valve fitted onto a radiator and used in conjunction with the room thermostat system or boiler energy control system; it works by reducing water flow into the radiator when the thermostat reaches the set temperature;
- Storage water controls, used for storage or combination heaters: they include such features as automatic thermostats (to control heat storage and output according to peak demand loads and tariffs windows), convector-control room temperature thermostats, and external timers.

Good Practice Tip

A complete heating and cooling control package can usually be installed at any time, but installation costs can be substantially reduced if it is done during refurbishment.

Double-Glazing

Based on energy savings alone, the pay-back time for double-glazing replacement windows is 4 to 7 years. The most important feature in reducing heat loss is not the thickness of the glass, but the space between the layers of glass, which should be around 20mm. Low-emissivity glass will further reduce heat loss.

Good Practice Tips

In the case of windows already installed, secondary glazing usually made of glass in plastic or aluminium frames is a cost-effective option. Wood and PVC frames are better insulators than aluminium.

Trickle vents to ensure adequate ventilation should accompany replacement windows.

Sealing and Stripping

Badly fitted doors and windows are a major source of heating and cooling loss, but are cheap and easy to repair. Sealing and stripping materials include silicon strips, blade seals, brush piles and fillers, and rubber, PVC and aluminium seals.

Good Practice Tip

It is especially important to maintain adequate ventilation where flued (fuel and gas) appliances are in use, since adequate air must keep entering the area to allow fires to burn safely. If trickle vents are not fitted, the upper part of windows should not be sealed.

Controlled Ventilation

While sealing and stripping is important, so too is controlled ventilation. Adequate ventilation is important to reduce condensation and the resulting damp, and to ensure that odours, carbon dioxide and stale air are removed and good indoor air quality is maintained. There are several types of controlled ventilation suitable for hospitality buildings:

- Background ventilation systems such as trickle vents;
- Rapid ventilation systems such as extractor fans;
- Ducted systems including heat recovery.

Low-Energy Lighting

Low-energy lighting is easy to install and can reduce energy costs by 10-15%. Lowenergy lamps include compact fluorescent (CLFs), fluorescent tubes, and tungsten halogens.

CLFs last about 8 times longer than tungsten halogen lamps and use about 25% less energy for the same light output. Tungsten halogen lamps are about 50% more efficient than standard lamps and last twice as long. All energy-efficient lighting offers the advantage of dimmer switches, which allow control of light output.

Coverings and Coatings

In warmer climates, weatherproof coverings should be finished off with sunreflecting paints to reduce solar heat gain. Similarly, pale shades used for decorating exteriors and interiors reduce heat gain and increase light reflection.

Heat Recovery

Hospitality properties can achieve substantial savings by recovering sensible and latent heat from kitchen, laundry and swimming-pool exhaust systems, boiler flues, and condensed heat recovery. This heat can be channelled back for space or water heating. Heat recovery requires the installation of heat exchangers to separate the heat from its source (water, gas or combustion products) and transfer it to where it can be reused – the water or space heating system. The most cost-effective heat-recovery systems for hospitality businesses are usually sensible heat exchangers such as run-around coils and thermal wheels.

The feasibility of heat recovery depends on:

- The temperature of the waste heat in the air or water;
- Where the waste heat is to be used, which should be closely connected to the source of the waste heat;
- Purchasing and operating costs of the heat-exchange unit: the cost of the heat recovered should be higher than the purchasing and operation of the heat-exchange unit.

COMMON QUESTION What is the difference between sensible heat and latent heat?

Sensible heat is the heat associated with a change in temperature. Latent heat is associated with a change in state such as from liquid to gas.

Building Energy Management Systems (BEMS)

BEMS are computer-based energy-management systems which provide for the integrated control of thermostats, boilers, and zone controllers, each zone having its own heating, cooling and lighting units. They therefore enable different areas of a property to be controlled separately and even shut down when not in use.

BEMS allow for the use of occupancy-linked control systems, which are very useful for hospitality businesses. These include:

• LINK PANELS AND KEY FOB PANELS

These allow for power in rooms to be activated to set temperatures only when occupied. The link panel is activated when the key is removed from the key holder at reception or the control area, while the fob panel is activated when the key is placed in the key holder inside each room. Both systems require the installation of TRVs.

• INFRA-RED OCCUPANCY DETECTORS

These systems turn on units when motion is detected and allow for individual temperature control by the occupant. If no motion is detected, the system holds the set temperature for a preset time (5-50 minutes) before switching back all units to background levels.

Combined Heat and Power (CHP)

CHP systems generate electricity and channel the heat generated in the process (normally regarded as waste) to use for water or space heating. As both electricity and heat are generated at the same time, the efficiency of CHP systems can be as high as 80-90%.

CHP is most suited to properties that require water and space heating for longer periods of the year. The UK Department of the Environment, Transport and the Regions reports that around 17% of total CHP installations in the UK are in hotels.

Good Practice Tip

CHP systems do not always bring financial returns. Specialist advice is needed to evaluate the feasibility of this option.

Replace Older Equipment

Older boilers and chillers are more energy-intensive than newer models. Replacing equipment over 15 years old will reduce energy bills by 10-15%. If equipment is less than 10 years old, investing in controls may prove more economical.

Renewable Energy Options

Renewable energy is a source of energy that can be produced at the same rate as or faster than it is consumed, and therefore does not deplete natural resources. Renewable energy technology for tourism and hospitality includes solar water heating, photovoltaics (PV), mini-hydro systems, wind turbines, bio-fuels and geothermal heat pumps.

The use of renewable energy will be discussed at length in Unit 5.

Wall, Roof and Floor Insulation

Around 80% of cooling and heating is lost through external walls. In conjunction with heating/cooling controls, wall insulation also reduces condensation and damp. Many recycled and more environmentally-preferable insulating materials are available and should be given preference. Formaldehyde should be avoided.

The types and methods of roof insulation depend on the roof pitch (sloping or flat),
boulders, eves, rafters, weatherproof coverings, etc. The most commonly used insulation materials are plastic (mainly polystyrene) and mineral wool.

Floor insulation is best done when floors are being replaced or extensions built. If insulation is laid above existing floors, care should be taken that the extra thickness does not affect existing fittings and skirtings. Floor insulation is especially useful to reduce heating and cooling losses in buildings with suspended wooden floors. Insulation materials include mineral wool, polystyrene and foam glass.

Good Practice Tip

As there are many specifications in the choice and the laying of insulation, specialist advice is needed.

Examples of Good Practice

Through power factor correction and the installation of a load-shedding system, the Hotel Inter-Continental in Sydney, Australia, is achieving savings in electricity costs of A\$27,000 a year. A BEMS is used to control and monitor all chillers, boilers, steam generators and hot-water tanks.

70% of the hot water requirements of the Welcome Group Mughal Sheraton Hotel in Agra, India, is obtained through solar water heaters. Energy-efficient compact fluorescent lamps are fitted in guestrooms and public areas, and infrared sensors automatically switch off lights when rooms are vacant.

As a result of an environment status review on energy, The Renaissance Jamaica Grand Resort, Ocho Rios, Jamaica, has replaced its old chillers with new CFCfree equipment with 0.50kw/tonne energy-efficiency. The cooling towers have also been upgraded. The hotel is reviewing the feasibility of CHP.

Canadian Pacific Hotels and Resorts lowered water heating costs by insulating hot-water pipes and tanks, and regularly monitoring boiler thermostats. Some properties use solar water heaters to provide hot water for swimming pools.

Energy-management measures which collectively reduce energy costs by 20-25% per annum, at the Taj Residency, Indore, India, include:

- Timers on office air-conditioners to switch off units for 15 minutes every 45 minutes;
- BEMS and link panels to turn power on and off in guest rooms;
- Solar water heaters;
- Waste heat from air-conditioning units recovered and reused for water heating;
- Sun-control films on glass panes to reduce solar gain and airconditioning loads;
- Roofs and outer walls of the rooms on the top floor, which are exposed to direct sunlight for long periods, embodied with 50mm of insulation to reduce heat gain.

ENVIRONMENT MANAGEMENT PROGRAMME FOR WASTE

Reducing and reusing waste is one of the easiest areas for environment improvement and therefore one of the best areas to start. The preliminary environment status review requires a list of all waste generated by the business. This can now be used to identify products that can be:

- Replaced with alternatives which avoid waste or generate less;
- Reused for the same or another purpose;
- Sorted and collected for recycling under municipal waste recycling schemes;
- Used for longer.

A checklist on waste management for hospitality facilities is given below. It follows the order of the waste management hierarchy:

- 1. Avoid
- 2. Reduce
- 3. Reuse
- 4. Recycle

WASTE MANAGEMENT CHECKLIST



- **1. AVOIDING WASTE AT SOURCE:**
- ✓ Favour products with less packaging
- ✓ Invite suppliers to take back packaging, especially reusable boxes, crates, and pallets
- ✓ Buy in bulk rather than small packs
- ✓ Plant Christmas trees and reuse them every year
- 2. REDUCING WASTE:
- ✓ Avoid using individual food portions
- Avoid disposable cutlery and crockery; if you have to use them, choose biodegradable ones (e.g. starch-based or made from recycled paper and plastic)
- ✓ Mulch and compost garden and kitchen waste
- Send food waste to pig farms as feed

- ✓ Replace individual toiletries in guestrooms with refillable fixed dispensers
- ✓ Use both sides of office paper before disposal
- Donate leftover food from buffets to charity
- ✓ Switch from disposable to reusable laundry bags
- Donate old furniture and linen to charity
- 3. RE-USE OPTIONS:

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- Re-use packaging containers for holding and storing other materials
- ✓ Re-use glass/plastic bottles as toilet dams in cisterns
- ✓ Re-use leftover guest stationery in the back office
- ✓ Re-use old linen as cleaning rags and laundry bags
- 4. RECYCLING OPTIONS:
- ✓ Establish in-house sorting and collection procedures for recyclable waste such as:
 - Glass
 - Plastic
 - Paper
 - Cardboard
 - Aluminium
 - Batteries
- ✓ Contact local recycling dealers for information on the sale of waste for recycling.

How can the Separation of Waste be Easily Incorporated into Hospitality Operations?

- Place separate waste containers in rooms and invite guests to use the containers as labelled;
- Ask guests to sort out waste such as batteries for separate collection and disposal;
- Install housekeeping carts with separate waste containers;
- Place separate waste containers in kitchens, other F&B outlets, housekeeping and administration areas;
- Place bulk containers for separate waste in an appropriate back office area;
- Train employees in all departments to separate waste.

In the case of hazardous waste such as solvents, pool chemicals, paints, chemical pesticides and other such products, the local authority's disposal stipulations should be followed. Hygiene and food safety codes provide guidance for food and packaging waste disposal, which will facilitate waste management.

Some Facts About Composting

Composting is the use of micro-organisms to break down organic waste (vegetable clippings, leaves, seeds, skins, shells, rinds, garden waste, etc) into inorganic form, which can then be used to improve the nutrient and water retention capacity of soil.

Composting techniques range from simple backyard heaps to in-vessel systems.

As composting waste is wet, backyard heaps need to be layered with dry bulking materials such as wood, sawdust, hay, leaves or shredded paper. Commercial compost activators can also be used. A small amount of nitrogen fertiliser can be added to increase energy content and speed up decomposition. Compost heaps need to be kept moist and thoroughly mixed to ensure waste breaks down rapidly. An unturned pile will become anaerobic (lack oxygen) and smell.

In-vessel systems allow waste to be composted in enclosed vessels, reducing composting time to less than 30 days. As the composting takes place in enclosed vessels, they can be installed indoors (in kitchens and corridors, for example) or outside without the problems of smell, space or leakage. These systems have loading and screening devices, computerised or mechanical aeration systems, and mixers to turn the piles.

Most composting systems recommend that only 15% of the waste heap consist of meat; in-vessel systems have partly overcome this disadvantage.

Good Practice Tip

Adding too much bulking material can create a low-energy compost mixture, which takes a long time to break down.

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Preparation of Waste for Recycling

If waste is to be successfully prepared and used for recycling, it must be uniformly sorted and cleaned, and free from bottle-caps, food, metal, plastic, etc. Compactors can be used to reduce waste volume. This lowers the space required to collect and store waste and increases its value as a recyclable material. But compactors can be expensive and are only worthwhile in large properties with significant waste volume.

Plastic and paper waste usually needs to be baled and compacted before collection for recycling. Advice needs to be obtained from local and/or municipal waste collection and recycling schemes on the preparation of waste, use of compactors, baling specifications, and the market price for recyclables.

COMMON QUESTIONS How high are revenues from selling waste for recycling?

Revenue from recycling waste depends on the type and volume of waste separated and made available for collection, the local market for recycled products, and local policies on the recycling of post-consumer waste. For best returns, the waste must be sorted and contamination-free. Working closely with recycling dealers will enable effective sorting and collection plans to be developed and returns to be optimised.

Is recycling the most environment-preferable option for post-consumer waste?

All recyclables need to be sorted, cleaned, and baled before collection from commercial sites, homes and businesses. They then have to be transported to material handling facilities where they are further sorted, cleaned, and crushed (or pulped in the case of paper) before they can go to manufacturing sites for reuse. The transport involved in recycling increases if people drive to waste collection points to dispose of their waste.

These processes and transport requirements can consume large amounts of water, power, fossil fuels and other materials, and emit wastes and emissions.

The key question is:

Are the resources used and waste generated by the recycling process higher than the resources used and waste generated if virgin materials were used for the same purpose?

The answer requires detailed environment, life-cycle and economic studies and will vary with each recyclable material. Consideration must also be given to the entire organisation, profitability, and growth prospects of the recycling market in question.

Some recent and controversial studies in the UK and the US show that for paper and plastic, incineration with energy recovery can be a better business and environment-preferable alternative than recycling; the parameters are too numerous to discuss here. But it should not be forgotten that incineration plants are very capital-intensive to build and operate, and even state-of-theart incinerators can emit harmful gases, including dioxins. Another argument against incineration with energy recovery is that it drives down incentives for waste reduction. S E C T I O N

The other waste disposal option is landfill, which has significant environment impacts. In an effort to reduce landfill waste volumes, landfill levies and taxes have risen significantly over recent years and legislation aimed at restricting the building of new landfill sites is being enforced in many countries.

In the light of these trends, recycling is expected to gain new ground in the future. As large generators of post-consumer waste, the hospitality industry has a key role to play in increasing recycling volumes and the market for recyclable products.

Examples of Good Practice

At the Trouville Hotel, Restaurant and Conference Centre in Hornbaek, Denmark, waste is separated as follows: organic waste, paper and board, coloured and non-coloured glass, returnable bottles, aluminium, and packaging material. Plastic materials are reused and do not enter the waste stream.

- Organic waste is frozen and sold for conversion into animal food;
- Paper and board are compacted and sold for recycling;
- Packaging materials are returned to suppliers;
- Glass is deposited at the nearest recycling collection point;
- Returnable bottles are sold for reuse.

The Trouville has also discontinued the use of disposable items. Shampoo and bath and shower gel are provided in refillable wall-mounted dispensers; glasses have replaced disposable plastic mugs. The use of individual packages of butter, marmalade, honey, cream etc., has been discontinued. Most brochures are printed on recycled paper.

The Trouville is a holder of the 'Green Key', the Danish national eco-label for environmentally-preferable hospitality facilities.

The Cama Rajputana Resort, Rajastan, India, composts all food, kitchen and garden waste through 'vermicomposting', the use of specially-bred worms to break down waste into compost. The hotel operates its own vermiculture laboratory that produces worms for composting on-site as well as for the local community. The resort is also working towards using the biogas generated during the breakdown of waste for cooking.

The Renaissance Jamaica Grand Resort, Ocho Rios, Jamaica, recycles paper through the Social Mobilisation and Self Help Project (SMASH), which uses waste paper to make hand-made postcards, birthday and business cards. Used cooking oil is collected and sold to soap manufacturers.

At the Hong Kong Hotel, Hong Kong, efforts are made to:

- Limit paper use in the back office;
- Replace disposable plastic newspaper bags with reusable cloth ones;
- Collect used cooking oil for sale and reuse in other industries;
- Replace plastic bottles in the mini-bars with glass ones;
- Use plants to decorate restaurant tables instead of flowers.



ENVIRONMENT MANAGEMENT PROGRAMME FOR PURCHASING ENVIRONMENTALLY-PREFERABLE PRODUCTS AND SERVICES

Along with waste management, purchasing is an easy and visible area to start environment action. Using environmentally-preferable products demonstrates a company's environment commitment to employees, visitors and suppliers, and helps avoid and reduce waste.

The purchasing inventory compiled during the environment status review indicates the best place to start. Additional considerations include:

- Are products being purchased that are not being used? What are the levels of dead stock?
- Can the purchase of some items be discontinued? Could a similar level of service be provided without them? Might they be resourced/ replaced with materials presently ending up in waste streams?
- What toxic products are being purchased? Could they be replaced with non-toxic alternatives? Consider the following examples:

TOXIC PRODUCTS	ENVIRONMENTALLY-PREFERABLE ALTERNATIVES
Pesticides and herbicides	Biological pest-control alternatives
Oven cleaners	Baking soda
Permanent ink markers	Water based markers
Photocopy toners	Recycled toners
Varnish	Varnishes with lower VOC content
Paints	Low VOC and water-based paints
Air fresheners	Pot-pourri and home-made solutions of vinegar and lemon juice
Aerosols	Pump spray products
Pool chemicals	Technologies such as 'alternative' salt, ammonia and baking-soda-based solutions, osmosis, ionisation and UV
Moth balls	Cedar and sandalwood chips and oil

Environmentally-preferable alternatives to toxic products

- Have any food items been genetically modified or manufactured with genetically modified raw materials?
- Are items being purchased with high volumes of packaging? Can they be replaced with items with less, or less bulky, packaging? Can the packaging be returned to the supplier?
- Can the purchase and use of disposable items be discontinued? Can they be replaced with more environmentally-preferable alternatives, such as starch-based disposable plates?
- Can more effort be made to 'buy recycled'?
- Can more effort be made to buy biodegradable products?
- Is preference given to environment certified products and services?
- Is preference given to locally produced goods and services?
- Are efforts being made to buy in bulk when possible?
- Have efforts been made to use products that require less energy and transport to manufacture, use and distribute?
- Do suppliers and contractors have environment policies?
- Have suppliers been asked to provide more environmentally-preferable alternatives?

Good Practice Tip

Excessive packaging is neither economical nor environment-suitable. However, a minimum level of packaging must be maintained to protect goods from contamination, prevent damage and spoilage, and facilitate transport, storage and end use. If a reduction in packaging results in increased product damage and spoilage, the effort is pointless. Food safety, hygiene codes and local packaging legislation will provide additional guidance on the minimum levels and types of packaging that need to be maintained.

Examples of Good Practice

The Steigenberger Kurhaus Hotel, Amsterdam, The Netherlands, has an active policy to 'buy in bulk, recycled and biodegradable'. By working closely with suppliers, packaging is minimised and crates and pallets are collected and reused. All paints and varnishes used for redecorating are water-based and low in VOC content. The collective waste and purchasing management policies have reduced waste by 28%.

*Results of the Taj Group of Hotel's*³ *environment purchasing programme include:*

- Hand-made recycled paper⁴ is used for visiting cards, stationary and menus. Biodegradable and natural 'old-style' products are used for cleaning;
- Packaging is kept to a minimum;
- Newspaper and laundry bags are of organic cotton, made in India;
- Guest slippers are of natural jute, made in India;
- Plastic bags have been replaced with reusable wicker baskets;
- Use of plastic is kept to a minimum.

The purchasing policy has been a central element in the EMS of the Hotel Inter-Continental, Sydney. Environment sensitivity, energy-efficiency, durability, price and quality are primary considerations. Suppliers are asked to reduce packaging, and to keep suggesting 'greener' alternatives as they arrive on the market. They are also asked to respond to the Hotel Supply Questionnaire about their products and commitment to environment responsibility.

As part of its award-winning EMS, the Sånga Säby Hotel, Study and Conference Centre, Svartsjö, Sweden, buys exclusively Swedish. Food is purchased from agricultural co-operatives. Transport distance being an vital element in purchasing, preference is given to locally grown and manufactured products.

Suppliers are required to enclose the following information with tenders:

- Environment policy;
- Public environment report;
- How raw materials are sourced, transported and used;
- Vehicles and fuels used for transport;
- Types and volumes of packaging and the percentage accepted for recycling.

³ The Taj Group of Hotels operates over 60 hotels in India and 8 other countries.

⁴ This paper, a traditional craft industry in India, is made from a mixture of jute, choir and cotton, and recycled paper.



ENVIRONMENT MANAGEMENT PROGRAMME FOR EMISSIONS CONTROL

Emissions from hospitality facilities are mainly emissions from vehicles and from the burning of fossil fuels used for space and water heating and cooking.

Regular maintenance checks should be conducted on boilers and generators. Filters and scrubbers should be fitted to exhaust fans, and be regularly cleaned and maintained. Local legislation on emission standards should be consulted before control devices are installed.

The use of vehicles, boilers and generators that can operate on ethanol blends and bio diesel should also be considered.

Some Facts About Bio-Fuels

(From the Argonne National Laboratory, Canada, 1997)

The use of 85%-ethanol-blended fuels has been shown to reduce greenhouse gas emissions by 30-36%. A 10%-ethanol blend results in a 25-30% reduction in carbon monoxide emissions (by promoting a more complete combustion of the fuel) and a 6-10% net reduction of CO2. In addition, as ethanol oxygenates the fuel, there is a roughly 7% decrease in exhaust VOCs emitted from low-level ethanol-blended fuels compared with fossil fuels. In high-level blends, the potential for exhaust VOC reduction is 30% or more.

Examples of Good Practice

At the WelcomeGroup Mughal Sheraton, Agra, India, carbon monoxide and sulphur dioxide emissions from boilers are purified through scrubbers before being released. All fossil-fuel-operated equipment is maintained in good working condition to minimise carbon dioxide emissions.

The Sånga Säby Hotel, Study and Conference Centre, Svartsjö, Sweden, in association with the Swedish Ethanol Foundation, acquired the first rape methyl ester fuelled car in 1995. Today, all vehicles, tractors, boilers and some of the lawn mowers operate on rapeseed oil (the other lawn-mowers are powered by PV).



ENVIRONMENT MANAGEMENT PROGRAMME FOR MANAGING INDOOR AIR QUALITY

Indoor air pollutants include combustion gases such as carbon dioxide, nitrous oxides and hydrocarbons, tobacco smoke, VOCs, asbestos, ozone, dust and particles, CFCs and radon.

The worldwide ban on the manufacture of CFCs came into effect in 1999. The phasing-out of CFCs and other ozone-depleting substances used in the hospitality business merits detailed consideration, and is discussed in the following subsection of this unit. Detailed information on the management of ozone-depleting substances in the hospitality industry can be found in the UNEP DTIE publication, entitled *How the Hotel Industry can Help Protect the Ozone Layer*, in 1998.

Indoor environment quality depends on specific pollutants and their levels of concentration inside the building. Monitoring air quality will give the most accurate picture of the types and concentration of pollutants in the air. This requires specialist help and equipment that may not be available in-house.

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Monitoring must be conducted over a long period to enable a range of data to be collected. A single monitoring attempt will not give a correct estimate of air quality, for pollution levels will vary at different times of the day and year, being influenced by weather conditions, activity levels and the air quality of the outside environment.

Whether or not monitoring is undertaken, efforts to improve indoor air quality are best begun by reducing the following emissions:

- Carbon monoxide arising from incomplete combustion of fossil fuels;
- Carbon dioxide arising from combustion and exhalation;
- Humidity arising from human activity;
- Over- or under-ventilation;
- Ozone drawn in from outside and as secondary emissions from; fluorescent lights and photocopiers;
- Nitrous oxides from gas burner stoves;
- Tobacco smoke.

Good Housekeeping and Maintenance Options for Maintaining Indoor Air Quality

The first step is to regulate the changeover of air according to the number of occupants, concentration of pollutants in the air, level of activity and climate conditions. In a typical hotel in a moderate climate one change of air per hour is suitable for bedrooms, 5 per hour for offices, reception and lobby, and up to 20 per hour in kitchens, laundries and garages.

Exterior sections of the ventilating system should be kept clean and free of obstructions to airflow. This is vital to ensure that stale air does not re-circulate back into the ventilation system. Boilers, stoves and generators should be kept in good repair and vents and filters should be cleaned regularly. Filter replacement should be carried out according to the manufacturer's instructions.

Retrofit Options for Maintaining Indoor Air Quality

- In hot climates, a ceiling fan and an open window are less energyintensive options than air conditioning;
- For buildings with no central ventilation system, window or wall type room air-conditioning units can be fitted on external windows or on wall areas where increased ventilation is required;
- Low-VOC paints, adhesives and varnishes should be used when redecorating. Formaldehyde building insulation should be avoided;
- If the building contains asbestos, specialist advice is essential. Asbestos releases fibres into the surrounding air, and if inhaled, this can be carcinogenic. If the fibres have deteriorated or are damaged, they must be removed or encapsulated and the affected part of the building must be evacuated until this has been done.

Longer-Term Options for Maintaining Indoor Air Quality

Employee and guest complaints about indoor air quality can be recorded and studied over time to identify regular patterns or sources. For example, if more complaints come from people spending time in newly decorated areas, it could mean a problem with VOC emissions from building materials. If employees working in areas near busy garages and roads report dizziness, it could be caused by continued exposure to higher levels of carbon monoxide and carbon dioxide.

Examples of Good Practice

The Tampere Hall Concert and Conference Centre, Tampere, Finland, adjusts air-conditioning during concerts and meetings according to load levels. Staff responsible for air-conditioning circulate in the halls with carbon dioxide meters and increase or decrease air-conditioning as required.

At the Maurya Sheraton Hotel and Towers, New Delhi, India, 'ozoniers' are installed in guest rooms to improve indoor air quality. These devices (sometimes referred to as 'aranisers') energise the oxygen in the air. Energised oxygen accelerates the breakdown of odours, pollutants and many other harmful substances.

COMMON QUESTION What is an araniser?

Air is purified naturally in several ways. The most frequent is during a thunderstorm, when the build-up of energy before a lightening strike charges the oxygen in the air. The charged oxygen reacts with contaminants in the air and destroys them. This process is partly why the air smells so clean and fresh after a storm.

An araniser creates an energy corona, a simulation of the natural phenomenon. It selectively separates the molecules of oxygen in the surrounding atmosphere and regroups them into 'free' nascent atoms of oxygen. These groupings have more power to combat pollutants.



ENVIRONMENT MANAGEMENT PROGRAMME FOR THE MANAGEMENT OF OZONE-DEPLETING SUBSTANCES

The main uses of ODS in hospitality businesses are:

- Refrigerators, freezers including cold display cabinets, mini-bars, ice and vending machines, in which CFC-11, CFC-12 and CFC-114 may be used as refrigerants;
- Air-conditioning in buildings and vehicles in which CFC-11 and CFC-12 may be used as refrigerants;
- Dry-cleaning equipment which uses CFC-113 and methyl chloroform;
- CFC-11, CFC-12, CFC-113, and CFC-114 are used as blowing agents in the manufacture of plastic foams. Foams are used in hospitality for packaging, upholstery, pipe insulation, cushions, car interiors and carpet underlay;
- Halon-1211, Halon-2402 and Halon-1301 are used in fixed and portable fire extinguishers.

ODS Management in Refrigerators and Freezers

Discontinuing the use of ODS in refrigeration includes containment, recycling, retrofitting, and replacement.

• Containment means regular maintenance to prevent refrigerant leakage and thereby avoid the need to recharge or 'top-up' the system;

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- When 'recycling', a refrigerant may be removed from one system to another at the end of the service life of the first;
- Retrofitting involves replacing the refrigerant but not the equipment;
- Low- or zero-ODS refrigerants should be used to replace older equipment. Low- or zero-ODS models offer the added benefit of higher energy efficiency.

There are various specifications to consider in recycling and retrofitting refrigerants. They concern the refrigerant, the type of equipment, and the low- or zero-ODS substitute chemicals available. The advice of refrigerant specialists should be obtained.

ODS Management in Air-Conditioning

Feasible options are containment, retrofitting and replacement.

- Containment means regular equipment maintenance to prevent refrigerant leaks and optimise efficiency;
- Retrofitting involves replacing the original CFC-11 or CFC-12 refrigerants with more environmentally-suitable alternatives such as HCFC-123 or HFC-134a;
- Older equipment can be replaced with new equipment using low- or zero-ODS refrigerants.

ODS Management in Dry Cleaning

The best option in the case of ODS-containing dry-cleaning equipment is regular maintenance to avoid leaks, and working with suppliers to facilitate solvent recycling and recovery. When replacing equipment, suppliers should be consulted on zero-ODS alternatives.

Good Practice Tip

If dry-cleaning quantities are small, an economically and environmentally feasible solution could be to sub-contract to a dry-cleaning specialist working with zero-ODS solvents.

ODS Management in Fire-Extinguishers

As long as the halons in a fire extinguisher remain contained in the extinguisher and are not discharged, they do not contribute to the depletion of the ozone layer. Equipment should therefore be checked for leaks. Once the contents have been discharged or the extinguishers become redundant, they should be replaced with zero-ODS alternatives, which include dry carbon dioxide powder and foam appliances.

Halons in redundant equipment can be recycled at halon banks. National ozone units can provide information on halon recycling in each country. When replacing extinguishers it is important to consider optimising fire-extinguishing capacity. Employee and guest safety should never be compromised.

Managing ODS in Aerosols and Foams

With aerosols and foams, it is best to switch to zero-ODS alternatives as soon as current stocks have been used. Zero-ODS alternatives include natural fibre-based materials to replace foams, and pump-action or refillable spray cans to replace aerosols.

Examples of Good Practice

At the Steigenberger Kurhaus, Amsterdam, The Netherlands, all refrigeration systems are CFC-free. Refrigeration experts carried out the disposal of old equipment, to ensure that no CFCs leaked or evaporated during the process.

The Park Sheraton, Madras, India has installed zero-ODS refrigerators, walk-in cold rooms and deep-freezers. The CFC-11-based central air-conditioning unit has also been replaced with zero-ODS alternatives. Aerosol spray cans have been replaced with pump action sprays. Dry-cleaning machines now operate on perchlorethylene, which is not an ODS. Foam insulation has been replaced with natural materials. After working with suppliers and implementing a waste management plan, styrofoam packaging is no longer used and the use of styrofoam cups has been discontinued.

The Renaissance Jamaica Grand Resort, Ocho Rios, Jamaica, has replaced the old chiller with an HFC-134A-operated 350-tonne chiller which brings added benefits in terms of energy efficiency, 0.50 kw/tonne.



ENVIRONMENT MANAGEMENT PROGRAMME FOR NOISE MANAGEMENT

Good housekeeping options for noise management

- Ensure all doors are kept closed, especially those in noisy areas;
- Investigate if more regular maintenance will help reduce noise levels from appliances and equipment;
- Check if changes in operating procedures can help reduce noise
- Require delivery and waste-removal vehicles to switch off their engines while loading and unloading;
- Use rubber mountings to soundproof isolated machines;
- Work towards eliminating false fire alarms;
- At night, switch off machinery located near guest rooms;
- Ensure that ear protection is worn by employees involved in very noisy work.

Repair and retrofit options for noise management

- Install quieter motors and fans in equipment;
- Use sound-absorbing devices to enclose entrances to noisy areas and equipment;
- Install noise-controllers on air-cooling openings;
- Encapsulate machinery with damping materials (e.g. elastic panel mounting);
- Install reinforced foundations for heavy equipment;
- Install automatic door closing in guest rooms;

- Use mini-bars with absorber refrigerators rather than compressors;
- Install double-glazed windows;
- Install quiet toilet-flush tanks (that also use less water).

Refurbishment options for noise management

Together with architects and engineers, look into property design and construction improvements, such as:

- Installing sound-absorbing inner walls, or insulating walls and floors; with mineral wool, fibreglass or rubber;
- Use of sound-absorbing building materials.

INTERNAL ENVIRONMENT COMMUNICATION, DELEGATION AND TRAINING



If an environment management programme is to be successful, employees must be motivated and trained to integrate reducing resource use and waste into daily operating procedures. In tourism and hospitality, it is the employees who are in contact with the customer, who create the experience, and who deliver the service. If they are well informed and motivated to achieve environment objectives, this will reflect in their working practices and improve service quality.

Employees are also the hospitality industry's biggest public relations instruments. They are the best placed to inform visitors of the business's environment policies. This will in turn enhance corporate image and reputation.

Well-trained employees can identify problem areas and suggest improvements more effectively than external consultants and managers.



Action Checklist on Internal Communication, Delegation and Training

- The environment status review can be used to inform employees of the company's environment commitment and that an environment management programme is in the pipeline.
- Once the environment policy has been established, it should be communicated to all staff, posted on notice boards, enclosed in internal newsletters, and announced at staff meetings. An informal meeting might be organised to mark the launch of the environment effort.
- Delegation and training become critical during implementation of the environment programme. Environment responsibility should be integrated at all levels and in all job descriptions. Delegation is best done within the formal management hierarchy and existing reporting lines.

1	The environment champion and the management team should serve as the central co-ordination unit.
✓	The environment management team should include a representative from each department, with responsibility for ensuring that the environment management programme is implemented in that department.
√	Establishing departmental environment performance targets facilitates delegation of responsibility. For example, F & B departments could be required to reduce packaging waste by 20%, and housekeeping to reduce the use of toxic cleaners by 40%.
√	On-the-job training, supported by training instruction sheets in the case of complex technical work, is most suitable for integrating environment action into hospitality practices. Managers, supervisors, or external trainers could conduct this training. To support training efforts, informal seminars and poster displays could be organised.
1	 Training programmes should be developed to inform and demonstrate to employees: What should be done; How it should be done this way; How often it should be done (daily, weekly, monthly); Potential difficulties and how they can be rectified; What the expected results of their actions are.
1	Senior management should show leadership. Small actions such as switching off lights, using both sides of office paper and separating waste are good ways to demonstrate that environment management is a serious effort and has company commitment.
1	Networking is important. Businesses should participate in local environment initiatives such as round tables, industry partnerships, tree planting and wildlife conservation initiatives.
✓	It is also good to subscribe to a few business and environment journals. This helps the environment champion and the management team to gain a deeper understanding of environment issues and how other businesses handle them.
✓	As the environment management programme gets underway, employees should be kept informed of progress, with reports and monitoring sheets posted up, announced at staff meetings, and featured in internal newsletters. This will help reinforce responsibility and motivation. Employee morale may increase as staff come to realise

they are working for a business that is concerned about working comfort, safety and

 Participation in the environment management programme should be a criterion for performance evaluation. 'Good environment ideas' and 'outstanding environment contributions' could be rewarded with prizes. Some hotels organise 'Green Employee

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UNIT 4: ENVIRONMENT MANAGEMENT SYSTEMS

environment improvement.

of the Month/Year' competitions.

Examples of Good Practice

The Taj Group of Hotels, India, has developed an in-house environment 'train the trainers' programme. Department heads and all senior-level staff are trained for two days on conducting environment awareness, resource consumption, waste reduction and environment performance monitoring classes for all staff in their respective units. Resource consumption training includes water and energy auditing procedures, cost-benefit analysis, benchmarking against international standards, energy and water conservation strategies, and building employee awareness on water and energy conservation. Training in waste reduction is based on the '3 Rs' – reduce, reuse, and recycle. The rationale of this programme is that increased environment awareness will raise commitment, enthusiasm, and participation in the EMS.

Senior staff are encouraged to attend the environment leadership-training programme conducted by the Indian Institute of Hotel Management.

The EcoTaj Environment Information Centre in Bangalore, India, has an EMS and conservation library and resource centre for the use of all employees. An in-house environment magazine is circulated to all units and employees.

All new employees undergo an environment-training programme as part of their induction.

COMMUNICATING ENVIRONMENT PERFORMANCE TO GUESTS

There is little point in implementing an excellent environment action plan if clients are not told about it. Guest communication is critical to optimise the business benefits of the EMS.

The preliminary environment status review provides initial insight into the environment awareness and demands of clients. If a business works with travel agents and tour operators who have environment policies, and if competitors have begun to work on EMS, it is likely that visitors will be receptive to environmentally responsible services. But even when environment action is not widespread, a business can enhance its corporate image by becoming a pioneer in environment action.

Suggestions for Environment Communication Methods

- Hang a framed copy of the environment policy statement in reception;
- Include the environment policy and information about the on-going environment management programme in brochures, guest information packages, and on the in-house television channel;
- Place tent cards suggesting guests use towels and linen for longer;
- Tell guests about the importance of saving water and energy, and reducing wastes;
- Provide information on local environment issues;
- Invite guests to participate in local conservation efforts;
- Suggest how guests might participate in maintaining and improving environment quality, both during their stay and when they get home.

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Good Practice Tip

A business should never indulge in 'green-wash' or false environment claims. Care must be taken not to blow achievements out of proportion. If the business has a major environment impact, it is best not to draw attention to it before rectifying action is in place. There are many groups interested in the environment performance of businesses, including environment groups, non-government organisations, regulators, and competitors. While transparency is important, false green claims are always found out: this can seriously damage the reputation and credibility of the business.

Examples of Good Practice

The Hotel Inter-Continental, Sydney, Australia, organises regular service information sessions for corporate clients, to inform them of new packages and services available. Information on environment performance is always included in these sessions.

The Royal Castle Hotel in Dartmouth, Devonshire, UK, actively discourages guests from using their cars while on holiday. Vehicles are parked free of charge on arrival, and guests are provided with a wide choice of activities that can be done by bicycle, in group tours, on foot or by public transport. Guests arriving by public transport are picked up free of charge. An information leaflet, '20 Things To Do Without Your Car in Dartmouth and Devonshire', is included in the guest brochure. A tent card outlining the Royal Castle's environment commitment, and the in-house environment newsletter 'Green Matters' are placed in rooms.

The Hilton Batang Ai Longhouse Resort, Sarawak, East Malaysia, informs guests about its eco-friendly practices through formal presentations and informal chats. As a further incentive to adopt environmentally-friendly habits, the Housekeeping Department places a thank-you note in rooms whenever guests reuse their towels. Guests who write to the resort commenting on environment practices or giving suggestions are always acknowledged.

Examples of Good Practice Communicating Environmental Performance

An important spin-off from EMS is environment improvement not just within the business, but also in the surrounding neighbourhood and community. Consider the following examples:

The Hotel Inter-Continental Sydney, Australia, cooperates in conducting environment training and networking programmes with:

- The Green Jobs Unit of the State Department of Employment, Education and Training;
- The University of New South Wales;
- Hotel schools in Sydney;
- The Taronga Zoo;
- Other hotels in Australia and overseas.

The EMS of the Hotel Nikko Hong Kong is used as a practical study programme for final-year students of the Department of Building Services of the Hong Kong Polytechnic University.

- The partnership began in 1992 when the students performed an audit on the hotel's water and energy consumption and indoor air quality;
- In 1996, the hotel created an annual environment prize awarded to the final-year student of the Department of Building Services of Hong Kong Polytechnic University who demonstrates outstanding performance: a certificate, a trophy, and a scholarship worth HK\$5,000;
- In 1997 the hotel and the Hong Kong Polytechnic University published 'A Guide to Energy and Water Conservation in Hotels', a practical guide for managers and engineering staff based on experiences gained from auditing hotels in Hong Kong;
- The hotel is currently working with Hong Kong Polytechnic University to develop training materials to assist the entire Hong Kong hotel and catering industry to implement EMS and work towards ISO 14000 certification;
- The Hotel is a sponsor of the Hong Kong Annual Business and Industry Conference and participates in tree-planting efforts and fund-raising activities for environment charities.

Eco Paradiso Hotel, Playa del Carmen, Quintana Roo, Mexico, collaborates with inhabitants of the neighbouring town, Celestun, in:

- Developing and updating an ecology information brochure made available to visitors;
- Conducting an ecology training programme for tour guides, all from surrounding villages.

The Casuarina Beach Club in Barbados has won an award for its continuing contributions to the St Lawrence community. The hotel has adopted a school, and sponsors and participates beach clean-up activities and tree-planting efforts. The hotel has also begun a turtle-watch programme involving guests and local people in protecting the nesting areas, observing turtle behaviour and, if necessary, assisting hatchlings to reach the ocean unharmed.

MONITORING AND DOCUMENTING THE PROGRESS OF THE ENVIRONMENT MANAGEMENT PROGRAMME



'You cannot manage what you cannot measure.'

Monitoring and documenting on-going environment performance will enable businesses to:

- Assess whether targets and objectives are being met;
- Identify plans that are not being successfully implemented;
- Identify the corrective and preventive actions needed to improve performance.

Monitoring should be regular. A standardised environment-monitoring format helps standardise data-collection and record-keeping across the company. The following is an example of a monitoring format used for documenting water and energy consumption.

WATER AND ENERGY CONSUMPTION								
Date	Consumption		Consumption Costs	Meter Readings	Comments			
	Actual	Targeted	% Variance					
Total								

Examples of Good Practice

Environment performance monitoring at the Steigenberger Kurhaus, Amsterdam, The Netherlands involves weekly and monthly reading of meters and checks of water and energy use, and volumes of waste handed to contractors. Waste contractors report twice a month on quantities of separated waste collected and estimated percentage of waste recycled. The results are reported at staff meetings.

The Taj Residency, Indore, India, has sub-metered all the different areas of the hotel to allow for monitoring water, fuel and energy consumption, and effluent and emissions output per department. Waste volumes of the entire property are monitored collectively. Department heads evaluate costs and benefits every three months.

At the Hotel Inter-Continental in Sydney, a detailed energy, water and waste (including emissions) monitoring exercise is carried out every three months.

EMS STAGE 4: CONDUCTING THE EMS AUDIT AND REPORTING ON ENVIRONMENT PERFORMANCE

4.1 Environment Management System (EMS) Audit

The Environment Audit is necessary to:

- Verify the effectiveness of the environment management programme;
- Ensure that environment objectives and targets are being met;
- Evaluate how the EMS should be modified and expanded in the context of future business expansion, new environment legislation, emerging environment issues, and the growth of the tourism and hospitality industry as a whole.

The ISO 14000 series on environment management include three standards that provide guidance on environment auditing:

- ISO 14010 Guidelines for Environment Auditing; General Principles;
- ISO 14011 Guidelines for Environment Auditing; Audit Procedures; Auditing of Environment Management Systems;
- ISO 14012 Guidelines for Environment Auditing; Qualification Criteria for Environment Auditors.

EMS audits are generally conducted every one or two years. An audit can be performed by the internal environment management team, by an external environment auditor, or through a joint internal and external effort. In selecting auditors, it is important to bear in mind the following:

- The auditors should have a good appreciation of environment management systems and issues. ISO 14012 outlines specific criteria for environment auditors.
- The reliability of the audit is important. Auditors should be independent of the activities they audit. In other words, people cannot be asked to audit activities they have been working on, or the activities of their own department.

What Should an EMS Audit Produce?

An EMS audit should answer these questions:

- Is the environment management system complete?
- Have objectives and targets been set?
- Does the environment management programme cover all aspects of business activity? In hospitality businesses this includes front and back office, food and beverage, kitchens, housekeeping, laundry, maintenance, banqueting, conference centre, visitor centre, retail outlets (pastry shops, gift shops etc), business centre, sports and leisure facilities, gardens, transport and administration.

- Is information on environment performance communicated to employees?
- Are there adequate procedures for corrective action?
- Are environment practices integrated into daily operations?
- Is environment performance being monitored and documented?
- Does there appear to be a commitment to continuous improvement?
- Is the environment management system well implemented?

The best evidence of good implementation is the level of environment improvement. Other evidence can be found in resource and material use records, data sheets on waste and emissions, training instruction sheets, visitor comments, fines imposed, accident records, and equipment maintenance records.

 Is the environment management system sufficient to achieve objectives and targets? The best evidence of this is the variance between actual environment performance and the set objectives and targets.

Audit Procedures

The following audit procedures are based on the recommendations of ISO 14011:

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- Determine the objectives of the audit and which sites and activities are to be audited. This is especially important for larger businesses, where several offices and operating sites may need to be audited;
- Establish priority areas and issues of confidentiality;
- Start with an opening meeting at which the scope, objectives and procedure of the audit are confirmed and the necessary resources obtained;
- Carry out the audit in consultation of environment performance monitoring documents (described earlier), interviews and site visits;
- Assess information quality best done by comparing recorded performance data with results of interviews and observations made during site visits;
- Compile the findings into an audit report;
- Present the audit report to company management and the environment management team at a closing meeting.

4.2 Reporting on Environment Performance

A corporate environment report communicates to all stakeholders the company's environment performance over a given period. It is a key indicator of the business's environment commitment and an important tool for building dialogue and communication with local communities, legislators and non-government organisations.

Corporate environment reports detail the results of the EMS. They also catalyse environment action across the company, validate the efforts of environment managers and increase support for environment improvement.

The target audiences for information on corporate environment performance include employees, shareholders, legislators, customers, bankers, insurers, local

communities, environment organisations, suppliers, trade and industry partners, and the public at large.

Environment performance can be reported through a variety of methods – newsletter, press release, a section in the annual financial report, or a stand-alone corporate environment report.

National environment legislation has made such reporting mandatory for some industry sectors in Europe and North America. It is also mandatory under the EU Management and Audit Scheme (EMAS).

Over a hundred of the world's leading companies and over 600 smaller ones report on environment performance. Some report annually, others every 2 or 3 years with annual interim updates.

Within the tourism and hospitality sector, major airlines, passenger transport companies, hotel chains and the larger leisure and entertainment providers report on environment performance. The Sånga Säby Hotel, Study and Conference Centre, Svartsjö, Sweden was perhaps the first independent hospitality business to report annually.

Contents of a Corporate Environment Report

A corporate environment report communicates the company's environment-related performance over a given period. It reports on the:

- Environment policy;
- Objectives and targets;
- EMS implementation and results;
- Areas of environment performance which have improved or deteriorated;
- Objectives and targets realised;
- Compliance and fines;
- Accidents, emergency response, occupational illness;
- Environment improvement efforts in the local community and participation in industry networks and partnerships;
- EMS improvement plans for the future.

It is good practice for the environment report to include a statement from an independent environment verifier on the accuracy of the information contained in the report. Such verification is a mandatory requirement of the EU EMAS regulation and an optional requirement of ISO 14001.

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SECTION 3: DEPARTMENT CHECKLISTS ON ENVIRONMENT MANAGEMENT

The environment management programme was discussed under the action areas: water and wastewater, energy, waste, purchasing environmentally-preferable products, emissions, indoor air quality, noise, internal communication and training, visitor communication, and monitoring and documenting the progress of the environment management programme. These actions will now be briefly recapitulated as department checklists.

ENVIRONMENT MANAGEMENT CHECKLIST FOR ROOMS, HOUSEKEEPING AND FRONT OFFICE

- Train staff to use less hot water and electricity when cleaning;
- Use water-saving devices such as aerators, low-flush valves, low-flow showerheads, waterless urinals, toilet dams, etc;
- Avoid rinsing under running taps use buckets or bowls instead;
- Run washing machines only when full;
- Place tent cards in rooms inviting guests to save water and energy;
- Use energy-saving 'fob' and 'link' controls;
- Fit energy-saving light-bulbs and translucent lampshades;
- Use hot/cold water mixes in all outlets;
- Avoid placing furniture in front of heaters and air-conditioners;
- Maintain hot water in taps at 50°C;
- Open and close curtains to maximise and minimise heat gain as required;
- Separate waste for recycling;
- Purchase reusable, recyclable, less toxic, biodegradable and lightly packaged products;
- Avoid individual toiletries use bulk dispensers instead;
- Avoid disposable products;
- Reuse old linen, containers, and left-over guest stationary;
- Train staff in environment-related actions and keep them informed about environment progress;
- Co-operate with, and report repair needs to, engineering and maintenance departments;
- Keep proper records of environment performance.

ENVIRONMENT MANAGEMENT CHECKLIST FOR ADMINISTRATION, PURCHASING AND BACK OFFICE

- Train staff in water and energy conservation and waste reduction and separation;
- Separate waste;
- Keep abreast of environment news, including changes in legislation, tariffs and charges;
- Switch off equipment and lights when not required;
- Use energy-saving lighting;
- Implement environmental purchasing policies;
- Give preference to environmentally certified products and those with less packaging;
- Give preference to stronger, longer-lasting products;

- Invite suppliers to suggest environment-preferable alternatives;
- Make efforts to reduce paper and other office materials;
- Use energy-saving computers, copiers, fax machines etc;
- Recycle toner cartridges;
- Install individual thermostats on heaters and coolers;
- Co-operate with and report repair needs and malfunctions to engineering and maintenance departments;
- Communicate environment achievements to visitors, stakeholders, the local community and the wider public;
- Monitor resource use and waste output;
- Maintain records on environment performance.

ENVIRONMENT MANAGEMENT CHECKLIST FOR FOOD AND BEVERAGE AND KITCHENS

- Train staff in energy and water conservation;
- Separate waste, including organic waste, fats and oils;
- Replace old equipment with more energy-efficient models;
- Defrost at room temperature, not in hot water;
- Avoid using ozone-depleting substances;
- Match pan size to burner size;
- Use biodegradable cleaning products;
- Install hot water mixers in all water outlets;
- Compost organic waste;
- Send food waste to pig farms;
- Fit grease traps on all effluent outlets;
- Ensure all equipment is in good working order;
- · Maintain sealing and stripping in cold rooms and refrigeration units;
- Invite suppliers to take back and reuse crates, pallets and other packaging;
- Minimise the use of disposable cutlery, crockery, and other such items;
- Highlight local specialities on menus;
- Buy in bulk and from local producers;
- Donate left-over food from buffets;
- Co-operate with and report repair needs and malfunctions to engineering and maintenance;
- Monitor resource use and waste output.

ENVIRONMENT MANAGEMENT CHECKLIST FOR GARDENS

- Water in the evening or early morning;
- Direct water flow directly to roots;
- Use drought-resistant, native plant species;
- Compost garden waste;
- Collect rainwater for watering;
- Avoid pesticides, insecticides and chemical fertilisers;
- Reduce lawn areas;
- Plant trees (including deciduous trees) to reduce heat gain during the summer and increase it during the winter;

- Look into PV-powered outdoor lighting;
- Co-operate with engineering and maintenance on EMS.

ENVIRONMENT MANAGEMENT CHECKLIST FOR POOLS

- Ensure adequate filtration and turnover of water;
- Experiment with water purification techniques other than chlorine;
- Maintain water temperature at around 29°C;
- Maintain indoor air temperature at the same temperature as, or slightly higher than, the pool water (up to 1°C);
- Maintain relative humidity at about 60%;
- A general guideline for ventilation for indoor pools is 4 to 6 changes of air per hour;
- Co-operate with engineering and maintenance on EMS.

ENVIRONMENT CHECKLIST FOR ENGINEERING AND MAINTENANCE

- Maintain water supply and distribution networks;
- Maintain energy and hot water distribution networks;
- Review insulation over the property, including hot water pipes;
- Check feasibility of wastewater treatment and reuse on-site ;
- Look into automatic load-shedding systems;
- Install building management systems together with timers, TVRs, and thermostats on all equipment;

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- Look into possibilities of heat recovery and CHP applications;
- Ensure energy and power controls are set according to levels of activity and climate considerations;
- Explore possibilities for the use of renewable energy sources onsite;
- Inquire into purchasing 'green' electricity generated from renewable energy sources;
- Inquire into calibrated water supply systems;
- Install water-saving devices in all outlets;
- Ensure adequate changeover on indoor air;
- Ensure the good working order of all equipment;
- Ensure that fans, vents and filters are clean and in good condition;
- Provide for the safe storage and disposal of hazardous waste;
- Use non-halon fire extinguishers;
- Ensure all vehicles are in good working order;
- Work on the sub-metering of different areas of the property to improve in-house data accuracy;
- Eliminate ODSs in refrigeration and air-conditioning;
- Seal gaps in windows and door frames;
- Monitor water, fuel, power use and indoor air quality;
- Use environment-preferable building materials during refurbishment and renovation;
- Co-operate with other departments in EMS management and monitoring.

1. Turtle Island, Yasawas, Fiji

The 500-acre Turtle Island, also known as Nanuya Levu, is part of the Yasawa Island group, a chain of small islands located approximately fifty miles northwest of one of the two main Fiji islands, Viti Levu.

In 1972, Richard Evanson took over the over-grazed island and initiated an intense reforestation programme: over the past 25 years, Evanson has focused on reviving the island's fragile ecosystem by planting more than a quarter of a million trees and encouraging wildlife to re-establish itself. The island is now a luxury resort complete with secluded private beaches and fifteen thatched, hand-built Fijian-style beachside cottages (bures), and is home to 160 local inhabitants.

WATER

- While the quality of the water on the Island is good, the quantity is limited. Guests are encouraged to save water wherever possible by having short showers and by not requiring their towels to be washed every day;
- Each bure is fitted with water saving showerheads;
- The three-acre, organic vegetable and herb garden depends on a drip-feed watering system rather than a spray watering one, which minimises mid-air evaporation;
- Waste water is treated through an on-site treatment facility. The waste water is first pumped into sceptic tanks, where preliminary sedimentation takes place (heavy particles are allowed to sink to the bottom). Waste water is then introduced to grass-covered leach fields. Residue sediment is dried and used as fertilizer for forestry.

ENERGY

- Hot water is generated through solar hot water panels, situated on the roofs of all relevant buildings. Each bure has its own hot water panel, as does the kitchen, laundry and administration area;
- Outdoor photovoltaic lighting is used to light paths and walkways at night;
- All bures are fitted with low voltage lights;
- The drying room is heated by a co-generation unit which operates on waste heat generated by the resort's diesel generators. The drying room is located next to the diesel generator and receives warm air from the generator's radiator through a 60 centimetre square, sheet metal duct. The air escapes through the roof or the door at the end of the drying room, thereby preventing heat build-up. The drying room provides enough space to dry about 200 sheets at any one time. Harnessing this otherwise wasted energy is estimated to save AUS\$5000 a year on energy costs.

WASTE

 Solid waste is separated into type – petroleum-based waste, metals, glass, plastics, organic kitchen waste and plant cuttings – at the time of disposal;







- Hazardous materials, such as batteries, are shipped to the mainland for recycling;
- All plant waste is fed into a high-powered chipper to create compost. This is stored in large heaps to enable bacteria to heat the compost and increase the rate at which it is converted to useful organic humus. This takes about seven months. The compost is then used as a soil enhancement in tree planting around the island and in the vegetable garden.

MONITORING





TRAINING AND MOTIVATING EMPLOYEES

- Environmental awareness programmes and training are constantly being developed to ensure that all staff understand the importance of their surroundings;
- Environmental meetings take place on a daily basis, and a scheme to award those staff who show the greatest initiative in regard to environmental conduct is currently being implemented.

COMMUNICATION



SEA TURTLES

Between the coral reef and shore lies the lagoon, a shallow but rich area of marine life. In the "Blue Lagoon" facing the western side of Turtle swim hawksbill turtles, green turtles and manta rays. The staff of Turtle Island pay local Fijian fishermen a fee for any sea turtles delivered live. The shell is then scratched by Turtle staff and so becomes valueless to poachers and souvenir seekers. (No harm is done to the turtles in this process; it is just cosmetic.) These endangered turtles then have more of a chance to survive. In deeper waters cruise coral trout, swift barracuda, wahoo, mahi mahi, dolphins, walu and the occasional pilot whale and billfish.

(Extract from brochure: "The Ecology and Culture of Turtle Island".)

• Guests are exposed to the Turtle's ecological activities even before setting foot on the Island though the resort's promotional material, and in most cases, arrive keen to learn more about their role in preserving the environment. Accordingly, they are offered a tour of the island's ecological zones and are encouraged to read the Environmental Audit, a copy of which is displayed in each bure.

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COMMUNITY ACTION

- The Turtle Island Community Foundation, a trust fund that goes towards the health, education and transportation for the local population, has been established;
- In 1990, a healthcare foundation for those who otherwise would not have had access to modern medicines, was established. Each year since, Turtle Island has hosted an eye clinic. A dental clinic and dermatology clinic have been set up in the same way, and there are plans to extend the eye clinic to other South Pacific islands and even to construct a permanent, state of the art hospital on the island in 2001/2.

CONTACT INFORMATION

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2. The Orchid Hotel, Mumbai, India

DESIGN

The 245-room, five star, ECOTEL-certified Orchid Hotel was designed from the outset with preservation of the environment in mind. Amongst the environmentally-preferable building materials used were fertilizer waste⁵, bricks containing 60% fly ash (a waste product of the power generation process from coal fired power plants), redundant rubber wood⁶ or medium density fibre wood (MDF)⁷.

Windows are triple glazed which prevents the sun's heat from entering and helps to conserve energy generated from air-conditioning: The reflective outer glass reduces heat load by 15 percent. The atrium provides natural lighting to the reception and lobby.

WATER

- Flow restrictors, low-flow showerheads and aerators have been installed in all guestrooms. Aerators reduce water usage from 200 litres per shower to 110 litres per shower, by restricting water flow;
- All rooms have been fitted with concealed cisterns which use only six litres of water per flush, as opposed to 15 – 20 litres used by conventional systems;
- Taps in the back of house are on timers;

These measures have collectively reduced annual water use from 782.6 litres per available room to 614.3 litres. Water savings as a result of using the aerators alone produce savings of U\$1,790 per year.

ENERGY

• Energy-efficient lamps are used, which provide as much light as ordinary bulbs, yet consume substantially less energy. A 10 Watt lamp is as bright as a 60 Watt incandescent bulb, yet the power consumption



⁵ The fertilizer waste is phospho gypsum from the phosphatic fertilizer plant.

⁶ After producing rubber sap, the tree is cut down and cannot be used for any constructive purpose thereafter, as the wood from the rubber tree is soft. This rubber wood can, however, be processed using timber preservative chemicals to ensure dimensional stability, thereby allowing it to be used in construction.

⁷ MDF is manufactured using cotton stalks. The cotton tree is cut down after yield and rendered useless. However, through an advanced manufacturing process, the waste stalks can be chipped, sieved, washed and cooked to produce medium density fibre wood, which has all the features of natural wood.





of the lamp is only 25 percent of that of an ordinary bulb. Room lights only come on when a key card is inserted;

- Mini-bars in guest rooms save up to 40 percent energy as they are equipped with 'fuzzy logic' which senses the load inside the refrigerator and cools it accordingly;
- Photovoltaic lighting is used for lighting the outdoor terrace;
- A master control panel, incorporating a unique feature, known as the 'green button', is installed in each guest room. On pressing this button, the thermostat of the air-conditioning unit is turned up by 2 degrees. The saving in electricity resulting from this 2 degrees increase in temperature is converted into rupees and displayed on guest folio. This money is then used for funding NGOs and environment-related programmes on a long term basis. Additionally, a certificate is issued to the guest who has voluntarily participated in conserving energy, and they are later informed by direct mail of the hotel's ongoing environmental activities.



"Eco button" from bedroom Master Control Panel

Total savings per year in heat, light, power and guest amenities costs have reached US\$152,471. Energy savings per available room are now 10 – 15 percent.

WASTE



- Virtually all in-room products are reusable or recyclable. For example, hangars are made from recycled sawdust and items such as pens and tissue boxes are made from chlorine-free cardboard and fibre wood respectively;
- Paper usage is kept to a minimum: Laundry is returned in reusable cloth laundry bags, newspapers are delivered on request in reusable cane baskets and no 'Do Not Disturb' or 'Make Up the Room' signs are used;
- Kitchen waste is treated in on-site vermiculture pits, which breaks down waste into compost;
- Waste water generated from the hotel amounts to approximately 120 kl per day. 90 – 95 kl of grey water is recycled at the on-site wastewater treatment plant, 30 kl of which is then used for gardening and airconditioning purposes.

Total savings in water purchasing costs per year have reached US\$13,440.

SUPPLIERS

- Preference is given to Indian-manufactured products and materials;
- Incoming packaging material has been reduced by 30%;
- Suppliers are regularly screened to ensure they fulfil the hotel's stringent environmental criteria;
- All suppliers must deliver goods in reusable and returnable crates;
- Suppliers are encouraged to offer their own innovative suggestions as to how packaging can be reduced.

TRAINING AND MOTIVATING EMPLOYEES

- Employees undergo a thorough environmental induction programme, with monthly refresher courses to ensure their conduct conforms to the hotel's eco-sensitive culture;
- Regular newsletters and site inspections also ensure staff are both informed of and behave according to the organisation's environmental policies.

COMMUNICATION

- Internal environmental performance is communicated to staff through internal e-mail and notice boards;
- · Guests are kept informed of environmental activities through a direct mailing system;
- The hotel spreads its environmental message externally through newsletters, electronic media, the organisation of conferences and seminars and by regularly reporting to its certifying body, ECOTEL;
- Staff also participate in events like World Environment Day and World Anti-Smoking Day through activities such as 'clean up drive', 'no plastic bag' and 'pollution under control' campaigns.

CONTRIBUTIONS TO THE LOCAL COMMUNITY

- In addition to training 140 temporary trainees and 71 apprentices, the hotel has created 430 new job opportunities for Indians living in and around the city of Mumbai;
- Prior to The Orchid's opening, there were no local suppliers who manufactured or traded eco-friendly products. Today, the hotel's persistence in educating, informing and negotiating with suppliers has resulted in the development of a fully-fledged industry supplying such products. This has generated further job opportunities within the local community;
- The Orchid promotes local culture and crafts wherever possible. Many guest supplies, for example, are produced by the local cottage industry, which has created employment opportunities for local craftspeople.

CONTACT INFORMATION

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3. Hotel Madhuban, Dehra Dun, India

DESIGN

When the Hotel Madhuban (42 rooms) was renovated a few years ago, windows were enlarged to allow more natural light to enter the building and old beams were dismantled, restored and reused. The additional timbers used were from authorised sustainable timber plantations. The roof of the hotel was painted with reflective paint to reduce heat gain.

WATER

- Grey water from the bathtubs and sinks is treated at the wastewater treatment plant located onsite. The treated water is used to water the lawns and gardens;
- Old toilet cisterns, which used 18-20 litres per flush, have been replaced with high-pressure flush cisterns that use 5-8 litres;
- Guests are given the choice of using their towels for more than one day.

These measures have collectively reduced water use by 40%. Waste water volumes have been reduced by 60%.

ENERGY

- A solar water heater has eliminated the use of coal-fired boilers to provide hot water;
- Hot water at the tap is limited to 45°C;
- Together with the installation of an energy-management system, lowenergy light bulbs are fitted in all areas of the hotel and motion detectors installed in corridors and some back-office areas;
- Master switches that turn off all power outlets are fitted in guestrooms. Air-conditioners are equipped with individual temperature controls.

These measures collectively have lowered energy costs by 30%.

WASTE

- Paper waste is shredded and sold to recycling dealers;
- Food waste, kitchen trimmings and garden waste are composted and used as fertiliser;
- Old linen is converted into cleaning cloths;
- Plastic laundry bags and paper napkins have been replaced with cloth ones;
- The larger deep-fat fryer has been replaced with 4 smaller fryers of different capacities, which reduce waste fat.

Waste disposal costs were reduced by 3,100 rupees in 1997. The replacement of the large deep-fat fryer has reduced waste fat by 40%.

PURCHASING

- Efforts are being made to buy in bulk;
- Packaging is returned to suppliers for reuse or sold to recycling dealers.

MONITORING

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The consumption of water, electricity, liquid petroleum gas, lubricant oils and cooking-fat is monitored weekly and comparisons are made with previous weeks and months. Allowances are made for fluctuations in occupancy and climate conditions.





TRAINING AND MOTIVATING EMPLOYEES

A competition for 'best environment employee' is held annually: the winner gets a cash prize and a certificate at a staff party.

COMMUNICATION

- Several environment awards and the 'Green Hotelier' certificate awarded by the International Hotel & Restaurant Association are displayed in the lobby;
- · Guests are informed of the hotel's EMS through an environment newsletter handed out at check-in, which also invites guests to reuse towels and switch off the power mater switch when leaving the room.

In keeping with our quest for a clean and healthy environment, we have discontinued the use of paper and plastic amenities. An effort is being made to replace the same with similar amenities derived from recyclable and environmental friendly materials.

While regretting any inconvenience that you may come across we look forward to your continued support and welcome your valuable suggestions which may prompt us to bring about improvements in the environment around us and make your stay at the Madhuban more

healthy and comfortable. Do let us know if you feel even a bit of bother, we'll surely try and do

something about it.

With regards,

(Manu Kochhar) President.

Hotel Madhuban

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4. Hotel Mocking Bird Hill, Port Antonio, Jamaica

DESIGN

This independent hotel was established in 1993 by converting a private villa into a hotel. During refurbishment, all original features of the villa were retained except for the small windows, which were replaced with larger ones to maximise natural light and ventilation. The only addition to the building was the gallery, which was built on slab columns rather than blasting rock to lay the foundation. The use of formaldehyde as a building material was avoided. Floors were tiled rather than carpeted to reduce heat gain and the need for vacuum cleaning. Furniture was made of Jamaican wicker and bamboo and the use of tropical hardwood avoided.

LANDSCAPING

- The hotel is built on a hill, the surrounding hillside terraced to minimise erosion. The soil washed down to the bottom of the hillside is reused for terracing;
- Pathways are gravel-paved to minimise run-off and allow rainwater to seep into the soil.

WATER

- Grey water from the kitchen, laundry and bathrooms is treated at the on-site wastewater treatment plant;
- The swimming-pool water is purified using solarpowered ionisation technology;
- Flow-reducing valves are installed on all toilet cisterns and washbasins;
- Linen is changed every three days and only towels 'dropped in the shower' are replaced;
- Rainwater is collected and used to supplement non-drinking needs.

ENERGY

- Passive solar design (through building orientation) and enlarged windows provide substantial light and cooling;
- A solar water-heating system provides hot water;
- Ceiling fans are used instead of air-conditioners in all areas;
- Guestrooms are not equipped with televisions or mini-bars;
- No dryers are used in the laundry;
- Motion-detectors are used to regulate all security lighting;
- Energy-saving light bulbs are fitted throughout;
- Exterior areas are lit by mercury vapour lamps;
- The use of extra-light linen reduces laundry weight and related water and energy consumption.

WASTE

- The following waste is separated for recycling: paper, glass plastic and cooking oils;
- Food and garden waste are composted;
- Individual guest toiletries have been replaced with wall dispensers;
- Laundry bags and napkins are made of cloth;



WHERE YOUR HEART WILL SING AND YOUR SOUL WILL FLY...







- The 'daily specials' menu is written on a blackboard in the restaurant, avoiding the printing of new menu sheets every day;
- Local fruits and flowers are used to garnish cocktails instead of disposable cocktail sticks;
- Picnic lunches are packed in reusable boxes;
- Beverages are bought in returnable deposit bottles;
- No aluminium paper and cling film are used;
- Only rechargeable batteries are used;
- Old linen is reused as cleaning cloths;
- The hotel makes its own jams, marmalades, bread, pasta and ice cream to minimise packaging waste.

PURCHASING

- There is an active policy to 'buy local' and 'buy environment';
- Products made of natural materials are given preference;
- PR and marketing brochures are printed on recycled, unbleached paper;
- All fresh produce is purchased from local farmers;
- No pesticides or insecticides are purchased;
- Washing powders are toxin- and phosphate-free;
- Baking soda, boric acid and vinegar are used for cleaning.

EMISSIONS

- Refrigeration equipment is CFC-free;
- All vehicles operate on lead-free petrol.

TRAINING AND MOTIVATING EMPLOYEES

- Employees are provided with on-the-job training to ensure that environment is well integrated into daily duties;
- · Managerial and supervisory level staff attend environment-training courses.

COMMUNICATION

- Hotel Mocking Bird Hill markets itself as a hotel managed with environment awareness and reports that nature-oriented tourists are an important part of its clientele;
- Information about on-going EMS and environment tips for visitors are included in the guest information brochure, which also contains information on Jamaican culture;
- Tent cards in guestrooms invite guests to save water and reuse towels.

CONTRIBUTIONS TO THE LOCAL COMMUNITY

For every nature-oriented tourist staying at the hotel, a donation is made to a local non-government environment organisation.

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5. Saunders Hotel Group, The Lennox and Copely Square Hotels, Boston USA

WATER



- Both hotels participate in the US Environment Protection Agencies' WAVE, a voluntary programme promoting water conservation in businesses;
- Low-flow showerheads, tap aerators, and low-water flush cisterns are installed in all bathrooms and toilets;
- A linen and towel reuse initiative is on-going;
- At the Lennox hotel, water-efficient washing machines and dishwashers filter the rinse water from one load and reuse it for the next.

The towel and linen reuse initiatives bring savings of over 3 million gallons of water and US\$35,000 in water, energy and detergent costs a year.

175,000 gallons of water (40% of total water used in the laundry) are conserved through water re-use technology. Associated water and energy-related cost savings are about US\$3,400 a year.

ENERGY

- Both hotels have retrofitted back-of-house and public areas with energy-efficient light bulbs;
- Motion-detectors are fitted in luggage rooms and storage areas;



- In guestrooms, signs above light switches remind guests to turn off lights when not required;
- An energy-management system has been installed at the Lennox Hotel, which provides for greater control heat, light and ventilation.

The Energy Management System at the Lennox Hotel brings savings of 88,000 kilowatt hours of electricity, US\$37,000 a year.

The lighting retrofits save about 52,000 kilowatt hours of electricity.

WASTE



- Cardboard, paper, telephone cards, glass, plastic, aluminium, steel, toner cartridges and fluorescent light bulbs are separated for recycling;
- The number of pages of all printed documents was reviewed and reduced. Nightly reports are not printed and are maintained only on computer;
- Old toilet fittings were sent for reuse as road-fill;
- Leftover food and old furniture is donated to shelters;
- At the Copely Square Hotel, wall-mounted dispensers have replaced individual guest toiletries.

33% of the hotel's waste stream is recycled, saving US\$16,000 a year. Reducing the volume of administrative reports and printed matter has saved US\$22,000 in paper strorage costs a year.

Wall-mounted dispensers for guest toiletries avoided wasting 272,222 one-ounce bottles a year.

In 1997, the hotels collectively recycled 22 tonnes of mixed paper including telephone directories, 35 tonnes of cardboard, 19 tonnes of glass, plastic and metals, and donated 45 tonnes of mattresses and furniture to shelters for the homeless.

PURCHASING

- There is an active policy to 'buy recycled';
- All regular purchases except fresh produce are made in bulk;
- Suppliers are asked to deliver all products in reduced or reusable packaging.

MONITORING

- The engineering department monitors gas, electricity and water use per occupied room every month;
- A weekly recycling review is conducted in every department;
- Environment performance data is posted on staff notice boards.

TRAINING AND MOTIVATING EMPLOYEES

The Saunders Group's environment policy and EMS are implemented through SHINE, the Saunders Hotels' Initiative for Nature and the Environment. SHINE is designed to gain the active participation of all staff, from 'green captains' and recycling co-ordinators who have direct environment management responsibility, to seasonal and part-time employees. In-house environment education, training and motivation efforts include:

- SHINE Questions of the Week;
- The Bella Terra Newsletter;
- Monthly eco-tours of the hotel;
- Quarterly departmental SHINE briefings;
- Awarding SHINE pins to employees who participate in over five eco-activities;
- Recognition of employees with 'bright environment ideas' and high achieving departments at an environment award ceremony;
- The annual painting of the Earth Day mural;
- Presenting all employees with an organic, unbleached cotton T-shirt on Earth Day;
- The annual SHINE Bowl, where the teams from all Saunders hotels compete against each other on the basis of their environment-oriented achievements and knowledge.

COMMUNICATION

- Copies of the Saunders Group environment policy and awards achieved are displayed in the lobby;
- Tent cards in guestrooms ask guests to switch off lights and reuse towels;
- Guests get a brochure entitled 'Planning for the Future', which details the environment efforts of the Saunders Group;
- Press releases are sent out on the Group's annual environment achievements.










OUR ENVIRONMENTAL ACTION PLAN

When The Copley Square Hotel celebrated it's 100th Anniversary in 1991, we placed a time capsule in the cornerstone of our building. One item, stored away for future generations, was our written commitment to protect and preserve natural resources. Here's a brief list of additional actions our employees have since put into place:

- **Employees** formed The Legacy Team to generate new environmental initiatives and to make them succeed.
- Our **housekeepers** offer you a choice to reuse towels and sheets a second time, saving water, energy and detergents. We also donate mattresses, bedsprings and linens to homeless shelters.
- In the **restaurants**, we have eliminated many disposable items, including single-serving coffee creamers, paper placemats and plastic cups. Food scraps are used as animal feed and glass and metal containers are recycled.
- Our **engineers** installed energy efficient lighting in many public spaces, and have retrofitted our toilets, showers and air conditioning systems to save water. They've even recycled the old porcelain toilet bowls into road gravel.
- Our **purchasing agent** buys products made from recycled materials to help strengthen the recycling market. We're a proud member of the Buy Recycled Business Alliance.
- At the **front desk** our new computer system prints only the reports we need, and we ask other companies to eliminate duplicate mailings; cutting paper waste in half.
- All **departments** pitch in with the recycling of cardboard, computer & office paper, newspaper & magazines, phone books; metal cans, glass bottles, kitchen grease, fluorescent light bulbs and laser toner cartridges.
- Our **communications** team designed eco-plaques for the guest rooms to help you, our guest; participate in this environmental effort.
- On Earth Day and throughout of the year, our **staff** participates in service, related projects, that help the environment and our community.

ENVIRONMENTAL POLICY

We have not inherited the earth for our ancestors, we are borrowing it from our children. Native American saying

All of us at The Copley Square Hotel are taking strides to make the world a cleaner, safer place for ourselves and our children. As Boston's oldest continually operated hotel, the creation of our comprehensive environmental campaign demonstrates our ongoing commitment to future generations.

During the implementation of our environmental program we will:

- Identify and take action in every area where waste can be reduced or recycled, energy and water conserved, and our guests and employees educated;
- Introduce new products and services which are safer for our environment, visitors, neighbors and fellow workers.
- Maintain the high standards for which we have earned AAA's three diamond rating and become known as "one of Boston's most affordable treasures".

By working together, we will all make a difference and will leave our children a planet that will heal and flourish.

TIPS FOR TREADING LIGHTLY IN YOUR TRAVELS

Traveling puts stress on us – and on our planet. Roughly 3,000,000 visitors stay in U.S. hotels each day. Imagine the combined water and energy used, and waste created by simple acts like showering, shopping and sightseeing. But you don't need to sacrifice comfort or convenience to be conservation-minded on the road. Here are some tips to make your traveling experience more enjoyable and more earth friendly too.

LEAVING HOME

- Pack a canvas bag if you plan to shop you won't need a new paper or plastic bag with every purchase.
- If you're driving make sure your car is well tuned and tires are fully inflated; you'll increase your gas mileage up to 15 %.

IN YOUR HOTEL ROOM

- Turn lights, television and air conditioners off when not needed.
- $\cdot \,$ Never use the toilet as a trash basket.
- Ask your room attendant to let you reuse your linens or towels a second night to reduce water, energy and detergent use.

DINING OUT

- Seek out local and organic foods being fresher and less processed they are better for you and will enhance your understanding of the local cuisine and culture.
- Taking out? Grab only the napkins, utensils or condiments that you need.
- Bring a reusable mug or cup that can be used over and over, at home and away.

GETTING AROUND

- Plan your day with a map that has public transit information.
- Walk to nearby destinations for fresh air, to stretch your legs and take in the local sights, sounds and smells.

ECO-ACTIVITIES

- Experience the natural environs: Rent a bike or sailboat, and visit a local waterfront, park or zoo.
- "Leave nothing but footprints, take nothing but photographs" and remember to reuse and recycle the plastic film containers.

ADVOCATE FOR THE ENVIRONMENT

- Vote with your dollars. Support "green" merchants & markets.
- Express your concerns about the environment via comment cards of in writing to the business that you patronize. Your voice does make a difference.

CONTRIBUTIONS TO THE LOCAL COMMUNITY

- The Saunders Group participates in Boston's annual Earth Day event;
- It is corporate policy to host environment conferences and organise environment tours of the hotel properties for schools, other businesses and interest groups.

"The SHINE initiative has enabled the Lennox and Copely Square Hotels to generate US\$120,000 from groups who have stayed in our hotels because of our visible environment commitment. Environment Management is good business."

Mr. Ted Saunders, Executive Vice President and Director of Environment Affairs

CONTACT INFORMATION
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Annually, our small actions have:

- Eliminated 37 tons of trash: over 35% of our waste stream.
- Saved 1,700,000 gallons of water.
- Eliminated 112,000 paper placemats, napkins, cups and butter packets.
- Saved 110,000 kwh of electricity, enough to power 30 houses for one year.
- Saved 175 adult trees via paper recycling.

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6. Hotel Kurrajong, Australia

Hotel Kurrajong was one of the three hotels originally constructed for the early parliament in Canberra in 1926. It has been extensively modernised since then, and now houses a hotel school as well as 26 double rooms, restaurant, bar, and several meeting rooms. The hotel-school facility is apart from the hotel and includes classrooms, training areas and accommodation for 120 students.

Hotel Kurrajong began working on EMS as a participant in the Cleaner Production Demonstration Project of Environment Australia, Environment Protection Group.

WATER



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- Dual-flush cisterns, reducing consumption by 6-7 litres per flush, are installed in all guest, student and staff toilets;
- Water-saving showerheads, limiting water flow to 12 litres per minute, are installed in all guest, student and staff bathrooms;
- Aerators reducing water flow to 5-6 litres per minute are fitted on all washbasins;
- A timer-controlled drip irrigation system is used to water the gardens;
- Storm water is collected and used to supplement garden water requirements;
- Guests are invited to reuse towels and only those 'dropped in the bath' are changed;
- For overnight guests, a limited linen change is proposed with only the top sheet being changed every other day.

At 70% occupancy, these water conservation measures have reduced flush and shower wastewater by 30%.

The towel and linen reuse programme has reduced laundry loads by 10%, saving 15 kilolitres of water a year.

Taking account concomitant reductions in washing powder and energy, savings amount to over AUS\$2,250 per year.

ENERGY



- Low-energy light bulbs are used in most public areas, classrooms, dormitories and back-office areas;
- Timers are fitted to all bathroom heaters;
- Motion-detectors are used to activate lighting in residential corridors;
- The temperature of hot water at tap is lowered, especially in the summer, from 45°C to 40°C, lowering boiler fuel-consumption.

The following energy inefficiencies were identified in a 1994-95 energy audit. Rectifying these measures was estimated to reduce energy use by at least 10%, with savings of around AUS\$18,000 a year. The payback period for the capital expenditure involved was estimated at 2 years. These measures are now being implemented.

- There was significant inefficiency in the computer-controlled main heating, lighting and ventilation unit. The software also needed upgrading;
- All areas of the hotel and hotel school were being cooled and heated even when unoccupied. The power distribution network needed to be

upgraded so that different sections of the property could be controlled separately and the power supply shut down when not needed;

- The kitchen exhaust fans were drawing air from the adjacent airconditioned rooms;
- High-energy incandescent lights were still being used in some guest rooms;
- Occupancy detectors could be fitted to lighting in additional areas such as the student dining rooms;
- The kitchen exhaust hoods and attached air fans needed upgrading to improve kitchen ventilation and reduce noise;
- During low occupancy periods, the cold rooms were underused. In addition, weighted automatic closures could be fitted to the doors to ensure they were never left open;
- The energy awareness of staff and students needed to be increased;
- An energy manager was needed to improve the energy-efficiency of the hotel and school, responsibilities to include monitoring fuel and electricity use, ensuring correct timer-switch settings, rationalising the use of the cold room, maintaining energy records, raising in-house energy awareness, recording student and guest meal numbers, and maintaining weather data;
- It was decided that final-year students would be selected to perform the role of energy manager.

WASTE

The following recyclable wastes are separated and sent for recycling:

- Plastic, brown, green and clear glass, corks, cardboard, office paper and newspaper;
- Vegetable and food scraps are composted;
- Non-recyclable waste such as chemical containers, soiled plastic and paper, tins, wax paper and broken kitchen implements are collected and disposed of separately;
- Guests have separate bins for paper and other general rubbish;
- Dispensers have replaced individual bathroom products.

The waste management effort has reduced, annually:

- Waste volumes by 40%;
- Landfill space by 570 m3;
- Waste disposal costs by AUS\$4,500.

Hotel Kurrajong also reports that:

- After the initial breaking-in period, the time taken for staff to segregate waste is negligible;
- The maintenance supervisor spends less than 3 hours a week overseeing the programme;
- Approximately 70% of recyclable waste is indeed being recycled. 100% of glass waste is recycled;
- Recycling efforts could be further improved through additional training for new staff.



PURCHASING



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• Preference is given to non-toxic and biodegradable products;

- Products containing phosphates, silicates, formaldehyde, solvents and acid alkali are not purchased;
- All disposable items bought are made from recycled materials;
- Suppliers are asked to use packaging that can be collected and reused.

VISITOR COMMUNICATION

- Hotel Kurrajong's 'Statement of Environment Commitment' is displayed in all guestrooms;
- Guests are invited to accept the limited linen and towel change and to switch off lights, heaters and coolers when not required.



TRAINING AND MOTIVATING EMPLOYEES AND STUDENTS

• Information on the environment management programme is included in the induction and orientation of new staff and students.

"It is our objective to make environment protection a norm, where 'being green' becomes second nature to staff and students. The value of our environment programme has been more than just cost savings and a marketing edge – it enables us to incorporate practical examples of environment management into the hotel school's teaching programmes."

Representative, Hotel Kurrajong

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7. The Severin Sea Lodge, Mombasa, Kenya

The Severin Sea Lodge is a 400-bedroom beach holiday and leisure complex. In 1999, the hotel began a 120-point environment action effort.

WATER

• In 1999, The Lodge began building an on-site three-stage wastewater purification plant. The objective was to treat all wastewater from rooms, kitchen and laundry. The treated water is used for landscaping, flushing and other non-drinking uses.

ENERGY

- Hot water is provided by 300 square metres of solar panels. The use of the diesel boiler has now been completely eliminated;
- Thermostats have been installed on all air-conditioners.

WASTE

- Paper, plastic, glass and metal wastes are separated and sold to recycling companies;
- Food waste is used as feed in pig farms;
- Garden waste is composted;
- Batteries are sent to a supplier in Germany for recycling.

PURCHASING

- All suppliers are asked to deliver goods in reusable containers;
- Plastic laundry bags have been replaced with recycled paper bags.

LANDSCAPING

• When redesigning the gardens, walls are replaced with fences and hedges, more trees are added to provide additional shade to reduce heat gain inside buildings, and small drains are added to provide for the collection of storm water.

"We take the responsibility for the resources at our disposal and we view nature as an equal partner. This is why environment protection is a part of company policy. We are the first hotel in Kenya to have an environment officer on its staff."

Representative, The Severin Sea Lodge

CONTACT INFORMATION

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8. Bass Hotels & Resorts (BHR)

Bass Hotels & Resorts (BHR) operates over 3,200 hotels worldwide. BHR's brands include:

- Inter-Continental;
- Crowne Plaza;
- Holiday Inn;
- Express by Holiday Inn;
- Staybridge Suites.

BHR is a division of Bass PLC. The headquarters of the group are in London, UK, with regional offices in Atlanta for the Americas, Hong Kong for Asia Pacific, and Windsor for Europe/Middle East/Africa.

Each region has an environment team leader who reports to the Vice-Chairman of BHR. The vice-chairman is the company sponsor of the BHR Environment Initiative, and as such represents BHR on the Bass PLC Environment Working Group.

One of BHR's worldwide environment initiatives is the **Conserving For Tomorrow** programme. With over 1,100 participating hotels worldwide, it focuses on energy and water conservation and offers guests the opportunity to reuse towels and sheets during multiple-night stays. Towels and linens are washed every three days. Based on the number of participating hotels, the programme is estimated to save 7,038,000 gallons of water and 46,920 gallons of detergent every month, in addition to the energy savings from using less hot water. BHR conducts on-going guest surveys to measure consumer perception of the towels and linen programme: response has been very favourable.

The *Conserving For Tomorrow* programme also focuses on lighting.

From 1 January 2000, Holiday Inn hotels have been required to switch to compact fluorescent lighting, which meets specific criteria to ensure that guests have more light, but for less energy. The lighting programme also calls for a reduction in mercury lighting, which reduces not only environment impact but disposal costs as well.

ith your help and participation in the linens and towels program, you can make a significant difference in conserving our environment. The Conserving For TomorrowSM program involves the following environmental procedures:

ONSERVIN

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- Recycling paper, aluminum, cardboard, and other items where possible. "One staff member calculated that, because we now recycle all the paper in the hotel, we have so far recycled enough to save 200 trees."
- Looking for opportunities to buy more environmentally friendly products.
- "The extra money we spent on changing to biodegradable toiletries was more than offset by the savings we made on water and electricity bills."

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- Providing smoke-free guestrooms and dining in our restaurants. "We found that creating non-smoking guestrooms cuts down on the amount of cleaning chemicals necessary."
- Using more environmentally-friendly cleansers and detergents. "We changed to a non-toxic, biodegradable, multi-purpose cleaner/ disinfectant. It was as good as our previous product in cleaning and rinsing."
- Changing linens every three days or upon request and towels only as needed when guests stay more than one night. This initiative is estimated to save over 70,000 gallons of water and 500 gallons of detergent annually at each medium-sized participating hotel. A guest comments... "This program not only saves the hotel significant resources, but engenders good/will toward the guests. I want you to know that I am fully in subport of programs like this, and consequently will enderwor to patronize hotels that hove such programs."
- Encouraging its hotels to install water-saving devices and energy-saving products and make operational changes to save these resources. "We fitted water saving devices to our shower heads. This maintained the force of the shower but reduced the volume of water by 30%." "Where possible, we used reduced lighting at night time to 50% capacity between midnight and 6:00 am. by employing the use of timers."

ONE PERSON CAN MAKE A DIFFERENCE...



OR

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ACHIEVEMENTS OF SOME BHR HOTELS:

- A hotel in Mexico has realised 20% savings on energy costs by placing presence sensors in guestrooms to control air-conditioning and lighting;
- A hotel in Turkey has reduced its energy consumption through moderate adjustments in the building's automated temperature settings – savings of over \$71,500 in one year;
- A hotel in Canada saves \$65,000-plus a year in recognisable costs -particularly in waste-disposal and laundry, with savings of over \$30,000 a year in these two areas alone;
- This same Canadian hotel uses the *Conserving For Tomorrow* programme as a sales tool when soliciting group business. It has so far helped secure two environment conferences worth some \$50,000;
- A Bahrain hotel lowered water costs by 4.5% and fuel costs by 4.3% in one year, despite increased occupancy and food/beverage sales;
- Many hotels have found that their environment programmes have increased their involvement with local communities.

BHR-owned and managed hotels use environment self-audits to measure their progress, covering energy and water conservation, waste management, water quality, product purchasing, indoor air quality, external air emissions, noise, stored fuel, PCBs, pesticides and herbicides, hazardous materials and asbestos.

One goal of the BHR environment team is to increase awareness and use of this self-audit within the franchise community.

Within the Inter-Continental brand, individual hotel audit scores are rolled into regional scorecards, with awards and recognition for high performers.

BHR also recognises hotels that have achieved significant results in a hotel-level environment effort. The Environment Award is presented at BHR's annual Worldwide Conference, attended by over 2,500 owners and operators.

Bass PLC publishes a corporate environment report every two years.

BHR continues to look for ways to expand its environment initiatives. The company is working on:

- A comprehensive guide to energy management;
- A standardised environment self-audit form for use by all BHR brand hotels;
- Including conservation information on the company's brand Internet sites;
- Building better alliances with suppliers of environmentally-preferable products and services.

CONTACT INFORMATION Corporate Affairs

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9. 'Golden Tulip Goes Greener': Environment Management at Golden Tulip Hotels

Golden Tulip Hotels is a leading hospitality company with 67 owned hotels and a great many more franchised and licensed properties all over the world. The 5 and 4-star hotels operate under the brand name 'Golden Tulip Hotels', while the 2-star category is marketed as Golden Tulip Inns.

GREEN TEAMS AND ENVIRONMENT CO-ORDINATORS

The corporate environment effort began in late 1997 with a bottom-up approach: Green Teams and Environment Champions were appointed in all Golden Tulip-owned hotels and inns in the Netherlands. The members of the Green Teams are volunteers from all levels of hotel staff.

Most co-ordinators are employees with a high level of social awareness and an overall appreciation of environment issues. While they are well placed to identify practical and low-cost good housekeeping improvements, it was found they did not have the overall business perspective needed to integrate environment management into business operations and to 'sell' the needs and benefits of environment management along the management hierarchy.

To address this issue, the Golden Tulip Business School has developed an in-house training pack for Environment Co-ordinators and Green Team members on:

- Obtaining the active participation of general managers in environment management;
- Creating and maintaining environment-oriented enthusiasm among colleagues and employees.

ENVIRONMENT MANAGEMENT

The objective was to begin action with no-cost and low-cost good housekeeping and repair activities and move on to more capital-intensive improvements at a later stage. Action therefore began in a phased effort, with a new environment action area being introduced every month. The action areas implemented to date are water, waste, energy and chemicals.

Newsletters introducing and discussing each environment action area were distributed to all employees⁸. The Green Teams were invited to submit lists of environment management actions that could be undertaken in each action area. The lists were then compiled into a series of department and operation specific-action checklists called 'Golden Tulip Goes Greener, Water/Energy/Waste/Chemicals Tips'. The departments and operations are included. The checklists were distributed to all Green Teams, which have begun to use them in the implementation of environment action.

ENVIRONMENT TARGETS

To help maintain enthusiasm and continued environment action, the Green Teams have been given broad environment performance targets and standards for each action area. This has also helped shape systematic environment-monitoring and data-recording procedures across Golden Tulip Hotels and Tulip Inns.

CORPORATE ENVIRONMENT POLICY

⁸ The newsletters include general environment information on the specific action area, resource use/ waste volumes statistics, 'tips' and ideas on resource conservation and waste management, quizzes and crossword puzzles and news briefs on the environment performance of selected Golden Tulip Hotels and Inns. The Golden Tulip Hotels' Corporate Environment Policy, established in 1999⁹, has validated the efforts of Green Teams and is effectively gathering support for further environment improvement.

ENVIRONMENT REPORTING

A section on the environment is included in the Golden Tulip Hotels' 1998 Social Report.

ENVIRONMENT ACTION IN 2000

Integrating and implementing the environment policy into everyday business was the main objective for 2000. Activities included:

- Environment training programmes for Green Teams and Environment Co-ordinators (discussed above);
- Two new action areas:
- The Guest and the Environment
- The Supplier and the Environment;
- Commencing environment action in the other divisions of Golden Tulip Hotels – Sales and Marketing, Human Resources, Purchasing and Development;
- Establishing a standardised corporate environment-performance auditing procedure;
- Carrying out environment-performance audits in all owned Golden Tulip Hotels and Tulip Inns, comparing actual performance against targets, and identifying areas for further improvement;
- Initiating environment management at Golden Tulip Hotels licensed and franchised businesses.

"For us in the hospitality business, environment management is imperative for continued business success. We began environment action in a practical and hands-on manner, and used this experience to establish a corporate environment policy. We are now working on improving environment performance with increased support from top management and an effective environment policy behind us.

For Golden Tulip Hotels, environment action is not a marketing tool, but a business and social responsibility. We are not planning to market our environment performance until fully-fledged environmentmanagement programmes are up and running, and valid performance data is available."

Representative, Golden Tulip Hotels

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This section introduces cleaner production, eco-efficiency, industrial ecology and life-cycle assessment, which will provide the reader with a greater appreciation of the EMS philosophy.

5.1 Cleaner Production

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While traditional environment action has focused on cleaning up waste and pollution after it has been created, cleaner production aims to avoid the generation of waste and pollution in the first place. Strategies for cleaner production include:

- Reducing the use of raw materials and energy;
- Reducing the use of toxic raw materials;
- Reducing toxic waste output;
- Reducing environment impacts during the lifecycle of products and services from raw material extraction to manufacturing, production, storage, distribution, consumption and recycling and/or final disposal.

In economic terms, cleaner production means reducing material and energy use and related costs, auditing, adopting more efficient production processes, lowering waste volumes and disposal costs, eliminating clean-up costs, fines and charges, and producing higher quality goods and services.

Cleaner production is the continuous application of integrated preventive strategies applied to processes, products and services to increase efficiency and reduce risks to humans and the environment.

(UNEP DTIE 1996)

5.2 Eco-Efficiency

Eco-efficiency is about doing more with less – using the same or a lesser amount of materials and energy to deliver a higher quality or quantity of goods and services. The World Business Council for Sustainable Development (WBCSD) provides the following definition:

Eco-efficiency is reached by the delivery of competitively priced goods and services that satisfy human needs and bring quality to life, which progressively reduces ecological impacts and resource intensity throughout the life cycle, to a level that is at least in line with the earth's carrying capacity.

5.3 Industrial Ecology (Systems Thinking)

Industrial ecology refers to business operations that mimic the natural ecosystem, where an industrial system is managed like an ecosystem - a continuous and sequential flow of materials, energy and information.

The two major concepts of industrial ecology are sealing the material cycle and dematerialisation:

• Sealing the material cycle means carrying out production in closedcircuits, in the same way as an ecosystem. For example, through photosynthesis plants produce carbohydrates. These feed herbivores, which then fall prey to carnivores, whose waste is, in turn, food for detritus organisms. Similarly, industries could reuse waste as raw material and reuse or recycle end products after they have been consumed. In this way materials and waste would move round in closed circuits.

• Ecosystems have built-in methods for optimising the use of materials and energy. Similarly, dematerialisation is about doing more with less: optimising the use of raw materials and extending the service life of end products. An additional benefit in extending service life is that it creates new job opportunities, especially in maintenance and repair.

Industrial Ecology in Practice

One of the best examples of industrial ecology in practice is the case of the Danish town Kalundborg.

Kalundborg has four main industries:

- Asnaes Power Station, a coal-fired plant;
- Novo Nordisk, producing enzymes and pharmaceuticals;
- Gyproc, a plasterboard manufacturer;
- Statoil, an oil refinery.

The evolving industrial ecosystem works as follows:

- Asnaes produces steam and heat while generating electricity, and sends some of its steam to Statoil and Novo Nordisk. Statoil, which gets 40% of its steam requirements from Asnaes, uses the steam to heat pipes and tanks. Novo Nordisk gets 100% of the steam it needs from Asnaes, and uses it as a source of heat and pressure.
- Asnaes also pipes excess heat to local fish farms and some homes. Plans are underway to expand this to all homes in Kalundborg by 2005. This process of heat and steam recycling has raised the efficiency of coal burning from 40% to over 90%.
- Asnaes' waste steam and the by-product gypsum (produced in the scrubbers which reduces sulphur dioxide emissions) are used by Gyproc to make plasterboard. The remaining gypsum is sent to local cement producers.
- At the Statoil Refinery, flue gas is created as a by-product of oil refining. The gas first goes through a de-sulphurisation process. The hot, liquid sulphur captured is sold to the Kemira Acid Plant in Jutland. Statoil's sulphur-free flue gas goes to Asnaes and Gyproc, instead of being burned off. Asnaes thus saves 30,000 tonnes of coal a year. Statoil's flue gas meets nearly 95% of Gyproc's gas needs.
- Novo Nordisk gives its nitrogen-rich sludge to local farmers via pipeline or truck. This is reported to save each farmer about US\$50,000 a year in fertiliser costs.
- This evolving symbiotic scheme is also being extended to water use.

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5.4 Life Cycle Assessment

Life Cycle Assessment (LCA) is a method of assessing the environment impacts of a product or service during its life cycle – extraction, processing, manufacturing, transport and distribution, consumption, maintenance, reuse and recycling, and final disposal. It is a quantitative and scientific analysis, designed to generate objective information about environment impacts. Economic and social issues only enter the picture once the scientific analysis is complete.

LCA can be used to:

- Develop new products and services;
- Improve manufacturing/service delivery;
- Provide consumers with credible information on the environment aspects of products/services;
- Develop environment-preferable purchasing policies;
- Improve the quality of existing products and services.

Specialised life cycle analysis software, together with methodology improvements and increased data availability, is making LCA easier to carry out.

LCA methodology consists of four main stages.

1. DEFINITION OF THE SCOPE OF THE LCA

Questions arising at this stage include:

- What will the results of the LCA be used for?
- What aspects and functions of the product or service must be taken into account?

2. INVENTORY ANALYSIS

A detailed inventory of:

- All inputs (land, energy, water, and raw materials used);
- All outputs (waste, emissions and by-products) is developed and quantified for each process. This information is then developed into a process flow chart.

3. IMPACT ASSESSMENT

- The checklist and flow chart are quantified into a number of selected impact categories;
- These are then weighted in importance.

4. IMPROVEMENT ASSESSMENT

All opportunities to reduce impacts are systematically evaluated.

Case Study: The LCA of a Vending Machine

An LCA was conducted on a fully automated hot drink dispensing machine for tea, coffee and chocolate. The LCA findings showed that:

- The energy consumption was highest for the production and transport of the ingredients and for the use and servicing of the machine;
- 70% of the energy used during the lifetime of the machine was to maintain it on stand-by;
- The majority of waste and emissions came from the use and servicing of the machine;
- The material input for the ingredients (tea, coffee, chocolate, hot water, milk, and sugar) was 10 times greater than the material input in the manufacture of the dispensing machine.

These findings were used to implement the following improvements:

- The ingredients in the machines were replaced with more environmentally-preferable alternatives;
- The ingredient containers were enlarged;
- Daily servicing was reduced to weekly servicing;
- The hot water tank was insulated.

Ingredient and energy use was reduced by over 10%. As servicing costs were also substantially reduced, the price of the hot drinks dispensed could be lowered.

SECTION 6: EMS IN THE FUTURE

- Businesses have realised that if they are to remain profitable and competitive, they must integrate environment management into daily processes and practices.
- National legislation that makes EMS and environment reporting mandatory is on the rise. Taxes on emissions and waste are adding momentum to EMS implementation. Non-compliance will be punishable with heavier fines and even imprisonment.
- Increased environment expertise, together with more efficient and cleaner technologies, will greatly facilitate environment improvement.
- EMS will also move from piecemeal improvements to reducing the overall impacts of production and processes. Eco-efficiency, cleaner production and industrial ecology will move from being noteworthy but isolated achievements to common practice.
- EMS goals are fast evolving from environment management to sustainable development. Companies will not only have to reduce resources and waste, but also take steps to improve social welfare and the quality of life in the societies in which they operate. Corporate social responsibility involves good management, better pay and benefits, health and safety in the workplace, training, non discrimination, indigenous rights, avoiding child labour, and transparency in product and service procurement.
- The market and immediate stakeholders are demanding greater transparency. Companies have to not simply carry out environment management efforts, but report on environment performance with independent verification of performance data.
- There will be greater transparency on corporate lobbying activities, and the role of companies in influencing public policy on sustainable development.
- In tourism, leading airlines, airports, tour operators, hotels, and visitor attractions are working on EMS. There is still much scope for improvement – especially in small and medium-sized businesses that constitute a large part of the industry.

UNIT 4: EXERCISES

1. GROUP PROJECT

Develop and Implement EMS in a hospitality business

Ask hotels and restaurants in the region if they would be interested in having a group of students develop an EMS for their business. This will provide a hands-on practical project for several groups of students (5 to 6 students per group), and help local businesses improve environment performance.

The first group of students would visit the property, interview the management and employees, and:

- Conduct a preliminary environment review (including research on level of compliance, fines and charges, costs of resource use and waste disposal);
- Analyse the findings of the review;
- Develop an environment policy;
- Establish environment objectives and targets;
- Develop a baseline environment management programme.

A group of students from the next semester could:

- Help the business finalise the environment management programme
- Implement the programme;
- Set up regular performance monitoring practices;
- Analyse environment progress.

A group of students from the semester after that could:

- Carry out an environment audit;
- Assess the findings of the audit;
- Make recommendations on further improvements, revise targets and objects for continual improvement;
- Investigate how to maintain enthusiasm about the environment within the business.

2. GROUP PROJECT

Develop an EMS training programme for the management and employees of a small hotel or restaurant in the region. The exercise should involve site visits, a short preliminary environment review and interviews with management and employees. Make a presentation describing the programme. (Managers of the hotel/restaurant could be present during the presentation).

3. GROUP DISCUSSION OR GROUP PROJECT

Consider the environment management concepts and tools, cleaner production, eco-efficiency, industrial ecology, and life-cycle analysis. Devise examples of the application of each of these concepts in a hospitality business. Make a presentation of your examples.

4. WRITTEN ASSIGNMENT

Critically discuss the following statements. Your answer should be about 1,500 words long.

'Whose responsibility is environment quality? The tourism industry's, the hospitality business's, the tourist's, the supplier's, or all?'

'Tourism and hospitality trade associations can be very effective in promoting EMS in the industry.'

'EMS is equally important for small to medium-sized businesses and large companies.'

5. GROUP PROJECT

Develop and carry out an environment status review of your hotel school or the hotel and hospitality department (if it is part of a larger college or university). Based on the findings of the review:

- Create an environment policy for the school or department;
- Establish environment objectives and targets;
- Develop an environment-management checklist.

6. GROUP DISCUSSION OR WRITTEN ASSIGNMENT

Critically review the following article. Then consider this question:

What EMS steps and wider sustainable tourism actions could be taken in the Egyptian Museum in Cairo and in Egypt as a whole to improve conservation and environment protection?

Many Mummies

From The Economist, 31 July-6 August 1999

Egypt has more antiquities and tourists than it can cope with. Stopping the latter from destroying the former is its biggest challenge.

Many countries would envy Egypt's predicament. With the possible exception of Italy, no place in the world contains such a colossal stash of antiquities. Trouble is, Egypt enjoys only a small fraction of Italy's wealth. Just coping with what has already been found (let alone with the artefacts that keep pouring out of Egypt's bottomless archaeological motherlode, or with the hordes of tourists who want to see the stuff, or with the constant threat of encroachment on sites) is an increasingly onerous burden on the government and museum authorities.

At the Egyptian Museum in Cairo, the numbers are awesome. With more than 120,000 ancient objects on display, and even more crammed in the basement, the century-old building is stretched far beyond capacity. Despite costly renovations completed last year, the hall containing the gold of Tutankhamun packs in such a crush of visitors it is beginning to resemble Grand Central Station at rush hour. Over the next decade the numbers are expected to rise from 2m to 8m a year. Controversial plans for a mega-museum have been mooted, but its construction remains a distant prospect.

In the field meanwhile, each week produces exciting new finds, creating yet more pressure on bulging storerooms, as well as on the time and budgets of those

who analyse, catalogue and restore artefacts. "The last thing we need is more mummies," groans one archaeologist, faced with the recent discovery of a desert cemetery that Egyptian experts believe holds as many as 10,000 graves from the Greco-Roman period. Only a few choice pieces, some with gilded facemasks, will be displayed near the site in the oasis of Bahariya, a little over 300km southwest of Cairo. The rest will have to be reburied.

Rainer Stadelman, who is retiring as director of Cairo's German Archaeological Institute after four decades in Egypt, explains that you can dig practically anywhere and find something. "More than 3,000 years of high civilisation – and I'm only talking about Ancient Egypt — gives an enormous wealth of antiquities," he says.

Although nothing quite so flush with loot as Tutankhamun's tomb has been unearthed in the past ten years, recent discoveries have greatly enriched the science of Egyptology. At Abydos, 400km south of Cairo, a German team excavating a royal cemetery from the middle of the fourth millennium BC believes it has found the world's oldest readable writing. Inscriptions on ivory labels attached to oil jars show that officials of the First Dynasty used primitive hieroglyphs to record where the jars came from. Overturning the theory that Egypt adapted the art from Mesopotamia, the phonetic symbols put back the 'invention' of writing by two or three centuries, to around 3,300 BC.

Across the Nile at Akhmim, Egyptian archaeologists are beginning to uncover a temple precinct that may prove as large as the temple of Karnak at Luxor. This would make the site rank next to Angkor Wat and the Vatican as one of the world's biggest religious complexes — only many centuries older. The Akhmim site has already produced an exquisite 14-metre-high limestone statue of Ramses II's daughter, Merit-Amun.

In Luxor's Valley of the Kings, Kent Weeks, an American archaeologist, continues to explore a vast underground funerary complex dating from the reign of Ramses II (1304-1237 BC). With more than 200 rooms uncovered since excavation started in 1995, the purpose of this mysterious warren of chambers remains unknown. Theories range widely: perhaps it was a tomb for all of Ramses' 52 sons, perhaps a model representing stages of the afterworld.

Other recent finds include an intact pyramid capstone (at Dahshur), a tomb belonging to Tutankhamun's nurse that is decorated with beautiful relief carvings (at Sakkara), a cemetery devoted to the workers who built the pyramids (at Giza), fortresses in the Sinai Peninsula dating from 1500 BC, and a palace in the Delta decorated with Minoan paintings that prove there was a close trading relationship between Egypt and the ancient Cretan civilisation.

Leaving aside Ancient Egypt, finds from later periods are just as alluring. Divers off Alexandria have uncovered sculptures from the famous Ptolemaic lighthouse as well as Greco-Roman ports and palaces. The site where Napoleon's flagship, L'Orient, was sunk by Lord Nelson in 1798, with an estimated 10m gold francs of treasure aboard, has also been found. Far out in the desert, meanwhile, an Italian team has just finished restoring a chapel in the Coptic monastery of St Anthony. The stunning 13th-century frescoes on its walls, completely obscured by soot until three years ago, now rank among the most brilliant examples of Eastern Christian art.

All this work costs money. With Egypt's own resources severely strained, and with 20-odd foreign missions facing cutbacks, archaeologists must increasingly scout for their own backing. Rival French teams in Alexandria have each sought corporate sponsorship. Both have signed away exclusive rights for television coverage of their finds. To support his work in the Valley of the Kings, Mr. Weeks is

obliged to spend half his time in pursuit of private funding.

Egypt's own Supreme Council for Antiquities is beginning to go commercial. Earlier this year, its officials obligingly staged the 'discovery' of a tomb by the Giza pyramids for Fox Television. The US network paid US\$60,000 for the privilege. National Geographic recently coughed up US\$30,000 for exclusive film rights to the cache of mummies at Bahariya.

These sums are paltry compared with the task at hand, however. Much of the site at Akhmim, for example, lies beneath a village and a modern cemetery. Relocating them will cost as much as \$10m. The budget for dismantling and rebuilding the 2,500-year-old Temple of Hibis at the oasis of Kharga, which is threatened by rising groundwater, is a hefty \$6m. This is only one of hundreds of monuments — including some 200 medieval buildings in the centre of Cairo — that need urgent attention.

Fixing the Temple of Hibis is likely to exhaust funds earmarked for work in Egypt's oasis regions. Too bad, because these remote areas have lately produced remarkable finds: some recent desert discoveries include a Sixth-Dynasty governor's palace that proves early Egyptian occupation of the oases, a gold crown from the Ptolemaic period, and a surprising cache of Greek papyri, among them unique scriptures from the Manichaean religion that vied with early Christianity.

More pressing perhaps is that many desert sites need protection from treasure hunters. At an abandoned Roman fortress town 40km from Kharga, scavengers last year used backhoes to rip open cemeteries, leaving a macabre scattering of discarded mummy parts. At a nearby site that can be reached only by four-wheel drive vehicles, a desert guide recently caught a group of American tourists redhanded. They were using metal detectors and air compressors to sift through the ruins for booty.

Yet the damage from pilfering pales in comparison with the organised menace of mass tourism. At sites such as the Valley of the Kings or Sakkara, thousands of visitors mill about each day in cramped tombs that were designed for one occupant's afterlife. The deterioration of the paintings and reliefs on their walls is plain to see. Even the apparently indestructible pyramids of Giza are suffering. With each visitor who descends to their inner chambers exhaling some 20 grams of clammy water vapour, cracks have begun to appear. The antiquities service now works the great structures in shifts, closing one each year for rest and recuperation. Sadly, this solution cannot work for monuments that are more unique or more delicate.

"Tourism is already a catastrophe," says Mr. Stadelmann, who like most Egyptologists is understandably worried about the future. "But we have to admit that without tourism there would be no public interest, and without that there would be no money for our work." He is right, but as tourist numbers grow, Egypt is going to have to find a better balance between showing off its heritage and preserving it.

SOURCES FOR SIMILAR ARTICLES ON THE ENVIRONMENT AND TOURISM:

ASIA TRAVEL TRADE

PUBLISHED MONTHLY BY EASTERN PUBLISHING LTD, SINGAPORE FAX: 65-226 6096

ASTA MANAGEMENT

PUBLISHED MONTHLY BY THE AMERICAN SOCIETY OF TRAVEL AGENTS FAX: 1-212-279 3951

THE CATERER AND HOTELKEEPER

PUBLISHED WEEKLY BY REED BUSINESS INFORMATION, UK FAX: 44-20-8652 8947 WEB: WWW.CATERER.COM

HOTELS

PUBLISHED MONTHLY BY CAHNERS BUSINESS INFORMATION, ILLINOIS, USA FAX: 1-847-635 6856 WEB: WWW.HOTELSMAG.COM

HOTEL AND MOTEL MANAGEMENT

PUBLISHED SEMI-MONTHLY BY ADVANSTAR COMMUNICATION INC, MN, USA

HOTEL AND RESTAURANT

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LODGING: THE MANAGEMENT MAGAZINE OF THE AMERICAN HOTEL & MOTEL ASSOCIATION

FAX: 1-202-289 3164 E-MAIL: EDITOR@AMHA.COM WEB: WWW.LODGINGMAGAZINE.COM

RESTAURANT BUSINESS

PUBLISHED SEMI-MONTHLY BY BILL COMMUNICATIONS INC. NEW YORK, USA FAX: 1-212-592 6650 E-MAIL:PROMEO@RESTAURANTBIZ.COM WEBSITE: WWW.FOODSERVICETODAY.COM

7. GROUP PROJECT

EMS for the Eland Safari Lodge

You have been invited by the National Park Authority and the owners of the Eland Safari Lodge to develop an EMS strategy for the Eland Safari Lodge. The objectives are to:

- Reduce material and energy use;
- Reduce the output of waste emissions and effluents;
- Reduce noise and the disturbance to animals;
- Teach visitors about the ecosystem, game species and the importance of environment protection;
- Raise the environment awareness of staff;
- Enable the Eland Safari Lodge to contribute towards conservation and the improved management of the Park.

Read the information given below and develop a report containing:

- An overall EMS strategy;
- A preliminary environment review checklist;
- A checklist of activities that could be undertaken in an environment management programme, including staff training and visitor communication;
- A monitoring checklist to asses the achievements of the environment management programme.

Make a 15-30 minute presentation outlining the contents of the report.

BACKGROUND INFORMATION

The Eland Safari Lodge is located on the outskirts of a major game reserve, somewhere in Central Africa. It operates 83 rooms, two indoor restaurants, a garden bar and restaurant, a lounge bar, a swimming pool, and a pool bar. The back office areas consist of administrative offices, kitchen, storerooms, a cold room, and maintenance rooms.

The average length of stay is 4-6 days. Over 70% of guests are from overseas.

The Eland Safari Lodge also operates a safari (wild life viewing) service 'Savannah Calling'. The welcome and information desk is located next to the Lodge's reception, and this enables guests to confirm bookings directly upon arrival. Savannah Calling operates 5 open-roof, four-wheel drive vehicles, which seat 7 passengers, and 3 open-roof, 16-seat minibuses. The service employs 6 full-time game rangers. During the peak seasons 3 to 4 additional wildlife enthusiasts are hired to work as ranger-chauffeurs. Savannah Calling operates a programme of 4 game drives a day – at dawn, late afternoon, dusk and night. Each drive lasts around $2 \frac{1}{2}$ hours.

The surrounding landscape is typical of the savannah bush: dryland vegetation and grass plains interspersed with wooded areas, ponds, and the occasional small lake. There are two monsoon seasons per annum. However, over recent years, the monsoons have not been regular and annual rainfall has halved.

The Park originally covered 1,700 square kilometres but today incorporates 1,500 square kilometres. This size reduction is due to:

- Increasing pressure for agricultural land from the local population living in the buffer zones;
- The lack of adequate funds to maintain 1,700 square kilometres as a protected area.

Resident wildlife species include over 300 species of birds, elephant, wildebeest, rhino, hippopotamus, zebra, giraffe, antelope species such as gazelle, topi and eland, crocodile, fox, hyena, and the big predator cats – lion, leopard and cheetah.

The local population live around the buffer zones of the Park, and continue to rely on the Park's ecosystems for fuel and building materials such as peat and grass. They are also allowed to hunt 'permitted species'¹⁰ for meat.

The nearest large town, Pembroek, is 250 kilometres north of the Park – five or six hours by road. The capital city is 400 kilometres west of the Park. There are 2 flights a week from the capital to a small airport located around 100 kilometres north of the Park.

²⁰ Every year, the Park authorities allocate a number of hunting permits for certain species of abundant antelope to the local population. The objective is to provide" game meat for local consumption

ISSUES TO CONSIDER

WATER AND WASTEWATER

- Despite prevailing droughts and water shortages, no water conservation measures have been taken at the Lodge. Towels and linen are changed daily and gardens and lawn are watered throughout the day. All rooms are equipped with large baths no provisions are made for showers. The interior floors and windows are mopped and exteriors are spray- washed every day. The swimming pool is refilled twice a week during peak season and chlorine is used as a purifying agent. Many cold and hot water taps and toilet cisterns in guestrooms, back office and F&B outlets leak continuously. Water pressure at tap is not regulated. Hoses and sprinklers used to water the garden do not fit the water outlet, and here again there is significant water loss.
- Fresh water to the Lodge is usually supplied through a small diversion from the nearby river Nila, after purification in a water supply purification plant. Prevailing droughts have, however, drastically reduced the river water level, and water is now being supplied from the aquifer that lies directly beneath the park. Park authorities are concerned that the water levels of the aquifer are decreasing. The aquifer is critical to the maintenance of the Park's entire ecosystem, supplies the natural ponds and lakes that serve as waterholes for the animals, and provides water (through boreholes) to the local population.
- The wastewater from the Lodge is said to be treated at the wastewater treatment plant that serves the town of Pembroek. However, local citizen groups have reported that the wastewater ends up without treatment in the River Nila – the outfall being only a few kilometres upstream from the water supply diversion to the Lodge.

ENERGY

- Hot water, maintained at 70°C at tap, is provided by fuel-operated boilers. All other equipment operates on electricity, obtained partly from the national grid, and partly from the Lodge's own noisy and expensive diesel generators located onsite. Grid electricity is generated through hydropower. Peak tariffs are charged for power use between 08.00 and 10.30 and 17.00 and 20.00 hours.
- The garden restaurant operates a nightly barbecue dinner where coal and wood are used for torches and cooking.
- Prevailing droughts and low water levels across the country are now causing grid electricity shortages. The grid supply is interrupted from 23.00 to 05.00 hours at night and from 13.00 to 16.00 hours during the day. At these times, the Lodge makes maximum use of its diesel generators to produce electricity.
- Incandescent bulbs are used for lighting in all areas of the hotel, except the back offices and kitchens where fluorescent tubes are installed. Lights in public areas and corridors are left on throughout the day and at night.
- All guestrooms are equipped with single-unit air-conditioners. However, the thermostats of most units do not function, and therefore when turned on they only work at full capacity. Guests often have to open the windows as the rooms get 'too cold'. Most units are also noisy and leak water produced by condensation.

- No other areas of the hotel are air-conditioned. Ceiling fans operate day and night in public areas and restaurants.
- It is usual practice for the kitchen stoves to be turned on at the beginning of the day and left on the whole day until the dinner service is complete.
- There appear to be significant quantities of flash steam escaping from the boilers.
- The refrigeration system in the cold rooms is often out of service.
- Stoves, boilers and washing machines are over 10 years old. Dishes are washed by hand in tubs and buckets.
- There is no awareness of energy saving, how to lower energy use, renewable energy, or of equipment maintenance and monitoring. Little help is available from the national electricity company.

WASTE

- No waste is separated and all waste including food, kitchen, and garden is sent for land filling. Old linen and uniforms are included in the waste stream.
- Owing to problems with refrigeration in the cold rooms, leftover food from the breakfast and barbecue buffets is not reused. Significant quantities of food are therefore wasted.
- Paper napkins and tumblers, cocktail sticks, paper cups and glass holders are the main sources of disposable waste. Plastic waste includes packaging, food and cleaning products and chemical product containers. All beverages are purchased in glass bottles, which can be returned on a deposit refund scheme. However, no separate sorting system is in place and glass bottles are also sent for land filling.
- Items with longer shelf life such as dry food, tins, stationery, office supplies and cleaning supplies etc. are bought in bulk.
- There were some attempts to compost kitchen and garden waste. However, owing to poor maintenance and the contamination of the compost heap (by plastic, glass, animal fats and meats included in the compost), it began to attract rodents and birds, and gave rise to unpleasant odours. The effort was therefore abandoned.
- A significant volume of paper is used in the back office.
- No attempts have been made to reduce or reuse waste. There are two recycling companies based near the airport, but they have not been contacted for information on and assistance with the collection of waste for recycling.

PURCHASING

- All items, including fresh produce, are sourced directly from the capital city 400 km away and transported by truck twice a week. No attempts have been made to source goods locally or use the produce of local farmers, expect for game meat.
- Despite the availability of a good selection of nationally-produced alcoholic and non-alcoholic beverages, preference is given to imported products from Europe, the USA or South Africa.
- Chemical cleaners, non-degradable detergents and pesticides are freely used all over the property.
- Stationery is printed on imported bleached gloss paper.

- Even though some purchases are made in bulk, they include substantial volumes of packaging, which is sent for land filling with the rest of the Lodge's waste.
- There is no awareness of how to purchase environmentally-preferable products, except for buying in bulk.

EMISSIONS

- All the air-conditioners, refrigerators and the cold room use CFC-11 as a refrigerant. During repair, significant amounts of refrigerant are allowed to escape. The fire extinguishers contain halon. Insecticides and air fresheners are purchased in aerosol spray cans. Foam is regularly used as packaging.
- All Savannah Calling's vehicles operate on diesel. Owing to poor maintenance, the engines are noisy and give out copious exhaust fumes.
- The lobby, public areas and back office are all designed as open verandas, so the Lodge's management is confident that indoor air quality is not an issue. However, the kitchen and laundry exhaust fans are in poor working condition and there is no ventilation in the boiler room.

TRAINING EMPLOYEES

- Overall environment awareness is low to non-existent. Management does agree that 'the environment is important', and that 'it is good to recycle', but have no further environment expertise.
- The Park authorities require that only licensed game rangers those that successfully complete the recommended series of ecology, conservation and communication courses - conduct safari tours. There is also a special license for ranger-chauffeurs. However, the Lodge has not verified if any of the rangers and chauffeurs employed by Savannah Calling hold the required licence.
- It is further reported that rangers and chauffeurs are very willing to drive off-road to get close to animals for better photographs and even chase and track down bigger species when large tips are imminent.

COMMUNICATION TO VISITORS

• The Park has put together one brief wildlife information leaflet on resident and migratory species, the only information available to guests. The leaflet contains only scant information and needs to be upgraded.

RELATIONSHIP BETWEEN THE PARK AUTHORITIES AND THE LOCAL COMMUNITY

- The Lodge has just began talks with the Park authorities on a series of management-related problems including conflicts of interest with local communities, poaching, costly administrative delays, poor environment and visitor management, lack of funds and the gradual degradation of the Park's ecosystem. The Lodge's management and the Park authorities are working on how the Lodge could contribute towards increasing conservation funds, ensuring game ranger licensing, increasing visitor management and implementing EMS.
- The Lodge has no direct contact with the local communities living in the

buffer zones, except for the purchase of game meat. A handful of people living in the buffer zone villages work as housekeeping staff and kitchen hands. The rest of the employees are from Pembroek and its suburbs. They are provided with employee housing next to the hotel.

GLOSSARY OF TERMS AND ABBREVIATIONS

baling	packing together and weighing materials (in this context, for recycling)
BEMS	building energy management system
benchmark	a given quality, quantity or performance level that is used as a standard for comparison
BOD	biological oxygen demand
CFC	chlorofluorocarbon
СНР	combined heat and power
CLF	(low energy) compact fluorescent lamp
compacting	pressing materials together so that they become reduced in volume
environmentally- certified product	product formally approved as being environmentally- preferable
EMAS	eco-Management and Audit Scheme, a voluntary regulation of the European Union
EMS	environment management system
hybrid engine	engine that can operate on two types of fuel
ISO	International Standards Organisation
ISO 14000	a series of standards and guidelines on environment quality management systems, developed and implemented by ISO
legionnella pneumophilia	water contaminant that can cause legionnaire's disease, a serious and potentially fatal infection of the lungs
LCA	life cycle analysis
national ozone office	A government office that implements the national ODS unit phase-out strategy. This focal point should be able to provide additional information about country-specific technical and financial assistance
ODS	ozone-depleting substance
organic	carbon-containing, derived from plants and animals
SWOT	strengths, weaknesses, opportunities and threats analysis
renewable energy	energy that can be generated as fast as it is consumed
TQM	Total Quality Management
TRV	thermostatic radio valve
UV-C	Ultra Violet - C
VOC	volatile organic compound
WBCSD	World Business Council for Sustainable Development

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O S S A R