


**Subject: Tourism & Hospitality**

Production of Courseware

 -Content for Post Graduate Courses



**Paper 06: Hotel Housekeeping**

**Module 37: Energy and Water Conservation**



**THE DEVELOPMENT TEAM**

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ITEMS	DESCRIPTION OF MODULE
Subject Name	Tourism & Hospitality
Paper Name	Hotel Housekeeping
Module Title	Energy and Water Conservation
Module Id	Module no – 37
Pre- Requisites	Environment – Friendly Practices
Objectives	To understand the significance and methods of energy and water conservation in hotel operations
Keywords	Energy Consumption, Energy Monitoring, Water Conservation, Methods of Conservation

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## **QUADRANT-1**

### **Energy and Water Conservation**

#### **1. LEARNING OUTCOMES**

After completing this module students will be able to:

- I. Understand the importance of energy and water resource.
- II. Learn the consumption patterns of energy in hotels.
- III. Learn the new practices of energy and water conservation being followed in hotels.
- IV. Understand methods of conserving energy and water resources.

### **ENERGY AND WATER CONSERVATION**

#### **INTRODUCTION**

The tourism and hotel industry, over the last decade, has grown rapidly to become the world's largest employer. It is among the major contributors of GDPs and a major source of income for many countries. Due to high resource-intensiveness of the industry, this accelerated growth leads to overexploitation of resources. To preserve the rapidly depleting resources for the future generations, a more sustainable approach is required for the industry operations. A sustainable approach needs to be adopted particularly with regard to energy and water consumption. This module explains the significance of energy and water conservation and also elaborates the methods and techniques of conservation.

Conservation is a process of reducing demand on a limited supply such that the supply can rebuild itself. Mostly, the best way of conserving energy is to replace the energy used with an alternate. Without energy conservation, mankind will exhaust its natural resources. The depletion of resources also causes an enormous destructive waste product. The goal with energy conservation techniques is to reduce demand, preserve and

replenish supplies, develop and use alternative sources of energy, and to clean up and restore the environment.

## **ENERGY CONSERVATION**

### **Energy Consumption in Hotels**

A hotel consumes substantial amounts of energy to provide comfort and services to its guests. Generally the consumption patterns of buildings of the same size as a hotel is comparatively lower as they do not house customers who are paying for all the exclusive amenities and different services. The energy use typically varies among different types of hotels, their category, size, number of rooms, location, clientele, climate zone and even the amenities and services made available by the hotel.

(Image Source: <https://www.awarenessideas.com/Energy-Decals-s/10.htm>)

Energy is consumed in different forms in a hotel (like electricity, fuel, heat, etc). Research studies highlight that electricity is the primary source followed by gas and fuel. To understand the energy consumption patterns within a hotel property, let us segregate a hotel into three zones.



The energy flows in the following areas are usually very different and needs to be constantly monitored.

1. **Guest Room Area** – These are individual spaces sold by the hotel to its guests. These areas have varying energy loads but are usually on the higher sides. Bedrooms, Bathrooms/Toilets, Showers etc. are under this zone.
2. **Public Area**– Points of interaction between a hotel employee and a hotel guest. Various services are offered in these areas which welcome both resident and non-resident guests of the hotel. Examples include Hotel Lobby, Reception, Restaurants, Bars, Banquets, Meeting rooms and so on.
3. **Back Area or Service Area**– Staff only area related to hotel operations and staff facilities. It generally has higher energy loads due to the various equipments and

technicalities. These areas include kitchens, laundry, engineering rooms, staff facilities, store and so on.

### **Energy Monitoring**

Energy, in the form of electricity and fuels, is a significant part of hotels' operating costs, and generally constitute up to 70% of utility costs. The majority of this cost comes from the air-conditioning in guest rooms. Let us understand this better with an example. For instance, a 5 star property having 500 rooms with all facilities available has to operate in a power crisis. The cost incurred would be huge (say 12-15 lakhs a month). It is possible to save at least 15-20 percent of this cost just by following energy conservation techniques. In this case, the hotel can easily save 10 lakhs per year by setting a modest target of 7 percent energy savings. However, to develop such a system, each and every staff member/employee of the hotel has to be made aware of the hotel's effort regarding the conservation of energy. There has to be representatives within each department/section who should work together to formulate proper guidelines for preserving the energy. Guidelines should be strictly followed and do's and don'ts to be displayed in all possible areas. From housekeeping's perspective, there are the following areas that need to be monitored for energy conservation:

1. Guestrooms: They constitute major portion of a hotel's energy usage. However, the air conditioning, heating, lighting are directly related with the occupancy of the hotel.
2. Laundry: This facility uses large amounts of energy for washing. The energy consumption depends upon the type of equipment in use.
3. Lighting: It generally accounts for 10-25 percent of the hotel's electricity usage. Lighting is used throughout the hotel and hold the lion's share. Efficient use of lighting is important as other heavy electrical equipment generally work less effectively.

### **Energy Conservation Practices**

Energy conservation practices are a quick way of reducing operational costs with little capital investment. They can also reduce the damaging effects of fossil fuels on air quality, the ozone layer, global warming, and sea levels. Energy conservation is possible where there is good maintenance and housekeeping. In many cases, it is also a matter of a sound construction plan and techniques (like landscaping for shading). Following practices cost negligible/minimal capital to a hotel and can aid the hotel in conserving tremendous amounts of its energy resource:

1. Allocate one staff member to lead the energy conservation program. Responsibilities should include reading of meters (at least on a monthly basis), and monitoring progress.
2. Emphasize on staff awareness programs, training, and checklists and other clear instructions to meet energy conservation targets.
3. Regulate settings and lighting levels to ensure minimum energy consumption for desired comfort levels. Hot water should be set to 50°C, and room air temperature to 22-24°C.
4. In order to keep the equipment running efficiently, establish a preventive maintenance schedule for all major equipment with particular attention to: -
  - a. Regulating and replacing belt drives
  - b. Insulating and repairing pipes and ducts
  - c. Regular servicing of air-conditioning systems (usually results in 20% energy savings)
  - d. Refurbishing seals on doors, windows, coolers, freezers, etc.
  - e. Faulty or abnormal equipment vibration or sounds
5. Assign guestrooms such that unoccupied areas can be shut down.
6. Appoint staff to turn off pool pumps and exhaust fans overnight.
7. Run dishwashers and washing machines only on full loads.
8. Consider employing natural sunlight to totally or partially dry laundry.



9. Use natural ventilation and shading from trees and other vegetation to cool areas (guest rooms, patios, etc.)

### **Methods / Tips for Energy Conservation in Hotels**

Let us now learn some general methods for energy conservation which can be followed by the hotel throughout the property.

1. **Switching off lights and air-conditioning in the rooms not in use:** The first step of energy conservation activities is elimination of waste. Being aware of importance of making thorough efforts to small matters will result in great energy conservation.
2. **Energy conservation during guest room cleaning:**
  - a. Consider switching off in room air conditioning units while cleaning guest rooms. As even when the indoor air-conditioning units (fan coils and others) are turned off, room corridor air-conditioning units are still operational. Hence, turning off the fan coils during room cleaning would not cause poor work environment.
  - b. Open curtains whenever possible to utilize sunlight during the cleaning work, so that electricity is used only in a dark place, such as a bathroom.
  - c. All small initiatives being practiced should be documented in a manual and implemented by the cleaning supervisor.



3. **Lighting control in banquets:** Significant amounts of lighting are used in banquet halls. Banquet halls lights can be categorized into two -general lighting to keep enough illuminance in the rooms, and directive illumination such as chandeliers. The latter consumes greater electricity than the former. Use only general lighting during preparation and cleaning periods and turn off the directive lighting.

Image Source: *Energy Conservation for Hotels*  
(<http://www.asiaeec-col.eccj.or.jp/brochure/pdf/hotels.pdf>)



4. **Ventilation fan control in kitchen area:** Exhaust and other ventilation fans in a kitchen area are mostly operated by cooking staff. The fan operation has a great impact on energy consumption. The fan usage should be monitored and should be as short as possible.
5. **Documentation of procedures in a manual:** All departments of the hotel need to prepare a documented energy conservation manual and display it where employees can easily see, such as a wall of a staff room. It is imperative to develop an environment where employees can take an approach toward further energy conservation having common perception among them.
6. **Utilization of Natural Light:** Strategies need to be developed to optimize the use of natural light i.e. the sunlight. Skylights can be installed. Hotel design can include French glass doors and windows. Housekeeping should ensure all north facing glass is cleaned periodically to improve natural lighting.  
*Skylight installed in a restaurant. (Image Source: <http://litrausa.com/hotel-roofs-gallery/>)*
7. **Managing Artificial Lighting:** It is essential for the hotel to install high efficiency lighting systems with sophisticated controls like motion sensors.
  - a. Timers can be installed to turn on turn off lights when in need and vice versa. Using light-colored paints can maximize the light intensity.
  - b. Replace all incandescent lamps with energy efficient lamps like CFLs and HPMV lightings.
  - c. Install occupancy and daylight sensors so that lights are on only when they are required



## 8. *Climate Control / Air Conditioning*

- a. Using an energy-efficient heating and cooling system of the proper size in conjunction with a thermally efficient building shell is necessary.
- b. Installing R-value walls and ceilings, covering window panes with draperies, sun films and blinds, helps in reducing the air conditioning costs. Air-conditioning plants need to have heat-reclaiming equipment.
- c. The heat displaced during cooling the air can be used to heat water for guestrooms, laundry and kitchen operations. Hot-water pipes need to be insulated. There should be no leakages in the water and air pipes.
- d. Avoid functioning the heating and cooling systems concurrently. This is a common problem in hotels. Switch off cooling when a temperature of 21-23°C has been reached. Back-of-house temperatures can be set lower than those at front of house.
- e. Avoid using air conditioning until the temperature exceeds 23-24°C

9. **Alternate sources:** Hotels need to continuously vouch for adopting alternate sources of energy such as photovoltaic and fuel cells. Solar energy is available in abundance. Systems utilizing this free source of energy need to be installed. Biogas fuel is another alternate in kitchen can be implemented where ever applicable.

*Solar Energy Panels installed on roofs.*

*(Image*

*Source:<http://www.dnaindia.com/india/report-how-soon-can-solar-power-outshine-conventional-electricity-2206850>)*



**10. Transportation:** Hotels can encourage guests to use environment friendly means of transportation by providing bicycles, walking maps and information about public transportation and so on. Installing solar powered vehicles at the property to ferry guests can also be thought over.



*Energy Conservation Technology for Hotel Rooms. Image Source: (<https://technology4hotels.com.au/energy-eye-efficient-hotel-guest-rooms/>)*

## Energy Saving Tips for Hotels.

Image Source: British Gas, the Carbon Trust



(<https://business.directenergy.com/understanding-energy/go-green/energy-saving-tips>)

## WATER CONSERVATION

Most of the water (97%) is in the oceans and covers approximately 71% of the Earth's surface. In total there is just three per cent of freshwater, two-thirds is ice in glaciers and at the poles. This leaves the mankind with approximately 1% of freshwater found in rivers, lakes, the atmosphere and in groundwater.

With a rapidly rising demand due to increasing global population and a higher expectation of living standards and resource-intensive farming, that 1% is under threat. Climate change is an added problem that has made weather patterns less predictable and more pronounced. While there is a period of prolonged drought in a number of areas, there are heavier rainfalls in other areas. This causes floods and does not sufficiently replenish the groundwater.

Water is vital to the hotel and tourism industry — for food preparation, hygiene and cleanliness, guest comfort and recreation. Hotels are dependent upon their supply industries, like agriculture and the food and beverage industries, which also rely on water and would not function without sufficient water.

Hotels have a responsibility of not using more water than what is absolutely necessary. It makes business sense too as water accounts for high percentage of utility bills in many hotels. In fact, most hotels pay twice for their water consumption— first to purchase water and then to dispose it of as wastewater. Hotels with proper water conservation practices in place can reduce their water consumption per guest per night up to 50% compared with establishments with poor performance in water consumption.

#### **Setting a water conservation action plan**

1. Conduct a water audit to ascertain where all are the major water costs are and where can the savings be made.
2. A comparison has to be made for total and departmental water consumption figures with overall hotel industry benchmarks / standards to determine the potential for savings.
3. Calculate the average water consumption per guest per day by dividing the total water consumption of guest rooms by the number of guests for that month.
4. Establish realistic consumption target for each department of the hotel.
5. Communicate the hotel management's objectives and goals to hotel employees.
6. Ensure participation from the entire staff and encourage them to put forward their ideas.
7. Check on a regular basis for leakages from pipes, taps and cisterns. Always ensure that plugs in basins fit properly.
8. Implement a practice that enables guests to choose not to have towels and linens changed every day.
9. Kitchens, guest bathrooms and public washrooms must have sensors, low-flow and other water-saving fittings installed.

10. A proper rainwater harvesting system needs to be installed..
11. Staff needs to be educated on sensible usage of water and trained to maintain equipment for optimum energy-efficiency.
12. Develop standard operating procedures (SOPs) and keep improvising on new techniques.

### **General Tips for Water Conservation at Hotels**

The following guidelines provide crucial tips on water conservation practices that be implemented in the hotel industry to make hotels more water-efficient.

#### **1. Toilets**

- a. Installing water-free urinals can save up to nearly 230,000 litres annually per urinal. These urinals can also be combined with passive infra-red devices, which initiate a flush when they detect some motion or activity, or flush at shorter intervals at busy times.
- b. Timers need to be installed that flush more frequently at peak times. Sleeve-based urinal system, with a disposable sleeve to remove odours, flushes four to six times a day.
- c. Switching to low-flow or low-flush toilets results in big water savings. They usually consume around six litres, compared to 26 litres per flush in older models.
- d. Toilets with an option of dual-flush save water by allowing guests to select a full or half-flush.

#### **2. Taps**

- a. Standard taps on sinks need to be replaced with automatic, restricted or aerated models which make significant water savings. Electronic controls can be retrofitted or installed to save up to 70% of water.
- b. Manual valve taps can be upgraded to either flow restrictors or aerators. Flow restrictors are installed in the tap head and reduce the flow of water



by up to 9.5 litres per minute. Aerators lower water flow by infusing air to the water stream. They save 12 litres of water per tap per day.

- c. Push taps, which closes on its own (automatically) after up to 30 seconds are suitable especially in cloakrooms or toilets in public areas.

### **3. Showers and baths**

- a. Low-flow showerheads which infuse air such that the water pressure feels strong, results in a cut of 90 litres of water in a 10-minute shower.
- b. In bathrooms, the size of baths and basins has a dramatic effect on water consumption. Thus size should be carefully selected.

### **4. Hi-tech filtrations systems**

- a. These systems allow hotel organizations to reuse virtually all of their water which is usually lost to the sewage system. Hotels can reuse 99.9% of drainswater for irrigation purposes, air-conditioning and laundry operations.
- b. The filtration system requires servicing to remove the compressed sludge only twice a year on an average.
- c. Reverse osmosis systems make sea water safe to drink by removing salt, bacteria, proteins and pathogens.

5. **Swimming pools:** In a large hotel, a swimming pool increases freshwater consumption by atleast 10% . If at all the swimming pool is to be installed, consider designing the most water-efficient one.

- a. Design the pool system such that the backwash water can be captured and reused to irrigate the grounds.
- b. It is recommended to clean the pool using a brush and pan to collect debris rather than hosing.
- c. When not in use, the pool should remain covered to avoid water evaporation.



- d. The changing room facilities should be fitted with water-saving showerheads, dual flush or water-efficient toilet cisterns and push-button taps.
- e. Leaks can be detected by monitoring the meter at night and in the morning.

## **6. Fittings:**

- a. Update and Install the latest, most water-efficient fittings.
- b. Ensure machines run on full loads only.
- c. Wash smaller loads/items in a 5kg machine.
- d. Water inlet valves must always close properly.
- e. Check for leakages in dump valves.
- f. Rinsing has to be minimized without reducing quality.
- g. Reuse water from last rinse cycles for the first wash of a new cycle by installing temporary holding tanks.
- h. Ensure level controls on water reuse tanks work properly.
- i. Large hotel (500-room-plus) should consider installing a continuous batch washer (CBW). It uses all the rinse water for pre-washing and main suds operation.
- j. Buy only those washing machines that have high water efficiency ratings.
- k. Consider the use of ozone in laundry systems. Ozone when injected into the water, in conjunction with the laundry chemicals, provides a more efficient wash, reduces energy and water usage through shorter cycles.

1. Constantly monitor water usage and establish benchmarks.

*Image Source:*

*<http://www.climatetechwiki.org/content/water-efficient-fixtures-and-appliances>*

**7. A towel and linen programme:** A towel and linen programme can help any hotel make significant water savings and reduce its energy consumption, detergent and the need for waste water treatment. Numerous hotels already offer guests the option to reuse towels and/or bed linen. Intercontinental Hotels Group (IHG) asserts to have saved 199millionlitres of water a year in its 22 US properties alone using the linen re-use programme. It not only reducescosts but by saving water, it means less wear and tear of fabrics, prolonging their life, and saving time.

- a. Ensure to install a towel rail in the bathroom for guests to hang their towels for reuse.
- b. Ensure all staff are aware of the programme and the reasons for it.
- c. The wording on the in-room card must be clear and should inspire guests to conserve resources. It should not give the impression that the hotel is simply trying to reduce its costs. The policy can be included in the hotel questionnaire placed in the room to ascertain the guest feedback about the programme.



(Image Source: <http://www.greenhotels.com/catalog/printed.php>)

## **8. Maintenance**

- a. There has to be regular inspections of taps, showers, toilet mechanisms, and overflows from water storage tanks and pipe joints for leaks.
- b. Conduct checks for leakages in toilet. Food coloring can be added to the cistern to detect leaks (colored water will appear in the bowl if the toilet is leaking).
- c. Basin plugs should be fitted perfectly such that they produce an effective seal.

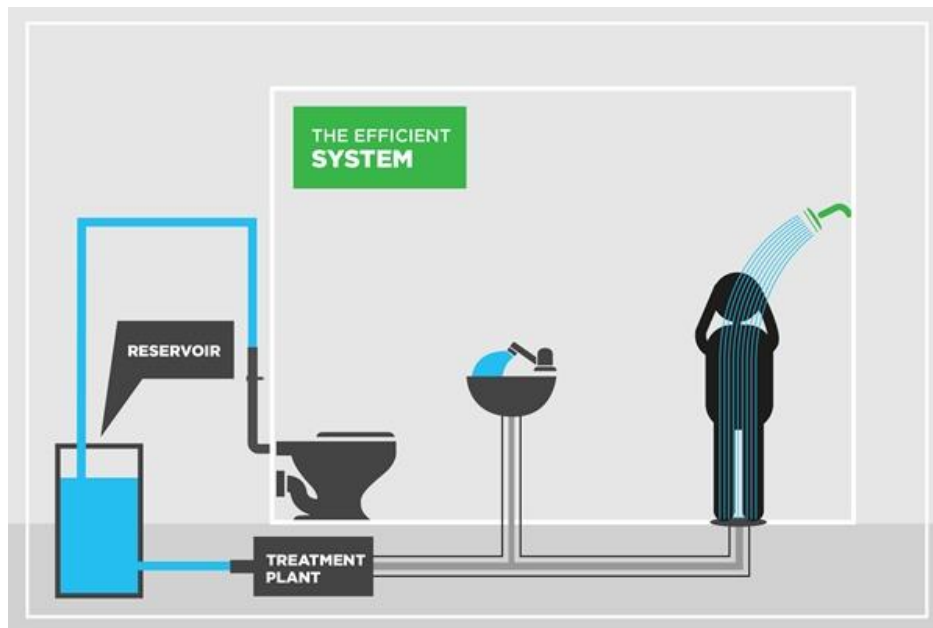
## **9. Guest Education**

- a. Make the guest aware of the various practices being followed by the hotel to conserve water resource. Communicate to guests the significance of local freshwater resources and provide opportunities to allow guests to use water wisely.
- b. Suggest guests to not leave the tap running while brushing their teeth or while shaving.
- c. Encourage and invite guests to reuse their towels and linens by opting not to have them changed every day.

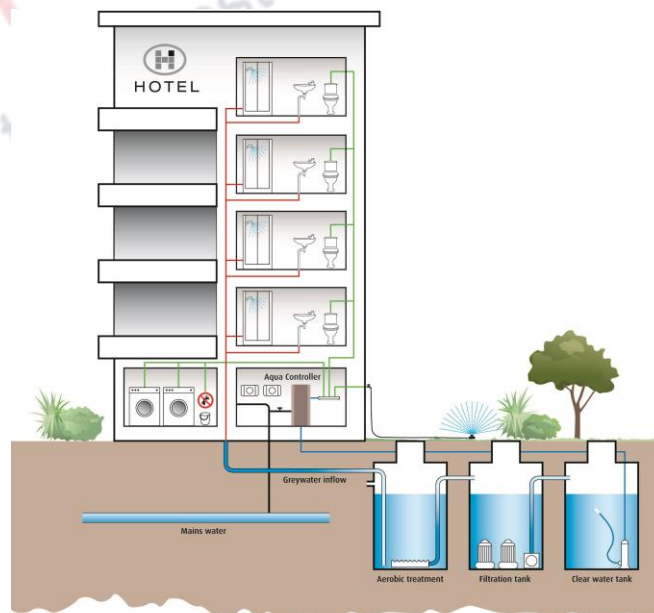
## **10. Staff Training**

- a. Ensure staff is trained on various practices and procedures. They need to be alert and observant. They should look for leaks, report them quickly.
- b. Use a plug and a bucket while cleaning baths and basins rather than keeping the taps (faucets) running.
- c. Clean the toilet after cleaning the bath and basin. This way the water can be used for a final wash down.
- d. Engage staff in developing more effective methods of operations. They too can suggest water conservation ideas.

## 11. Rain Water Harvesting



Waste Water from showers and hand wash basins is collected and treated. The recycled graywater is then used to flush the toilets. **This reduces water waste.**(Image



Source: <http://www.investinginwater.org/Downloadables/Paper-The-hotel-industry-a-shift-to-greener-and-lower-cost-operations/2024>)

## **Summary:**

Due to high resource-intensiveness of the hotel industry, this accelerated growth leads to overexploitation of resources. To preserve the rapidly depleting resources for the future generations, a more sustainable approach is required for the industry operations. A sustainable approach needs to be adopted particularly with regard to energy and water consumption. This module explains the significance of energy and water conservation and also elaborates the methods and techniques of conservation. Conservation is a process of reducing demand on a limited supply such that the supply can rebuild itself. Mostly, the best way of conserving energy is to replace the energy used with an alternate. Without energy conservation, mankind will exhaust its natural resources.

A hotel consumes substantial amounts of energy to provide comfort and services to its guests. Generally the consumption patterns of buildings of the same size as a hotel is comparatively lower as they do not house customers who are paying for all the exclusive amenities and different services. The energy use typically varies among different types of hotels, their category, size, number of rooms, location, clientele, climate zone and even the amenities and services made available by the hotel. Energy is consumed in different forms in a hotel (like electricity, fuel, heat, etc). Research studies highlight that electricity is the primary source followed by gas and fuel. To understand the energy consumption patterns within a hotel property, a hotel can be segregated into three zones namely, Guest Room Area, Public Area and Back Area. These three zones have varying energy consumption patterns as discussed in the module. We also studies various methods and practices by which a hotel can save tremendous amounts of its energy resource like appointing a staff personnel in every area to check consumption of energy, usage of natural light, effective usage of artificial lights, documentation of energy saving procedures and so on.

Hotels have a responsibility of not using more water than what is absolutely necessary. It makes business sense too as water accounts for high percentage of utility bills in many hotels. In fact, most hotels pay twice for their water consumption— first to purchase water and then to dispose it of as wastewater. Hotels with proper water conservation practices in place can reduce their water consumption per guest per night up to 50% compared with establishments with poor performance in water consumption. In this

section of the module we stressed on how to set up a water conservation plan in a hotel. Numerous techniques of water conservation are also discussed such as high-tech filtration systems, linen and towel reuse policy, aerated waters and so on.

It is suggested in this module that hotel management must strive to educate and encourage its staff and its guest on conserving our natural resources.

