**Sample**
**Environmental Review**

## Introduction

XXX is currently participating in a Waste Prevention Programme in conjunction with Galway County Council. The aim of the programme is to assist businesses in waste prevention, energy and water conservation. The programme is funded by the National Waste Prevention Programme and is administered by the Environment Protection Agency.

The aim of the programme is to identify practical implementable measures which will lead to waste prevention and a reduction in energy and water consumption, with 10% reduction targets set as a minimum to reach.

## Business Descriptive Summary

XXXXX
The hotel has 46 rooms, a large function area, 9 hole golf course, driving range and 2 restaurants.

The rooms were built in the early 1990's, so comply with building standards at that time i.e. insulation etc and all windows are double glazed. The treated area is 4,570 m2 (approx).

There are 58 staff employed in the hotel, made up of many nationalities. The hotel is open 362 days per year with a daily average of 43 sleepers and 166 meals served. Their busiest month is August with 82% occupancy, while 32% of rooms were sold from December to March.

## Environmental Auditing

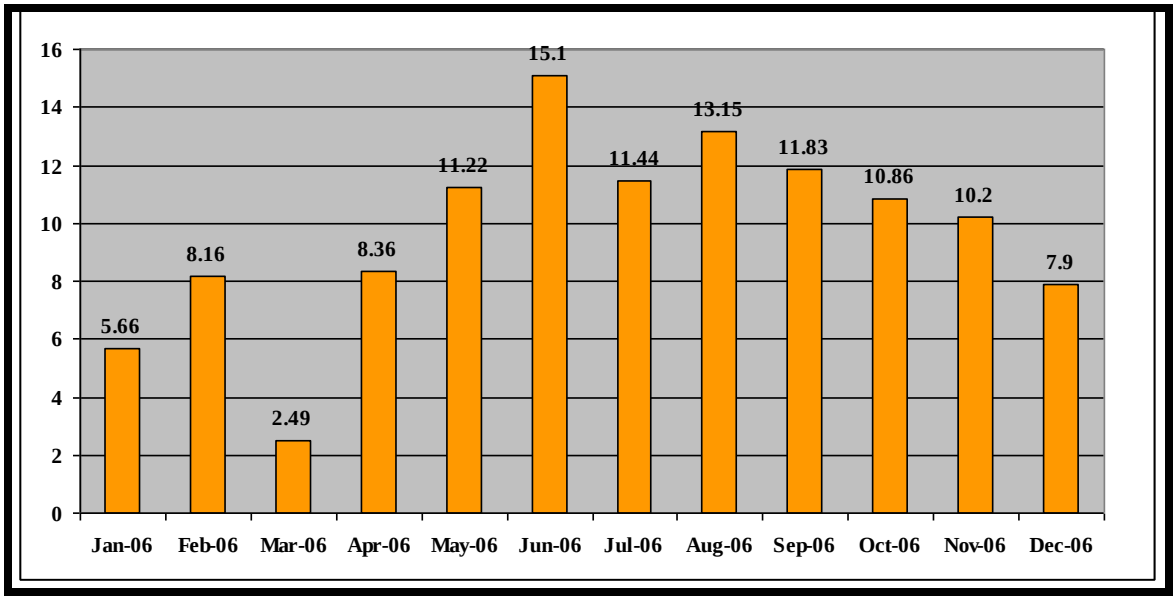
The first phase of the Prevention Programme in XXXX was to accurately access the existing situation with regard to waste arising and energy and water usage. Waste, Energy and Water audits were carried out during June and August in the hotel. Audits were carried out by the Project Team using auditing tools provided by the Clean Technology Centre, with the assistance of management and staff at the XXXXX. For the purpose of reporting the findings, the waste, energy and water audits will be dealt with individually, as will the recommendations for improved environmental practices.

## Waste Audit Results

The waste characterisation process was conducted on 7th June and 27th August. In addition, details of the annual waste arising were examined based on information available from waste contractors and invoices available from the hotel.

Approximately 116 tonnes of waste was generated during January to December 2006 at XXX. Segregation facilities are available for organic waste, glass and mixed recyclables and skips provided for landfill waste. See in Chart 1 the annual waste arising at the hotel:

**Chart 1**




The annual tonnage of waste arising at XXX is broken down as follows in chart 2 below: landfill waste at almost 53 tonnes, followed by cardboard at 23 and organic waste at 22.5 tonnes, glass at 14.5 tonnes and mixed recyclables at just over 2.5 tonnes..

**Chart 2**

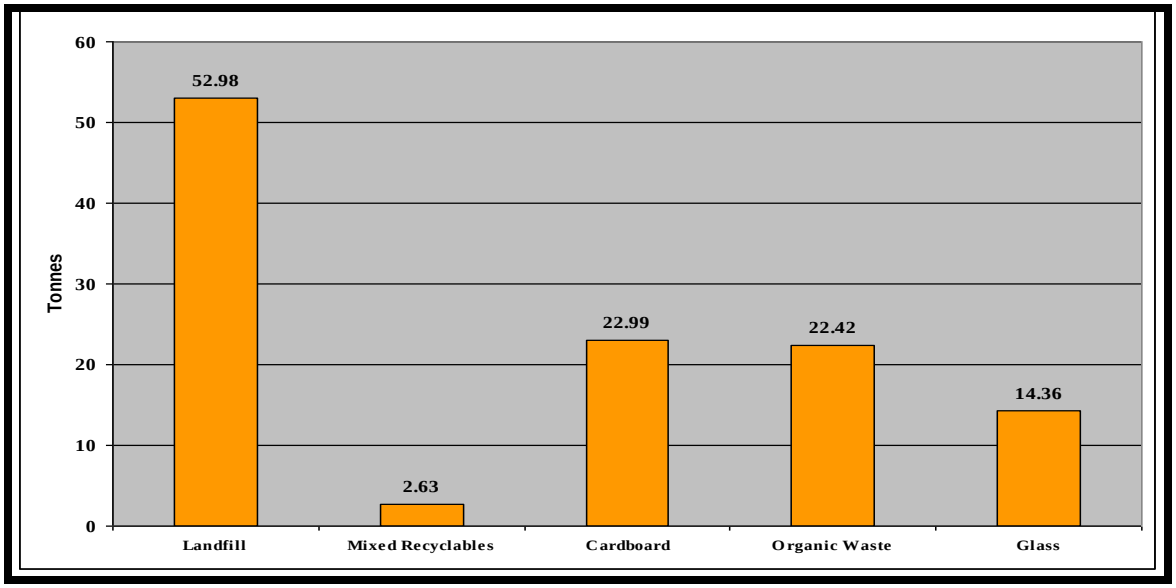
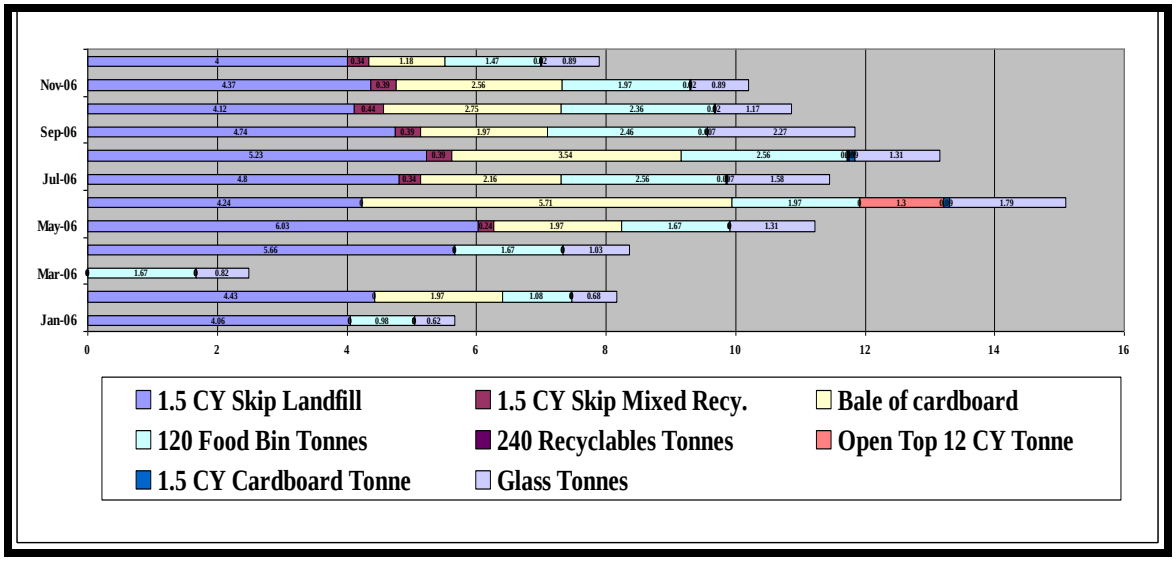


Chart 3 below shows on a monthly basis, the breakdown of waste arising in XX between January and December.

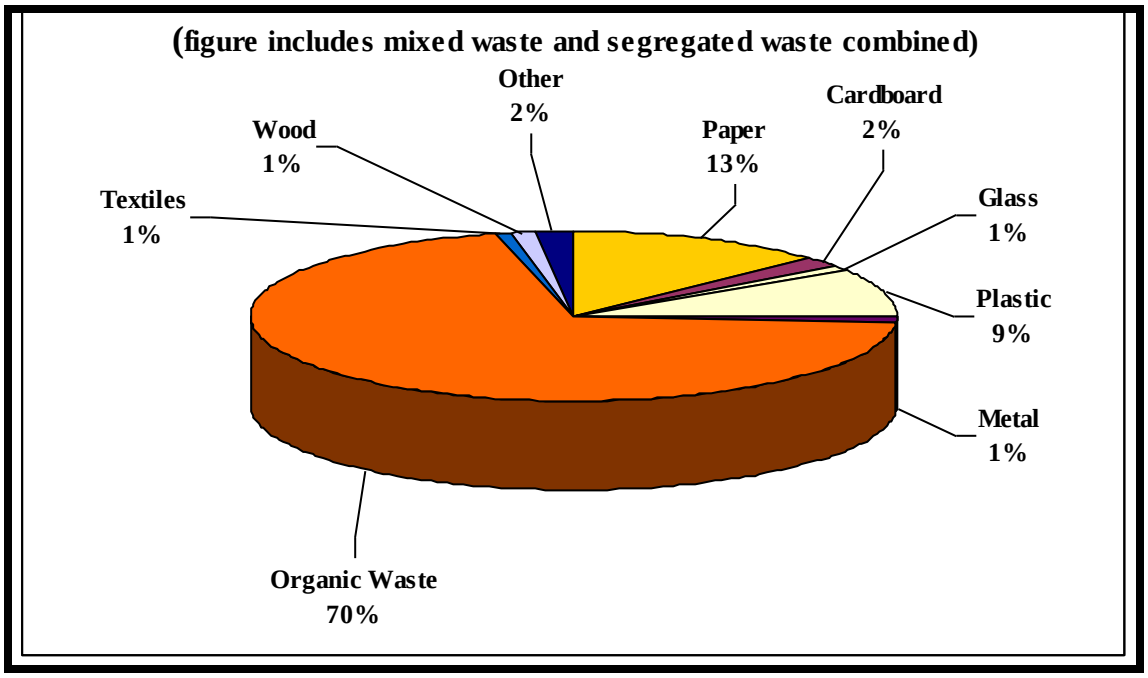
**Chart 3**




To further analyse the waste arising at the hotel, a waste characterisation process was undertaken. This process involved the analysis of landfill and segregated waste on site. During the characterisation, 142 kilos of mixed waste and 176 kilos of segregated waste was analysed, in addition to annual bills and weights from the Waste Contractors providing a service to the Glenlo Abbey Hotel

The waste characterisation process identified the waste streams below, chart 4, as % of the waste arising. Please note that this is a combined figure for waste identified within the mixed waste and segregated recycling waste streams of the waste characterisation process.

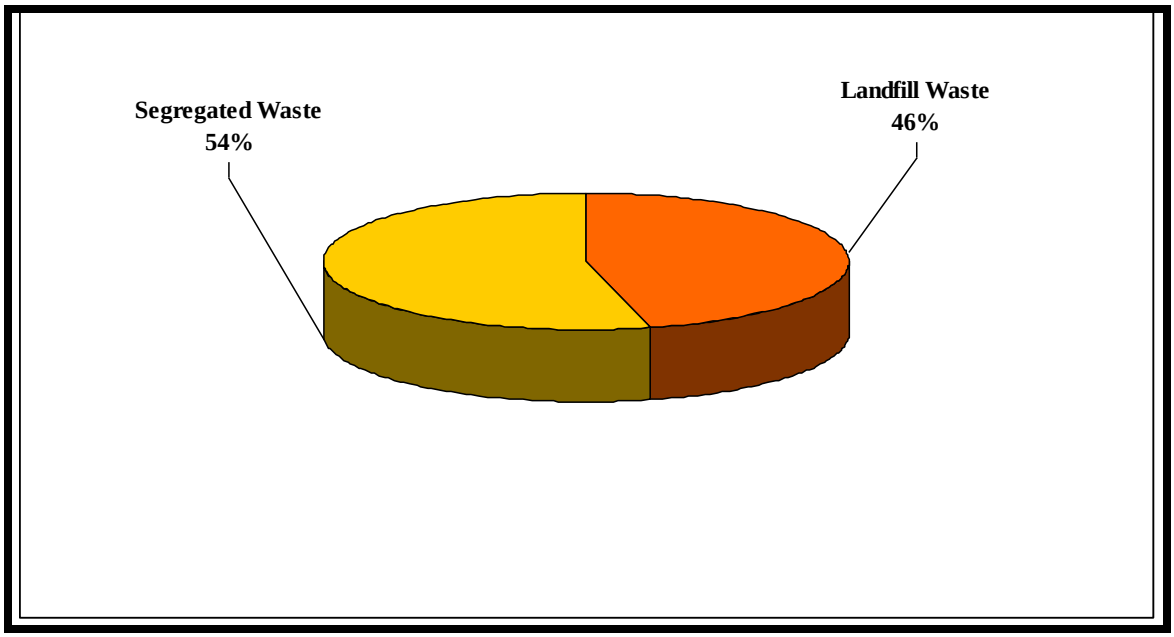
**Chart 4**




Mixed waste is the term used to describe waste where no effort to separate various waste types has been made. Of the total annual waste arising in XXX, 46 % is unsegregated landfill waste, and the additional 54% is segregated on site through the collection receptacles for mixed recyclables, cardboard, glass and organic waste. The figure for segregated waste is substantial and is due to organic waste making up approximately 70% of the daily waste arisings. See Chart 5 overleaf:

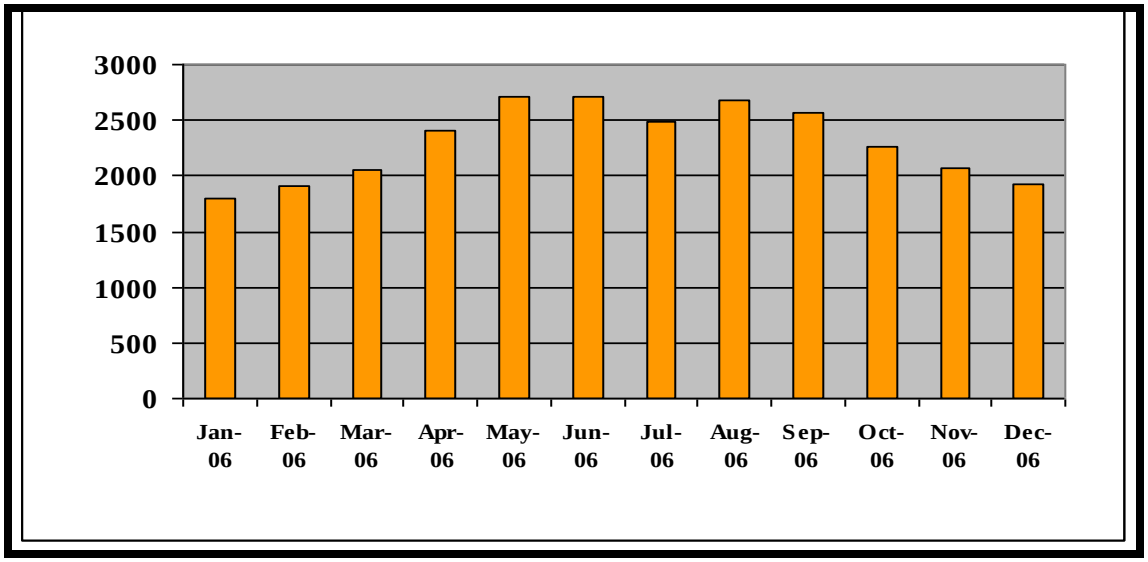
It was noted that although good processes were in place, contamination was evident in the waste and that further work needs to be undertaken to ensure all staff are aware of the waste segregation processes and how they operate.

**Chart 5**




The total annual costing of waste arising at XXX was €27,605.69. A slight increase is notable during the summer months, as this is the busiest time in the hotel. See Chart 6 below.

**Chart 6**




Based on the above figures, it is estimated that for each bednight in the hotel 7.5 kg's of waste is produced. Another breakdown, is for each meal served, 1.9 kgs of waste is produced.

The waste service providers are Walsh Waste and the City Bin Company. As with all elements of the existing business, continual exploration should be made to ensure that the best value is being gained from the service providers.

XXX has undertaken a number of initiatives to improve their waste management practices in recent years. On site, there are receptacles for mixed recyclables, glass and

organics and a skip for landfill waste. There are several recycling recepticles for segregated items i.e. cardboard, mixed plastics etc. During our visit, these bins did not appear to be operating successfully, as high levels of contamination were observed and also waste suitable for recycling was observed in the landfill bins. Good practices were observed in the offices, however continual emphasis should be placed on waste prevention here, minimising paper usage.

Prior to the audit, although staff training did occur, no formal arrangements were evident that encouraged and ensured that staff in all sectors complied with recycling procedure. In the hotel as a whole, dry recyclable segregation other than organics and cardboard, paper and plastic is poor at present. This was particularly noticeable as an amount of paper, organic waste and plastic waste is being presented as mixed waste which could easily be segregated for recycling.

Although a good effort is being made there is scope for many improvements. The hotel developed an environmental policy a number of years ago and this should now be reviewed to incorporate prevention as part of their policy.

**Recommendations / Actions for Improvement - Waste**

**Environmental Awareness**

- Establish Green Team who will lead actions for better environmental practice in the business;
- Prepare an Environmental Policy in conjunction with Senior Management / Green Team and display in a highly visible area;
- Identify a regular date for monthly meetings of Green Team, i.e. first Monday of every month;
- Identify a suitable Green Notice Board accessible to both staff and visitors
- Develop a Waste Awareness Programme in relevant languages for staff i.e. posters, color coding of bins, signage to maximise segregation and encourage waste prevention;
- Inform staff about your environmental action plan. Ideally provide staff with ten top tips for waste, water and energy management at your hotel;
- Continue to advise your visitors on environmental initiatives which you are taking.

**Operational Options**

**General**

- Identify and promote waste prevention options at all levels throughout the hotel;
- Examine the economics of changing to smaller sized bins, as this should encourage better waste management practices;
- Identify suitable number of waste stations throughout the hotel in conjunction with the Green Team/management, i.e. kitchen, bedrooms etc. and assign responsibility;

- Use clear refuse sacks for all waste collection to ensure recycling is maximized;
- Introduce color coded receptacles for different waste streams and locate at relevant areas in store;
- Encourage options for waste prevention where possible;
- Purchase in bulk where possible, i.e. concentrated cleaning agents etc.,
- Ensure recycling bins are emptied regularly to ensure maximum recycling is achieved i.e. kitchen.

**Kitchen/Bars/Restaurants**

- All cooked food waste should be segregated for composting;
- Use of disposable clothes should be kept to a minimum;
- Review the use of single use portion of jams, butters etc., where possible;
- Ensure all disposable cloth rolls etc. are completely used prior to changing;
- Ensure all food containers are empty prior to disposal;
- Review system to determine quantities of food cooked throughout the day;
- Delivery of fish – avoid container contamination where possible – ensure segregation before contamination can occurs;
- Composting of all food waste, including lemons from bar and flowers instead of current system.

**Bedrooms**

- Contamination of recyclables from bedrooms – teabags, sugar packets and soaps. Better training of staff;
- Replace individual toiletries in bedrooms with larger refillable containers eg liquid soap, shampoo etc;
- Promote waste prevention measures to guests;
- Collect old magazines from bedrooms and make available to staff/residents/ charity shop.

**Delivery Area/Yard**

- Investigate better methods for use of mixed recyclable skips;
- Formally review all suppliers asking them how they envisage reducing their packaging;
- Maintain records for waste sent offsite – a staff member should verify collection and have estimated / actual weight of each collection recorded.

**Legislation**

- Ensure compliance with all relevant legislation eg waste management, health and safety etc;
- Ensure that all waste collection contractors are permitted by the relevant authority;
- Implement a Hazardous Waste Management Programme and monitor and record these actions (Fluorescent tubes, batteries, detergents are key).

**Training**

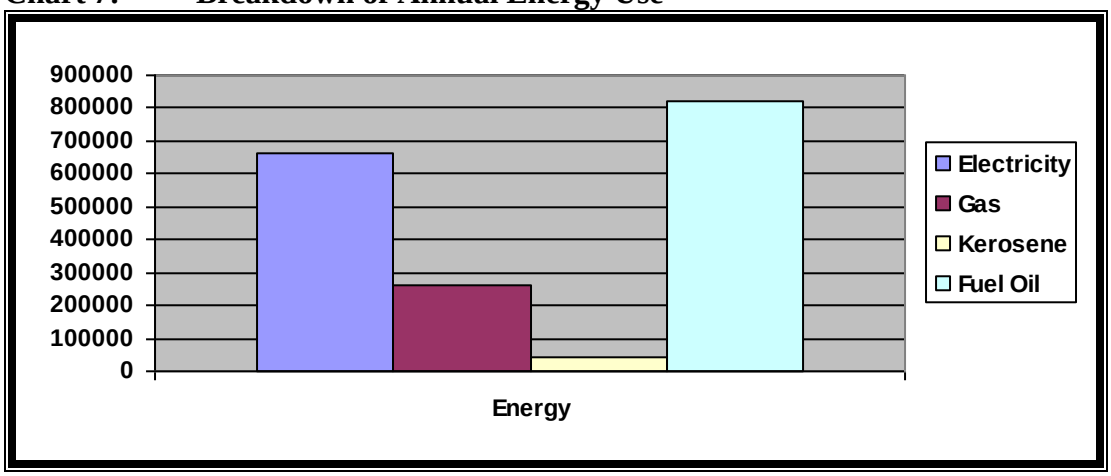
- Training to be provided for all staff on correct waste management practices

- Specific training to be provided for key staff in specific areas to ensure best practice

## Energy Audit Results

The total energy costs for the period XXX was €155,289.22. This represents 1,790,167 kWh of energy and the following chart displays the total energy used (kWh).

**Chart 7: Breakdown of Annual Energy Use**




The breakdown of energy costs per month is included in Appendix 1. Energy costs the business €425 per day, with 71% of the electricity used during the day. This equates to €10.10 per sleeper or 116 kWh per sleeper. When one considers the total number of guests visiting the hotel the energy costs are €2.05 per guest and 24 kWh used per guest.

The company has recently been registered with Energia, their electricity provider to allow for further analysis of their consumption patterns and maximum demand peaks. The maximum demand for the XXX is 120 kVA. The maximum demand is exceeded every month costing the business an excess charge of €2053 during the above period. All non essential equipment and lighting should be switched off at peak times. This maximum demand should also be reviewed at regular intervals.

The results of the energy audit are presented in Appendix 2 based on the best possible information available at the time to the Audit Team. For the purposes of this audit, the hotel was subdivided into a number of areas to determine the energy costs associated with each. The results of the energy audit will be further analysed with an energy specialist from Sustainable Energy Ireland (SEI). This may identify any unquantifiable energy sources and ensure greater accuracy in the results.

### Lighting

A lighting survey of the building was conducted which involved listing all bulbs in use together with the relevant wattage. It was estimated that all lighting (except bedrooms and the Pullman Train) was switched on 14.5 hours per day, 362 days per year. This may not be the case in all areas throughout the year. It must be noted that this survey was based on a unit rate cost of 13 cent, which was closer to the maximum unit cost

applicable during the above period. Lighting is estimated to cost the business up to €31,000 per annum and the results of this survey are summarised in the following table.

**Table 1: Maximum Annual cost of Lighting based on each Area**

| Building | Area | Total Wattage Available | Current Annual Cost |
|---|---|---|---|
| **Main Building** | **Reception** | 2713 | €1,851 |
| | **River Room** | 2760 | €1,883 |
| | **Bar** | 2460 | €1,679 |
| | **Stairways** | 1880 | €1,282 |
| | **Meeting Rooms** | 4180 | €2,852 |
| | **Business Centre** | 5199 | €3,548 |
| | **Corridors** | 7106 | €4,849 |
| | **Public Toilets** | 828 | € 546 |
| | **Main Kitchen** | 2592 | €1,769 |
| | **Bedrooms** | 6440 | €1,212 |
| | **The Abbey** | 1410 | € 265 |
| **Pullman Train** | **All Aeas** | 4314 | € 869 |
| **Pavillion** | **All Aeas** | 10793 | €7,529 |
| **Other** | **Driving Range** | 1840 | € 346 |

There is a capability of 48361 wattage of lighting in the hotel buildings which is estimated to cost in the region of €6.67 per $m^2$ and approximately 40 cent per visitor to the hotel.

Table 2 sets out the different factors used to calculate the annual cost of lighting. It highlights areas where immediate action should be taken to reduce overall energy usage. Spotlights (50 w) and candle lights (40w/25w) are common throughout the hotel and are generally used for decorative purposes in chandeliers, table lamps and wall lights. Energy efficient replacements should be installed where feasible, offering substantial savings during the lifetime of the energy efficient bulbs.

**Table 2: Examples of Calculations for Cost of Lighting**

| Area of Hotel | Type of Lighting | Wattage | Days per year | Cost per Unit | No of bulbs | Hours per day | Current Annual Cost |
|---|---|---|---|---|---|---|---|
| Reception | Spotlights | 50 | 362 | .13 | 24 | 14.5 | € 818.84 |
| Bar | Candle lights | 40 | 362 | .13 | 49 | 14.5 | € 1,337.45 |
| De Burgo Room | Spotlights | 50 | 362 | .13 | 50 | 14.5 | € 1,705 |
| Office | Fluorescent Tube | 65 | 362 | .13 | 24 | 14.5 | €1064.50 |
| Display Cabinet on corridor | Spotlights | 50 | 362 | .13 | 15 | 14.5 | €511.78 |
| Pavillion | Spotlights | 50 | 362 | .13 | 120 | 14.5 | €4094 |

**Appliances**

All appliances in use throughout the building were listed in addition to their respective wattage, estimated number of hours in operation and time operating at maximum output, in an effort to determine the cost to the business and to identify the most costly equipment in use. Electrical appliances listed cost approximately €33,000 per annum, but it must be noted that most of the heating, ventilation, air conditioning and refrigeration (HVAR) costs are not included in this estimate or gas equipment. These costs will be further analysed with assistance from the SEI to ensure the highest level of accuracy possible in compiling the energy

The results of the equipment survey are included in Appendix 2, while the following table summarises the total cost per area for appliance use.

**Table 3: Total Cost of Appliance Use per Area (excluding HVAR equipment)**

| Area of Hotel | Current Annual Cost | |
|---|---|---|
| **Main Kitchen** | €20,266 | Excludes HVAR equipment and gas equipment |
| **Pavillion** | € 5,036 | Excludes HVAR equipment and gas equipment |
| **Driving Range** | €893 | Excludes HVAR equipment |
| **Bedrooms** | €1,864 | Excludes HVAR equipment |
| **Kitchen** | | Excludes HVAR equipment and large Cuisine de France ovens |
| **Pullman Restaurant (Train)** | €2,219 | |
| **Administration** | €702 | |

The most expensive electrical appliances in operation are located in the kitchen costing approximately €20,000 per annum. Table 4 highlights the cost of some of the listed appliances based on an estimate of numbers of operation and percentage of time operating at maximum output.

**Table 4: Some of the Appliances Listed during Survey**

| Area | Appliance | % of time at max output | No of Hours per day | No of Days per annum | Cost per annum |
|---|---|---|---|---|---|
| **Main Kitchen** | Fetco Coffee Machine | 100% | 12 | 362 | €2,880 |
| | Bewleys Coffee Machine | 50% | 12 | 362 | € 3,473 |
| | Pass Through Dishwasher | 100% | 4 | 362 | €1,270 |
| | Oven | 50% | 6 | 280 | €2,935 |
| **Pavillion** | Authosham Fridges (2) | 60% | 24 | 365 | €2,938 |
| **Hotel** | Hoovers (2) | 100% | 2 | 365 | €759 |
| **Driving Range** | Vending Machine | 60% | 24 | 365 | €283 |

**Heating**
Heating throughout the hotel is run by a main frame system that can be set to turn on or off certain areas at different times. The annual cost of heating for this period is €49,000 based on bills provided, which represents a cost of €10.70 per $m^2$ or €0.65 per guest.

**Unestimated Costs**
As stated, the majority of the HVAR equipment has not been included in this report. Furthermore the bar equipment and gas equipment are also excluded.

These costs will be further analysed with assistance from the SEI to ensure the highest level of accuracy possible in compiling the energy data and benefiting from their experience in specialised areas ie HVAR.

**Recommendations / Actions for Improvement – Energy**

**General**
- Monitor energy use online to review bills, trends and unexplained peaks in usage;
- Identify use of unnecessary equipment/lighting at peak times.

**Environmental Awareness**
- Develop an Energy Conservation Programme in relevant languages for staff;
- Display relevant energy tips on Green Notice Board.

**Training**

- Training to be provided for all staff on energy conservation;
- Specific training to be provided for key staff in specific areas to ensure best practice.

**Lights**

- Continue to replace all lighting with energy efficient alternatives and with longer life spans;
- Ensure that lighting is in compliance with FLUX standards;
- Ensure lights are switched off when not required eg toilets etc;
- Investigate the installation of light sensors in underused areas – toilets, corridors, back of house, maintenance rooms.

**Heating**

- Investigate alternative energy systems;
- Monitor temperature on a regular basis and turn off radiators where not used;
- Insulate valves in boiler house and replace lagging jacket to avoid heat loss.

**Electrical Appliances**

- Ensure all office equipment is turned off completely when not in use;
- Ensure temperatures in freezers/refrigeration areas do not exceed the recommended temperature;
- Review manufacturer's guidelines for operating costly equipment and use according to the relevant guidelines;
- Review use of equipment in the kitchen with the relevant staff and only turn on equipment when required and turn off when not in use;
- Develop simple departmental standards for energy management, e.g.
    - Turn off extractor fans in kitchen when not required, they were on when not required during review.
    - Only turn on one grill until needed. On when not required during review;
- Ensure that all new appliances purchased in the future are 'A' rated;
- Introduce a sheet change card in bedrooms.

Part 2 of the Environmental Review, comprising of expert analysis from Sustainable Energy Ireland, based on further energy reviews of the hotel will be available and circulated shortly. An assessment of water usage will also be included together with practical measures on water conservation.

All figures used for auditing purposes in this Environmental Review are determined to be as accurate as possible at the time of auditing.

## Water Audit Results

There is a metered supply of public water being provided to the hotel. Water pressures were checked in a number of bedrooms, kitchen and bathrooms. Results showed that most taps and showerheads were using too much water. An estimate was made of the number of times and length of time each tap was used eg it was estimated that the taps in the men's public toilets were used on average 30 times per day for 1 minute period.

The pressures ranged from 3 litres per minute to 60 litres per minute as shown in the table below:

| **Location** | **Minimum Flow (litres per minute)** | **Maximum Flow (litres per minute)** |
|---|---|---|
| Public Toilets | 15 | 55 |
| Cellar Bar | 4 | 60 |
| Pavillion | 3 | 27 |
| Bedroom Sinks (sample) | 6 | 27 |
| Bedroom Showers/Baths (sample) | 10 | 34 |
| Kitchen | 6 | 60 |
| Pullman | 7 | 15 |
| Driving Range | 22 | 27 |

Best practice suggests that 10 litres per minute is acceptable. This can be achieved through the use of flow restrictor aerators on taps.

Based on meter readings taken, the water usage from mid June 2007 – mid February 2008 was 734 m3, which equates to an average of 73 litres per sleeper or 26.59 litres per food cover in 1007.

### Recommendations / Actions for Improvement - Water

- Establish the true volume of water supplied to the hotel by verifying meter readings;
- Monitor water flow by fitting a data logger over a prolonged period;
- Review volume of water in toilet cisterns and implement reduction programmes;
- Review flow of water through guest taps and showers and install flow restrictors to reduce flow to c. 10L per minute (test on sample rooms first);
- Measure flow in bedroom showers. If >20 l/min consider use of low flow shower heads;
- Review urinal cistern flushing frequency and install motion sensors as all urinals were on constant flow;
- Use stopper for all kitchen sinks when washing pots;
- Develop leak reporting initiative and repair all leaks immediately;
- Investigate the use of rainwater harvesting/grey water for flushing public toilets;
- Investigate the installation of dual flush toilets;

- Train staff in water conservation in each department and monitor; e.g. ensure accommodation staff minimise water consumption in cleaning of baths, sinks and toilets.