Best Environmental Management Practice in THE TOURISM SECTOR

6.2 Waste sorting and sending for recycling

This best practice is an extract from the report *Best Environmental Management Practice in the Tourism Sector*.

6.2 Waste sorting and sending for recycling

Description
Guest
On average, hotels generate approximately one kg of unsorted waste per guest per night (ITP, 2008), equating to 66 tonnes per hotel per year in the UK (WRAP, 2011). Waste disposal costs are likely to increase steadily in the future due to diminishing landfill space and increasing collection and disposal costs. Poor waste management has implications for hygiene and health, environmental quality, resource and economic sustainability. As outlined in section 6, a multitude of regulations pertain to waste management and handling, including local, national and European waste regulations, health and safety regulations in relation to waste handling, noise regulations in relation to compaction and collection operations (Waste Management World, 2011). The largest waste fractions generated by hotels are glass, organic, cardboard and paper, metals and plastics. Organic waste originates mainly from kitchen activities, for example preparing breakfast and meals for in-house restaurants. Best practice for organic waste management is described in section 8.2, in the chapter addressing kitchens. Meanwhile, economic factors are driving widespread glass recycling, with a similar situation evolving for cardboard and paper fractions. This section therefore focuses on best practice for the management of non-organic waste, and especially plastic waste, arising in accommodation.

Hotels face a range of barriers to sorting and recycling their waste. They are to some extent limited by the waste management infrastructure in their locality, often owned and operated by the local authority, especially if they are not able to find other takers for waste fractions that the local system does not accept. In city hotels, available ground floor space may constrain the storage of multiple bins for separated waste fractions – front-of-house areas such as reception, lobby, restaurant and banqueting facilities are prioritised for ground floor space. However, experience shows that there are many innovative means of sorting and recycling waste in accommodation, in the process reducing disposal costs. Figure 6.8 presents an example of the high sorting and recycling rates achievable by best performers, summarising data for a small UK hotel where 98% of waste is recycled. Interesting aspects of the hotel’s waste minimisation strategy include the reuse of clear bottles in the kitchen and return of food and drink packaging for reuse by local suppliers.

Figure 6.8: Sorted waste fractions recorded and recycled in a small 14-room boutique UK hotel and restaurant

Best practice 6.2 – Waste sorting and sending for recycling

As described in section 6.1, a relevant starting point for waste prevention, sorting and recycling is to record on-site waste generation by category and source. In addition, it may be necessary to perform or organise a study exploring local reuse and recycling options (Table 6.7). As outlined in Figure 6.3 (section 6), where possible, opportunities for product reuse should be sought before waste is sent for recycling. These may be on site or off site, and include options such as returning packaging to suppliers. Implementation of a successful waste sorting and recycling programme requires engaged management to coordinate technical and human resource requirements across all departments, including relevant staff training and time allocation (Table 6.7). In particular, staff should receive clear instructions on what types of waste are to be sorted and how, with specific responsibilities assigned. On-going monitoring and reporting of waste quantities should be monitored and reported so that recycling rates and unsorted waste disposal can be benchmarked to track progress. Consequently, hotels should seek to integrate waste management into an overall EMS (see section 2.1).

Table 6.7: Best practice measures to separate and recycle waste

<table>
<thead>
<tr>
<th>Department</th>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>All (management led)</td>
<td>Develop waste inventory</td>
<td>Survey of all areas and processes to identify types and sources of on-site waste generation. Identify waste recycling and packaging return options available locally</td>
</tr>
<tr>
<td></td>
<td>and identify options</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitoring and reporting</td>
<td>Continuously monitor and periodically report waste generation and collection by fraction</td>
</tr>
<tr>
<td>Procurement</td>
<td>Procurement selection</td>
<td>Select products and packaging made from recycled and recyclable material</td>
</tr>
<tr>
<td>Housekeeping</td>
<td>Waste bins</td>
<td>Install separated waste collection bins in rooms</td>
</tr>
<tr>
<td></td>
<td>Waste collection in rooms</td>
<td>Separate waste during room cleaning into fractions collected separately from accommodation premises</td>
</tr>
<tr>
<td></td>
<td>Back-of-house waste</td>
<td>Separate waste arising from public areas, maintenance of outdoor and indoor facilities, and other back-of-house areas into appropriate fractions for recycling and correct disposal</td>
</tr>
<tr>
<td></td>
<td>management</td>
<td></td>
</tr>
<tr>
<td>Catering</td>
<td>Green procurement</td>
<td>Consider packaging volume, production impact and recyclability when assessing products for green procurement (see section 8.1)</td>
</tr>
<tr>
<td></td>
<td>Separation</td>
<td>Install and train staff to use conveniently located bins for separate collection of glass, plastics, and paper and cardboard in kitchen and dining areas. See section 8.2 for separate organic collection</td>
</tr>
<tr>
<td>Reception and public areas</td>
<td>Collection points</td>
<td>Install collection points for paper and magazines, batteries and other hazardous waste</td>
</tr>
</tbody>
</table>

Achieved environmental benefits

Lifecycle environmental benefits

Figure 6.9 displays the lifecycle chain for extraction, production, consumption and waste generation. Reuse, recovery and recycling within the economic sphere are associated with environmental pressures, most notably energy consumption and emissions. However, these actions avoid much greater pressures associated with extraction and waste disposal, particularly resource depletion, energy consumption and emissions.
Best practice 6.2 – Waste sorting and sending for recycling

Figure 6.9: The lifecycle chain for extraction, production, consumption, waste management

Table 6.8 indicates the GHG emissions avoided by recycling one kg of different types of waste. Despite significant energy requirements to recycle some types of waste (e.g. glass transport and recycling), GHG emission savings are significant compared with disposal and production of new products with virgin materials.

Table 6.8: GHG emissions avoided per kg of different types of waste recycled

<table>
<thead>
<tr>
<th>Material</th>
<th>Glass</th>
<th>Board</th>
<th>Wrapping paper</th>
<th>Dense plastic</th>
<th>Plastic film</th>
</tr>
</thead>
<tbody>
<tr>
<td>kg CO₂</td>
<td>0.39</td>
<td>1.08</td>
<td>0.99</td>
<td>1.20</td>
<td>1.08</td>
</tr>
</tbody>
</table>


However, recycling results in a range of environmental benefits, in addition to GHG reduction, compared with disposal. Table 6.9 summarises the range of reuse and recycling options for different types of material, and the main environmental benefits of reuse/recycling.
### Table 6.9: Recycling options and associated environmental benefits for different materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Recycling option</th>
<th>Environmental benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat and fish</td>
<td>– Send for anaerobic digestion or composting, to local pig farm for feed (legislation permitting) or compost onsite using 'in vessel' composter</td>
<td>– Reduced GHG emissions, water pollution, landfill</td>
</tr>
<tr>
<td>Other organic waste</td>
<td>– Send for anaerobic digestion or composting, to local pig farm for feed (legislation permitting) or compost onsite using 'in vessel' composter</td>
<td>– Reduced GHG emissions, water pollution, landfill</td>
</tr>
<tr>
<td>Garden greenery</td>
<td>– Compost on site, chip and use as mulch on site, or send for composting</td>
<td>– Reduced resource depletion, water pollution and landfill</td>
</tr>
<tr>
<td>Used cooking oil</td>
<td>– Send for conversion to biodiesel</td>
<td>– Reduced resource depletion, water pollution and landfill</td>
</tr>
<tr>
<td>Cork</td>
<td>– Send to make insulation, tiles, pin-boards, soil mulch, etc.</td>
<td>– Reduced resource depletion and landfill</td>
</tr>
<tr>
<td>Aluminium cans and foil</td>
<td>– Send for recycling and use in aluminium industry</td>
<td>– Reduced resource depletion and landfill, and 75 – 90% reduction in energy and air pollution compared with virgin aluminium production</td>
</tr>
<tr>
<td>Glass</td>
<td>– Send bottles for reuse where possible, and send remaining glass fractions for crushing and recycling into new glass products</td>
<td>– Reduced landfill and 20 – 30% reduction in energy compared with virgin glass. Recycling one tonne saves 100 kg oil</td>
</tr>
<tr>
<td>Paper and card</td>
<td>– Separate into fractions (low- and high-grade) as specified by collectors and send for recycling</td>
<td>– Reduced resource consumption, landfill and energy</td>
</tr>
<tr>
<td>Plastics</td>
<td>– Return to supplier (packaging) or send for recycling into new plastic products through melting and remoulding or shredding Depends on types of plastic: see Table 6.11</td>
<td>– Reduced resource consumption, landfill and energy</td>
</tr>
<tr>
<td>Other packaging</td>
<td>– Select new, or work with existing, suppliers to reduce non-recyclable packaging waste</td>
<td>– Reduced soil, water and air pollution from leakages</td>
</tr>
<tr>
<td>White goods</td>
<td>– Return to supplier for recycling and disposal</td>
<td>– Reduced soil, water and air pollution from leakages</td>
</tr>
<tr>
<td>Chemicals and pharmaceutica ls</td>
<td>– Return to supplier or send to specialist contractor</td>
<td>– Reduced soil, water and air pollution from leakages</td>
</tr>
<tr>
<td>Batteries and lighting</td>
<td>– Return to supplier or send to specialist contractor</td>
<td>– Reduced soil, water and air pollution from leakages</td>
</tr>
</tbody>
</table>

**Accommodation premises savings**

Table 6.10 summarises the energy and GHG emission savings associated with recycling different materials, and indicates the magnitude of environmental savings achievable for a small 14-room hotel (Figure 6.8).
Best practice 6.2 – Waste sorting and sending for recycling

Table 6.10: GHG and energy savings from recycling compared with land-filling, and an example of savings achievable for a small 14-room hotel (Figure 6.8)

<table>
<thead>
<tr>
<th>Recycled fraction</th>
<th>GHG saving from recycling</th>
<th>Energy saving from recycling</th>
<th>Small hotel waste generation</th>
<th>GHG emissions avoided by small hotel with 84% recycling rate</th>
<th>Energy saved by small hotel with 84% recycling rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper &amp; card</td>
<td>1.0</td>
<td>4.1</td>
<td>1 954</td>
<td>1 700</td>
<td>6 730</td>
</tr>
<tr>
<td>Plastic</td>
<td>1.10</td>
<td>6.9</td>
<td>74</td>
<td>70.8</td>
<td>429</td>
</tr>
<tr>
<td>Metal</td>
<td>3.30</td>
<td>20.5</td>
<td>47</td>
<td>58.9</td>
<td>1 274</td>
</tr>
<tr>
<td>Glass</td>
<td>0.39</td>
<td>1.17</td>
<td>2 100</td>
<td>712.5</td>
<td>2 058</td>
</tr>
</tbody>
</table>

Source: Envirowise (2008); Browne et al. (2009); WRAP (2011).

Compliance across the entire hotel chain represented in presented Figure 6.12 with the proposed benchmark of 0.16 kg waste per guest-night would lead to a reduction in unsorted waste sent to landfill or incineration of 0.3 kg per guest-night. Compliance with the proposed benchmark across average hotels generating one kg residual waste per guest-night (ITP, 2008) would reduce the quantity of unsorted waste sent to landfill or incineration by 0.84 kg per guest-night. These reductions would translate into annual reductions in unsorted waste collection from a high occupancy 100 room hotel of 11 tonnes and 31 tonnes, respectively. In turn, these waste reductions would lead to annual GHG avoidance of over 13 t CO₂ eq., and annual energy avoidance of over 70 MWh, per hotel (Figure 6.10).

Figure 6.10: Potential annual GHG and energy savings for a 100-room hotel arising from achieving residual waste of 0.16 kg per guest-night (excludes organic fraction)
Best practice 6.2 – Waste sorting and sending for recycling

Appropriate environmental indicator

Indicators

There are two primary indicators of performance in terms of sorting and recycling waste generated on accommodation premises:

- the proportion of waste that is sorted and sent for recycling (percentage mass of total waste)
- the quantity of unsorted waste sent for disposal (kg per guest-night).

Benchmarks of excellence

Figure 6.11 displays the range of recycling rates across hotels in a mid-range European hotel chain, based on aggregated monthly data for 2010. The median recycling rate across hotels in the chain is 56%, and the top tenth percentile best performers achieve recycling rates above 84%.

Figure 6.12 displays the range of unsorted waste generated per guest-night (final waste sent for disposal) across hotels in a mid-range European hotel chain, based on aggregated monthly data for 2010.

The median quantity of unsorted waste per guest-night is 0.46 kg, and the top tenth percentile best performers generate less than 0.16 kg of unsorted waste per guest-night.

Thus, the following benchmarks of excellence are proposed:

**BM:** at least 84% of waste, expressed on a weight basis, is recycled

**BM:** unsorted waste sent for disposal is less than 0.16 kg per guest-night.
Best practice 6.2 – Waste sorting and sending for recycling

Cross-media effects
As represented in Figure 6.9, recycling is associated with energy consumption and other environmental impacts that arise during collection, transport and recovery operations. These impacts are usually considerably smaller than impacts arising from production from raw materials (Table 6.10). A detailed lifecycle assessment for PET recycling demonstrated that the environmental impact of recycling is comprised of logistics activities (37% of overall burden) and production of PET (63% of overall burden) (Figure 6.13). However, PET recycling is significantly more environmentally friendly than the incineration of the PET bottles in municipal waste incineration plants with waste heat recovery (Dinkel, 2008).

Packaging volume and recyclability is one of a number of important environmental criteria that should be considered in the context of lifecycle impacts when making procurement decisions (section 2.2). For many products, the production and/or use phases dominate lifecycle environmental impacts, so that procurement decisions based on packaging alone may not identify the best performing products from an overall environmental perspective.
Best practice 6.2 – Waste sorting and sending for recycling

NB: The impact was calculated according to the Swiss Ecological Scarcity Method (Frischknecht et al., 2008). Legend: HGV = Heavy goods vehicles, LGV = Light goods vehicles.

Source: Dinkel, 2008.

Figure 6.13: Environmental impact of the production of bottle-grade PET-flakes from recycled PET bottles

Operational data

Hazardous waste
A basic practice is to ensure that all hazardous waste, including chemicals, electronic equipment and fluorescent bulbs, is disposed of correctly, as required under relevant legislation and as recommended by producers (e.g. on packaging) or suppliers. Battery collection points may be provided at the reception for guests.

Waste inventory and reuse-recycling feasibility study
As for waste prevention described in section 6.1, developing an inventory of on-site waste types and sources is a relevant starting point for waste recycling and minimisation of residual waste. This requires management coordination and involves all departments, for example:

- housekeeping
- catering
- leisure facilities
- maintenance
- office.

Catering and housekeeping typically account for the majority of waste in accommodation. The initial waste inventory should be sufficiently detailed so that the major sources of all waste can be identified. Many sources can be identified from a simple tour of the premises, but in some cases there may be specific products to which large volumes of waste can be attributed, and that requires the involvement of specific relevant staff to identify. The information generated may
Best practice 6.2 – Waste sorting and sending for recycling

then inform procurement decisions within a lifecycle context (see section 2.2 on supply chain management), and indicate existing recycling potential.

With respect to economic implications, charges for collection of different waste fractions vary considerably across, and sometimes within, European countries. Therefore, it is important to identify locally applicable costs associated with various reuse, waste recycling and disposal options. It may be possible to form partnerships with other local enterprises producing similar types of waste in order to efficiently implement recycling collection or delivery (e.g. by guaranteeing the existence of a sufficiently large recyclable waste fraction for providers to collect separately, or by making organised delivery of waste fractions to central waste management stations economic). Alternatively, it may be possible to reach agreements with suppliers who may take back used products. For example, magazines provided to guests in the Rafayel Hotel in London are returned to the publishers for recycling.

Housekeeping

Housekeeping staff may separate waste from guest rooms, but some hotel groups have a policy for staff, based on health and safety concerns, not to retrieve waste already placed in bins (Accor, 2007). One solution to this problem is the provision of recycling bins in guest rooms, such as those provide in Scandic Hotels (left, inset). These bins comprise three separate compartments to facilitate sorting of organic, paper and other materials (inset, left).

The Hilton Slussen in Stockholm separates waste into 26 different fractions (ITP, 2008). However, for a typical hotel, it is usually unnecessary to separate waste into so many fractions – depending on the collection and recycling service. The Savoy hotel in London sends over 95% of waste for reuse or recycling. Waste from throughout the hotel, including rooms, is separated into eight fractions: glass, cardboard and paper, wood, plastic and metal, cork, organic oil, batteries, and electrical. Housekeeping staff recover recyclable waste from room bins. One company deals with the majority of the waste, and undertakes further separation after collection (The Savoy, 2011).

Catering

Management of organic kitchen waste is described in section 8.2. The Savoy in London incorporates a large kitchen for its restaurants, three smaller banqueting kitchens, and a staff canteen kitchen, and provides a particularly good example of catering waste management. Kitchen waste is carefully separated at source into the eight recycling streams listed above. Of particular note is the installation of a new automated system to monitor and change cooking oil, and store used oil centrally for collection to be converted into biodiesel. In addition, a use has been found for the thousands of bottle corks produced every week from the hotel and associated restaurants. Two 140-litre bins of corks are collected by catering staff every week and returned to Laithwaite's wine suppliers, who shred them to produce a mulch that is applied to their vineyards to help maintain soil moisture and suppress weeds (The Savoy, 2011).

Plastic waste recycling

Plastics represent a significant fraction of waste from accommodation which create environmental problems when sent to landfill owing to their slow decomposition. Many types of plastic are available across a wide range of products, some of which are easier and more likely to be recycled than others (Table 6.11). These may be identified by commonly used symbols similar to those displayed in Table 6.11 and referred to in the ISO 11469 standard relating to the generic identification and marking of plastics products. Depending on the area and service provider, mixed plastics may be collected for subsequent separation of recyclable fractions, or
accommodation staff may have to separate specific recyclable fractions. In either case, an important aspect to consider in green procurement decisions is the use of difficult-to-recycle plastics such as polyvinyl chloride, low density polyethylene and polystyrene (Table 6.11) in consumable products and packaging. Packaging minimisation and reuse (without affecting product quality and longevity) is the most straightforward measure to reduce waste from a lifecycle perspective. Accommodation managers may request suppliers of preferred products to improve the environmental performance, including recyclability, of their packaging.

Lifecycle impacts of packaging are heavily dependent on factors such as whether or not recycled material is used in production, different packaging weights associated with alternative materials, manufacturing location and methods, transport distance, energy sources, fate of used products, etc. (Öko-Institut, 2008). In a study of alternative drinking cup options for the Euro 2008 football games in Germany, Austria and Switzerland, Öko-Institut (2008) used LCA methods to assess the environmental performance of different cup types. Based on the Eco-Indicator-99 method, cups were ranked in the following order of environmental preference (best first):

- reusable PP cups (1<sup>st</sup>)
- disposable cardboard cups (2<sup>nd</sup>)
- disposable PET cups (3<sup>rd</sup>)
- disposable biodegradable polyacetide cups (4<sup>th</sup>)
- disposable PS cups (5<sup>th</sup>).

The results from this study highlight the environmental superiority of light-weight reusable cups, and cardboard over polystyrene cups.
Table 6.11: Main types of plastic, their identifiers, typical applications, and recyclability

<table>
<thead>
<tr>
<th>Polymer</th>
<th>Identifier symbol(*)</th>
<th>Typical relevant applications</th>
<th>Example</th>
<th>Recyclability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyethylene Terephthalate</td>
<td>01 PET</td>
<td>Drinks bottles; food containers; condiment containers.</td>
<td></td>
<td>Very good. Recycled into new bottles and clothes.</td>
</tr>
<tr>
<td>High Density PolyEthylene</td>
<td>02 PE-HD</td>
<td>Chemical containers (e.g. detergents, cosmetics); water pipes; garden furniture; other outdoor equipment such as water butts, potting trays, flower pots.</td>
<td></td>
<td>Good. Recycled to produce new bottles or pipes.</td>
</tr>
<tr>
<td>Polyvinyl Chloride</td>
<td>03 PVC</td>
<td>Bubble-wrap packaging; cling film for non-food use; electrical cable insulation; rigid piping; window and door frames.</td>
<td></td>
<td>Poor owing to additives.</td>
</tr>
<tr>
<td>Low Density Polyethylene</td>
<td>04 PE-LD</td>
<td>Shrink wraps; frozen food bags; squeezable bottles; cling films; flexible container lids.</td>
<td></td>
<td>Poor owing to economics and frequent contamination of films with e.g. food.</td>
</tr>
<tr>
<td>Polypropylene</td>
<td>05 PP</td>
<td>Reusable microwaveable ware; kitchenware; yogurt containers; margarine tubs; microwaveable disposable take-away containers; disposable cups; plates; bottle tops; nappies.</td>
<td></td>
<td>Poor. Wide range of types and grade make recycling difficult.</td>
</tr>
<tr>
<td>Polystyrene</td>
<td>06 PS</td>
<td>Egg cartons; packaging protection; disposable cups, plates, trays and cutlery; disposable take-away containers.</td>
<td></td>
<td>Poor owing to economics.</td>
</tr>
<tr>
<td>Other (e.g. polycarbonate)</td>
<td>07 O</td>
<td>Beverage bottles; baby milk bottles; compact discs; ‘unbreakable’ glazing; electronic apparatus housings.</td>
<td></td>
<td>Poor because often present in components of mixed plastic.</td>
</tr>
</tbody>
</table>

(*) American Society of the Plastics Industry. Symbols may vary across Europe (e.g. German DIN pre-fixes numbers with '0').

Source: Demesne (2011); Marius Pedersen (2011); Recyclemore (2011); British Plastics Federation (2011); Wikipedia (2011).
Storage and collection
Storage areas for waste fractions may be limited in some hotels, particularly those located in city centres. Compaction and densification of waste fractions using compactors, shredders or balers reduces storage area requirements and transport costs. Waste volume may be reduced 20 to 50 fold (Waste Care Corporation, 2011). The Savoy hotel in London compresses cardboard and paper waste into bales for collection, and stores plastic, metal and wood in a large compactor for collection and subsequent separation (Table 6.12).

Table 6.12: Waste compactor and compressed cardboard for collection from a large hotel

Donate items for reuse
Having addressed waste at source, the next step is to put appropriate systems in place to identify how the remaining waste can be redeployed, on site or by external organisations (ITP, 2008). Amongst others, Carlson Hotels Worldwide, Radisson Hotels & Resorts, Marriott International and Fairmont Hotels and Resorts donate untouched food from catering displays and trolleys, unwanted bed linens, mending kits and bathroom amenities to community projects such as homeless shelters, orphanages, homes for the elderly and drug rehabilitation centres, sometimes working through charitable organisations (Waste Management World, 2011).

Case Studies
Strattons Hotel
Strattons Hotel in Norfolk (UK) provides a good example of extensive reuse and recycling in a small boutique hotel (see Figure 6.8 above).

Hilton Slussen Hotel
Amongst larger high-end hotels, the Hilton Slussen in Stockholm sorts waste into 26 different bins. Introduction of a sorting and recycling scheme in 1997 reduced the 125 tonnes per month sent to landfill by 76 %, to 0.3 kg per guest-night. Cardboard was diverted to recycling, wooden pallets were diverted for heating buildings outside Stockholm, and other combustible materials were sent to generate district heating for apartments. Candle stumps were diverted to day care centres and to a church to be made into new candles for sale (ITP, 2008).
The Savoy

The Savoy hotel in London is a traditional luxury five-star establishment managed by the Fairmont Hotel Group. The establishment comprises 268 rooms, 62 suites (equivalent area of two rooms each), two restaurants, two bars and a tea room, and employs over 600 staff. Upon reopening in 2010 following a major refit, a comprehensive waste recycling programme was implemented in accordance with Fairmont Hotel’s Green Partnership Program (Fairmont Hotel Group, 2011). This included extensive and ongoing staff training – daily staff briefings incorporate environmental management topics, including waste separation, reuse and recycling. Consequently, over 95% of non-food waste is now diverted from landfill (Figure 6.14), and unsorted waste generation for the hotel and restaurants is equivalent to approximately 0.3 kg per guest-night (this includes waste arising from 30% non-resident restaurant customers). Organic waste amounting to a further 344 tonnes per year is separated and sent for energy recovery (see section 8.2).

Key actions of The Savoy's waste management programme include:

- purchasing department reduces packaging as part of green procurement (e.g. UKOS office suppliers rated top in The Sunday Times Best Green Companies 2010);
- housekeeping department sorts and recycles all items used by guests from rooms;
- installation of paper and food recycling bins in all departments;
- instigation of 'Food waste to Renewable Energy Scheme' that sends separated organic waste for heat and electricity generation by PDM Group (section 8.2);
- installation of an 'Oilsense' management and collection system for used cooking, to enable efficient reuse as biodiesel (section 8.2);
- all natural cork is collected by Laithwaites Wines, granulated and used as a mulch in their vineyards;
- an integrated pest management programme, operated by Ecolab Pest Control, minimises hazardous waste generation;
- implementation of a recycling programme for electronic waste and toner cartridges;
- redistribution of household goods and unclaimed lost property items to charity;
- donation of wooden crates to schools for arts and crafts uses;
- electronic document sending, double-sided printing and the use of whiteboards to minimise paper usage.
Applicability
All types, sizes and grades of accommodation can implement waste recycling (see also example of recycling on campsites in section 9.5).

Waste recycling options available to accommodation enterprises may be restricted in some locations. The provision of waste recycling services varies considerably across countries and localities, as indicated by the range of recycling rates across Europe (Figure 6.15; Figure 6.16). In areas where the municipality or private companies do not collect separated materials for recycling, accommodation managers can request the municipality to prioritise the provision of such services and seek alternative solutions, as required in such situations by criteria for the EU Ecolabel.

Even where collection services are not provided, proactive hotels are able to find solutions to waste recycling though cooperation with other local stakeholders, for example by arranging shared waste collection, or sending organic waste to local farmers for composting or biogas production.

In rural areas where collection services are less likely to be provided, it is usually possible to implement composting of the important organic waste fraction (section 8.2).

Source: ETC/SCP (2010).

Figure 6.15: Recycling rates for different fractions of municipal waste across EU Member States and Norway
Figure 6.16: Percentage of municipal waste treated in 2009 by country and treatment category sorted by percentage of landfilling

Economics
Waste management cost per guest-night
Ecotrans (2006) calculated the average cost of waste per guest-night in a German hotel. The waste collection and disposal costs for one day involving 43 overnight stays and the provision of 58 warm meals amounted to EUR 10.10, translating to around EUR 0.23 per guest-night, and EUR 115 per tonne. Waste costs were apportioned equally between the provision of accommodation and hot meals (Ecotrans, 2006). The survey found that waste charges were dominated by residual and organic waste fractions.

Waste management cost by fraction
The economy involved in sorting and recycling of waste relate to collection rates associated with the different waste fractions. These vary considerably across and within countries. Collection of residual, organic and hazardous waste usually incurs a cost, whilst collection of separated paper, plastic and metal for recycling is often free of charge (though this varies across municipalities). However, installation of appropriate waste-handling equipment and staff time for sorting different waste fractions incur costs that will somewhat offset benefits of lower collection and disposal charges. One hotel in Freiburg, Germany, is charged for removal of all waste except cardboard, for which a significant payment is received (Table 6.13).
Table 6.13: A breakdown of waste management costs for one German hotel

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Volume</th>
<th>Transport</th>
<th>Disposal</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tonnes</td>
<td>EUR/tonne</td>
<td>EUR</td>
<td></td>
</tr>
<tr>
<td>Waste for recycling</td>
<td>148.18</td>
<td>30.27</td>
<td>95.63</td>
<td>125.90</td>
</tr>
<tr>
<td>Building rubble sorted</td>
<td>7.88</td>
<td>11.68</td>
<td>6.50</td>
<td>18.18</td>
</tr>
<tr>
<td>Wood packaging</td>
<td>10.22</td>
<td>77.10</td>
<td>9.12</td>
<td>86.23</td>
</tr>
<tr>
<td>Mixed construction waste</td>
<td>10.16</td>
<td>18.11</td>
<td>91.96</td>
<td>110.07</td>
</tr>
<tr>
<td>Cardboard packaging</td>
<td>59.16</td>
<td>20.14</td>
<td>-61.60</td>
<td>-41.46</td>
</tr>
<tr>
<td>Glass</td>
<td>50</td>
<td>28.76</td>
<td>4.63</td>
<td>33.39</td>
</tr>
<tr>
<td>Food waste</td>
<td>116.64</td>
<td>NA</td>
<td>103.69</td>
<td>103.69</td>
</tr>
<tr>
<td>Light weight recyclables</td>
<td>18.4</td>
<td>49.32</td>
<td>93.01</td>
<td>142.33</td>
</tr>
<tr>
<td>Fat from grease traps</td>
<td>28.9</td>
<td>84.78(*)</td>
<td>41.18</td>
<td>41.18</td>
</tr>
<tr>
<td>Container rental</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*)Service costs to empty and clean grease traps (25 hours per year).

Hotel waste management savings

The Savoy in London pays approximately EUR 110 per tonne for mixed waste collection, compared with free collection for separated recyclable materials, and receives payment of EUR 0.30 per litre for the 600 litres of waste cooking oil collected every month by a private company to produce biodiesel.

A reduction in unsorted waste of between 11 and 31 tonnes per year for a 100-room hotel (see ‘Environmental benefit’, above) would lead to annual cost savings of between EUR 1 210 and EUR 4 030, assuming collection costs of EUR 110 to EUR 130 per tonne of mixed waste and free collection of recyclable materials.

By reusing or recycling 98% of waste, Strattons 14-room hotel and restaurant in the UK saves over EUR 1 000 per year in waste disposal costs (Envirowise, 2008).

Table 6.14: Some examples of economic savings arising from recycling actions

<table>
<thead>
<tr>
<th>Hotel</th>
<th>Action</th>
<th>Annual waste reduction</th>
<th>Annual saving</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>96-room conference hotel</td>
<td>Waste separation</td>
<td>72 t reduction in landfill</td>
<td>4 120</td>
<td>Sustainable South Land (2011)</td>
</tr>
<tr>
<td>Hotel and restaurant</td>
<td>Onsite composting</td>
<td>150 t organic waste reduction</td>
<td>30 000</td>
<td>Irish EPA (2008)</td>
</tr>
<tr>
<td>148-room conference hotel</td>
<td>Food and general waste recycling</td>
<td>70 % reduction in landfill</td>
<td>21 480 (44 %)</td>
<td>Irish EPA (2008)</td>
</tr>
<tr>
<td>and restaurant</td>
<td>Introduction of organic and mixed</td>
<td>127 t food waste, 17.5 t glass, 6.5 t</td>
<td>2 300</td>
<td>Foodwaste.ie (2010)</td>
</tr>
<tr>
<td>74-room hotel and restaurant</td>
<td>recyclable bin</td>
<td>paper and cardboard, 0.65 t plastic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Driving Force for Implementation
Driving forces for implementing waste sorting and recycling include:

- corporate social responsibility
- waste legislation
- differentiated charges for collection of recycling waste and disposal of waste
- voluntary EMS or ecolabel criteria
- environmental marketing – waste management is a visible demonstration of environmental commitment.

Reference organisations
The Hilton Slussen hotel Stockholm; The Savoy hotel, London; Scandic hotels; Strattons hotel Norfolk (UK).

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