RESOURCE EFFICIENCY FACTSHEET

Retail Sector

The sector

The retail sector in Ireland employs over a quarter of a million people, purchases c.€32 billion in goods and services (including €5 billion Irish food and drink products), has a turnover of c.€40billion, and generates over 200,000 tonnes of waste from over 42,000 retail businesses[1].

The retail sector is a major driver of production and consumption patterns, as a key link between producers and consumers. Retailers also have a great influence on producers, suppliers and consumers and therefore can help contribute to the promotion of sustainability issues within various groups of stakeholders in the supply chain.

Of particular significance from an environmental perspective is the sale of fast moving, high volume, low margin, consumer goods (including food, beverages, cosmetics and toiletries), goods that we consume on a daily basis. A study[2] of Total Material Requirements (TMR) in German household consumption revealed that 37% of TMR is attributed to consumption of these fast moving consumer goods.

In recent years E-commerce has increased the potential market for retailers and the scope of products available to consumers but has also led to an increase in packaging waste and transport emissions from the distribution of these goods.

Policy

The EU set up the Retail Forum in 2009 to facilitate the implementation of the EU Action Plan on Sustainable Consumption and Production and Sustainable Industrial Policy in the sector. It is a multi-stakeholder platform set up in order to exchange best practices on sustainability in the European retail sector and to identify opportunities and barriers that may further or hinder the achievement of sustainable consumption and production. The retail sector represents approximately 11% of the EU's GDP. Therefore, achieving sustainable development can be contributed in a significant way by a reduced environmental footprint from retailers.

The European Retailers' Environmental Action Programme (REAP) is already taking steps in this direction through resource efficiency initiatives which include:

- working on sustainable sourcing practices that, for example, help regenerate woodlands and find a second life for waste wood;
- redesigning and redeveloping their products, by using recycled or recyclable materials as much as possible, reducing dependence on virgin materials;
- gradually removing environmentally damaging chemicals and substances from products to facilitate the recycling of products;
- reducing the amount of energy consumed in stores;
- increasing the amount of energy sourced from renewable sources, such as solar panels on the roofs of stores and introducing new heating/cooling systems that re-use the heat produced by air-conditioning to acclimatize stores.

However, the challenges of implementing the circular economy go beyond these steps to include other issues such as value-chain efficiency, re-use and recycling which retailers are committed to addressing. Furthermore, these challenges are collective.

Some examples of commitments made by retailers with operations in Ireland are:
Ikea: Encourage and enable direct suppliers to become more energy efficient.
Marks & Spencer: Improve energy efficiency in UK and Irish stores, offices and distribution centres by 50% per m^2 by 2020. 100% of electricity directly purchased for M&S operated stores and offices in the UK and Ireland is from renewable sources.
Tesco: Food waste minimisation across the food chain; food surplus distribution. Reduce emissions/sq foot from stores and from products sold in stores. Become a zero carbon business by 2050. Help achieve zero net deforestation. Find ways to help customers reduce their carbon footprint.
Lidl: Enhance the number of Distribution centres, office buildings and stores which are certified according ISO 50001.

In Ireland the EPA has supported retailers through its Greenbusiness and Stop Food Waste programmes. Greenbusiness has produced a Resource Efficiency Guide for the Retail Sector.

Resource efficiency practices are considered as essential to assist retail business to increase profit, improve productivity and enhance competitiveness. In a very competitive sector many of the large operators have engaged in sustainability practices and programmes driven by cost reduction and pressure from stakeholders including customers and shareholders. A few have gone beyond the focus on waste reduction in the supply chain, energy and water consumption in stores and have initiatives that look to the products that it offers, introducing more sustainable product lines (e.g. eco-labelled products), redesigning product packaging and calculating the carbon footprint of products and their packaging.

[1] http://cso.ie

[2] http://wupperinst.org/uploads/tx_wupperinst/Benefits_Resource_Efficiency.pdf

[3] http://greenbusiness.ie/wp-content/uploads/2012/11/Retail-Guide-NEW-Web-version.pdf

Potential resource efficiency initiatives in the sector

Relevant Indicators

While the variety and type of products retailed is vast there are some common indicators, for example relating to retail buildings that can be employed. Some examples of indicators and best practice benchmarks are included in Table 1[4] (as well as in subsequent sections):

Table 1: Examples of indicators and best practice benchmarks

Indicator	Best Practice
Building energy performance kWh/m²yr	Specific energy consumption for heating, cooling and air conditioning less than or equal to zero kWh/m²yr if waste heat from refrigeration can be integrated. Otherwise, less than or equal to 40 kWh/m²yr for new buildings and 55 kWh/m²yr for existing buildings.
Lighting W/m²	Lighting: power consumption less than 12 W/m² for supermarkets and 30 W/m² for specialist stores.
Waste, tonnes per employee per annum	Zero waste to landfill or to incineration plants.
Number of EU eco-labelled or organic products offered (or % of sales of these products)	Products certified to EU Eco-label (or equivalent), organic or other environmental certification (e.g. FSC for timber and Oeko-Tex standard for textiles) reduces impact on the environment.
Food waste, tonnes per annum	Prevent food waste through better inventory control. Redistribute food through alternative channels (foodbanks and charities).

Waste

The Clean Technology Centre has determined the following benchmarks from food waste audits carried out in Irish businesses.

Table 2: Retail waste benchmarks

Business Type	Factor Used	Total Waste (tonnes/ employee/ annum)
Wholesale	Employee Numbers	1.96
Food Retail	Employee Numbers	1.88
General Retail	Employee Numbers	0.83

The two significant areas that produce waste in retail business are, in general, incoming packaging and, in particular, food waste in food retailers. There are a several simple ways to reduce packaging waste such as: take-back by suppliers; eliminate unnecessary packaging; and, where possible, the use of reusable packaging materials. Whereas reducing food in retailer food can be done by employing an efficient stock control system, working in co-operation with suppliers to ensure supply and demand are effectively matched and raising staff awareness to reduce unnecessary food waste.

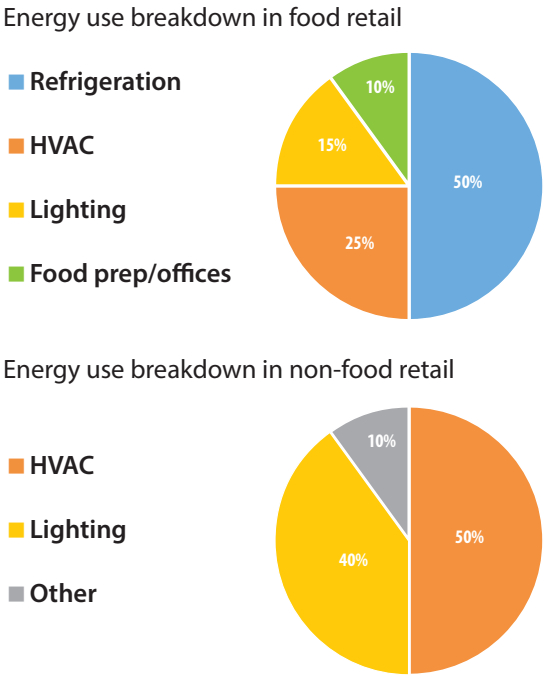
While many businesses cannot prevent waste being generated, they can work to reduce waste disposal by returning or recycling packaging and segregating food waste, (which is a legal requirement from any retailers (Waste Management Regulations 2007 and 2009 for packaging and food waste, respectively)).

Energy

Energy consumption represents a significant share in retail sector spending. In any food retail building, electricity is mainly used for food refrigeration, air conditioning and lighting. Additionally, energy is used in water heating and the sales floor/office heating (space heating).

The energy consumption between retail businesses varies. In general, it depends on the business size and category. For example, Refrigeration accounts for 50% of energy consumption in food retail, but HVAC accounts for 50% in non-food retail, as shown in Fig 1:

Fig 1. Energy use breakdown in retail outlets



http://susproc.jrc.ec.europa.eu/activities/emas/documents/RetailTradeSector.pdf

The first step to reducing energy consumption is to identify the energy users throughout the business. The four main areas that have the greatest potential for energy efficiency improvement are as follows:

1. Lighting
The lighting system in a retail business can include display lighting, security lighting, retail area lighting and external and car park lighting. On average, 25% of electricity costs are for lighting, and as we can see from Figure 1, lighting can consume up to 40% of energy costs in non-food retail.
There are many simple actions that can be taken to reduce energy consumed by lighting systems, such as changing the light bulbs for more energy efficient lighting e.g. LED lights, installing lighting control systems through the building e.g. motion sensors and daylight sensors.

LIGHTING CASE STUDY 1
Riverview pharmacy in Bandon replaced their lighting system from halogen down-lights to LEDs and replaced all fluorescent-based lighting behind the glass shelving display unit with LEDs tubes. This resulted in 68% energy reduction with payback in 2.2 years.

LIGHTING CASE STUDY 2
In 2013, Supervalu in Hacketstown installed a new refrigeration pack system including cabinets with double glazed doors and mid floor refrigerated freezer units with sliding covers. LED lights were installed throughout the store. This resulted in a 43% reduction in energy consumption, which equates to a €27,500 annual cost saving with payback of less than 3.5 years.

2. Heating, ventilation and air conditioning (HVAC) system
There are several ways to reduce energy consumption in HVAC systems in retail buildings, such as: installing more efficient equipment; installing programmable thermostats; implementing a building management system to automatically monitor and control HVAC systems operation; employing heat recovery; and raising awareness among staff.

In addition to HVAC systems, the retailer has to consider the energy consumed to produce hot water. Optimal energy usage of hot water systems includes: proper insulation of the tanks and pipes; automated thermostats; high efficiency control systems; upgrading equipment; regular maintenance; and switching to alternative heating sources, e.g. switching to natural gas instead of oil or install a solar thermal system.

3. Refrigeration
The refrigeration of fresh and frozen product in the food retail business can be considered as an energy intensive technology. Refrigeration plant can consume up to 50% of the total electricity consumption in a food retail business. Cost reductions can be achieved through: implementation of an energy management system; covers on open fridges; regular maintenance; reduced lighting in refrigeration units; situating refrigeration units in the correct place (taking into consideration any sources of heat); upgrading equipment with more efficient alternatives; and installing heat recovery systems.

Water
Water management and better use of water resources are some of the most successful approaches to improve competitiveness, reduce costs and meet the sustainability regulations and targets for any retail business. In addition to water saving, the business will save on the energy costs that are associated with heating water. Normally, cold water can cost €2-3 per 1000 litres, whereas the hot water costs can exceed €10 per 1000 litres. In general, water in any retail business is used in toilets, cooling and heating systems, floor cleaning, kitchen and food services area.

To minimise the water consumption in any retail unit the water usage patterns have to be well known. Table 3 shows the benchmarks for water use in three types of retail businesses. Monitoring water consumption on a daily, weekly or monthly basis to create a benchmark will assist the management team to link the water usage with activities and identify if there any leaks or faults in the water distribution systems. Implementing a sub-metering system can help to identify the area of the highest water consumption. Installing an on-line monitoring unit will continuously monitor the water usage and identify any sudden changes.

Table 3: Water benchmarks for commercial units

Business Type	Litres/m² floor area/day
Retail	2.48
Shopping centre	3.00
Café/fast food/butcher	2.48

Checking for leaks can be done using a night-time test. This is done by ensuring water users such as urinals are off then recording the meter readings at closing time and again on the following morning. Other measures include the installation of highly efficient fixtures such as: dual flush cisterns, waterless urinals, low flow aeration taps etc. The water flow rates in taps, hoses, toilets etc. should be compared with best practices flow rates as outlined in Table 4 below:

Table 4: Typical water flow rate for different equipment

Type of equipment	Recommended flow rates/litres per flush
Toilet wash basins	2 litres per minute
Toilets	4.5-6 litres per flush (dual flush)
Showers	6-8 litres per minute
Urinals	Managed not flushing automatically
Pot wash/kitchen	3-7 litres per minute

One way to reduce the mains water consumption is to find an alternative water source. Rainwater harvesting is considered one of the most effective alternative water sources, as it provides water at or near the point where it is needed. Rainwater harvesting can save up to 85% of main water usage for commercial buildings.

CASE STUDY
Stillorgan Village shopping centre, Co. Dublin, has a bulk water meter and sub-meters in each retail outlet. Management noticed that there was a significant difference between the bulk meter reading and the sum of sub-meter readings. By monitoring meter readings when businesses were closed they identified a significant water flow, suggesting leaks. After the leaks were repaired and fittings replaced, water usage was reduced by 40% with a financial saving of €24,000 p.a. and a payback time of 7 months.

Green Business Resource Efficiency Guide for the Retail Sector
http://greenbusiness.ie/wp-content/uploads/2012/11/Retail-Guide-NEW-Web-version.pdf

European Commission, Best Environmental Management Practice in the Retail Trade Sector
http://susproc.jrc.ec.europa.eu/activities/emas/documents/RetailTradeSector.pdf

Resource Efficiency in Priority Irish Business Sectors

Authors
Clean Technology Centre, Cork Institute of Technology.
Melbourn Building
53 Melbourn Avenue
Bishopstown
Cork
Ireland

Tel: 353 21 4344864
Email: ctc@ctc-cork.ie
Website: www.ctc-cork.ie

This factsheet is one of seven that accompanies the main report of the EPA research project: Efficiency in Priority Irish Business Sectors (2014-RE-DS-1). Other factsheets are available on the following sectors: Food and Beverage, Pharmaceutical and Chemical, Manufacture of Non-Metallic Mineral Products, Accommodation and Food Service. There is also an overall factsheet. The main report is available at www.epa.ie.

Resource Efficiency in Priority Irish Business Sectors