

**WASTES: Solutions, Treatments and Opportunities**1<sup>st</sup> International Conference  
September 12th – 14th 2011**HOUSEHOLD WASTE MANAGEMENT IN THE UK: CURRENT PRACTICES AND CHALLENGES**C. Cole<sup>1a</sup>, M. Osmani<sup>1</sup>, M.A. Quddus<sup>1</sup>, A.D. Wheatley<sup>1</sup> and K.Kay<sup>2</sup><sup>1</sup>Department of Civil and Building Engineering, Loughborough University, Loughborough, LE11 3TU<sup>2</sup>Charnwood Borough Council, Southfield Road, Loughborough, LE11 2TN<sup>a</sup>email: [Christine.Cole@charnwood.gov.uk](mailto:Christine.Cole@charnwood.gov.uk)**ABSTRACT**

The UK's reliance on landfill sites for waste disposal has been addressed in recent years with the Landfill Directive and Landfill Tax. This has encouraged Local Authorities to seek alternative methods of treating household waste, introducing and expanding kerbside collections of recyclates and organic waste.

This paper assesses current household waste management practices and challenges in the UK. Drivers and instruments for change and various approaches to kerbside waste collections are discussed. The current household waste management challenges in the UK are identified, including the division of responsibility for household waste management between various Local Authorities and Government Departments and the methods available to tackle these issues.

The research revealed adopting an integrated management system for household waste to comply with legislation and behavioural attitudes towards recycling and waste reduction activities are obstacles facing Local Authorities. Conversely, segregation of household waste by material is increasing, with separate kerbside collections for recyclates, organic waste and bulky waste collections, some of which is selected for reuse. The challenge now is to improve the yield of recyclates, reach people that do not segregate their waste for recycling and increase the quantity of material from participating householders with imaginative ways for reuse and recycling.

**Keywords: household waste; integrated waste management; challenges; UK.****INTRODUCTION**

This paper is part of an ongoing research project that aims to improve the efficiency and effectiveness of household waste collections. The UK has traditionally relied on disposal at landfill sites whilst the rest of Europe has used incineration [1]. The environmental concerns regarding the use of landfill are well documented, as are concerns about the long term impact of the high temperature residues from incineration. The move towards more sustainable approaches to household waste management, with waste increasingly seen as a resource, has seen widespread changes in kerbside collection methods to encourage separation of waste for recycling, reuse and bio-treatment.

This paper examines household waste management drivers, current practices and challenges within the United Kingdom (UK) context.

**WASTE MANAGEMENT – DRIVERS FOR CHANGE**

Several drivers exist to force changes to the way household waste is managed, including political, legislative and financial measures (Table 1). These are likely to encourage a move towards more sustainable waste management practices that include recycling and waste prevention.

**Table 1.** Drivers for change in household waste management [2].

Drivers	Instruments
Legislative and political drivers	<ul style="list-style-type: none"> <li>• European waste policies and strategies (e.g. Waste Framework Directive, (2008/98/EC) &amp; Landfill Directive, (1999/31/EC)</li> <li>• UK waste policies and strategies (e.g. recycling targets for Local Authorities)</li> <li>• Environmental legislation (both at European and National levels)</li> <li>• Employment legislation , Health and Safety legislation</li> <li>• Bans on landfilling certain substances</li> </ul>
Financial drivers	<ul style="list-style-type: none"> <li>• Increasing cost of landfill disposal (e.g. Landfill Tax escalator, LATs)</li> </ul>

### Legislative and policy drivers

The key waste management EU Directives are the Waste Framework Directive (revised 2008) covering regulation, handling and movement of waste and the Landfill Directive, 1999 and Waste Incineration Directive, 2000, covering particular types of waste treatment and disposal. There are also Directives that specifically target single waste streams, for example Waste Electrical and Electronic Equipment Directive, Waste Batteries and Accumulators Directive and the End of Life Vehicles Directive.

Waste management is a devolved responsibility in the UK; with separate waste strategies for Wales, Scotland, Northern Ireland and England. Each has different objectives and targets and an increasing diversification of strategy is becoming evident. However, all take account of the Waste Framework Directive's Waste Hierarchy, with waste reduction, recovery of resources and potential energy in preference to using disposal at landfill sites.

### Financial drivers

The main financial driver to reduce the use of waste disposal is Landfill Tax, an escalating fiscal measure, currently £56 per tonne, paid in addition to disposal costs set by the landfill operator and Landfill Allowance Trading Scheme (LATs). LATs expose Local Authorities to fines of £150 per tonne if allowances for landfill disposal are exceeded, but are due to be withdrawn in 2013. These combined financial measures shape local waste management policy, making recycling and reuse economically viable options [3] and providing Local Authorities with an incentive to encourage householders to recycle and compost waste [4].

## HOUSEHOLD WASTE MANAGEMENT PRACTICES

Local Authorities have a statutory duty under The Environmental Protection Act, 1990 to collect and dispose of household waste, but can determine frequency of collections, size of containers, materials collected for recycling and whether or not organic waste is collected separately. Significant variations in collection systems now exist across the UK [4, 5], with some Local Authorities simply complying with legislation and offering separate collections of two recyclable materials; while others collect waste as many as nine separate containers.

### Household waste composition

Waste composition analysis can establish the type and quantity of materials present in waste, allowing collections and waste treatment technologies to be tailored to suit waste arisings [6,7,8]. Although carried out before the widespread introduction of kerbside collections of recyclable materials, several UK household waste composition studies found consistency in the main materials found in the waste analysed [8]; these are shown in Table 2.

With a UK average national recycling rate of 39.7% in 2009/10 [9], there are still opportunities to increase recycling and bio-processing of household waste. In particular, the biodegradable wastes, food, kitchen and garden waste need special attention, as well as paper and cardboard, in order to meet the Landfill Directive and reduce the amount of biodegradable waste going to landfill.

**Table 2.** UK household waste composition [8].

Material	% present
Kitchen and garden	35-38 %
Paper and cardboard	23-25 %
Plastics	8-10 %
Glass	6-7 %
Metals	3-5 %

### Local Authority household waste collection performance

The Waste Duty of Care Regulation requires all waste transfers to be recorded from point of origin to final disposal point, ensuring an auditable trail exists for waste movements in the UK. Local Authorities report waste movements on a quarterly basis to Department for Environment, Food and Rural Affairs (Defra), who report progress towards national targets and trends in waste generation, treatment and disposal. Data on waste generation is useful for design and operation of collection services, identifying the point of waste generation and recycling and composting performance in different geographical areas.

In 2009/10 Local Authorities in the UK collected 23.7 million tonnes of waste, 12.5 million tonnes of this waste was landfilled. Household waste generated in 2009/10 was equivalent to 457kg per person per year, with 181kg recycled and 275kg disposed of [5]. Data on waste generation trends is useful for design and operation of collection services, identifying recycling and composting opportunities, the point of waste generation and enabling comparisons between performance in different geographical areas.

Individual Local Authorities performances are reported annually by Defra. The top performing recycling Local Authorities in 2009/10 are shown in Table 3, which reveals differing approaches to targets for collection of recyclates and organic waste. For instance, Staffordshire Moorlands District Council collected high proportions of organic waste (42.6%) and relatively low amounts of recyclates (19.2%); whilst South Oxfordshire District Council reversed this and collected relatively high levels of recyclates (35.5%) and lower amounts of organic waste (25.9%). The different approaches taken may also reflect the varying availability of treatment and disposal facilities.

**Table 3.** Recycling and composting performance of top ten UK Local Authorities 2009/10.

Position in league table for recycling performance	Local Authority	Percentage of household waste recycled, reused or composted	Recyclable materials collected (%)	Organic waste collected (%)
1	Staffordshire Moorlands District Council	61.84%	19.2%	42.6%
2	South Oxfordshire District Council	61.4%	35.5%	25.9%
3	Rochford District Council	61.2%	27.4%	33.8%
4	Cotswold District Council	60.4%	25.8%	34.6%
5	Stratford-on-Avon District Council	58.6%	27.2%	31.4%
6	South Hams District Council	57.2%	27.4%	29.8%
7	East Lindsey District Council	56.3%	27.1%	29.2%
8	Teignbridge District Council	56.2%	20.8%	35.4%
9	Rutland County Council	55.8%	31.4%	24.4%
10	Huntingdonshire District Council	55.5%	25.6%	29.9%

### Kerbside waste collections – Recyclates and organic waste

The easiest ways to treat mixed household waste are incineration and landfill [10]. To recover recyclates and treat biodegradable waste separation is needed. For this to be successful at source, householders need to engage in the process [11]. Collection services with complex sorting processes had lower participation rates [12]; binary sorting, simply separating recyclable materials from residual waste found to be more popular than multiple sorting [13]. Established processes exist for sorting paper, cardboard, glass and metals. These materials are frequently collected for recycling [14]. The

mass density of these materials may be a factor when choosing materials for collection, with them contributing to weight based recycling targets.

The high proportion of food waste present in household waste (Table 2) and its density, (on average, 341kg/m<sup>3</sup>) [15] supports separate collections of food waste for bio-treatment both to assist in meeting weight based targets and reduce the amount of biodegradable waste sent to landfill.

### **Bulky waste**

Bulky waste items are often collected separately due to being more randomly distributed than regular household waste; enabling some items to be recovered for reuse. Furniture reuse projects, seek to extend the functional life of products, primarily for social benefits, providing low cost usable furniture; the environmental benefits of diverting the waste from landfill being secondary [16]. The weight of materials recovered is usually low but can assist with reuse targets at relatively little cost.

## **HOUSEHOLD WASTE MANAGEMENT CHALLENGES IN THE UK**

The key challenges in household waste management are the division of responsibility for waste collection, treatment and disposal between Local Authorities and Government Departments, lack of participation and behavioural attitudes of householders, as well as the practical issues of sorting waste. Separating waste for recycling is a step which some householders are not prepared to undertake. Yet their behaviour and resulting performance are necessary to reach challenging targets [17]. The environmentally aware are easy to engage, but other sections of the public are more challenging, even in the best performing areas approx 20% of households do not use recycling collection services [18]. Changing behaviour remains one of the biggest challenges to successful recycling collection services.

### **Division of responsibility**

The responsibility for household waste management is divided at a local level between Waste Collection Authorities, the District and Borough Councils and Waste Disposal Authorities, the County Councils. Unitary Authorities have the responsibility for both collection and disposal of household waste. A similar division of responsibility occurs at a national level between the Department for Environment, Food & Rural Affairs (Defra), the Government Department responsible for waste policy, strategy and monitoring and the Environment Agency (EA), the UK Government Agency responsible for licensing and regulating waste collection and disposal, see Table 4.

**Table 4.** UK responsibilities for waste [2].

<b>Organisational responsibilities</b>	<b>Activities and jurisdiction</b>	<b>Role</b>	<b>Act creating responsibility</b>
Department for Environment, Food & Rural Affairs (Defra)	Sets general waste policy and has monitoring and reporting role	Policy maker	EU Directive
Environment Agency (EA)	Licenses waste collection companies, waste carriers and waste disposal and treatment sites	General regulator	Environmental Protection Act (1990)
District / Borough Council	Responsible for collecting municipal solid waste and recycling	Waste Collection Authority	Environmental Protection Act (1990) sections 45,46-7, &49
County Council	Responsible for disposal of municipal solid waste collected by Waste Collection Authorities	Waste Disposal Authority	Environmental Protection Act (1990) section 51, Waste & Emissions Trading Act, 2003
Unitary / Metropolitan Borough Council	Responsible for collection and disposal of Municipal Solid Waste	Waste Collection & Disposal Authority	Environmental Protection Act (1990) sections 45,46-7, 49 & 51, Waste & Emissions Trading Act, 2003

Separating responsibility and costs for waste collection and disposal prevents holistic approaches to household waste management. This “unhelpful division” makes policy making and operational issues functions of separate authorities with differing incentives [17]. Waste Disposal Authorities

procure disposal, treatment and recycling facilities for waste collections in which they have limited input [18] however, some authorities work together on strategy and service delivery [19].

### Waste prevention challenges

It is a challenge at Local Authority level to realize the priority position that waste prevention has in the EU Waste Framework Directive. This priority is not always as obvious at Local Authority level, where local waste policies are often biased towards recycling and disposal [20], making work in this area more challenging. Sustainable waste management should focus on limiting the impact of waste on the environment and reducing waste arisings [7]. Various initiatives operate nationally targeting either particular waste streams or groups, different approaches are shown in Table 5 [21].

**Table 5.** Waste prevention activities [21].

Criteria	Classification
Waste stream	By material (paper, glass etc) By product (packaging, nappies) By source (household, industry) By point of use (big events)
Target group	Retail Industry Public administration Householders
Instruments	Regulation (licensing, laws, product standards) Economic (subsidies, taxes, charges) Collaborative agreements(certification, labeling) Service and infrastructure (repairing, second hand shops) Communications (presenting information, delivering options)
Purpose	Reduction at source (complete avoidance, optimization of processes) Substitution (refillable containers – more environmentally friendly options ) Reuse (increasing product life by using second hand goods)

Waste prevention work is difficult, involving a greater behavioural change than participation in recycling activities. Consumers are often unable to see links between waste and their purchasing habits and are unwilling to reduce personal consumption. With 35-38% of household waste being organic waste a national education programme, Love Food Hate Waste was initiated. This aims to reduce food waste by educating the public about the correct storage of food, menu planning and using left-over ingredients, but there is little quantitative data available regarding performance [21].

Whilst persuading consumers to change purchasing habits is challenging, retailers have also resisted waste reduction projects, often seeing them as expensive and impacting negatively on sales. However, the Courtauld Commitment, a grocery retail group working with the Government funded Waste and Resource Action Programme (WRAP) focuses on resource efficiency, minimizing packaging and reducing waste in the food sales and manufacturing sector [22], claims to have avoided 520,000 tonnes of packaging between 2005 and 2009. Projects like this are necessary to raise awareness in household waste management; significant reductions in packaging waste can have an immediate impact on the generation of household waste.

### Conclusion

Significant volumes of waste, diminishing landfill space and concerns about resource efficiency make household waste management a priority in EU and UK environmental policy, this has been passed down to local levels to act upon. A major factor in improving national recycling rates and the UK reaching the 2010 target to reduce landfill disposal set in the EU Landfill Directive (1999/31/EC) has been the change in collection practices which has seen the introduction and expansion of kerbside collections of recyclable materials and organic waste collections.

To meet the challenge to further increase recycling rates Local Authorities must ensure full recovery of all recyclable materials by changing behaviour patterns, engaging non-recyclers and improving the quantity of waste recycled by people already participating. Additionally, the difficult area of waste

prevention needs addressing. With various target groups, target waste streams and different messages this requires specialist communications involving a wide group of stakeholders.

To operate fully integrated waste management services with the cooperation of all parties responsible for household waste the collection, transport and disposal of each material and treatment and disposal options will be made in accordance with the Waste Hierarchy. This will involve waste prevention programmes, recovery of as many recyclable materials as possible, treating organic waste separately and producing energy from waste treatment in preference to landfill.

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