



Destined for indecision? A critical analysis of waste management practices in England from 1996 to 2013



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ABSTRACT

European nations are compelled to reduce reliance on landfill as a destination for household waste, and should, in principle, achieve this goal with due recognition of the aims and principles of the waste hierarchy. Past research has predominantly focused on recycling, whilst interactions between changing waste destinies, causes and drivers of household waste management change, and potential consequences for the goal of the waste hierarchy are less well understood. This study analysed Local Authority Collected Waste (LACW) for England, at national, regional and sub-regional level, in terms of the destination of household waste to landfill, incineration and recycling. Information about waste partnerships, waste management infrastructure and collection systems was collected to help identify and explain changes in waste destinies. Since 1996, the proportion of waste landfilled in England has decreased, in tandem with increases in recycling and incineration. At the regional and sub-regional (Local Authority; LA) level, there have been large variations in the relative proportions of waste landfilled, incinerated and recycled or composted. Annual increases in the proportion of household waste incinerated were typically larger than increases in the proportion recycled. The observed changes took place in the context of legal and financial drivers, and the circumstances of individual LAs (e.g. landfill capacity) also explained the changes seen. Where observed, shifts from landfill towards incineration constitute an approach whereby waste management moves up the waste hierarchy as opposed to an attempt to reach the most preferred option(s); in terms of resource efficiency, this practice is sub-optimal. The requirement to supply incinerators with a feedstock over their lifespan reduces the benefits of developing of recycling and waste reduction, although access to incineration infrastructure permits short-term and marked decreases in the proportion of LACW landfilled. We conclude that there is a need for clearer national strategy and co-ordination to inform and guide policy, practice, planning and investment in infrastructure such that waste management can be better aligned with the principles of the circular economy and resource efficiency. If the ongoing stand-off between national political figures and the waste sector continues, England's waste policy remains destined for indecision.

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1. Introduction

The European Union (EU) Waste Framework Directive 2008/98/EC (2008) requires EU member states to apply the waste hierarchy to inform waste management policies and practises. According to the waste hierarchy, the preferred option for waste management is prevention, followed by re-use, recycling, recovery and disposal. Prevention provides an ultimate goal at the top of the hierarchy for decision makers to aim towards. This concept has been termed 'zero waste', where one-way linear resource use and disposal is replaced by a 'closed-loop' circular system (Curran and Williams,

2012). Ideally, household waste management in England should progress to reach the goal of zero waste in alignment with EU objectives.

As determined by the Environmental Protection Act (1990), the responsibility for household waste management in England lies with Local Authorities (LA), where waste collection is the responsibility of Waste Collection Authorities (WCAs) (normally a district or borough council), and waste disposal is the responsibility of Waste Disposal Authorities (WDAs) (usually a County Council). Unitary Authorities (UAs) provide both these services. As highlighted by Timlett and Williams (2011), significant developments in household waste management have occurred over the last decade, driven by decreasing landfill capacity and the requirements of the Landfill Directive (1999). The Landfill Directive (1999/31/EC)

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requires pre-treatment of waste before landfilling, and a reduction in the quantity of biodegradable waste landfilled; the UK target is to reduce to 35% of 1995 levels by 2020. Burnley (2001) concluded that 35–170 new municipal solid waste (MSW) incinerators would be required in the UK to comply with the 2020 requirements of the Landfill Directive, assuming relatively modest increases in recycling rate, and relatively high annual growth rates of household waste. In 2013, only 18 incinerators processed MSW in the UK (DEFRA, 2013). Alongside increasing incineration, attention from policy and decision makers has focused on increasing household waste recycling as such initiatives can produce measurable outcomes. In contrast, waste minimisation initiatives have been targeted more at commercial and industrial sectors (e.g. Price, 2001). England has household re-use, recycling and composting targets, which are interim goals to drive progress towards the obligatory EU target of 50% by 2020 outlined in the Waste Framework Directive (2008). These interim targets are for England and not obligatory for each LA; authorities should, individually, be aiming to meet these targets.

Past research on household waste management in the UK has been predominantly focused around recycling. Many studies have used specific LAs as case studies (e.g. Lyas et al., 2005; Robinson and Read, 2005; Woodard et al., 2005; Martin et al., 2006; Shaw et al., 2006; Williams and Cole, 2013; Cole et al., 2014), whilst relatively few have attempted to explain the national variation in recycling rates (e.g. Abbott et al., 2011), and classify authorities accordingly (Parfitt et al., 2001). The effects of key design variables for kerbside recycling schemes (Noehammer and Byer (1997) upon recycling behaviour have been evaluated in terms of: promotion and education (Evison and Read, 2001; Mee et al., 2004), economic incentives (Harder and Woodard, 2007; Shaw and Maynard, 2008), materials collected (Woodard et al., 2006) and collection frequency (Williams and Cole, 2013). There has been focus on increasing public participation and stimulating behaviour change (Perrin and Barton, 2001; McDonald and Oates, 2003; Davis et al., 2006; Harder et al., 2006; Shaw et al., 2007), and the interactions between neighbouring properties (Shaw, 2008). Conceptual frameworks have also played a role in understanding public attitude and behaviours towards waste management (Barr et al., 2001; Barr, 2004; Barr and Gilg, 2005; Timlett and Williams, 2011), whilst others have investigated the optimum geographical level for managing waste (Longden et al., 2007; Broitman et al., 2012).

It is well understood that England is compelled to move away from landfill as a destination for waste. Migration towards recycling and incineration offer means to gain value from household waste, but there remain unknowns in this regard. Firstly, and in contrast to some western and northern European countries, there has been no political steer in England in terms of a “preferred method” for waste treatment. Indeed, The National Infrastructure Plan 2013, which outlines the UK’s infrastructure needs across industry sectors, clearly states that decisions on individual waste projects “will be determined by the market”. Second, interactions between changes in landfilling, incineration and recycling are not well understood. The benefits and impacts of investment of differing approaches to achieving reductions in landfill are thus uncertain. Thirdly, migration of waste towards incineration as a destination has implications for attainment of goals aligned with the ambitions of the waste hierarchy. Investigation into the potential consequences of change in waste management on the achievement of waste hierarchy aims has thus far been limited. We propose that fuller understanding is required in order that alignment with the priorities of the waste hierarchy is achieved as a step towards a circular economy in the future.

With focus on England as a case study, this paper aimed to analyse and interpret Local Authority Collected Waste (LACW)

destinations at the national (England), regional and local level from 1996 to 2013 using ternary plots. The study aimed to:

- Elucidate changes in LACW destinations at regional and sub-regional level, and the reasons for the changes and differences observed.
- Determine the consequences of observed changes with respect to the overarching aims of the waste hierarchy.
- Critically evaluate decisions made by LAs, with the aim of informing future best practice.

2. Methods

2.1. Waste destination data

Data were collated and analysed from the WasteDataFlow archive, a web based system established in April 2004 for the reporting of municipal waste data by UK LAs to national government, and intended to increase the accuracy of data and efficiency and regularity of data collection (WasteDataFlow, 2013). Since the implementation of this archive, there have been changes in definitions related to WasteDataFlow (DEFRA, 2011). Prior to 2010, waste collected by LAs in the UK was referred to as ‘municipal waste’ household waste. After a consultation in 2010, the UK’s ‘municipal waste’ definition was revised to include household and waste from other sources (e.g. businesses) to align with EU terminology and definitions. Materials initially defined as ‘municipal waste’ in the UK were renamed as ‘local authority collected waste’; LACW data are utilised in this study. Initially the study focuses on national and regional level LACW and subsequently on the sub-regional level to elucidate detailed responses in waste destinations relation to policy, practice and infrastructure.

The data period for LACW is 1st April to 31st March and data are recorded by weight. Data were available from 1996/1997 (DEFRA, pers. comm.): for 2000/2001 to 2012/2013 LACW data were obtained from the regions’ spreadsheet located in DEFRA’s ENV18 statistical dataset (DEFRA, 2012), and data for 1996/1997 to 1999/2000 from DEFRA’s Municipal Waste Management Survey 2003/2004 (DEFRA, 2005). For the purposes of this study, the numerous LACW categories were grouped to align broadly with the European waste hierarchy (Waste Framework Directive 2008/98/EC; EC, 2008). The grouping of data into three discrete categories aligned with the destinations of the hierarchy (Table 1).

Table 1

Summary of waste destination categories in relation to the LACW waste data records, as employed in the study.

Destination category	LACW categories included
Landfill	Landfill Recycling/composting/re-use rejects (subsequently landfilled) Waste sent for another treatment method and subsequently sent to landfill
Incineration	Incineration with Energy from Waste (EFW) Incineration without EFW Refuse Derived Fuel (RDF) Recycling/composting/re-use rejects (subsequently incinerated)
Recycling	Recycled Composted (excluding home composting) Re-use Mechanical Biological Treatment (MDT) Anaerobic Digestion (AD) Landfill/incineration rejects (subsequently recycled)

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