

NATIONAL STRATEGY, LOCAL PRACTICE AND THE SOLID WASTE MANAGEMENT GAP?

A LOCAL AUTHORITY MANAGEMENT PERSPECTIVE ON SUSTAINABLE SOLID WASTE MANAGEMENT IN THE UK

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ABSTRACT

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Solid waste management is a field of great diversity and dynamism throughout Europe. Over the last 30 years waste and its management has become a significant environmental risk and an area of growing political importance in the UK. This has been paralleled by developments in European policy and standards linking the environment with the economy and society as the three pillars of sustainability. This thesis examines some of the developments in solid waste management and practice in the UK, using a range of techniques (surveys, case studies, interviews etc.) to analyse changing policy strands and their implications at the local scale where waste management is so evident and important as a municipal service or utility.

The development of sustainable waste management (that which does not impinge upon future generations) is now a primary policy field of the current Labour Government, and the amount of consultation, policy and guidance documents published over the last 4 years pays credence to this. This thesis will utilise this political and strategic backdrop to describe and evaluate changes in local service provision (waste bins, recycling collections, frequency and coverage etc.) and local strategies. It is suggested by this research that for all the developments in waste management policy and guidance at the national scale, little has filtered through to new activities at the local scale (through district, borough, unitary or county councils). This is attributed to lack of financial and staff resources to implement the necessary changes, lack of flexibility in terms of existing contractual arrangements and the inability of the authority to engage the public in the new services on offer.

This thesis deals with the reasons for this general lack of action, and uses case studies to illuminate where positive contributions to local policy and practice have occurred. Through the series of related papers presented in this thesis, drawn together from the research programme over the last 5 years, an assessment of what has worked and why is provided in terms of sustainable solid waste management policy and subsequent practice. By learning from these examples more local development, in terms of public acceptability, economic affordability and environmental sustainability, is expected in the coming decade. Through an examination of the landfill tax credit scheme, waste minimisation project clubs and the Recycling Roadshow public education campaign a flavour of what can be achieved in terms of solid waste management is provided. These examples highlight how the most common barriers to successful policy implementation (the public, the finances, and the political will) can be overcome at the local scale.

This research has made a significant contribution to the current debate in the UK on the path towards improved sustainability in waste management services (as noted by the number of articles that have been published and the author's input to international conferences) and has provided evidence for local councils in justifying decisions relating to their service provision and policy development (through the author's continuing consultancy record).

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Thanks should also go to the rest of my research supervision team at Kingston University, all those local authorities who have participated in the surveys, or as case studies, and a host of co-authors and research collaborators who helped me develop my style and research protocols during the last 4 years, of whom there are too many to name – but they all know who they are and I hope they are all reading this and find it of some interest.

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Special thanks must go to my parents for supporting me over the last 5 years as I pursued my goal of a PhD – I know I haven't been the best person to live with! At times when I forgot what it was that I was trying to achieve, they were there reminding me, and yes it is my Father's fault that I'm such a 'waste anorak'! If he hadn't taken me to the Institute of Wastes Management's Summer Conference in Torbay or offered ideas when progress slowed I may never have 'gotten the bug'.

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GLOSSARY

GLOSSARY OF TERMS

Agenda 21

the environment programme signed by more than 150 countries at the Rio Earth Summit in 1992 (United Nations Conference on Environment and Development), in which they committed themselves to programmes of sustainable development.

Anaerobic Digestion

a method of reducing organic waste matter through the action of bacteria in a sealed vessel, to consume waste, to breakdown materials, or digest organic material, which produces fertiliser and methane gas which could be utilised for heat or electricity.

Best Available Technique Not Entailing Excessive Costs (BATNEEC)

a concept that implies that the most effective techniques for an operation at the appropriate scale and commercial availability will, and should, be adopted; a common theme throughout environmental management.

Best Practicable Environmental Option (BPEO)

a concept first used by the Royal Commission on Environmental Pollution in their 5th Report (1976) in order to take account of the total pollution and negative environmental impacts associated with a process; currently a central concept for environmental strategy and policy choice.

Biodegradable Material

waste material which is capable of being broken down by micro-organisms into simple, stable compounds including carbon dioxide and water. Most organic wastes, including wood and paper are biodegradable.

Bring Systems

the traditional approach to local authority recycling in the UK, waste collection systems which rely on the consumer (householders) segregating and delivering waste materials to bottle banks and other collection receptacles for reprocessing and recycling; usually with separate bins for cans, paper, card, and 3 colour glass.

Centralised Waste Composting

a system utilising a central facility within a politically defined area with the purpose of composting garden and green waste (biodegradable).

CHP

combined heat and power plant (incinerator with energy recovery facilities).

Civic Amenity Site

a site provided by the WDA or a WCA at which the public may deposit waste.

Co-collection

the collection of bagged recyclables together with other municipal waste, using specially designed vehicles to keep the two categories apart; the recycled content will then be sorted at a MRF for reprocessing and recovery.

Commercial Waste

waste materials originating in wholesale, retail, institutional, or service establishments including office buildings, markets, theatres, and hotels; an element of MSW.

Composting

a traditional method of allowing bacteria to rot vegetation providing a fertile compost material. Currently being used to deal with the organic fraction of household waste. This is the controlled biological decomposition of organic solid waste under aerobic conditions.

Controlled Waste

industrial, household and commercial waste, as defined by UK legislation. Controlled waste specifically excludes mine and quarry waste, wastes from premises used for agriculture, some sewage sludge and radioactive waste.

COPA

Control of Pollution Act 1974.

Cost Benefit Analysis

the most comprehensive form of economic appraisal currently available for environmental planning and evaluation, which seeks to quantify in monetary terms as many of the costs and benefits of a proposal as possible.

Diversion Rate

a measure of the amount of waste material being diverted for recycling or recovery compared the total waste generated.

DETR

Department of Transport, Environment and the Regions

DoE

Department of the Environment.

Energy Recovery

conversion of waste to energy, generally through the combustion of processed or raw refuse, where the heat from the incineration process is collected and used for heating water or for generating electricity.

Environment Agency

established under the Environment Act (1995) to take over the functions of HMIP (Her Majesty's Inspectorate of Pollution) the NRA (National Rivers Authority) and the WRAs (Waste Regulation Authorities), providing a comprehensive approach to the protection and management of the environment by combining the regulation of land, air and water.

EPA 1990

Environmental Protection Act 1990.

EP 1995

Environment Act 1995

ETBPP

Environmental Technology Best Practice Programme to promote wastes minimisation throughout the UK, and funded by the DoE and the DTI.

Hierarchy

the preferred order of waste management options currently available based on their environmental impacts, and the guiding principle for UK waste management practices; formally recognised by the EU 4th Action Programme on the Environment (1987).

Household Waste

those waste products generated in the home or from domestic activities and collected by the local authority or taken to a civic amenity tip. This will include waste from street sweeping, bulky waste collection, litter collections and separate garden waste collections

Incineration

a traditional treatment method for all wastes, whereby material is burned to reduce volume and weight by upto 80%.

Integrated Solid Waste Management (ISWM)

the use of a combination or series of waste management options to effectively deal with an areas waste with least environmental impact and acceptable economic outlay; with specific options dealing with the types of waste for which they are most suited in a given locality.

Kerbside Recycling Collection

a system for diverting as many recyclable materials as possible from household waste for recycling. Normally the resident will put materials into a special container and place on the kerb for a pre arranged collection, from where the recyclable materials are sorted and sent for reprocessing.

Landfill

waste disposed of at a void, often a former quarry, sand or clay pit, filled to the original ground level, with waste material being used to landscape or reclaim areas of ground; the traditional process of disposing of rubbish.

Landfill Capacity

the remaining void space to be filled by landfilling in a region.

Landraising

where waste is deposited in a mound above the original ground level, thus altering the landscape and topography.

Landfill Tax

introduced in 1996 to protect the environment by making the disposal of waste by landfill more expensive, to encourage waste producers to reduce waste output and recover more value from waste by recycling or recovery techniques; currently at £7 per tonne for active wastes (including MSW) and set to rise to £10 per tonne from April 1999.

LARAC

Local Authority Recycling Advisory Council.

LAWDC

Local Authority Waste Disposal Company, previously the disposal unit of a County Council and now a private sector arms length body; under the EPA 1990.

LEAP

Local Environment Agency Plan, produced by the Environment Agency, in which some waste management issues of local concern will be considered and addressed.

LGMB

Local Government Management Board, an advisory body for local government service provision.

Life Cycle Analysis (LCA)

a method currently in use to determine all of the environmental impacts and costs of particular process or activities, in order for a valued judgement to be made on the most environmentally friendly option to be made.

Local Agenda 21

initiative set out in the publication Agenda 21: a guide for local authorities in the UK, in response to The Earth Summit; to provide services which will maintain and improve environmental standards for future generations.

Manual separation

the separation of recyclable or compostable materials from waste by hand sorting.

MRF

Materials Reclamation (recovery or recycling) Facility, where materials are salvaged from the waste stream.

Municipal Solid Waste (MSW)

includes household waste and any other wastes collected by a Waste Collection Authority, such as municipal parks, commercial waste and the clearance of fly-tipped materials.

National Waste Strategy 'Making Waste Work' (DoE 1995)

aims to reduce the amount of waste that society produces to make the best use of the waste produced, and to choose waste management practices that minimise the immediate and future risk of environmental pollution.

NIMBY

Not In My Back Yard; an expression of resident opposition to the siting of a solid waste management facility due to its location.

NIMTOO

Not In My Term Of Office; a political unwillingness to pass unfavourable planning or policy decisions in fear of not being re-elected.

Polluter Pays Principle

principle that the user / manufacturer of materials which have a potential to pollute the environment must pay for their safe disposal.

Producer Responsibility (DoE 1997)

all undertakings which are part of the packaging chain must take a share of the responsibility for recovering value from packaging waste arising from products which they take ownership of at any time.

Proximity Principle

an important element of European waste policy is the development of an adequate network of waste disposal facilities in each member state, aiming to achieve the disposal of waste as near to the point of reduction as possible, thus eliminating unnecessary movements of waste.

Reclamation

the restoration to a better or more useful state, usually through the extraction of metals from solid waste.

Recovery

a general term used to describe the extraction and utilisation of economically useable materials or energy from the waste stream.

Recycling

separating a given material from the waste stream and processing it so that it may be used again as a useful material for products which may or more commonly may not be similar to the original. The reprocessing of waste into secondary raw materials.

Recycling Credits

introduced in 1992 to enable recyclers to be compensated for the savings made in the disposal and collection costs which result from recycling household waste.

Refuse Derived Fuel

product of a mixed waste processing system in which certain recyclable and non-combustible materials are removed, and the remaining combustible material is converted for use as a fuel to create energy.

Reprocessing

the conversion of collected and sorted used packaging into secondary raw materials, or the reforming of reclaimed materials into new products.

Residues

materials remaining after processing, incineration, composting, or recycling have been completed. Residues are usually disposed of in landfill.

Re-use

the repeated use of a product for its original purpose, thus reducing the generation of waste.

SERPLAN

the London and South East Regional Planning Conference, providing a strategic forum for certain counties of the Environment Agency's Anglia, Thames and Southern regions.

SESPIT

Somebody Else's Problem Isn't It, a misguided approach to local service provision and planning.

SEWRAC

the South East Waste Regulation Advisory Committee, who provide a strategic waste regulation and policy forum for the SERPLAN region.

Source Reduction

the design, manufacture, acquisition, and re-use of materials so as to minimise the quantity and toxicity of waste produced.

Source Separation

the segregation of specific materials at the point of generation for separate collection. Residents will source separate recyclables as part of a kerbside collection, or for buy-back programmes and drop-off schemes.

Sustainability

development that does not impair the opportunities for similar development by future generations, or living off the profit of the Earth rather than its capital of natural resources, as defined at the Earth Summit (Rio '92).

Sustainable Waste Management

the goal for all authorities and companies; to achieve the most cost-effective and environmentally beneficial waste management practices which will not hinder future generations and their needs for waste management.

Transfer Station

a permanent site where waste materials are taken from smaller collection vehicles and transferred to larger vehicles for transport for final disposal, by truck, train or barge. Recycling and some processing may also take part at a transfer station.

Waste

surplus, defective or residual materials which have fulfilled the purpose for which they were intended and have no further function in their present form.

Waste to Energy

a recognised alternative process to reduction or recovery of recyclable materials, a technological advance for incineration, where the energy contained in waste material is extracted during the burning process to drive turbines and generate heat and electricity.

WCA

Waste Collection Authority; borough or district councils, or unitary authorities

WDA

Waste Disposal Authority; county council, statutory body or unitary authority.

WRA

former Waste Regulation Authority; now Environment Agency function.

Waste Disposal Plans

prepared by WDA, under the COPA 1974, containing the Authority's policies and supporting information.

Waste Local Plan

or Minerals and Waste Local Plan, are produced by the County Councils under the town and Country Planning Act 1990, indicating preferred sites and potential void in the region.

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CHAPTER 1

INTRODUCTION

CHAPTER 1 [I]

DELIVERING SUSTAINABLE WASTE MANAGEMENT

CHAPTER 1 – INTRODUCTION

‘DELIVERING SUSTAINABLE WASTE MANAGEMENT’

Waste management has a political profile in the UK today unrivalled in recent historical times. In the last 5 years there have been 2 major acts, 3 waste strategy consultation documents, 2 waste strategies, and a plethora of UK implementation in response to European Directives. It is the intention of this thesis to review some of the changes taking place in the UK and the manner in which it manages its municipal solid waste streams at the turn of the 21st Century. For a full policy review and institutional framework analysis see Appendix 1.

Production of waste in the UK across all sectors of manufacturing, industry and municipal sectors generates in excess of 400 million tonnes per year [1]. Of this, households generated 25.1 million tones in 1998/99. This equates to 0.42 tonnes of waste per head of population. At current growth rates of 3% per annum, waste quantities will double in twenty years and by 2020, the UK will require twice the number of waste facilities (and twice the processing capacity) than at present [2]. This is a significant challenge for all of those involved in the management of society's waste, particularly local authorities who facilitate collection and disposal and the private sector companies who are contracted to collect, recycle, treat and dispose of this waste. Clearly there is a need to address waste prevention, and this forms the focus for Chapter 4.

Collection and disposal of domestic wastes in the UK has historically been provided through the two-tier levels of local and county authorities acting in their roles as Waste Collection and Waste Disposal Authorities [2] as noted in Figure 1.1. On a more specific level, waste management services include the following municipal services: refuse collection, street cleansing, recycling, waste disposal and civic amenity sites. Appendix 2 offers a case study review of the difficulties of managing waste in London. These services deal with all aspects of household waste from generation to treatment to final disposal. Local authority waste services deal with the 'end of pipe' solutions, waste collection, recycling etc.

There exists a wider context and role for local authorities to implement strategies for waste education, promotion and awareness. If we are to deliver sustainable development and make a step change in attitudes towards waste, local authorities must work in partnership with businesses, community groups and the public. This is the focus of Chapter 3.

Figure 1.1 Local Authority Waste Management Responsibilities [2]

Persuading people to change attitudes towards waste is probably the biggest challenge that we face, and all parties must take responsibilities [3]. However, according to the House of Commons Select Committee [4] *'there were striking inadequacies in the 1995 UK Waste Strategy which need immediate attention; it did not recognise the scale of change required to meet its own targets for recycling and recovery; and it did not place its waste strategy squarely in the context of sustainable development and resource use.'* They went on to report [4] that *'it is important to stress from the beginning of our Report our profound disappointment, on the basis of evidence we have received, that waste management in this country is still characterised by inertia, careless administration and ad hoc.....'*

..... rather than science based decisions. Lip-service alone, in far too many instances, has been paid to the principles of reducing waste and diverting it from disposal.'

The report concludes that 'Central Government has lacked the commitment, and local government the resources, to put a sustainable waste management strategy into practice.' This is not only the central contention of this thesis but is the sole focus of Chapter 3.

Waste continues to be a highly emotive and politically charged issue both at a European Union, UK Government and local level. Although the ideal of sustainable waste management is well acknowledged and generally accepted it is proving more difficult than hoped to implement [3]. This is essentially because, the public are unwilling to change their consumer habits, households are not directly charged for waste collections and disposal, local authorities have historically suffered from under-funding of their waste management services, and because local authority politicians have been unwilling to make difficult decisions regarding the location of required processing and disposal facilities [3]. Policy related themes are dealt with essentially in Chapter 2 and public issues concerning participation are the focus of Chapter 5.

A revised National Waste Strategy 2000 [5], published in May 2000, recognised that much needs to be achieved in a short period of time, indicating that previous Government policies [6] have not worked [3]. The Strategy introduced a range of legislative targets to focus attention on maximizing recovery/recycling and reducing dependence on landfill to enable the UK to meet its requirement as a Member State of the European Union under the Landfill Directive. The Landfill Directive requires deprioritization on the dependence on landfill, and a change to current practice.

The new waste policy targets include the recovery of value from 40% of municipal waste by 2005 (increasing to 67% by 2015) and to recycle or compost at least 25% of household waste by 2005 (increasing to 33% of household waste by 2015).

Much of the work and the implications of new policy guidelines are dealt with in Chapter 7.

According to Michael Meacher (Environment Minister) *'tough statutory targets for recycling; developing new markets for recycled waste; turning public sector purchasing green; giving more producers responsibility for recycling of used products; and enlisting householders in the drive to recycle and compost more waste. These moves are key to tackling our growing waste mountain.'*

The Minister, also pledged that the public sector's requirement to buy 'recycled' will help increase the demand and stabilise the markets for recycling schemes, whilst the Strategy also acknowledges the need for waste minimisation to counter the trend of 3% per annum municipal waste growth, with emphasis on 'breaking the link that exists between economic growth and increased waste production' [7]. The work on waste minimisation in Chapter 4 and the work on public education in Chapter 5 provide an overview of this ongoing debate. He went on to say that *'without determined action from everyone, councils could otherwise be handling a massive 50 million tonnes of household waste a year by 2020. Acting now to cut waste will avoid the need for hundreds of extra new waste facilities in the coming decades. We are simply throwing money away; even at today's recycling rates, for example, recycling aluminium cans saves £21million a year, producing 95% less greenhouse gas emissions than using raw aluminium'*.

However, research [8] suggests that policy implementation gaps exist in slowing down policy implementation at the local authority level quoting problems such as cost, staffing levels, privatisation, reduced funding as key factors. Inherent in these problems are local authority structure.

Within a local authority framework, internal innovation can come from various sources including; local authority officers, national policy, local council members introducing ideas into all levels of the organization.

Therefore, successful innovation from concept to delivery is dependent upon organizational culture within the organization and the organizations ability to respond, address and implement within practicable realistic timeframes. Papers later in this introduction and those presented in Chapter 2 and 3 deal with this theme. Failure to reach previous targets [8] set for waste management in the UK has now required the Government to re-think its approach, and take a more leader-based stance on its waste policies through the setting of intermediate statutory targets. In some ways this removes the choice option out of part of the decision-making equation, as local authorities were only ever faced with 'non-statutory targets' until this year. No longer can recycling and sustainable waste management be on the Local Authorities 'wish list', and have to compete against other local authority departments (education and social services for example) fighting for the 'pot of money' that is available. The statutory targets laid out by the Government to drive sustainable waste management in the UK are [5];

- Waste Disposal Authority areas with 1998/99 recycling and composting rates of under 5%, to achieve at least 10%
- Waste Disposal Authority areas that recycled or composted between 5% and 15% in 1998/99 to double their recycling rates
- The remaining Waste Disposal Authority areas to recycle or compost at least one-third of household waste

Will statutory levels for recycling (discussed above) focus decision-making attention towards maximizing recycling levels and full adoption of waste management thinking? As argued by Read (1999) many factors are at play [8]. If the targets are met then an overall recycling rate of around 17% by 2003 will have been achieved. Government figures for 1998 showed people in England and Wales recycled just 8% of their household waste compared to 52% in Switzerland and 45% in the Netherlands. Scotland fared even worse at 5.8% This shows the scope of change required in a relatively limited timeframe, which will undoubtedly incur costs for all involved in the management of society's waste [5]. Chapters 4 and 7 consider these points in more detail.

Statutory recycling targets will only be achieved if there are long-term sustainable markets for the materials recovered. This is the rationale behind the creation of the 'Waste and Resources Action Programme' (WRAP), which will aim to help overcome the market barriers that currently exist to recycling. WRAP is a newly created body with scope to look at commercial, municipal and industrial wastes.

However, developing a sustainable approach to waste management will require a huge commitment from everyone involved, and thus other initiatives were also outlined in the Strategy. One interesting development for the 'general public' has been the acceptance by the government of the need to pilot a range of 'incentives' for households to reduce and recycle their waste. These incentive systems will be piloted over the next couple of years to provide evidence of whether any of them can successfully raise awareness and promote recycling by consumers. The need to motivate residents (householders) to change their patterns of consumption and recycling are dealt with in some detail in Chapter 5. If any one of these incentives schemes prove successful then the pressure will begin to build for the industry to lobby government for their widespread introduction as a means of enhancing widespread involvement in recycling activities. This may prove to be an essential element in the waste management system given the Government's noted reluctance to direct charging for household waste services through 'pay as you throw' schemes [7]. The implications for this in terms of householder responsibility are considered in a paper later in this introduction and again in Chapter 4 when the theme is wastes minimisation.

The Landfill Tax Credit Scheme (LTCS) was also given a high profile within the Strategy. The Government makes it clear that it is keen to use the LTCS to help boost recycling, and extends the activities eligible for support to include 'recycling and re-use projects carried out by non-public bodies (community schemes)'. The Government have sent a clear message to the landfill operators that recycling is a high priority and that they should be looking to invest larger sums of money in this part of the waste management system. Whether this is realistic or not remains to be seen.

Chapter 6 is devoted to the topic of the landfill tax and its credit scheme, looking essentially at how sustainable waste management can be driven by the scheme.

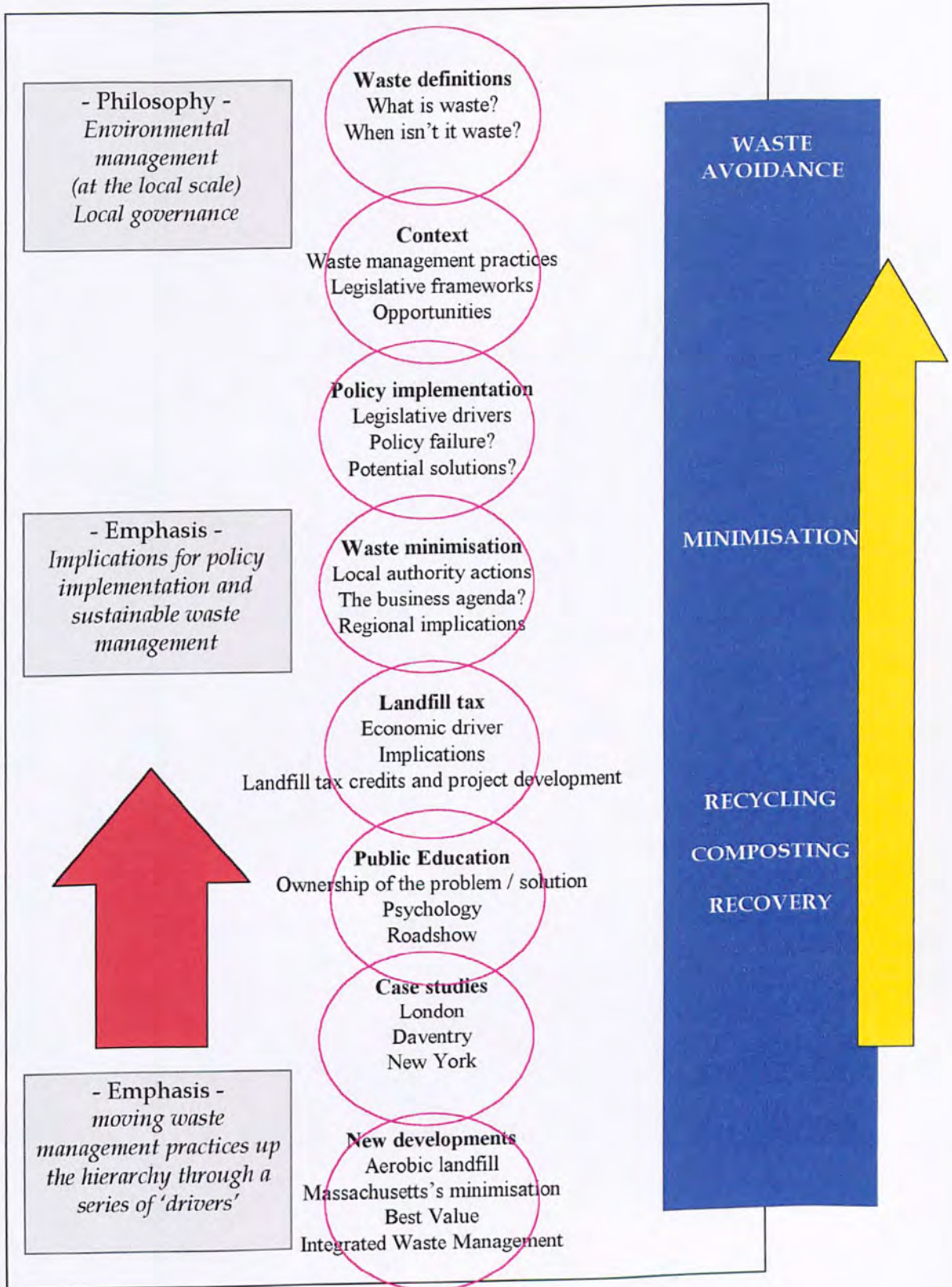
If the Government is to deliver sustainable development it must begin to tackle the growing mountain of waste. This can be achieved through; designing products which use fewer materials; using processes that produce less waste; putting waste to good use; and choosing products made from recycled materials. This again refers to the work covered in Chapter 3. There are 3 elements, which need to be in place if 'cyclical systems' of materials recovery are to be effective; greater provision of single material waste streams; greater reprocessing capacity; and more use of recycled (secondary) materials in production processes. Until all three are guaranteed (which is by no means certain) the Government's aims as set out in the Strategy will remain 'on the shelf' and not have the scale of impact on local service provision that was intended [8].

Clearly the success of the Strategy will depend upon its ability to influence 3 key areas; economics, public awareness and education, and industry action. Following the publication in May this year of the Government's Waste Strategy the Environment Sub-committee of the House of Commons Select Committee on the Environment, Transport and Regional Affairs has resolved to inquire into the progress, which has been made since publication in June 1998 of its Report on Sustainable Waste Management [4]. The Sub-committee will examine whether the policies set out in the Waste Strategy are sufficient to deliver sustainable waste management, and whether the necessary measures, including provision of financial resources, are in place for those policies to be implemented. Clearly, we are all watching developments closely.

This thesis represents 4 years on continual research into sustainable waste management policies and practices. It is thus a collection of research reports, academic papers and short communications considering developments in sustainable solid waste management in the UK. The focus centres on driving sustainable waste management through a range of measures and stakeholder action, with a series of case studies discussed from different regions and scales. The philosophical and structural framework for the thesis is highlighted in Figure 1.2.

The thesis is opened by a series of introductory papers related to conceptual definitions of waste, the waste management context and the overall policy dimension. At this stage we must consider whether 'controlling' or more 'facilitating' frameworks are more effective for encouraging greater sustainability in the way that the UK manages its waste.

Figure 1.2 Thesis framework diagram



Chapter 2 provides an historical assessment of the role and use of landfill in the UK, whilst drawing on parallel research from North America to indicate what solutions could be on offer in the UK (in Appendices 3 and 4). The role of strategic planning in New York and aerobic landfilling systems in Georgia provide a timely reminder of what happens when a landfill site is complete.

Chapter 3 develops the strands of Chapter 2 with a detailed evaluation of solid waste management policy adoption, translation and implementation in the UK. The chapter reports on a survey of all waste management authorities operating in England and delivers a telling review of practice and inactivity from 18 case study interviews (background material is provided in Appendix 5). The problems faced by local authorities and the opportunities afforded form the basis of Chapters 4, 5 and 6.

In terms of driving the hierarchy for waste management in the UK one of the principal themes of recent years has been resource efficiency and waste minimisation. This is the focus of Chapter 4, where there are papers considering concepts of waste prevention and reduction, a review of waste minimisation project clubs and 2 case studies of what can be achieved, one from Surrey County (Appendix 6) and the other from Boston – Massachusetts (Appendix 7).

Chapter 5 has a two-pronged focus on recycling and the associated issues of public motivation and participation. The chapter opens with a discussion of public education campaigns (Appendix 8), considering the negative consequences of not addressing public needs when planning a recycling collection scheme, and there is a discussion of how different publicity campaigns can effect the success of local authority recycling programmes, with some important lessons for industry on what works and why. The chapter then looks at great detail at a particular public education campaign in use in the Royal Borough of Kensington & Chelsea.

Chapter 6 offers an insight into one of the financial mechanisms available for improving service delivery and the development of recycling, namely the landfill tax credit scheme.

Following an overview paper on the development of the scheme and the use of the money to date, two shorter papers consider how the landfill tax is (and could) be used to drive sustainable waste management (Appendix 9) and the different approaches that exist for using the available funds. This suggests a potential mechanism for helping fund the drive towards greater sustainability in the management of society's waste in the UK.

In Chapter 7 the new policy framework comes under the spotlight. There is a paper detailing the new targets set out in Waste 2000 (some of which have been reported earlier in this introduction). This is followed by a review of the EU landfill directive (Appendix 10) and its likely implications for the disposal of household waste. In light of the greater emphasis now being given to organic waste management throughout Europe, there is a consideration of the development of composting and its potential application as a mass waste management approach in the UK (Appendix 10). The chapter is completed by a discussion of Best Value as the new decision-making framework for local authority services (putting the social element clearly into the frame) and the development of integrated waste management contracts and systems (Appendix 11), which provides an indication of where the UK municipal solid waste management sector may be heading in the coming decade.

Much of the material used within this thesis has been published in a range of trade and academic journals during the last four years and has been rewritten to take account of more recent policy shifts and industry issues. A full list of the author's published work is provided in Appendix 12, where there is also a more refined list of the work that has been used in the completion of this thesis.

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THEMES AND STRUCTURE

The overall theme of the research has been the implementation of solid waste management policy by local authorities in the UK. This theme must be considered with the constantly moving 'playing field' of national and European policy, which has continued to alter targets, shift focus and change priorities on a regular basis. New legislation has come on-line since 1995-96 (when the PhD programme began) with mandatory requirements, along with more facilitating opportunities (landfill tax credits, waste minimisation act and best value) assisting in the local authority drive towards greater sustainability in solid waste management. This thesis intends to consider what the changing policy framework, target levels and facilitatory opportunities have this meant for the local implementation of national strategy and the achievement of sustainable waste management.

It must be noted from the outset that this is a collection of related research papers providing an overall analysis of the move in the UK towards greater sustainability in the management of society's waste. The PhD is thus the culmination of published work which has been researched over the last 4 years, some of which has been structured and developed to allow an informed discussion of solid waste management policy development and implementation.

This thesis, thus represents a snap-shot of what has been evolving in the dynamic world of solid waste management and should not be considered the last word on the subject. Policy and practice continue to evolve at a rapid pace, and ongoing research programmes (as noted in Chapter 9) are considering these in more detail. All of the work included has been tested and evaluated in the real world through collaboration with industrial, academic and municipal partners (and sponsors), and more importantly through publication in academic and practitioner journals and presentation at international conferences.

The thesis will be structured around 6 key themes each including a series of 2 or 3 related papers; each themed chapter will have a written introductory section and an evaluative overview written about them whilst each of the papers (or subchapters) will act as a case study to explore the issue in more detail.

The key themes under consideration are;

- [1] landfill availability (Chapter 2)*
- [2] policy, practice and implementation (Chapter 3)*
- [3] waste minimisation (Chapter 4)*
- [4] public participation in recycling (Chapter 5)*
- [5] landfill taxation (Chapter 6)*
- and [6] new policy agendas (Chapter 7)*

AIMS and OBJECTIVES

The underlying aims from the original research programme are reflected in the final thesis structure and content. The themes under consideration were;

- *Assess the shifting nature of solid waste management policy and practice in the UK*
- *Discuss the policy implementation process centred on local authority waste management services and strategies*
- *Highlight the future likely scenarios for solid waste management in the UK in light of the findings of the research*

Since the start of the research there has been a great deal of evolution in the field of waste management (both in terms of legislation and practice), and thus the research has evolved in parallel to reflect this. Thus, the simple research goal dating from 1996 has developed to review a number of related research topic as presented in the following chapters. As such, this PhD will present a series of research projects (in the style of research papers, publications and reports) which have been re-written (and edited) with material from the central research theme of policy implementation and new linking sections which help tie together the independent sections into a coherent research thesis investigating the *'move in the UK towards greater sustainability in the management of society's waste.'*

CHAPTER 1 [II]

CONCEPTUALLY REVISITING WASTE

CONCEPTUALLY RE-VISITING WASTE 'ITS DEFINITION AND MANAGEMENT'

1. DEFINING WASTE

Wastes (unwanted materials and products) are often categorised based on material types (paper, glass, metals, plastics, etc.), or some typical characteristic of consequences (hazardous wastes, radioactive wastes, etc.), or by their source (household wastes, industrial wastes, agricultural wastes, etc.). While these classifications are useful from an organisational viewpoint, they give no help in understanding waste creation, and little help in solving the global (or local) waste problem. On the contrary, if we classify wastes by the reason(s) for its creation, it should inherently imply how the waste's creation could be avoided, or where the quantity of waste generated could be minimised.

Gourlay asked the question 'what is waste?' [1]. Is there one generic group or classification or are there only many different wastes? Clearly the core of this question was to determine whether there were features common to all wastes that would justify one designation, and also to subsequently suggest a common solution to the problems they pose? The present ("organizational") definition for waste is given by the EC Directive 75/442/EEC [2] as follows: '*any substance or object which the holder disposes of, or is to dispose of pursuant to the provisions of national law in force*'.

The essence of the definition is that the owner does not want it; thus waste exists only where it is not wanted. Some other definitions also explain why the owner does not want it. A proposed definition for waste is given by Lox *et al.* [3] '*either an output with ("a negative market") "no economic" value from an industrial system or any substance or object that has "been used for its intended purpose" (or "served its intended function") by the consumer and will not be reused*'. The second half of the definition suggests that the product was designed for one single purpose, and as soon as the purpose was fulfilled, it became waste. It (the product) may still be functional, but it is not used anymore. It may also mean, that the product has lost its original properties, and cannot fulfill its function anymore.

On the other hand, the first half of the definition suggests that waste is a substance that no-one ever wanted. It was created to be a waste, but this raises the obvious question of why?

The problem with these definitions is that they do not really suggest that creating waste is bad (or environmentally or economically inefficient). It seems quite acceptable, according to this definition, to toss away something we do not want anymore, or to create something with no use at all. More specifically, looking at the definition of hazardous waste – ‘*a solid waste or combination of solid wastes, which because of its quantity, concentration or physical, chemical or infectious characteristics may (1) cause or significantly contribute to, an increased mortality or an increase in serious irreversible illness, or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of or otherwise managed*’; it does not state that creating something hazardous is malign. Rather it explains that there is hazard only if the material is improperly treated, stored, transported, or disposed; while it should suggest that we should avoid creating such substances in the first place.

Yet, there are other types of wastes. Gourlay again [1], points out that the blob of mustard left on your plate after your evening meal is neither useless, nor has lost its properties. It became waste, because the owner failed to use it. Gourlay thus suggests that a working definition for waste could be: ‘*waste is what we do not want or fail to use*’.

2. IMPROVED DEFINITIONS

In terms of improving the definition of waste we clearly need to focus attention on the act (or mindset) of waste creation. This taxonomy uses four waste classes:

1. *Non-wanted objects that were created either not intended, or not avoided, and have not been assigned a purpose.* Into this group belong outputs with negative market value, non-useful by-products, emissions, processing and process wastes, cleansing wastes, etc.

2. *Objects that were given a Purpose with a finite function thus were destined to become useless after fulfilling that functional specification.* This is the group of single-use products: most packaging, single use cameras, disposable diapers, etc.
3. *Objects with well-defined Purpose, but their Performance ceased being acceptable, with respect to the Purpose.* The loss of Performance may be due to fault in Structure or State. This is the most typical waste group of obsolete, faulty or spoiled products.

These first three classes show that waste is an object that has no purpose, or not the right purpose, or does not perform with respect to its purpose, due to a fault in structure or state. There is however a more important fourth class of waste:

4. *Objects with well-defined Purpose, and acceptable Performance, but their owners failed to use them for the intended Purpose.* Here belong products used in excess, products that go beyond their target (e.g. artificial fertilisers that are washed out from the soil), and products perfectly functional, but the owner disposed it, simply because he did not want it anymore.

This fourth class shows how important the role of the human is in recognising and producing wastes. A perfectly functional object can be labelled as waste just because one human finds it non-useful, while the same thing could be useful to someone else, or at some other time or place. Clearly this definition raises the question of ownership of the material or the waste.

3. WASTE ORIGINS

When classifying waste, we often end up classifying by their origin: wastes from energy conversion, processing waste, wastes from emission treatment, cleansing wastes, household wastes, packaging wastes, demolition and construction wastes and so the list goes on. Alternatively we classify by some of the waste's characteristics; as hazardous, or as organic. However, what we are doing is simply creating lots of smaller groups from a large one, whilst losing the whole concept of waste, that concerning why it was created. If we would classify waste by the reasons of their creation, we have four types:

1. *Non-wanted objects, created not intended, or not avoided, with no purpose.*

Into this group belong outputs with negative market value, non-useful by-products, emissions, processing and process wastes, cleansing wastes, etc.

2. *Objects that were given a finite purpose, thus destined to become useless after fulfilling it.*

This is the group of single use products: most packaging, single use cameras, disposable diapers, etc.

3. *Objects with well-defined purpose, but their performance ceased being acceptable.*

Here belong obsolete products, old furniture, discarded household appliances, non-rechargeable batteries, demolition wastes, etc.

4. *Objects with well-defined purpose, and acceptable performance, but their users failed to use them for the intended purpose.*

Spoiled products, products used in excess, products that go beyond their target, etc.

While the 4th class is very difficult to manage, since will find it increasingly more difficult to stop millions of people wasting through wrong actions (overfilling their plate), this way of defining the problem suggests ways of solving it. However, we must accept that waste is a non-artifact, or is turned into a non-artifact, because:

1. It wasn't given a purpose;
2. It wasn't given the right purpose;
3. It is not performing well anymore.

The obvious solutions seem to be:

1. Define or re-define the purpose;
2. Enhance the performance.

Both of these, suggest preventive action, and call for correcting the understanding of the expression 'waste management' by all concerned.

4. WASTE DEFINITIONS IN SUMMARY

Waste is thus an artifact that is in the given time and place not useful. Thus, waste management in turn should be about minimizing the amount of non-useful objects, and include the act of assigning purpose to the waste objects where appropriate.

According to the present waste definition, waste is the object that someone wants to dispose of, that is, he/she doesn't want it. Does this automatically mean that it is not useful to him? Is non-conscious disposal wasting as well? Does one have to be conscious about the fact that he/she is wasting? No, it is still wasting. The point is that we have to be conscious about it so that we can avoid it.

The EU regulation also talks about "objects set out in Annex 1" as being wastes. The list only contains objects that are non-useful. But what if someone throws away something useful just because for some reason he/she doesn't want it?

Waste is thus an object that in the given time and place is not useful to its present owner.

So what's if it (the waste) never had an owner? Is the producer the owner? In this case the useful product could also be called waste, since the producer doesn't want it, he was making it to sell for profit. The producer is not really an owner, but the useful product has the potential of being given ownership. Thus waste is a man-made object that is in the given time and place not useful to its owner, or an output that doesn't have any owner.

5. THE OWNERSHIP CONCEPT

The concept of ownership has a particular importance in recognizing and determining wastes. A definition of ownership would be *'a right and a responsibility to act upon the object that is to manipulate the properties of the thing'*.

It seems somewhat thoughtless and unjust that a useful object is labelled waste in the same meaning as a non-functional waste object that has no Purpose or Performance.

Moreover, the legislation supports this notion '*waste is any substance or object, which the holder disposes of, or is to dispose pursuant to the provisions of national law in force*' [2].

This suggests that waste is simply a thing without an owner. No indication is given as to why the owner disposed of the object. At present it seems acceptable to toss away something because it doesn't please us anymore. Would we not disapprove if the same thing were the norm for living objects? It is accepted as morally wrong to abandon a cat, or dog. One must take responsibility for a pet, although you may eventually give the pet to someone else. This is a transfer of the responsibility to someone else, and when this happens one is generally careful to transfer this responsibility to someone trustworthy; to make sure it will be in good hands.

However, the sense of responsibility is much weaker or completely missing for inanimate objects. Yet we are responsible for every object we produce or acquire, although we may be unaware of it.

All officers involved in waste management, and much of the general public are familiar with the Polluter Pays Principle. '*Producer responsibility initiatives*' are generally referred to as the responsibility of manufacturing industries to reduce their resource use, as well as to take back for recycling waste materials, which result from their products. While both governments and the public like the idea of requiring industry to take back materials after use, the term should really be broadened in its application. The general public is waste producer too. To make the public aware of the amount of waste they create, is one of the major reasons behind the advent of household charging schemes for waste collection throughout mainland Europe and North America.

User-pay schemes are raising awareness and encouraging householders to sort their waste when separate recyclables collections are available. However, the schemes are often abused, with people putting non-recyclables into the free collection to avoid paying for them to be removed as waste. People may also be tempted to dump waste in car parks and other public areas, just look at railway alleys across the UK.

When the German City of Munich increased waste disposal charges by 42% in 1993 and a few months later by a further 8% [4] , illegal dumping of waste increased alarmingly. Four carpets, nine chairs, one sofa, a bed, 213 large appliances such as washing machines, refrigerators and ovens, and 1230 tyres have been found dumped in different parts of the city since charges were increased (6 month period). In The Netherlands, eleven small towns have experience with the 'expensive rubbish bag' system. The waste management company will collect only garbage that is put in a special rubbish bag. The bags can be purchased in local stores. Some of the towns reported a 60 % reduction in the amount of the garbage that had to be landfilled. It was noticed however, that garbage dumping in neighbouring towns increased when the bags' price exceeded 2 guilders. Neighbouring towns that did not employ variable rate systems, sometimes needed to handle up to 20% more household waste [5].

This is simply a passing of responsibility to another, without having considered a formal transfer of ownership. Clearly, society does not realise that when purchasing an object, one acquires the right for it, as well as the responsibility over it.

6. TRANSFER OF OWNERSHIP

For ordinary municipal solid waste, the inhabitants or housing companies pay the municipality or the organisation responsible for waste collection, for their service of waste collection and disposal. Many people are thus unaware that in this way they transfer the ownership and the responsibility over their non-wanted objects to the waste management company. Nobody questions the morality of this, nor cares for the fate of the discarded objects. However, to act as responsible owners, consumers should opt for durable products as opposed to short life, or single use ones, and consumers should look for opportunities to donate or trade still useful objects before they ever become waste. Most importantly they should also support waste recovery systems, which ensure that waste is utilized, as a raw material in recycling or as an energy source in recovery processes.

This may become an interesting element of future public education campaigns in the UK, making people aware of their responsibilities and asking them to support recycling and recovery programmes on the back of their responsibilities for waste and its generation. This theme will be picked up in a later chapter.

The collective 'object' (waste) will often end up in landfill sites, owned for example by the municipality (or a private disposal operator). The municipality thus has the responsibility over them, and also has the right to manipulate them. Thus, by definition municipality became the owner of the collective object, once it had been collected from the resident's bin. If, however, 'waste' meant having no owner, the collective object in a landfill would not be waste because it had acquired an owner (the municipality) and should really be considered a resource – as a means of infilling old quarries to reclaim land, or as a potential store for the materials until the processing techniques and economics allow them to be subsequently recovered and their inherent value reclaimed. Waste is thus now the property of the municipality or landfill operator; property buried and covered in a well-lined landfill: our heritage for the future generations. By supporting this definition, one supports the current state of public ignorance: ignoring one's responsibility as an owner of the waste that we had generated.

7. THE OWNERSHIP CONCEPT IN LEGISLATION

Ownership in legal terms brings to mind concepts of copyrights and the ownership of intellectual property. Authors would fiercely defend their rights over their intellectual creations: patents, artistic or literary works, trade marks, etc. Producers of material goods are also protecting their creations. If this creation, however, is a liability, waste or even a dangerous compound, the legislation is needed to remind the creators of their ownership rather than protect their ownership rights. Depending on the nature of a waste, owners may be restricted in their right of giving up the ownership freely. It is important to evaluate the risk if one is allowed to claim an ownership over a thing, and accordingly, if one is allowed to give up an ownership. The role of legislation is to decide, evaluate and monitor the conditions owners can give up their ownership. This naturally includes evaluation of the hazard of a waste, and prescribing, or motivating actions owners should take if intending to give up their ownership.

This is an important concept in terms of what the law should allow and what the law should prohibit in terms of waste management. Historically the law has acted to regulate, but perhaps the law has an important role in explaining and educating regarding ownership issues and waste creation.

8. DEFINING WASTE MANAGEMENT

The term 'waste management' is confusing in itself. We can treat waste, we can handle, or dispose it, but we actually do not really manage the waste problem very well. Management is defined in the Webster dictionary as *judicious use of means to accomplish an end* [6].

The most striking point in this definition is, when using it in terms of waste management: what would be the 'end'? What is the goal we would like to achieve in connection with wastes? The answer should be, what we all wish: to have the least amount of wastes. Yes, but 'waste management' is defined as '*Collection, transport and reception of waste and its storage, neutralization and other such treatment, and all activities necessary to monitor the environmental impacts of waste management*'. This actually means that we have a certain amount of waste, and we try to get rid of it by some ways. Unfortunately it doesn't mean that we are trying to minimise its amount. Clearly waste management is about processes and end of pipe procedures (after waste has been produced) and not about environmental protection and waste avoidance.

A common interpretation of 'waste management' would include the following elements;

- collection
- transport
- reception
- storage
- neutralization
- monitoring

Strangely enough, the widely accepted "Waste Management Hierarchy" comprises the main waste management methods, the hierarchy being:

[1] waste avoidance;

[2] re-use;

[3] recycle;

[4] composting;

[5] incineration (thermal recovery, to include thermolysis, pyrolysis, hydrolysis, etc)

and [6] landfill

However, this hierarchy can be further refined as;

1. Waste avoidance (basic guidelines include)

- 1.1. lightweighting
- 1.2. producing durable goods
- 1.3. consumer responsibility

2. Re-use (involves)

- 2.1. collection
- 2.2. transport to the filler
- 2.3. cleaning and other miscellaneous preparation
- 2.4. back to the normal production system

3. Recycling (involves)

- 3.1. recovery
- 3.2. collection, separation, and eventual storage
- 3.3. transport to the industry
- 3.4. pretreatment
- 3.5. to other production system

4. Composting

- 4.1. collection
- 4.2. separation
- 4.3. pre-treatment (grinding, mixing with fluffy agents)
- 4.4. to the actual composting process

5. Thermal recovery (incineration, thermolysis, pyrolysis, hydrogenation...)

- 5.1. collection
- 5.2. separation
- 5.3. pretreatment (e.g. size uniformisation)
- 5.4. to the thermal process

In summary *'waste management includes collection, transport, storage, separation and pre-treatment of waste'* with the aim of making the waste 'fit' to enter one of the waste receiving operations (as noted in Figures 1.3 and 1.4).

Figure 1.3 The Waste Management Cycle [3]

Figure 1.4 The Waste Management System [5]

Waste management should comprise all activities involved in minimising the overall wasting (material and energy), and only then treat the waste that is created in a way that its environmental impact is minimal [6]. If we accept that wastes are non-artifacts or artifacts with deficiency in purpose or performance attributes, when we want to manage these problems, we may have to alter the products or their process design. Waste management, would thus become *control of waste related activities for a purpose*. Thus in addition to the well established understanding of waste management activities; the following activities could (and) should be added;

1. If waste was created as a non-wanted but not avoided output, with no purpose:

In this case, waste is process-specific and can be avoided or minimised, by changing the process performance, or by using different input materials and specifications. We are aware that most industrial, commercial and consumption processes that are aiming at a necessary and desirable output, leave behind undesired by-products that we call waste. The act of waste management here would mean controlling the process with the aim of optimising the amount of waste produced. Optimising and not minimising, was used purposefully, since minimising may not lead to overall environmental benefit.

In some cases actually getting the most amount of “waste” is the best environmental option, e.g. exhaust-gas scrubbing. In other cases, aiming at the minimum amount of waste would require larger resource use, the environmental effect of which may exceed the gained benefit. This problem also calls for extending designer responsibility for the “non useful” by-product’s fate and subsequent disposal or use. A viable solution may be looking for waste-trade possibilities: the waste of one process may be a valuable raw material for another one; a growing phenomena known as ‘waste exchanges’.

2. When waste is created because the products have fulfilled their single intended purpose:

The best examples for this category are packaging [7]. The act of waste management in this case would mean to take the responsibility already at design for the product’s fate and extend it to include the waste material produced after it has fulfilled its function. If its (the wastes) most probable fate is to end up in landfill, opt for lightweight, low volume or collapsible shapes and flexible walls. If heading instead for material recovery, use materials that are the most economical to recycle. If incineration is planned, omit ingredients that may lead to toxic emissions, etc.

3. When waste is created, because products are not performing well anymore:

We are aware that most products have a certain life-span, and after that time, they cease to be useful. The act of waste management here would mean creating goods with optimum life-times. Again, the expression optimum and not maximum, was used with purpose. While for some products (e.g. fluorescent light-bulbs) maximising life-time is beneficial, there may be cases, when the overall environmental benefit of efforts to prolong life-time may be questionable; for example would it be useful to create refillable glass bottles that are more durable? Basically it would mean that glasses would be thicker - and heavier. They could be refilled more often, but for their larger weight would involve higher transportation energy inputs and reprocessing costs. Also this problem calls for the use of ecological design, design for assembly and disassembly, so that even if the whole product ceased to be useful, some parts of it could still be utilised, etc. All these activities should be understood as waste management, i.e. the control of waste related activities.

In light of this a more refined procedural list of waste management activities would look similar to this;

1. Waste recognition
2. Search for and pinpoint source, define quantity and composition of the waste
3. Quantitative analysis
 - could it have been avoided?
 - could the amount be reduced?
4. Quality analysis - could the effect be mitigated?
 - from source?
 - end of pipe?
5. Analyse the possibility, benefit and or danger of returning to the system?
6. Find out if it is useful to someone else?
 - as such?
 - after treatment / modification?
7. Can some useful/marketable product be produced from it?
8. Is it profitable/preferable to dismantle/disintegrate to regain some constituting part?
9. Can the calorific value be recovered?
10. Which of the above options is preferable (environmentally and economically)?
11. Is it dangerous/ does it have a dangerous part, liable to national regulations?
12. Can the dangerous part be neutralized or separated?
13. Is the quality and or quantity under permissible limits?
14. Does the part remaining to be disposed of need a special site?
15. Regularly monitor and check if any new usage possibility become available.

If this procedural list was to include more reference to issues of definition and ownership, as have been noted in the discussion to date - the procedural list would start with a form of input-output analysis. The list of activities should be revised if the desired product/result was produced/achieved effectively. In this way, that “waste management as the control of waste related activities” becomes an effective definition. Clearly, the emphasis is now on checking what it is in the products that we don't/didn't want (from a composition stance).

The revised procedure should thus consider;

1. Make an input-output analysis of the material or product
2. Revise whether the result was achieved effectively
3. Identify objects that are not useful for you
4. Analyze if there a possibility that it is of use;
 - i. at some other time?
 - ii. at some other place?
 - iii. to someone else?
5. When you find someone to give it to, you have 3 possibilities;
 - i. you get money for it
 - ii. you give it away free
 - iii. you pay for someone to take it

So it is actually only at stage 4 when the system starts to practice waste management, and only at stage 5 when waste management as defined today is completed. As such, *the role of waste management is to find a new ownership and/or giving a new purpose to the waste.*

9. CONSUMER AWARENESS

When an artifact is designed, a time period during which the performance of the artifact is used is guaranteed. The performance of complicated artifacts depends essentially on the combined performances of structural parts. Usually the performance of an artifact ceases as soon as the performance of a part ceases. Thus, it is the designer's task to assess the risks and benefits of replacing the non-working part, or the whole artifact. In the case where the whole artifact is declared waste, it may still contain structural parts that have an acceptable performance. It can again be the designer's task to determine how the working structural parts can be reused in their present state, or whether the constituting materials should or could be reused. In any case, the designer can only give suggestions for further action. To act accordingly is the owner's responsibility.

The importance of individual actions in waste management is undoubted. The nature of the human-waste relationship depends greatly on awareness.

When it is about consumer wastes, no legislation can be as effective as a well-informed, environmentally conscious, ethical public. The more that human beings are aware, the better the quality of this link. First, however, let us define awareness.

9.1 Defining awareness

Awareness is knowledge of causalities. A citizen aware of waste management initially has knowledge of how to act, but also has a meta-knowledge, or a critical view of causalities. He / she can assume the consequences of his / her actions, and thus he / she is conscious about his / her actions. The observation is that in society at large, citizen awareness is rather low. For ordinary citizens, present municipal waste management schemes make the transfer of responsibility of the non-wanted objects very simple, perhaps too simple. Citizens are not even aware that when discarding non-wanted objects, they are giving up their ownership over them, because they no longer want to be responsible for them. Nobody questions the morality of it, nor cares for the fate of the discarded object. Apart from the times when waste collectors are on strike, few even appreciate the services of waste collection and disposal.

Embracing the ownership concept could help in changing this. If everyone became conscious of being owners, and aware of responsibilities associated with ownership, people would be more careful with giving up their ownership, and would consequently be more careful in choosing a waste management option.

9.2 Raising awareness

The introduction of separate waste recovery systems is a first step in awareness raising. Citizens will have a chance to participate in more environmentally conscious waste management. They may know which bin to put recyclables, but that does not make them aware. They will know only how to act, but they cannot see the consequence of their actions. Without knowledge, there is no motivation, and without motivation many recovery schemes fail to meet expectations [8].

For those of us who deal with waste management and have deep knowledge of causalities, it is difficult to understand or even keep in mind that much of the general public do not have much knowledge of waste management. It is not enough to put a recyclable collection bin; the benefits of recycling have to be explained.

On the other hand one should also keep in mind that we are not asking a favour from citizens, but offering them an opportunity to act responsibly. Thus, it would seem that 'carrots' (e.g. deposits), and 'sticks' (e.g. waste collection fees), would not work as well, as simple morals and ethics.

Participating in waste recovery should not have a "price"; it is everybody's responsibility. It should be explained to citizens that waste is simply an object that they don't want, it is thus their "fault" it ended up being waste, and the least they can do is help to turn it into something useful again. To act as responsible owners, consumers should opt for durable products as opposed to short life, or single use ones. They should look for opportunities to donate or trade still useful objects. They shall also support waste recovery systems, which ensure that waste is utilized.

9.3 Citizen education

Young people and children have been shown to appreciate and understand concerns about the environment, in many cases more actively and with more conviction than their parents and elders. They are also the consumers of tomorrow and fortunately also the manufacturers and politicians.

The Oulu example (Finland);

In Oulu, a small local firm started separate waste collecting from three housing companies, among others the students' housing company. It was hoped that creating such an environment around the students, where separating waste in the household becomes an everyday habit, a new, environmentally conscious generation could be raised. The housing company and the waste collection firm in cooperation used passive, active and inter-active approaches to promote waste recovery. The following is an account of events at one of the suburbs of Oulu, where separate waste collection is running [9].

Before the opening of the new waste collection facilities, the housing company distributed an information leaflet to all residents, presenting the use of facilities, and inviting the residents to the opening.

At the opening, the representative of the waste collection company held a promotional presentation, demonstrating the use of the facilities, explaining the fate of the collected waste, answering the questions of the participants, and highlighting the fact that recycling saves resources, landfill space, and creates jobs. The interactive presentation is a great education media if the citizens attend. However, in this case, the participation rate was extremely poor.

It was expected (by the waste management decision-makers) that the amount of mixed waste would drastically drop when the system of separating recyclables was begun, but apparently a large percentage of tenants did not separate their waste. The mixed waste collection bins soon overflowed, and complaints from the tenants were soon pouring in to the housing company. The emptying of mixed waste bins had to be done more frequently. Ironically, many also complained about the untidiness of the collection facility, which still continues to be a problem, while the tenants are the only ones who could prevent this happening. Without the proper knowledge, the tenants do not realise their responsibility.

As a further form of active promotion, additional explanations about the use of the waste collection facility were distributed to every household, encouraging participation. The use of facilities was also advertised in the newsletter of the tenants' council, and also on the homepage of the council. The unwillingness of tenants to participate was still obvious. The leaflets were either not read, or the message did not get through.

A small survey among the members of the tenants' council (many of whom did not separate their waste either) shed light on the tenants' complete lack of feeling of responsibility for the fate of their own waste items. Some said eventually they would participate if free collection receptacles were installed in their kitchens. The housing company was not averse to this idea, and agreed to finance the design and installation of collection bins. Its effect on waste recovery is yet to be seen.

The conclusion is, however, that without understanding their responsibility as owners, a small inconvenience is too high a price to pay for the environment's sake.

Overall, apathy and the lack of concern are the main reasons for the low participation rate. Public presentation, leaflets distributed to every household, advertisement in community forums failed to meet expectation. Real education needs face-to-face contact. If people do not reach for the message, the message has to go to reach them. It has been proven that direct teaching of citizens has great effect on the success of waste recovery. This topic will be addressed in great detail in later papers.

10. MODELLING WASTE MANAGEMENT

Waste management should thus be summarised as all waste related activities. When we are acting upon an existing amount of waste, we are controlling the phenomenon taking place in the material, in order make it advance with a desired rate and extent, to achieve minimal environmental disturbance. Ideally, we want to design or modify a process, so the act of waste management is thus a process design activity and not an end of pipe activity.

When we want to optimise waste generation, we have to control already existing production or consumption processes in order to achieve minimal environmental disturbance. Again, the act of waste management is process design activity. Modeling waste management thus means modeling process design activity [10].

11. CONCLUSION

The reason for a physical thing to be valued as waste, and consequently an activity subclass for "managing" the waste, can be found from a deficiency either in the value of Purpose or in the value of Performance of the physical thing. To be able to model waste management, we must characterise its properties. What we should mean by the model of waste management is a formal representation of knowledge, which can be documented and shared. A useful model can be built only by starting from the proper definition of the concept.

The paper presents a new classification of waste based on the conceptual analysis of wasting and points out at the need to clear out the concept of waste management.

Waste is defined as an object without an owner, or without a Purpose. Waste can be made non-waste, if assumes a new owner, who gives it a Purpose. Being an owner means right and responsibility over the object we own. The role of 'waste management' is giving new Purpose to waste. Legislation should not support the state of ignoring owners' responsibility.

An important class of owners are the producers of an object. While producing a marketable product, they shall be aware of their responsibility over all of the other, maybe not marketable outputs. They always have to be aware of the risk of being owner without even knowing it. The role of legislation is to monitor the condition owners may give up their ownership over and object. Consumers shall be informed about their responsibilities as owners, too. They shall see that it is morally wrong to give up their ownership non-controllably, and should be aware that paying a waste removal fee means transferring their ownership as well as responsibility, and the right thing to do is to seek and promote that the waste objects will be assigned a new purpose.

The new, object oriented concepts and definitions, have proven to be useful on many accounts. Waste taxonomy according to the reason for waste creation prescribes how wastes can be turned non-wastes. New waste definitions help to define the roles of waste management and are the first step towards creating a waste management theory. The ownership concept points to the responsibilities of ordinary people, thus it can be a powerful tool in citizen awareness raising, and ultimately can aid waste recovery.

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CHAPTER 2

THE STARTING POINT

CHAPTER 2 [I]

LANDFILL AVAILABILITY AND ITS FUTURE

CHAPTER 2 – THE STARTING POINT

‘LANDFILL AVAILABILITY AND ITS FUTURE

The UK waste management sector has been dominated for the last century by landfill disposal, or the filling of holes in the ground (see Figure 2.1). This is a reflection on the country’s geology and history of extraction for mining, quarrying and construction purposes. Not only have landfills come to dominate parts of the British landscape, but they have helped to distort the UK waste management sector offering overly cheap landfill to authorities unlike mainland Europe where the cost of landfill can be ten-times that of the UK. This has effectively blunted the development of recycling, except for the war years when the material value was increased because of scarce resources, and alternative waste processing and disposal options. These alternatives have proved too costly for local authorities to select against the cheap and simple approach of landfill sites far from the city centres of waste production.

Figure 2.1 The landfilling of waste (source: author)



This section will deal with the historical overview of landfill disposal in the UK and its role in a sustainable waste management system, where it must act as a foundation stone. The chapter utilises three papers offering different insights to the landfill issues, the three papers in question consider;

- *Landfill availability in the UK (Chapter 2)*
- *The implications of the closure of Fresh Kills landfill site in New York (Appendix 3)*
- *New aerobic processing techniques and what they offer for sustainable landfill (Appendix 4)*

Landfill is without question a valuable waste management option under the right circumstances, it can recover land from disamenity by infilling quarries and mines, reclaim land from the sea and put spoiled land back into agricultural use. However, there has been a mounting swathe of criticism levelled at landfill over the last 25 years due to the environmental risks and health problems associated with landfill practices. Landfill sites in the past have been responsible for groundwater pollution, housing explosions and methane emissions to the atmosphere, all of which are now recognised as undesirable (see the aerobic landfill paper - Appendix 4 - for more detail).

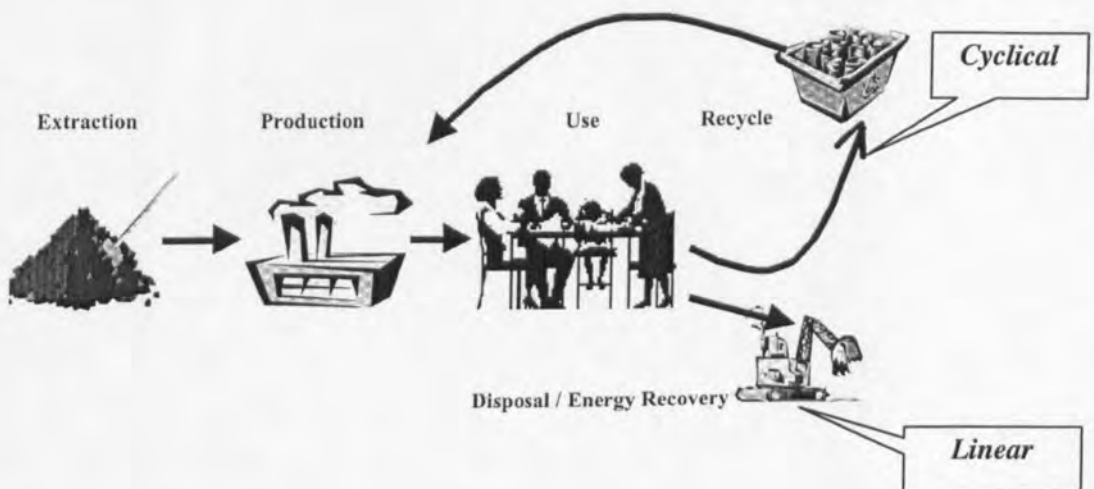
However, these issues are not as significant as they used to be in the UK because of controlled sanitary landfill practices with liners, caps and piping for leachate and gas emissions. In addition there has been the growth of legislation and a general public warming to the ideals of recycling and recovery, noting that landfill is essentially a dump for unwanted items, all of which have a material worth of some degree.

The first paper considers the availability of landfill void across the UK, linking this to developments in integrated waste management systems and the growth of recycling and waste to energy programmes. In areas where landfill void is more scarce (like London) the costs associated with waste transportation and disposal are far greater than those counties with abundant landfill space (Bedfordshire and Kent for example).

This has resulted in authorities looking more closely at the opportunities afforded by recycling, composting and recovery to limit their need for landfill and thus curb their ever increasing waste management costs.

This paper goes on to examine the impact of Government legislation in shifting the waste management sector's emphasis away from simply disposal towards more integrated and environmentally acceptable solutions. What is apparent is that there is a great deal of regional variation in landfill availability, and this is having a significant impact on the adoption and delivery of alternatives to landfill. This paper should be seen as a pre-cursor for those that follow in Chapter 3 and 7 where issues of government strategy and implementation and the EU landfill directive are discussed in greater detail. The paper goes on to recommend the need to move away from linear product cycles to more cyclical ones (see Figure 2.2), where materials and energy content are recovered as opposed to being buried.

Fig 2.2 Linear or Cyclical Economies? (source: author)



The second paper takes the debate a stage further through the use of a case study of New York State (Appendix 3). The decision to close Fresh Kills landfill site in the mid 1990s paved the way for a great deal of debate at all levels in both the State and the City of New York. With one of the largest operating sites in the world due for closure the issue of alternatives came to the forefront.

This paper discusses the political struggles surrounding the decision to close the site, outlines a number of the proposed alternatives including recycling and energy recovery and debates the problems associated with out-of-state movement of the waste to disposal sites in Virginia and Pennsylvania.

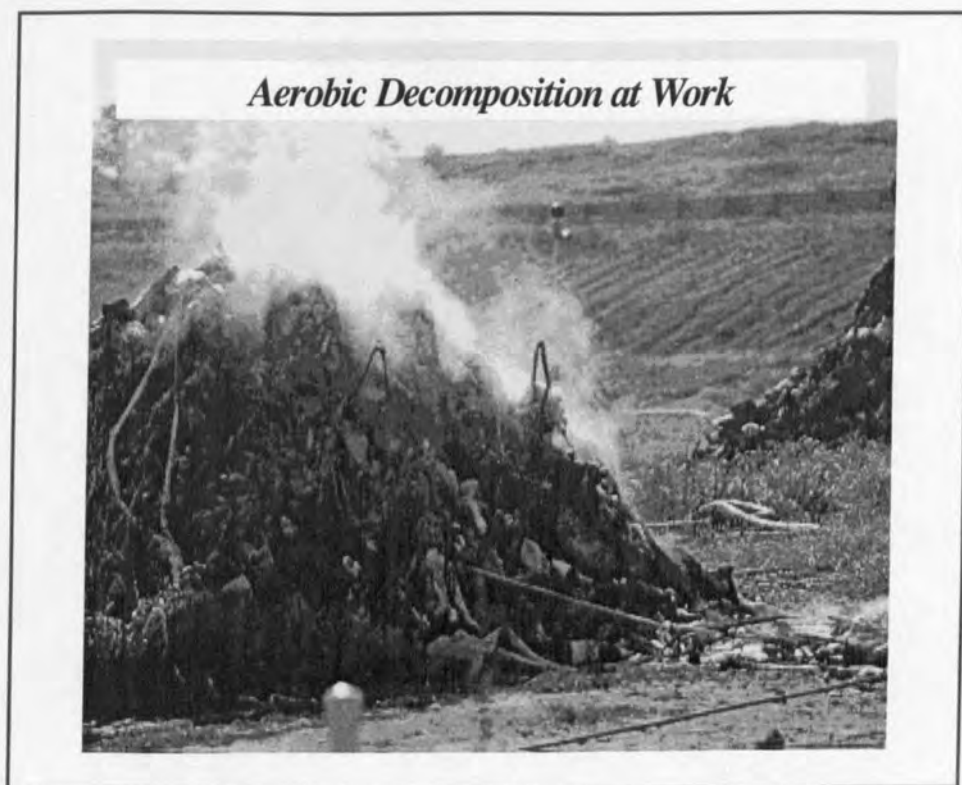
What is important from this discussion is the apparent lack of consultation with the local residents in New York, or the intended sites out of state, and the problems with polluting neighbourhood counties and states. This is somewhat reminiscent of the UK where London sends almost all of its waste for disposal to Kent, Essex and Bedfordshire. Perhaps the UK could learn a few things from the way that New York approached the delicate subject.

Figure 2.3 Fresh Kills: the only operational landfill site in New York City
(source: Gandy 1994)

The final paper in this chapter (Appendix 4) brings the debate up to the present day with a scientific evaluation of a new approach to landfill management being developed and applied in the USA with some significant benefits for landfill practices around the world. Composting (the approach adopted within the test landfill sites) is an extremely old waste management technique, natural in origin, which has been used for the management of organic waste for centuries.

As a landfill site will commonly store substantial organic material under anaerobic conditions, the bacteria present will degrade the material producing leachates and methane which are explosive and polluting. By applying the same process of 'composting' in-situ within a landfill site, aerobically enhanced degradation can be controlled and the pollution associated with landfill sites alleviated.

Figure 2.4 Material removed from the aerobic landfill site showing evidence of degradation (source: author)



The results of these pilot projects were most successful resulting in significant void space recovery through decomposition of the organic material. The sites also showed what could be achieved through mining of the material post-composting to recover plastics and metals for recycling. This left a site with over 50% of its content missing, and thus produced new void for infill. The approach suggests the possibility of developing perpetual or sustainable landfill sites with hundreds of years of active life through the continual aerobic processing of the organic material and recovery of recyclables from the site.

This technique also raises important questions concerning the EU Landfill Directive (see Appendix 9), which is attempting to limit the amount of organic material sent to landfill. Rather than develop composting plants and worry about kerbside collections of organic material, it may be more sensible and cost-effective to look at the widespread use of this technology for controlling organic waste in landfill sites. This approach also leads to a discussion of whether the site should really be called a landfill site (alluding to ultimate disposal) when it is really an aerobic processing facility – this may also prove to be a way round the EU Landfill Directive; clearly the debate will continue to rage for some time to come.

CHAPTER 2 [II]

FUTURE OF LANDFILL AS A WASTE MANAGEMENT OPTION IN UK

THE FUTURE OF LANDFILL AS A WASTE MANAGEMENT OPTION IN ENGLAND

1. INTRODUCTION

1.1 Framework

This paper is an investigation into the issues and themes that are currently of interest to the UK municipal solid waste disposal sector. Through these themes a broad introduction to this sector and its associated environmental problems will be provided, and an assessment of future environmental performance considered.

Of the 35 million tonnes (approx.) of municipal solid waste generated on average each year in England and Wales about 88% is landfilled, some 6% is incinerated and the remaining 6% is recycled [1]. This reliance on landfill has been of great concern of late due to the need for continuous void availability which is now proving difficult to meet, and this is the fundamental theme investigated within this paper.

Municipal solid waste management has evolved from primitive origins through the development of open dumps in Ancient Rome to the sophisticated collection and disposal systems that are in use today. In 1875 The Public Health Act made it law that all domestic refuse should be kept within a dustbin which would be emptied by the relevant Local Authority at least once per week. The foundations of the present controls relating to municipal waste collection and disposal were laid down in the 1936 Public Health Act, and in the 1947 Town and Country Planning Act, whereby Local Authorities were given power of control over the development of new disposal sites which had to meet certain environmental standards. The fundamental piece of waste management legislation was the 1974 Control of Pollution Act, which really took hold of the industry and provided it with new and greater direction, guidance and regulation. Much of this legislation has been maintained and developed within the 1990 Environmental Protection Act, which tightened the structure of the waste industry and provided greater guidance and regulatory controls.

There have been several important contributions to the development of waste management theory and practice during the recent past. Particularly notable are the work of Powell and Brisson [2] and Cooper [3] on '*green economics*', Pearce & Turner [4] on '*economic instruments*', Coopers and Lybrand [5] on *waste management externalities*, and Coggins [6] and Gandy [7] on *minimisation and recycling strategies*. However, there has been little active research focusing upon Government control over choice of municipal solid waste management strategy by waste disposal authorities or national landfill availability, which are intrinsically linked and are the central concerns of this paper.

The main theme of this work is to assess what municipal waste management decision makers think the future role of landfill will be in England, whilst investigating whether Government policy has been actively encouraging the growth of alternative waste management options at the expense of landfill.

A number of preliminary objectives were established to guide the research.

- To establish the extent of the landfill problem facing the future disposal of municipal solid waste in England.
- To determine whether alternative waste management practices have been adopted in response to the predicted landfill shortage, and to assess the impact of these options on landfill disposal of municipal solid waste.
- To investigate the role of UK Government policy and legislation in shaping the behaviour of municipal waste managers, through their adoption of alternative management strategies other than landfill.

1.2 Industry Structure

In the UK, The Public Health Act (1875) made it law that all domestic refuse should be kept within a dustbin which would be emptied by the local authority at least once per week [8].

The foundations of the present controls were laid down in the 1936 Public Health Act, and in the 1947 Town and Country Planning Act [9], whereby local authorities were given power of control over the development of new disposal sites which had to conform to certain environmental standards. The fundamental piece of waste management legislation in the UK was the Control of Pollution Act [10], which took hold of the industry and provided it with direction, guidance and regulation.

Much of this legislation has been maintained and developed within the Environmental Protection Act [11], which tightened the structure of the waste industry and provided greater guidance and regulatory controls to waste authorities [12]. Waste management in the UK is now governed jointly by the Department of the Environment and the newly created Environment Agency, which is now responsible for regulation and enforcement matters, leaving collection, disposal and planning functions with local government [13].

Local authorities have statutory powers in relation to the management and control of many types of waste, principally those arising from households and commercial premises [14]. In recent years local authorities have increasingly focused their attention on waste reduction, finding alternatives to the traditional means of waste disposal, landfill. Care for the environment has long been a concern of many services within local government, yet inevitably there has been a tendency for these services to be provided as relatively discrete areas of professional and departmental activity with too little attention paid to the ways in which they are interconnected [15]. This inadequacy may have previously hampered the role of minimisation, recycling and composting [16], but is now being addressed through the development of Integrated Waste Management Plans and the growing role of Local Agenda 21 [17].

The waste industry has undergone rapid restructuring during the last decade, which has had a significant impact upon the adoption of waste management strategies by local authorities. For example, in London the GLC was abolished in 1986, with the removal of a single unitary body responsible for waste disposal, regulation and licensing.

It was replaced by a number of statutory waste disposal authorities, a greater number of voluntary waste disposal groupings and the London Waste Regulation Authority. Since the 1990 Environmental Protection Act there has been a further restructuring with the national division of waste responsibilities between Collection, Disposal and Regulatory bodies or Authorities. The intention of this was to increase efficiency and control over the industry, and provide less opportunity for pollution [18]. Also during this period there has been the steady growth of private sector involvement, following the introduction of Compulsory Competitive Tendering for waste collection and disposal contracts. This has resulted in a radically different waste sector than previously, with more opportunity for regulation and control, in a sector that is evolving into one dominated by the private sector. Most recent has been the launch of the Environment Agency, operational from 1 April 1996, which has combined the powers of the NRA, HMIP and Waste Regulation Authorities into a single unifying body.

A great deal of the present operational responsibility for waste management lies in the private and voluntary sectors, with the EPA 1990 placing the operational responsibility for waste disposal in the private sector, whilst the Local Government Act 1988 introduced a system of Compulsory Competitive Tendering for refuse collection. The existence of different tiers of authority with different functions places obstacles in the way of achieving an integrated approach to waste management, not least in fully integrating recycling into waste management and other functions, particularly land use planning. This is why this research focuses upon all of the major facets of the Municipal Solid Waste Management industry, both private and public bodies, collection, regulation and disposal authorities, consultants and merchants alike.

1.3 Environmental Concerns

Damage to the environment due to poor waste management can be avoided by implementing environmentally sensitive waste management techniques, involving minimisation, composting, recycling, reuse and waste to energy programmes.

The problem of disposing of waste is international in its scope with many nations suffering from a similar fates, with serious local implications particularly groundwater pollution from leachates, methane gas production from landfill and atmospheric pollution from incinerators.

The 1992 Earth Summit in Rio set a series of Agenda 21 (*action today to preserve the environment for the twenty-first century*) objectives for environmental management. The main theme of this conference was to assess the nature of sustainable development, how it could be achieved and what it would cost, both socially and economically. Sustainability, acting in a manner that will not leave poor environmental consequences for future generations, is now a key theme for UK waste management. A number of objectives were set for increasing the sustainability of waste management, and these included:

- minimising waste
- stabilising waste production
- quantifying waste flows
- maximising environmentally sound waste re-use and recycling
- developing national programmes for waste management research and practice
- raising public awareness
- and promoting environmentally sound waste disposal.

These goals require translation through national policy and legislation to targets, which can stimulate local authorities and private waste companies to promote minimisation, recycling, reuse and energy recovery.

The onus is presently on local authorities to implement strategies to deal effectively with their waste in a sustainable, self-sufficient and environmentally acceptable manner.

The availability of suitable void for municipal waste disposal is closely tied to changes in the role of the aggregates mining industry, which until recently has been a relatively successful industrial sector and has thus provided a continuous flow of new sites requiring infilling with waste, thus keeping the costs of landfill disposal to a minimum. Landfill will usually only fill void created by mineral extraction, and the rate of mineral extraction has slowed recently to below the rate required by annual waste generation, leaving a surplus of waste requiring treatment and disposal.

In some parts of England there may be available void, but permission to use it for landfill is becoming increasingly difficult to obtain, with more rejections of planning applications, due on the whole to the greenbelt policy of local authorities and the NIMBY (Not In My Back Yard) attitude of residents [19].

This trend has been noted by Adams [20], who concludes that of the plethora of new legislation introduced to the waste industry since 1990, only a tiny fraction has addressed land use planning, as opposed to waste regulation. However the vast majority has indirectly made it more difficult to obtain planning permission for landfill sites. With both the NIMBY and NIMTO (Not In My Term of Office) syndromes on the increase the waste planning system is approaching gridlock. An absence of accurate Government statistics means that there is no way of quantifying the extent to which landfill capacity has shrunk during the decade, but most would agree that Landfill is a wasting asset. In 1994 90% of landfill appeals were rejected, amounting to 50 million m³, or half of the annual landfill consumption rate in England and Wales. Thus there appears to be a need for planning guidance on landfill and waste disposal to ease this problem as the availability of landfill continues to wane during the coming decade.

The problem of disposing of waste is an international one, with often serious local implications [21]. For decades, the response of the majority of governments worldwide has been to burn or bury it, but such poor waste management techniques are no longer necessary or acceptable [22].

Numerous waste management techniques are currently available which, when used together, can create a truly integrated reclamation system [23]. Damage to the environment due to poor waste management can be avoided by implementing environmentally sensitive waste management techniques, through the principle of Best Practicable Environmental Option (BPEO), whereby minimisation, re-use, recycling and recovery techniques are employed where feasible, in order to reduce the burden on the need for landfill, which is a declining resource [19]. These environmental concerns and issues provide the necessary framework within which to discuss in greater detail the development of Municipal Solid Waste Management in the UK, and the problems and opportunities, which currently face this sector.

2. WASTE PLANNING ISSUES

2.1 Local Government Waste Management

The environmental agenda is so wide ranging and interconnected that it can often confound precise action, and because it involves almost everything, it sometimes identifies nothing, with some councils, or individuals, uncertain about where to start. The environmental agenda presents local government members and officers with a substantial management challenge. However, sustainable development policies cannot be restricted to a single department or public sector agency. Traditional approaches for setting policies and organising and delivering front line services are not normally designed around corporate principles. Getting different parts of the council to work together, as well as collaborating with other public services and with the private and voluntary sectors, is a major challenge.

One of the basic challenges in modern waste management is to ensure that an efficient, reliable and cost effective service continues to be provided in the future.

It is clear that National Government policies and goals require assistance at the County level being dependent on County Councils for their implementation and monitoring [24]. This provides the Counties with a fundamental role within the future of the waste disposal industry. County Councils can decide which disposal routes are suited to the local conditions and then determine which planning applications and waste disposal license applications should be granted and which should be rejected. It is at present in the hands of the County Councils in which direction the waste should go. The long-term vision for local planning authorities should involve the pursuit of a more radical approach which advocates the more comprehensive use of waste minimisation, recycling, incineration and other reduction methods. Otherwise the South-East, and much of the rest of the UK will face an intolerable waste disposal problem [25]. The Government has produced its national strategy [1], but this lacks the local detail which is required at the local level. The consequence of this local policy vacuum is that a number of local authorities have decided to produce non-statutory waste management plans, often through a partnership between the planners, the waste disposal operators, waste collection authorities and waste disposal authorities [26]. Without the local context, local planning authorities may have problems at local plan inquiries, for how they will justify local plan policies, unless they have a local but strategic waste management context within which to work.

2.2 Landfill Planning

The use of landfill for disposing of municipal waste has a number of controlling factors that have become more noticeable during the last decade (Read 1997, Rose 1995). Landfill will usually only fill void created by mineral extraction, clay extraction and quarrying, and the rate of these have slowed to below the rate required by annual waste generation [27], leaving a surplus of waste requiring treatment and disposal. In some parts of the UK permission to use available void for landfill is becoming increasingly difficult to obtain, with more rejections of planning applications, due to the greenbelt policy of local authorities and the NIMBY (Not In My Back Yard) attitude of residents [28].

This trend has been observed by Adams [20], reporting as the Chairman of the Environmental Services Association's Planning Committee. He concludes that of the plethora of new legislation introduced to the waste industry since 1990, only a tiny fraction has addressed land use planning, as opposed to waste regulation. However, the vast majority has indirectly made it more difficult to obtain planning permission for landfill sites. With both the NIMBY and NIMTO (Not In My Term of Office) syndromes on the increase the waste planning system is approaching gridlock. An absence of accurate Government statistics means that there is no way of quantifying the extent to which landfill capacity has shrunk during the decade, but most would agree that landfill is a wasting asset [28]. This issue is being partly remedied and addressed by the current administration, which intends to increase the reliability of waste generation, treatment and disposal statistics [29].

In 1994, 90% of landfill appeals were rejected, amounting to 50 million m³, or half of the annual current landfill consumption rate. However, it must be considered that appeals only account for 10% of all landfill applications, and thus the seriousness of the situation may not be as great as indicated by Adams [20].

There appears to be a need for planning guidance on landfill and waste disposal to ease this problem [30] as the availability of landfill continues to wane during the coming decade, and the volumes of waste requiring treatment and disposal continue to increase as a by-product of our expanding *throw-away* society. Figures 2.5 and 2.6 indicate the declining availability of void for landfill in the South-East of England, used here as an example of the diminishing availability of void throughout the UK [31]. The primary problem facing the industry and the UK in general is the declining availability of void [32, 33] in certain regions, particularly the South-East the South and the North West [34]. Perhaps there is a need for the industry to seriously consider the benefits of landraising techniques, where instead of filling a void a hill is built from waste materials, which can be landscaped to fit in with the surrounding contours and environment [35]. A number of these issues are currently being discussed in the newly developing regional waste planning and disposal fora [36] of which SERPLAN is the South East representative [37].

Figure 2.5. Total Available Landfill Void in the South-East of England [35]

Figure 2.6 Landfill availability in the South East [35]

From a landfill policy survey carried out by Read [38], it appears that those areas with the shortest duration until exhaustion of void are generally located in the vicinity of major conurbations, including Liverpool and Birmingham, with the most acute shortage around London, where landfill will cease to operate in a number of counties by the year 2000. In contrast, the periphery of England has more available void with capacity for another 15 years throughout much of the North, East Anglia and the South-West. In particular the county of Cornwall, in the South-West, has a landfill life-expectancy in excess of 20 years due to its legacy of mining and extraction works (available void), its low population density (low domestic waste production) and its distance from major conurbations (sources of waste). Similarly the counties of Oxfordshire, Leicestershire and Essex have relatively lengthy capacities (15-20 years) due to their historic role as aggregate producing counties. In contrast the North-West and Shire counties in the South have a life-expectancy of under 10 years due to heavy population densities, and limited free land for the development of landfill sites. At the extreme are Dorset and Hampshire which have almost no void available and were incinerating much of their waste, and have plans for a number of large-scale waste to energy, recycling and composting plants, to further reduce their need for landfill.

3. POLICY REVIEW

In the 1970s the prevalent method of disposing of solid wastes was by open dumping, although this practice today has been virtually eliminated in many countries to be replaced by a comprehensive system including waste reduction, recycling facilities, waste to energy and sanitary landfills [8].

Previously considered a local issue, it is now clear that solid waste management has international and global implications. More than ever before, solid waste management policy-makers world-wide need sound and reliable information on the on the technical performance, environmental impact and costs of solid waste collection, recycling, treatment and disposal [39].

Before 1972 there was no legislation concerned primarily with the broad problems of waste disposal in the UK, although local authorities have long had powers to control waste as an aspect of public health. The Public Health Act 1936, consolidated much earlier legislation, and empowered local authorities to remove house and trade refuse from domestic and commercial properties.

Under the Control of Pollution Act (1974) the primary purpose of waste licensing, management and regulation was to prevent pollution of water or danger to public health. The Secretary of State for the Environment remains responsible for waste management under the COPA 1974, and has supervisory powers over local authorities with waste management responsibilities, whilst reviewing waste disposal plans and waste recycling plans before they are finalised. By virtue of section 14(1) of COPA 1974 Waste Collection Authorities (usually district or borough councils) will usually be required to deliver the waste they have collected to such places as the Waste Disposal Authority directs, where it will be treated and transferred to a disposal facility or landfill site. This is the common waste management system utilised across much of the UK, except for those localities which have Metropolitan Boroughs or Unitary Authorities, which will combine collection and disposal functions at the local scale.

3.1 The Waste Hierarchy

The former Conservative Government's first priority was to reduce waste at source, through the imposition of rigorous standards and increased disposal costs, which it hoped would filter down through the waste sector to producers and 'brokers' [1], and this remains a central theme for the current Labour Administration. In line with this, the UK Government (initiated by the Conservatives but continued under Labour) had a policy of promoting recycling initiatives, and developing the potential of energy from waste [40]. Landfill is to be considered as the last option for those wastes, which cannot be treated by alternative measures, and for the residues of incineration [40].

The former and current Government's waste policy is based on a hierarchy (Figure 2.7), which has adopted the ideals and principles of the European Union's waste hierarchy. This hierarchy embodies sound waste management practice and mirrors the requirements of sustainable development [1].

Figure 2.7. The Waste Management Hierarchy [1]

The waste hierarchy is a table of preferred waste management options, providing a framework within which waste management decisions can be taken by local authorities, when considering management strategies for municipal solid waste treatment and disposal. It was initially introduced by the EU 4th Action Programme on the Environment (1987) and was accorded greater emphasis in the EU 5th Action Programme '*Towards Sustainability*' (1993).

The fundamental aim of the hierarchy is to guide waste policy so that minimisation, re-use and recovery become more attractive management options for waste producers and local authorities who are obliged to manage these wastes. It is currently the UK Government's primary waste management theme to move the management of municipal solid waste further up this hierarchy, requiring the movement of waste practices from the lower rungs (disposal dominated) through treatment practices to the higher rungs (waste avoidance).

However current waste management practices are biased in favour of the bottom of the hierarchy;

- 85% of controlled waste goes to landfill
- 88% of Municipal Solid waste is landfilled
- about 5% of household waste is recycled and only a further 4% has energy recovered
- only 12% of Municipal Solid Waste is recycled or recovered
- however, 50% of household waste is recyclable, and 30% is potentially compostable

Recent research has identified two main failures in the current operation of the solid waste market [4]. Firstly, there is no direct incentive through the pricing system to reduce or recycle waste, and secondly it appears that the prices of the different waste management options do not accurately reflect their environmental impacts. One of the ways of addressing these problems has been the recycling credit scheme whereby waste collection authorities are paid credits of an equivalent value to the disposal savings of the waste disposal authority for volumes of waste that are recycled and thus removed from the disposal chain, whilst a more recent attempt has been the landfill tax. There is not the time within this paper to provide a full account of the costs associated with the various waste management techniques [8, 40] or the barriers that exist to their implementation by local authorities [26, 13, 19] although it will suffice to say that recycling collection costs and sorting costs make it a far more expensive method of waste treatment [5] at present than landfill (£20 per tonne) and on a par with energy from waste plants (£40 per tonne) [37].

3.2 The Environmental Protection Act (EPA)

The principal pieces of waste legislation in England are the Environmental Protection Act (1990) and the Environment Act (1995) which created a framework within which local authorities, contractors and individuals within the industry would be stimulated to recycle more waste, by providing a system of recycling credits to be paid for each tonne of material removed from the disposal path.

The UK Government White paper '*This Common Inheritance*' [11] set a recycling target of 25% for household waste by the year 2000, which was a goal that local authorities were to aim for, whilst funding was made available to these authorities to aid the establishment of new recycling facilities, indicating the Government's commitment to reducing the nation's dependence on landfill.

In conjunction with this changing emphasis came the Environment Agency which has been operational since April 1996, and was set up through the Environment Act (1995). This Agency has responsibility for the regulation and monitoring of the municipal solid waste industry, ensuring standards are met, encouraging the initiation of regional waste facilities, and providing long-term policies for sustainable waste management. This body has inherited the regulatory powers of the former waste regulation authorities which were part of County Councils, and is thus a key development in the continuing shifting balance of the municipal sector, taking practical discretionary power away from local government who remain only responsible for waste collection and disposal through contracts with the private sector.

3.3 The National Waste Strategy

In view of the potential landfill crisis and rising public opinion, the UK Government in December 1995 published their National Waste Strategy '*Making Waste Work*', in which they outlined a number of policies and action points for the UK waste industry; listed below.

Aims of Making Waste Work

- to reduce the amount of waste that society produces
- to make the best use of the waste that society produces
- to minimise the risks of immediate & future environmental pollution and harm to human health
- to increase the proportion of waste managed by the options towards the top of the waste hierarchy

Targets of Making Waste Work:

- to reduce the proportion of controlled waste going to landfill from 70% to 60% by 2005
- to recover 40% of municipal waste by 2005
- to recycle or compost 25% of household waste by the year 2000
- 40% of domestic properties with a garden to carry out composting by the year 2000
- all waste disposal authorities to cost and consider the potential for establishing central composting schemes by the end of 1997
- easily accessible recycling facilities for 80% of households by the year 2000

The implications of this policy and the targets will be discussed in a later chapter on policy implementation.

3.4 The Landfill Tax

The landfill tax had its genesis in a recommendation to the Government made by the Advisory Committee on Business and the Environment in its first report to Ministers in October 1991, stating that the price of landfill should be increased significantly to levels obtaining elsewhere in the EU [42]. The following year in *'This Common Inheritance- The Second Year Report'*, the Government gave a general commitment in favour of economic instruments as a means of achieving environmental goals.

Shortly afterwards Coopers & Lybrand were commissioned to write a study on a possible levy on controlled waste which was landfilled, as part of a series of studies on economic instruments [5]. It came to the preliminary conclusion that a levy based on weight would be simplest and most practical to administer. It also concluded that in the short term there would be little change in the quantity of waste being landfilled, though in the long term there would be an increased incentive to incinerate waste. The study expected recycling to be relatively unattractive even at a levy of £20 per tonne, whilst the levy posed the threat of encouraging fly tipping and other forms of illegal disposal.

Following a period of internal Whitehall debate, the Chancellor in his Budget Statement on 29 November 1994 announced the Government's intention to introduce a levy in 1996. A consultation paper emerged in March 1995, which proposed a single rate ad valorem tax on the charges levied by landfill site operators, with a tax rebate for environmental trusts for the restoration of orphan landfill sites and for research into and development of more sustainable waste management practices. The consultation paper received over 700 responses, with most criticisms surrounding the ad valorem charge, and the Government responded to this by announcing on 2 August 1995 that the landfill tax would be weight-based. The rates of the tax were announced by the Chancellor on 28 November 1995, and the Finance Bill was published in January 1996.

The landfill tax is placed on every tonne of waste which goes to landfill for disposal, and the tax is set at £7 for active wastes and at £2 for inert. This will raise the cost of landfilling considerably and should encourage the adoption of alternative strategies as they become more economically competitive against an ever more expensive landfill route. Predictions from Coopers and Lybrand [5] suggested that a £10 levy per tonne would stimulate an increase in recycling from 2% to 4%, whilst incineration levels would rise by 5% from 7% to 12%. However, more significantly a £20 levy would raise the recycling rate to 12% and produce an increase of 12% in incineration to 20%, thus leaving only 68% of the waste to be disposed of by landfill, a major improvement on the present situation. However, this tax will only be of benefit to both the environment and to UK industry if more businesses and local authorities move toward recycling, re-use and waste minimisation.

Current estimates show that approximately 1,400 waste management businesses, operating 2,700 landfill sites will need to register with HM Customs and Excise for the tax. To help prevent additional fly-tipping, the Environment Agencies will give the problem a higher profile, although it will not become a revenue offence in tax law. The Chancellor predicts that the new tax will raise around £450 million in a full year, plus VAT.

The landfill tax is likely to assist the current trend away from landfill disposal, with more waste being directed toward recycling and recovery, with some increase in the amount of incineration. Thus the new landfill tax may have the desired effect on reducing municipal waste requiring landfill.

For both private organisations and local authorities, the landfill tax could be the catalyst that creates significant cost savings. For example in 1994, the UK consumed approximately 11.6 million tonnes of paper and board, of which almost 31% was recycled. The remaining 8 million tonnes were disposed of in landfill, accounting for about 8% of all waste which is landfilled. Recovery and recycling more of this waste stream would potentially save up to £150 million on disposal and tax costs alone. Thus an opportunity now exists for producers of waste to re-examine their modus operandi in order to meet the Government objectives without undue financial burden. The most obvious solution is to minimise the amount of waste that is being created and thus minimise the cost of disposal, but this requires long term strategic planning and large scale reorganisation with associated financial costs. Another obvious alternative is the re-use of materials before they enter the waste stream, however it is not always possible to find readily available ways of re-using existing materials.

The main issue for society is where will the waste go if it does not go for landfill disposal. From the waste management industry viewpoint the obvious place for the material to go, and the initial *raison d'être* of the tax, was to divert more to recycling and other waste management methods further up the hierarchy. However, these options will only succeed in diverting waste if their necessary infrastructures can be implemented at minimal costs and if markets are available for the materials.

4. RESEARCH METHOD

4.1 The Survey

A postal survey was selected as this is the accepted standard practice for conducting social surveys. However, postal surveys are often hindered by having low response rates, thus in order to achieve acceptable levels the questionnaires were sent to the officer responsible for waste disposal or policy at each of the organisations.

It was assumed that those people most in-tune with the research would be more willing to return a completed questionnaire and thus they were targeted by this survey. Large scale postal surveys have been used extensively in previous waste management research, and the value of this style of research has been shown time and time again. It was decided that the population for the landfill policy survey would include all the County Councils and Metropolitan Authorities in England, representing the waste disposal authorities, along with all the major waste disposal contractors that dealt with landfilling. The contact names and addresses for the public sector bodies were obtained from the *Croner Directory of Waste*, whilst the contractor sample was selected by using the *National Association of Waste Disposal Contractors Handbook* – both of which are annual reviews of contacts and services. This enabled all the national waste management companies to be selected, whilst regional and local companies were not chosen as it was deemed that a sample of only the larger companies would provide the necessary data for the intended analysis.

It was also concluded from literature searching that these companies would be potentially more responsive to changing policy and economic circumstances, and thus would provide an ideal sample of the private sector from which a comparative analysis could be made. The handbook provides a detailed breakdown of all the registered companies, their regional offices and their local authority contracts, enabling a private sector sample to be selected which was both adequate in size and areal coverage, but which was consistent in definition allowing only national operators to be selected.

4.2 The Response

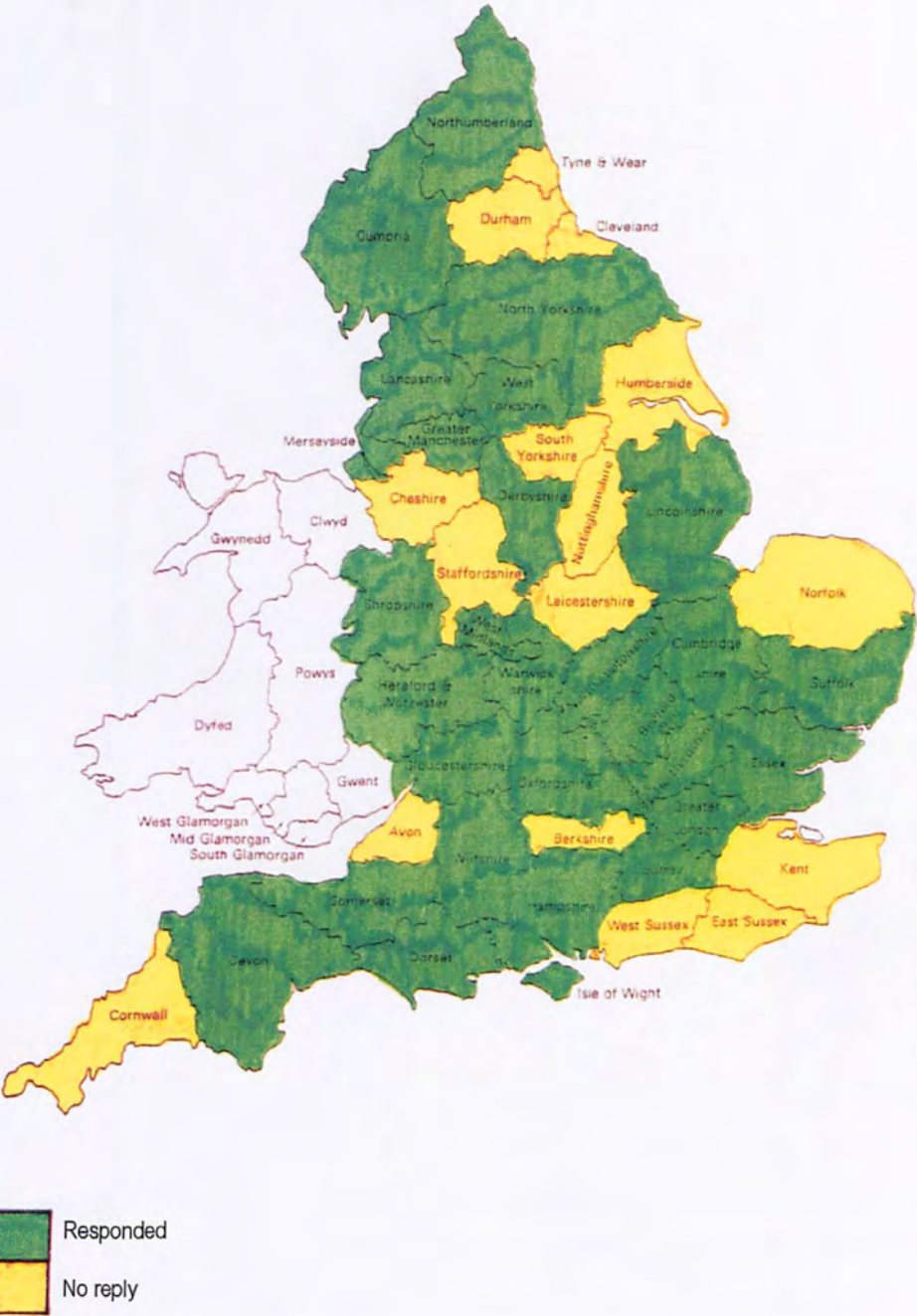
The response rate was respectable with an average return rate of 72%, well in excess of the 30% predicted for most postal surveys. The breakdown for the survey responses is shown in Table 2.1. The success of the questionnaires is attributed to the initial research and planning carried out during the draft stages of the survey design. The surveys were subsequently sent to the best placed individuals, usually the waste manager or disposal officer, and the questions were structured to make it as simple as possible to fill in the form and send it back in the pre-stamped envelope. The areal coverage of County Council response is depicted in Figure 2.8.

Table 2.1. Response rates for the surveys

Survey Group	Sent (population)	Returned	Response Rate
Public Sector (waste disposal) authorities	59	48	81%
Private Sector (landfill operators)	60	38	63%
Total	119	86	72%

There has been much publicity regarding the future of landfill as a municipal waste management option, and SERPLAN have made a series of studies of available landfill void throughout the south-east region (1986,1992, & 1994) concluding that landfill capacity at present rates of use will last for no more than 10 years. Data have been obtained from both county councils and private contractors on the life expectancy of current landfill operations within their jurisdiction. The data obtained are summarised in Table 2.2.

Figure 2.8 Response from Waste Disposal Authorities in England



5. RESULTS

5.1 National Landfill Life Expectancy

There has been much publicity regarding the future of landfill as a municipal waste management option, and SERPLAN have made a series of studies of available landfill void throughout the south-east region [28, 32, 33] concluding that landfill capacity at present rates of use will last for no more than 10 years. Data have been obtained from both county councils and private contractors on the life expectancy of current landfill operations within their jurisdiction. The data obtained are summarised in Table 2.3.

Table 2.2 Summary of National Landfill Life Predictions

Landfill Life Predicted	Number of Authorities	Percentage of Authorities	Number of Contractors	Percentage of Contractors	Total responses	Overall Percentage
0-5	12	25%	3	8%	15	17%
5-10	13	27%	3	8%	16	19%
10-15	14	29%	6	16%	20	23%
over 15	9	19%	26	68%	35	41%

5.2 Discussion

There is a distinct difference between the results of the contractor and authority surveys, which may be attributed to their positions within the waste management sector, whereby the public sector setting policy and strategy and the private sector responding to these requirements. Over 50% of authorities tend to agree with the life-expectancies quoted by SERPLAN with under 10 years of active landfill life available at current disposal rates, with 81% of Authorities suggesting that landfill availability in their regions will be exhausted by the year 2010. In contrast to the depressing picture painted by the public sector, the private contractors seem to view the present situation with less concern, with only 16% believing that void would be utilised within the next 10 years, and only 32% stating that all landfill would be exhausted by the year 2010.

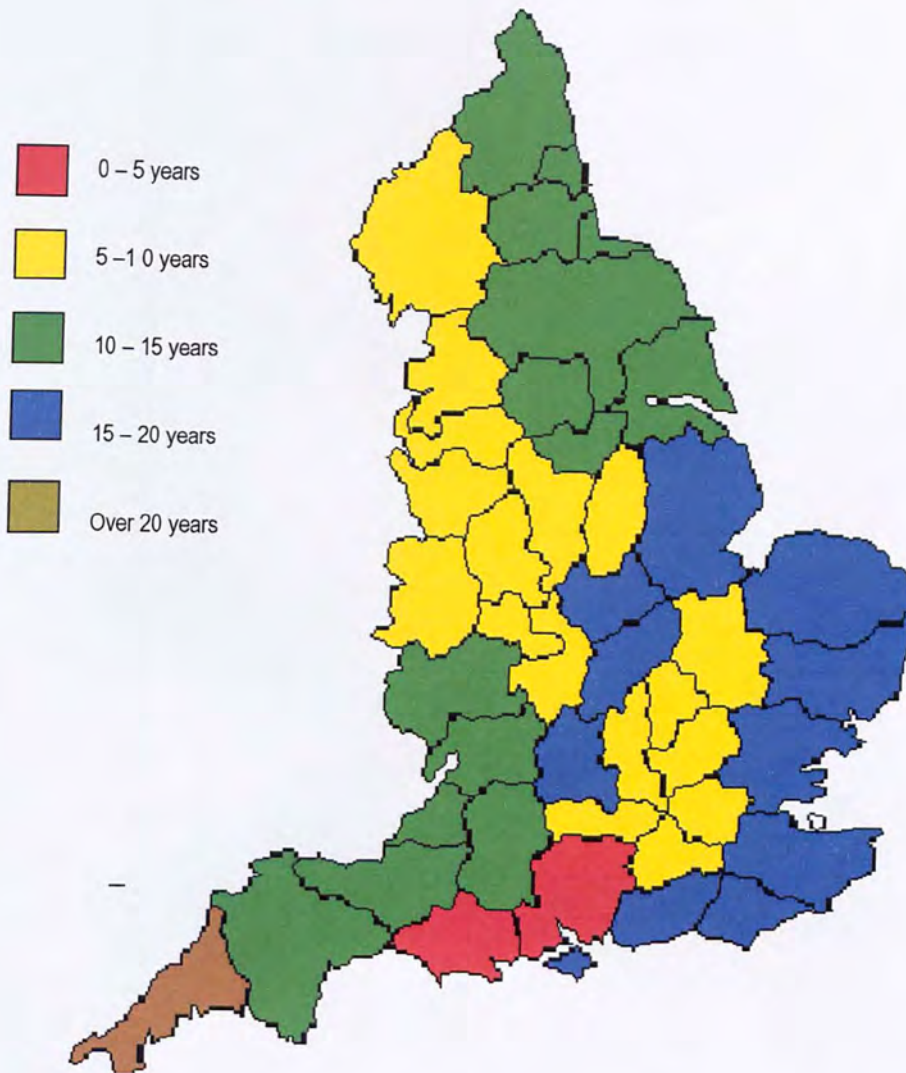
Table 2.3. Summary of National Survey Responses

		<i>Local Authority</i>	<i>Contractor</i>
1. How does your authority/company dispose of its waste? (specify the % for each route)			
Landfill	[]	90%	78%
Incineration	[]	6%	21%
Recycle	[]	4%	1%
Other	[]		
2. How long has Landfill been a method of disposal?			
1-3 years	[]		3%
3-5 years	[]		5%
5-10 years	[]		8%
10-15 years	[]	10%	16%
over 15 years	[]	90%	68%
3. What is the predicted operational life of these Landfill sites?			
1-5 years	[]	25%	21%
5-10 years	[]	27%	21%
10-15 years	[]	30%	26%
15-20 years	[]	10%	11%
over 20 years	[]	8%	21%
4. Has your involvement with Landfill increased or decreased over the last 5 years?			
Increased	[]	6%	55%
Decreased	[]	31%	16%
No change	[]	63%	29%
5. If it has decreased, it has done so as a response to.....(rank in order, 1 = lowest)			
Environmental Issues	[]	23%	18%
Pressure from National Government	[]	20%	24%
Pressure from Council Members	[]	20%	21%
Public Relations	[]	13%	15%
Cost of present methods	[]	19%	22%
Lack of Space	[]	5%	1%
6. Have you decreased the amount of waste being Landfilled over the last five years? (give a %)			
Yes	[]	44%	26%
No	[]	56%	74%
Average decrease	[]	12%	16%

		<i>Local Authority</i>	<i>Contractor</i>
7. Do you intend to decrease the amount of waste going to Landfill over the next five years? (give a %)			
Yes	[]	73%	37%
No	[]	27%	63%
Average intended decrease	[]	16%	12%
8. Do you feel that Government policy is forcing the waste industry away from Landfill? (and how?)			
Yes	[]	50%	58%
No	[]	50%	42%
Landfill Tax	[]	49%	21%
Recycling Policy	[]	38%	58%
EC Policy	[]	7%	5%
Planning Restrictions	[]	6%	6%
9. Are you encouraging other waste management options? (please rank, 1 = lowest)			
Incineration	[]	15%	21%
Recycling	[]	46%	48%
Minimisation	[]	36%	27%
Composting	[]	3%	4%
10. How are you encouraging these options?			
Policy	[]	50%	54%
Incentives	[]	15%	28%
Subsidies	[]	20%	8%
Publicity	[]	7%	3%
Facility Provision	[]	8%	7%
11. Do you feel that Landfill prices will change over the next couple of years?			
Increase	[]	96%	100%
Decrease	[]	4%	
No change	[]		
12. Are you in favour of Landfill as a disposal option?			
Favourable	[]	52%	76%
Unfavourable	[]	27%	8%
No preference	[]	21%	16%
13. Is there a future for Landfill? (and for how long?)			
Yes	[]	not asked	95%
No	[]	not asked	5%

In general, it appears as though the private sector perceives a longer life-expectancy for landfill than the public sector. It is difficult to explain this difference, although there are a number of influential factors.

Figure 2.9. Landfill availability predictions in England



The County Councils may be responding more rapidly to Government policy and legislation and are more aware of the impending landfill crisis, as they are preparing long-term waste management policies for their respective regions. Thus, they are already looking towards the increased development of recycling, incineration and composting for the coming decade.

The contractors may be over confident in their expectations, as some companies may have included sites, which have yet to be granted planning permission or sites, which are presently undergoing mineral extraction within their estimate. These differences do suggest that shifting patterns are occurring within the waste sector with greater control being exerted by the private sector since the introduction of Compulsory Competitive Tendering and the contracting out of local government services under the Thatcher administration.

In summary 51% of the total sample expect landfill void in their respective regions to be used-up by the year 2010. The county councils predict an average of 12 years of life remaining, in comparison to the average of 19 years suggested by the contractors. This provides a national landfill life-expectancy for England of 14 years taking the nation to the year 2010 before landfill availability reaches crisis point. This scenario is a little less critical and imminent than the figures being cited by SERPLAN for the south-east, but the relative similarity of these figures and those of previous SERPLAN reports adds to the credibility of this study (see Figure 2.9).

5.3 Regional Summary of Landfill Availability

From the landfill policy survey data, those areas with the shortest duration until exhaustion are generally located in the vicinity of major conurbations, including Liverpool and Birmingham, with the most acute shortage around London, where landfill will cease to operate in a number of counties by the year 2000. In contrast, the periphery of England has more available void with capacity for another 15 years throughout much of the North, East Anglia and the South-West. In particular the county of Cornwall, in the South-West, has a landfill life-expectancy in excess of 20 years due to its legacy of mining and extraction works (available void), its low population density (low domestic waste production) and its distance from major conurbations (sources of waste). Similarly the counties of Oxfordshire, Leicestershire and Essex have relatively lengthy capacities (15-20 years) due to their historic role as aggregate producing counties. In contrast the North-West and Shire counties in the south have a life-expectancy of under 10 years due to heavy population densities, and limited free land for the development of landfill sites, refer to Figure 2.9.

At the extreme are Dorset and Hampshire which have almost no void available and are presently incinerating much of their waste, when these plants close in the coming year they have plans for a number of large-scale waste to energy ,recycling and composting plants, to further reduce their need for landfill.

In summary, England faces a difficult future regarding the landfilling of waste. The South-East is already beginning to experience the problems associated with limited landfill capacity, particularly rising disposal costs, greater transportation requirements and the inability to initiate long term disposal contracts for their waste materials, and within five years these problems will spread to the North-West and the Shire counties, whilst by 2010 almost all of England will be suffering from a landfill shortage. These findings do bear some similarity to the figures published by SERPLAN [28]), and it is in the light of this impending problem that the Government has begun to attempt to influence the waste industry away from landfill, where alternative methods higher up the waste hierarchy are given priority.

5.4 National Survey Comparison and Analysis

Forty-four per cent (44%) of authorities had decreased their volumes of waste going to landfill, whilst only 26% of contractors had done so over the last five years. More important though were the 69% of authorities and 37% of companies who were intending to decrease their volumes of waste going to landfill over the next five years, which is 55% of the total number sampled. Thus, authorities appear more aware of the impending crisis facing landfill and are actively seeking alternative waste management options.

There is general agreement between both authorities and contractors over the main reasons behind their decision to reduce the use of landfill, with rising costs, environmental concern, and Government influence all receiving about 20% of the response. Most interesting of all were the 58% of contractors and 50% of authorities who recognised the important role played by the Government in attempting to shift the focus of municipal waste management by reducing the industry's dependence on landfill through the promotion of alternative practices.

Some 37% of the total sample that acknowledged the role of the Government, accredited their influence to the landfill tax, and another 48% stated the growing influence of recent recycling and incineration policy, particularly the National Waste Strategy. Thus, it would appear that the Government, through legislation and policy measures, is one of the major influences acting upon the private and public sectors to reduce their use of landfill.

For those questionnaires from the landfill policy survey which were fully completed, about 10% were not, a more detailed analysis was carried out and the results have been placed in a series of cross-reference tables, whereby the response to one question can be directly linked to another to allow an assessment of relationships to be made. Ninety-three percent (93%) of those authorities who have previously decreased waste going to landfill (during the last 5 years) will further decrease the waste they send to landfill (in the coming 5 years), compared to 56% of contractors, showing the greater commitment of the public sector to removing the burden on landfill through changing waste management strategies and systems.

However, 88% of those authorities intending to decrease their landfill use recognised the role of the Government, whilst 100% of the contractors intending to decrease landfill use concurred. All 100% of the contractors who had decreased their use of landfill acknowledged the role of the Government as an influential factor in their decision, as did 73% of the authorities that had decreased their use of landfill. These figures clearly show that there are some striking correlations relating to Government influence and landfill practices operating in England. These figures are summarised in Tables 2.4 and 2.5.

From the summary cross-reference table (Table 2.6) two important themes can be drawn. Of all those surveyed 79% of those who have so far reduced landfill use will continue to do so in the future, whilst 43% of those who have yet to reduce waste to landfill will start doing so in the next five years. Eighty-three percent (83%) of those who have decreased their use of landfill and 92% of those who intend to reduce their use cited the role of the Government as being an important factor.

Table 2.4. Authority cross-reference Table

	HAVE DECREASED LANDFILL	HAVE NOT	WILL DECREASE LANDFILL	WILL NOT	GOV. ROLE	NO GOV. ROLE
DECREASED LANDFILL			14 93%	1 7%	11 73%	4 27%
HAVE NOT			10 50%	10 50%	13 65%	7 35%
WILL DECREASE	14 58%	10 42%			21 88%	3 12%
WILL NOT	1 9%	10 91%			3 27%	8 73%
GOV. ROLE	11 46%	13 54%	21 88%	3 12%		
NO GOV. ROLE	4 36%	7 64%	3 27%	8 73%		

Table 2.5. Contractor cross-reference Table

	HAVE DECREASED LANDFILL	HAVE NOT	WILL DECREASE LANDFILL	WILL NOT	GOV. ROLE	NO GOV. ROLE
DECREASED LANDFILL			5 56%	4 44%	9 100%	0 0%
HAVE NOT			8 36%	14 64%	12 55%	10 45%
WILL DECREASE	5 38%	8 62%			12 92%	1 8%
WILL NOT	4 22%	14 78%			9 50%	9 50%
GOV. ROLE	9 43%	12 57%	12 57%	9 43%		
NO GOV. ROLE	0 0%	10 100%	1 10%	9 90%		

This clearly highlights the significant role, which the Government has for reshaping the state of the municipal solid waste management industry. These are very striking results, as they clearly show that awareness of the Government’s role is a key theme in shifting the balance of municipal waste treatment.

Table 2.6. Summary cross-reference Table

	HAVE DECREASED LANDFILL	HAVE NOT	WILL DECREASE LANDFILL	WILL NOT	GOV. ROLE	NO GOV. ROLE
DECREASED LANDFILL			79%	21%	83%	17%
HAVE NOT			43%	57%	60%	40%
WILL DECREASE	51%	49%			92%	8%
WILL NOT	17%	83%			41%	59%
GOV. ROLE	43%	57%	74%	26%		
NO GOV. ROLE	11%	89%	15%	85%		

5.5 Summary of National Survey Responses

From the landfill policy survey there are a number of points that need to be noted, and the major findings from the landfill survey are listed below.

- Landfill dominates the municipal waste industry in the UK, and the majority of active landfill sites will be infilled and returned to agricultural or recreational use within the next 15 years.
- Landfill use has decreased during the last 5 years, in response to a range of Government initiatives, and the growth in awareness of the environmental issues surrounding landfill disposal.

- There is widespread support for a reduction in the use of landfill during the coming decade from landfill policy makers and practitioners, and this will be achieved primarily through the adoption of recycling systems, waste to energy facilities, and minimisation programmes.
- The industry is aware of the Government's attempts at discouraging the use of landfill, and cited the landfill tax and general recycling policy as being the main thrusts of Government activity.
- Those authorities that have already decreased their use of landfill will continue to decrease their use during the next five years. A similar response was found from the contractors although the correlation was not as strong.
- Both the private and public sectors are beginning to adopt and develop alternative waste management strategies to landfill, in response to growing public opinion, declining void availability and Government influence.

5.6 The Sample of Professional Waste Managers

The '*professional opinion survey*' involved a series of interviews carried out over a short period of time with respected individuals in active senior positions within the industry to provide a representative cross-section from all facets of the UK municipal waste sector. The sample was selected from professional contacts developed during the author's employment as the Recycling Support Officer with The Royal Borough of Kensington and Chelsea, or are academics linked to this and other research programmes with which the author is currently involved. These people were selected because they had access to the opinions of many other active personnel from the waste industry, and could thus sum-up the general feeling within the industry, providing a very detailed and broad overview of its opinions.

Those who responded to the detailed survey are listed in Table 2.7. Although they will remain anonymous for reasons of confidentiality, their role in the waste industry and their organisation are listed. The questions used during the interview are listed in Table 2.8.

5.7 Results of interviews

5.7.1 Current issues of interest in the waste sector

Landfill is the predominant disposal method in use in the UK accounting for over 85% of municipal waste disposal each year, due to its cheap and uncomplicated nature [16]. However, there has been a general lack of Government policy, strategy and support in the field of waste disposal until very recently, and a lack of clear direction, as noted in the ongoing research output from the author [24].

Table 2.7. Sample for the professional opinion survey

Title	Company (region)	Sector
Director of Waste	Waste Collection Authority (London)	Public
Head of Waste Management	Waste Collection Authority (London)	Public
Recycling Manager	Waste Collection Authority (London)	Public
Waste Manager	Waste Collection Authority (Wales)	Public
Waste Regulation Officer	County Council (South West)	Public
General Manager	Waste Disposal Authority (London)	Public
Recycling Manager	Waste Management Contractor (South)	Private
Director	Waste Management Contractor (National)	Private
Director	Waste Management Contractor (Midlands)	Private
Director	Waste Management Contractor (South)	Private
Executive Officer	Industrial Membership Body (National)	Private
Executive Officer	Industrial Membership Body (National)	Private
Director	Waste Management Consultancy (National)	Consultancy
Project Manager	Waste Action Programme (London)	Consultancy
Senior Lecturer	University (London)	Consultancy
Senior Lecturer	University (West)	Consultancy
Senior Lecturer	University (Midlands)	Consultancy
Editor	Waste Management Journal (National)	Private
Executive Officer	Recycling Materials Company (North)	Private

Recycling and waste to energy (incineration with energy recovery) have struggled in an industry dominated by cheap landfill markets, where landfill prices have not taken account of environmental costs, and there are prospects for large-scale closures of current incineration plants [16]. However, changes are at present taking place in response to the Environmental Protection Act (1990). According to the general manager of a London Waste Disposal Authority,

“Experience in America and elsewhere suggests that environmental concerns are likely to lift the value of residual landfill sites and result in an increased interest in incineration for future waste disposal. Waste prevention, recycling and re-use will have an effect on the problem, but it is unrealistic to assume that the volume of waste currently being dealt with will be significantly reduced.”

Table 2.8. The Professional Opinion Survey

1. Describe the current waste disposal situation and the general trends for MSW in the UK?
2. What will be the impact of the landfill tax?
3. What has been the influence of recycling targets on MSW disposal and treatment?
4. What other methods are being used by the Government to encourage a reduction in landfill?
5. What has been the impact of Government legislation over the last decade?
6. What has been the impact of EU legislation over the last decade, and its impact in the next?

Waste disposal has been generally lacking in a National strategy, but this has now been provided through Making Waste Work and the launch of the new Environment Agency, in the Environment Act [1]. Waste disposal has moved from a public health operation to a highly sophisticated commercial enterprise. Waste disposal is now subject to commercial pressures, which is a real cause for concern where alternatives to landfill disposal are not viable in the market place. Waste disposal is solely paid for by the public out of the public purse, yet there is no responsibility on the producer of the waste for its disposal, with the notions of cradle to grave and polluter pays simply not applying. The methods of waste disposal are out-dated, and the notion that out-of-site and out-of-mind is a sensible approach to a complicated business still dominates.

Landfill in the majority of cases is not properly costed, and thus its environmental costs are not put into any financial equation. This issue needs to be addressed, and this practice has begun through the use of recycling credits and the landfill tax [43]. The landfill tax has been an inevitable step in both previous and current Government environmental policy. Whether the landfill tax is seen as a success or not depends on what it is seeking to achieve. In terms of creating revenue it has been successful, but in terms of moving waste up the hierarchy perhaps it hasn't been, with little increase in recycling. There remains no incentive for individuals to recycle, and there remains no real drive to make people recycle.

While the landfill tax has had little impact on the volumes of active waste landfilled, most operators are reporting a marked downturn in the volume of inert waste they are receiving. There remains little evidence that the landfill tax has had the benefits that were originally envisaged [44], and perhaps isolated economic instruments will never achieve goals which require a robust and integrated strategy. The use of landfill tax credits to fund environmental bodies is potentially a great idea, but the money must be used for environmental purposes, particularly environmental centres, training and research. The role of environmental bodies is also potentially significant in encouraging landfill tax money to be provided for bodies to carry out environmental improvements through land reclamation, building restoration, education and research programmes [43].

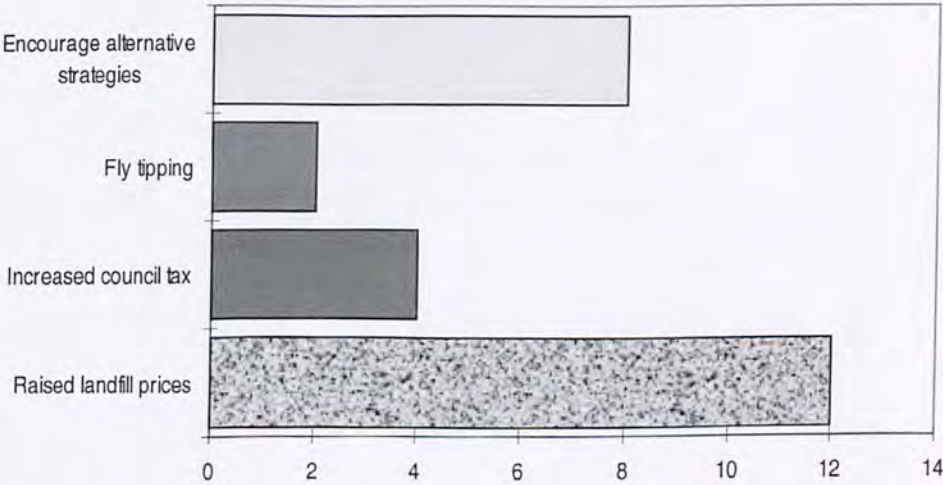
The costs of landfilling will undoubtedly increase making landfill a less favourable option and alternatives more attractive as prices within the market place level-out. The benefits for the waste industry through the growth of alternatives will only occur in the long-term after companies have had time to bear the new costs and alter their disposal strategies. However, price increases will be passed to the consumer through higher council taxes and service costs. This could result in an increase in illegal dumps as operators attempt to minimise their additional costs.

It seems that we have to make environmental issues saleable, as society will not want to buy environmentally unsound commodities, but how one achieves this in a free economy is an issue to address and overcome. We are doubtless stumbling along the right solution, which is to create cultural change. Figure 2.10 provides an assessment of the general response of those surveyed to the question relating to the impact of the landfill tax on the industry. According to the Director of one of the largest waste management companies operating in the UK,

“The higher costs will concentrate the minds of industry and local authorities on the need for waste minimisation and recycling schemes, forming part of an overall waste management strategy. Landfill could be priced out of the market but only in the long term.”

Figure 2.10. Impact of the landfill tax on solid waste management

(number of responses to each option)



The success of the recycling targets has been an insignificant impact on the use of landfill for waste disposal because they have had no legislative basis and have not been enforced, whilst they have not fully off-set the costs saved by reducing the use of landfill [38]. However, they have put pressure on local authorities when producing their Waste Local Plans to consider and implement strategies for waste recycling, and have raised the profile of recycling throughout the media and public.

The new target of 40% recovery from municipal waste, may be more realistic, as it includes waste to energy and composting strategies, but the problem arises of how to measure what tonnage has been recovered. Local government seems to be struggling with finding an effective means of achieving these targets. It would appear that the planning authorities' greatest tool is controlling the amount of planned void available for landfilling through their Local Minerals Plan and the statutory planning system. Very few authorities will be able to achieve these targets, if current recycling figures are to be believed, with only a handful of schemes currently exceeding 10%. If legislation is introduced and markets are provided then the national recycling targets may prove to be a valuable tool through which waste requiring landfill is reduced. The success of these targets depends upon the relative economics of the available options for disposal and treatment, and their successful implementation at the local level [38].

National recycling targets are thus a necessary evil, acting as a goal for politicians and councillors alike. The existence of these targets has been the catalyst for a number of Local authorities to change their waste disposal methods, and as a consequence send less material to landfill. However, these targets have helped to raise the profile of the waste dilemma and have resulted in the average lay person becoming more aware of the benefits of recycling. The targets have also helped to create a recycling industry, and hastened the development of good recycling practices [38]. They have encouraged the introduction of pragmatic schemes which have brought the UK up to speed with other pro-active recycling nations in Europe. Figure 2.11 provides a summary of responses on whether those surveyed believe that the recycling targets will be met. According to a Local Government waste manager,

“They appear to have been set arbitrarily, why at 25%? There has been no indication of how these targets should be achieved, and whether energy from waste and minimisation should be included. A more realistic figure would be 15% including minimisation and incineration with energy recovery.”

Figure 2.11 Will the recycling target be achieved?

Only two other means have recently been utilised by the Government, excluding the landfill tax and the recycling targets, to encourage the reduction of landfill use and push practices up the hierarchy of available options.

They are the non-fossil fuel subsidy and the recycling credit scheme, which are paid for wastes that are recycled or incinerated to generate electricity. Statutory recycling credits were introduced by the EPA 1990 (Section 52) and have been operating as an economic instrument since 1992. They are intended to correct a market failure which results from the fact that householders do not directly pay for the collection and disposal of their waste. Recycling credits are paid to recycling collectors and reflect savings in household waste collection and disposal costs achieved by their collections. It is mandatory for disposal credits to be paid by WDAs for WCA recycling services and discretionary for their payment to 3rd party recycling collectors in the private and voluntary sectors. The basis for calculating recycling credits is contained in the Environmental Protection regulations 1992 and 1994. Recycling credits for disposal savings are calculated on the basis of long run marginal costs which are intended to take account of all elements of the resources saved in waste disposal and are calculated as being equivalent to the average disposal cost per tonne using the most expensive method at the time in the relevant area.

'Without the Recycling credits scheme, levels of recycling in many authorities would be substantially lower, following the collapse in prices offered for reclaimed materials. Their purpose being to make available to recyclers the savings in disposal and collection costs which result from recycling household waste.'

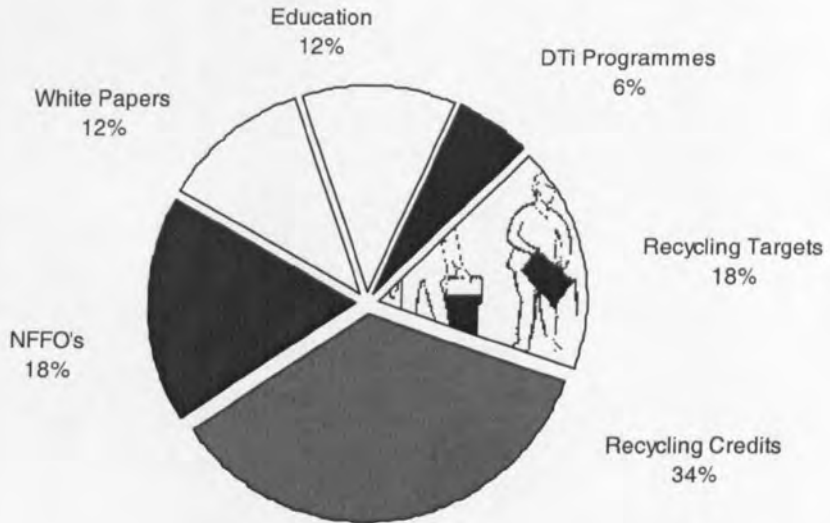
Market solutions to environmental problems often fail, an issue that needs addressing, as environmental concerns are high on the media and political agendas, but adequate solutions are proving somewhat harder to obtain. In the short term Government measures will probably have a beneficial effect, as it will create some interest and lead to some positive action. In the longer term if the drive to more environmentally friendly waste disposal method does not come from the market place then the whole matter is likely to collapse. There is a need to create markets for recyclables and impose restrictions on waste production.

Waste minimisation and clean technology need to be encouraged [38], however the former Government had little success as new cleaner disposal routes are more expensive than landfill, and the current administration faces the same dilemma. Financial incentives are more influential than regulations, but market-based policies are not a solution to environmental problems.

The Government's (past and present) measures are no more than pump priming. Figure 2.12 provides an indication of the methods that have been used by the government to encourage a shift in the balance of the waste industry away from landfill. The NFFO subsidies, although not originally designed to promote energy from waste at the expense of landfill but rather to encourage alternative energy sources rather than over-use fossil fuels, has resulted in the upgrading of a number of incineration plants to energy from waste plants, the building of 2 new plants and another 7 plants are currently in the pipeline. There is also the threat being posed by the incoming Landfill Directive which is in a draft format at present which will among other things ban the landfilling of putrescible wastes, which should provide an essential boost for recycling and energy from waste plants. According to the representative of a waste management organisation,

“The Government, through the DTI, is sponsoring and encouraging clean technology and waste minimisation initiatives; this will have a significant impact on waste production and subsequent disposal in the UK.”

Figure 2.12. Alternative methods employed by the Government to discourage the use of landfill



There has also been the development of producer responsibility for packaging with targets being set from Europe for the reduction and recycling of packaging wastes. However, this remains in its infancy with little data to indicate its effects during its first year of operation. These methods have not had any major impact on the use of landfill for waste disposal because the recycling credits have no legislative basis and the non-fossil fuel subsidy is only a small-scale operation focusing upon the use of renewable energy rather than on promoting sustainable waste management practices. They will have little impact in the future unless they are given legislative backing and only then if markets for recyclables are maintained, as their degree of success will depend upon the relevant economics of all the disposal options available. However, the recent introduction of the Producer Responsibility Regulations on Packaging Waste (1997) could provide a new impetus for recovery and recycling, with high targets and goals and the use of penalties and fines to enforce the required changes in practice.

The future success of alternatives to landfill will lie with the willingness of the public to move toward a more environmentally clean world, or in clear legislative control from central Government.

Few significant changes have occurred in UK waste management legislation in the ten years leading up to the 1990 Environmental Protection Act, which reorganised the British waste industry and introduced new laws and licensing regulations which tightened operating standards, and forced costs to rise. Changes are beginning to take place in response to this Act, and more important changes will occur soon. However, the impact of this piece of legislation must be questioned, because little of real significance has changed in the six years since its inception, and the landfill issue is becoming more imminent. The guiding legislation for the British waste industry has been the Control of Pollution Act (1974) and the more recent Environmental Protection Act (1990).

However, UK legislation has yet to change the concept behind waste production and disposal, and to implement the polluter pays principle, which will be crucial in shaping the future diminished role of landfill for the disposal of household waste. The more recent introduction of the Environment Act (1995) separating the waste regulation function from the County Councils, and providing a central environmental regulation and enforcement body may help to move forward the UK approach, as will the increasing level of the landfill tax, and the producer responsibility regulations which are statutory for packaging and will be extended to other sectors in the coming decade. However, until a definite and direct approach with integrated and complimentary measures is adopted, change will remain slow and piecemeal, with too much emphasis on local authorities suffering from budgetary cuts.

There has been little influence from European policy and legislation until the last couple of years, when a number of pieces of Community legislation have been passed, although the 1980 Groundwater Directive did result in an improvement in landfill engineering and in gate fees to pay for the necessary improvements. These directives have yet to have any significant influence, but over the next five years these legislative documents will be the guides for future UK waste disposal practice and policy, particularly the Framework Directive on Waste, which sets out common definitions and standards for waste management throughout the Union. However, the EU has successfully raised the profile of the environmental impact of landfill disposal, and has begun to implement legislation to clean up existing sites and improve future practice [23]. It is expected that European influence will dominate future waste legislation and will guide UK waste methods and policies in the near future. European legislation will be the guiding light for British waste disposal and that of all other Community nations, particularly through the continuing development of the landfill directive, once its legislative difficulties have been overcome, and the waste management hierarchy which will lead to tighter standards and rising costs [19]. This is where the greatest amount of pressure is coming from, being the dominant force in the move towards cleaner and improved methods of disposal.

Europe, undoubtedly, has a greater social heart than this country at present; what we are experiencing in the UK today has already been European driven, and it is believed that Europe will continue to do so. According to a Local Authority Recycling Officer,

“Europe has introduced the Waste Hierarchy which has been accepted as the dominant philosophy for waste disposal under the present Government, and the birth of the Environment Agency had its origins in Europe. The European attitude has helped to push up standards, and has suggested the adoption of non-landfill waste management options.”

5.8 Summary of Interview Responses

Landfill remains the dominant waste management method employed in the UK, accounting for in excess of 85% of all municipal waste, whilst recycling and waste-to-energy schemes have struggled due to their relative costs.

However, there is plenty of scope for future improvement with the recent launch of the Environment Agency, the landfill tax, guidance on recycling for local authorities, the producer responsibility regulations, and the current review of the national waste strategy.

Changes are beginning to occur following the 1990 Environmental Protection Act, recognition of diminishing void availability and ongoing Government action and policy. Considering these and other changing circumstances, alternative strategies to landfill will continue to develop, gaining an ever increasing proportion of the market during the coming decade [38]. Integrated waste management, where a number of treatment practices are employed in unison, is now being advocated at all levels of government and throughout the industry [45], and this should see the growth and development of composting and anaerobic digestion practices along with recycling and recovery plants, in order to meet new European and British targets and improve the sustainability of practices.

The Government (particularly the Conservative administration) has previously attempted to reduce landfill disposal through the recycling credit system and the non-fossil fuel subsidy. However, they have achieved only limited success, due to their limited nature, and because they do not wholly correct the economic market imbalance.

It is expected that landfill costs will continue to rise following the inception of the landfill tax, and that these additional costs will be passed onto the client through higher service charges and the public through increased community rates. The tax has been required due to the limited success of the recycling targets set in the 1990 Environmental Protection Act, which had no legislative basis nor any enforcement. Clearly these targets will not succeed without Central Government action to maintain markets for the recyclable materials, and legislation to ensure that all local authorities are actively pursuing these targets. These targets have subsequently been reviewed and accommodated within the new 40% recovery target, as laid out in the National Strategy for Waste [1].

This particular issue remains the key theme for the authors PhD research, where local implementation and translation of national strategy and policy is being investigated to identify the barriers that exist, and to educate the industry about how to overcome these barriers.

6. CONCLUSIONS

6.1 Assessment of the Objectives

There is a serious problem facing the future of landfill as a management and disposal option for municipal solid waste in England. 81% of authorities will have filled their available void within 15 years and 32% of companies have only 15 years of void remaining according to their figures. There is however the embryonic technique of landfill mining whereby covered and closed landfill sites are being dug-up to recover items which can be recycled, thus leaving the site with available volume for additional waste. This technique, currently a common practice in the USA, and under way in Buckinghamshire, could provide a valuable source of new landfill void, through the recycling of used void. The Government has introduced the Environmental Protection Act (1990) with the recycling credit scheme and also initiated the non-fossil fuel subsidy, both of which were recognised within the survey as being influential factors from the Government on the encouragement of alternative treatment options. More importantly the recent introduction of the landfill tax supported by the national waste strategy, suggests that the Government is responding to the decreasing landfill availability situation. However, the pace of change remains slow.

Landfill use has decreased over the last five years, with 31% of authorities and 15% of contractors obliging. The main reasons stated were increasing costs, County Council policy, National Government legislation and growing concern for the environment. There is little doubt that landfill use will continue to decrease, with 69% of authorities and 37% of companies intending to decrease the volumes of waste that they send for landfill during the next five years. This is in response to Central Government legislation and policy, declining landfill void and increasing landfill costs. All alternative waste management options are presently being used and encouraged but at differing rates by the private and public sectors.

Recycling is the most important, being encouraged (and subsidised) by 79% of authorities and 88% of companies, whilst 66% of authorities and 69% of companies are actively supporting minimisation programmes and trials. This is very encouraging for the future reduction in landfill use and the conservation of existing void, which will be an essential part of any future integrated waste management strategy dealing with untreatable waste materials and residues.

The Government has taken a more active role in the planning and management of the waste industry, since the inception of the EPA (1990) and its influence has continued to grow through the national waste strategy and the landfill tax. 50% of the authorities acknowledged that the Government was an active factor in shaping the use of landfill and alternative treatments, whilst 58% of the companies agreed with this sentiment, and it is this awareness of Government involvement that is in part influencing the decrease in use of landfill in English counties. Over 22% of the companies and 20% of the authorities recognised the influence of the government as a major reason for their decreased use of landfill, whilst another 17% of companies and 20% of authorities recognised the role of County Council policy, which is often in direct response to Government policy and targets. The most important methods used by the Government have been the non-fossil fuel subsidy, recycling credits and the landfill tax.

6.2 Summary

The use of both primary and secondary data have provided the basis for an increased understanding of the waste disposal industry in the UK, and has allowed an assessment of the role and influence of National Government in shaping the industry's future, particularly the role which landfill will fulfil. Research into current waste management issues is an essential part of the evolving waste management sector, with the intention of identifying important trends which could prove useful for future waste policy decision-making. This research charts the general confusion that has existed during the last few years and shows that even after Government attempts to focus the industry, there still remains some disorder and a general lack of direction, which will need to be further addressed in the coming decade.

The recent growth in Government legislation has appeared in response to an increasing awareness of the distorted waste disposal market, whereby disposal and treatment costs have previously not taken account of the environmental costs of particular treatment options. The Government is presently acting to correct this distortion through the non-fossil fuel obligation, recycling credits, the waste hierarchy principles and most significantly the landfill tax. The Government has recently taken a more active role, than in the past, in encouraging the recent changes within the waste industry and will continue to provide incentives for the adoption of alternative strategies to landfill. It is hoped that the landfill tax will have an immediate positive effect upon the use of recycling and waste to energy options in order that precious void can be preserved for the future disposal of untreatable residues and ash.

There is little doubt that the industry is changing in response to diminishing void, public opinion and Government action, and this paper has discussed a number of the avenues of change presently in use, and indicated the potential routes which the industry could follow. It would appear that the landfill tax is a necessary development given the inadequacies of the recycling targets, recycling credits and non-fossil fuel subsidies, which were tried previously, but proved unsuccessful. Perhaps now the waste industry will be given the high political and media profile that it requires, which will enable more positive pro-active, rather than reactive, steps to be taken towards the goal of sustainable waste management practice in the UK.

To conclude, there is an overall growth in awareness from those involved in the management of municipal waste for the need and benefits of adopting alternatives to landfill, but this growth must continue and be nurtured by Government support through new waste legislation. The attractiveness of recycling and waste to energy schemes must be enhanced, by a more ethical government stance where the environmental is assigned a realistic value, and environmentally acceptable and preferable waste treatment strategies are funded and legislated for. These changes must occur soon if the limited landfill void available is to be conserved for the disposal of residues.

Current trends and renewed Government commitment must continue if the nation is to be prepared to cope with the landfill crisis which will arise over the next 15 years, through the increasing use of environmentally friendly alternatives to landfill. Landfill will no longer be the cheapest or simplest waste disposal option, and the new targets will encourage local authorities and waste management companies to embrace the ideals of minimisation, recycling, re-use, composting and waste to energy, in an attempt to minimise their costs, achieve their targets and maximise their environmental performance.

Perhaps there are two approaches that can be adopted to help alleviate the UK's reliance on landfill. The first involves a range of drivers and policy programmes to promote and encourage sustainable waste management. These approaches form the remainder of the chapters in this thesis detailing public education and recycling, waste minimisation and the landfill tax. The other approach is to re-use old landfill sites and recycle their content (waste) through an innovative procedure known as landfill mining and aerobic landfilling techniques. This forms the basis of the third paper in this chapter, looking at solutions to the problem outlined in the second paper on New York City.

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CHAPTER 3

POLICY IMPLEMENTATION

CHAPTER 3 [I]

POLICY FAILURE AND CORRECTIVE ACTION

CHAPTER 3 - POLICY IMPLEMENTATION

‘POLICY FAILURE AND CORRECTIVE ACTION’

As was noted from the previous chapter, waste management is a particularly complex and dynamic industry, with a great deal of new policy guidance and strategic documentation adding to the already dispersed management infrastructure and stakeholder interests. This makes the implementation of policy through services at the local scale a most troublesome proposition, and this is the sole issue addressed in the paper that follows.

Undoubtedly, with the increasing costs of landfill, the decreasing regional availability of void and greater public and political acceptance of the need for recycling and other forms of waste treatment, the issue of policy implementation becomes one of significant interest (see Figure 3.1 for a review of the ‘policy process’). No matter what the political back-drop or the policy in question, without a clear and precise understanding of the implementation process little progress will be achieved in changing the way that waste is managed at a borough, district or county level. And with increasing political emphasis being attributed to diversion from landfill, more and more consideration will be given to means of implementing policy ideals and speeding up the process of operationalising policy goals and strategic aims.

It is widely accepted that waste management as an essential local government service, or as an industry sector, or as a policy field for local and national decision-makers, must be sustainable. Management for too long has been an ‘out of sight, out of mind’ service that was provided for residents in the cheapest approach possible without concern for the long term health and environmental risk that this might cause. In light of the growing debate on sustainability, waste management now has more than a simple cost function to consider, it must also strive to be socially acceptable (responding to the needs of the customer) and environmentally acceptable (preventing undue harm to the environment within which we exist).

Figure 3.1. The Policy Implementation Cycle (source DETR 'Best Value' series)

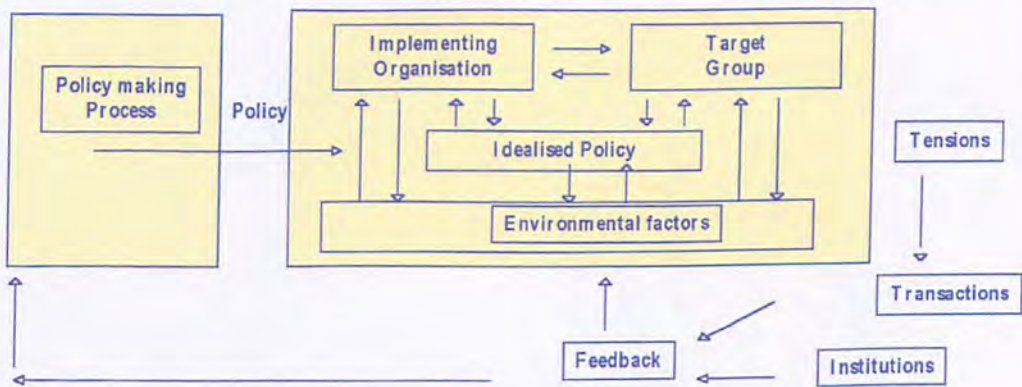
Waste (and its management) remains an issue of responsibility. Chapter 1 suggests that waste management has failed in the past to address adequately the issue of responsibility, and this is one of the fundamental reasons why we have existed within this 'out of site, out of mind' mentality. The opportunity through sustainability and through the best value regime (see Chapter 7) is to put the social and environmental considerations at the heart of the decision-making process and allow the best practicable environmental option to be delivered for a particular location or waste stream.

However, making more 'informed' decisions will not inevitably lead to improved services and local infrastructure, and nor will it secure enhanced public acceptance and participation (an issue addressed in Chapter 5). What is required, if we are to achieve improved local services, move towards greater sustainability in waste management, and achieve notional government targets, is to consider how policy is adopted by local authorities, how they adapt the themes and principles to suit their local conditions (and political agendas) and how they translate this policy into local strategy.

Only after we have investigated these processes can we begin to consider what the opportunities and barriers are for the delivery of local policy and strategy through service improvement and the development of appropriate techniques.

This chapter represents the central focus for the PhD, stemming from the author's time as a local authority officer struggling to implement local policy and strategy, encourage greater participation in recycling and respond to new national targets for waste management performance. This was the driving force for the author's research and offered him the opportunity to investigate many related issues that impinge on policy translation and development, some of which are discussed in greater depth in later chapters. This chapter also represents the summary of a 5-year (ongoing) programme of research investigating local authority performance, local strategy and policy agendas in the field of solid waste management. All of the survey material and supporting documentation used during this phase of the research can be seen in Appendix 5.

Figure 3.2 Policy Implementation Processes (source: author)

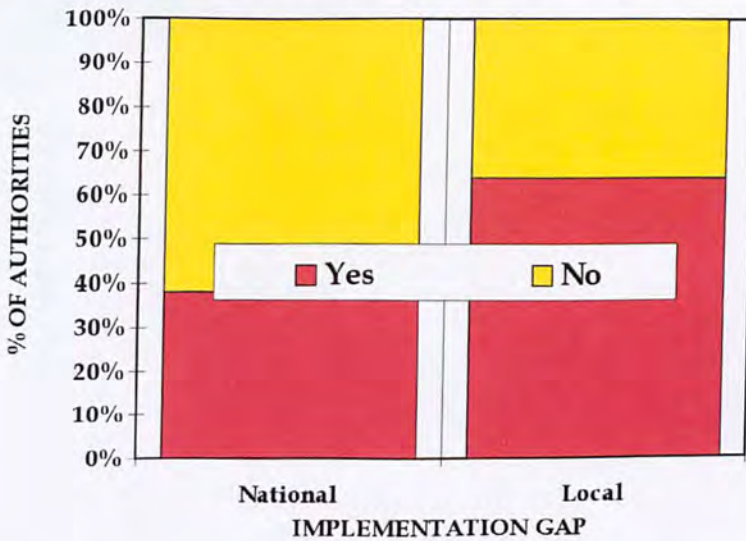


The paper that follows will provide both descriptive data on local government solid waste management performance dating from 1997, but will also offer an in-depth analysis of the problems facing local authorities in-terms of implementing national strategies (Figure 3.2) and in many cases their own policies through service delivery.

The focus for the work remains the policy document that drove my own day-to-day activities as a local authority officer, 'Making Waste Work' (1995), with its targets for recycling, recovery and diversion from landfill. The quantitative analysis of waste practices (derived from a survey of all waste management authorities in England) is paralleled by a qualitative review from 18 case study authorities where questions of policy development and service provision are addressed in more detail.

There is little doubt that policy implementation is failing at some stage (as noted in Figure 3.3) in the process, because little has changed in terms of service provision in the last four years and little credence is given by local authority officers to national strategy in terms of it being a driver for change. More often they claimed that availability of landfill was the prime driver for the adoption of recycling and recovery approaches.

Figure 3.3. The Existence of a Policy Implementation Gap (source: author)



The most significant problems (Figure 3.4) faced by local authorities and those reasons why policy implementation was tending to struggle were the economics (addressed in Chapter 6), the lack of political support, the lack of public acceptance and involvement (see Chapter 5) and a general lack of Government leadership.

Figure 3.4. Ranked reasons for a Policy Implementation Gap (source: author)

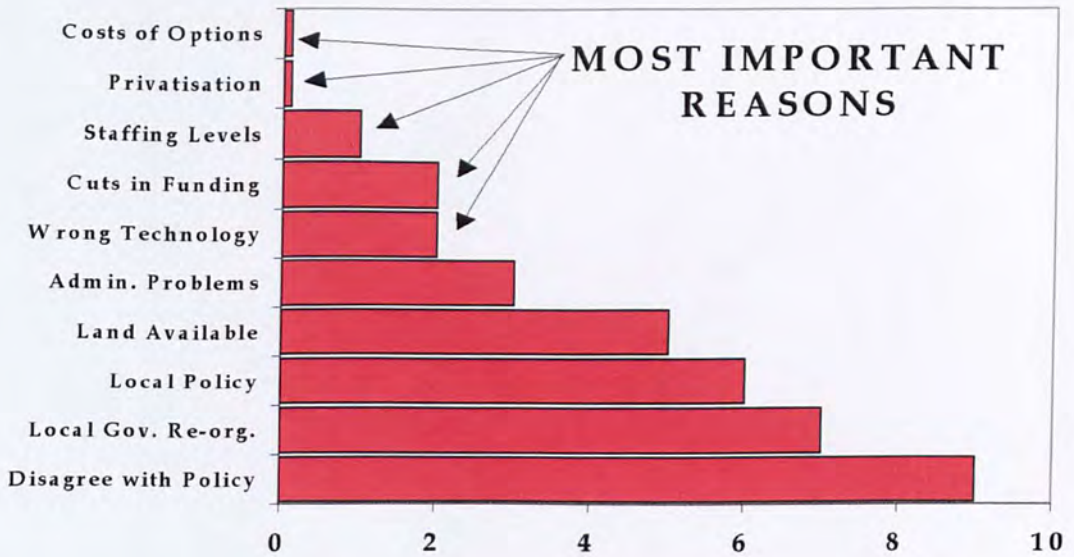
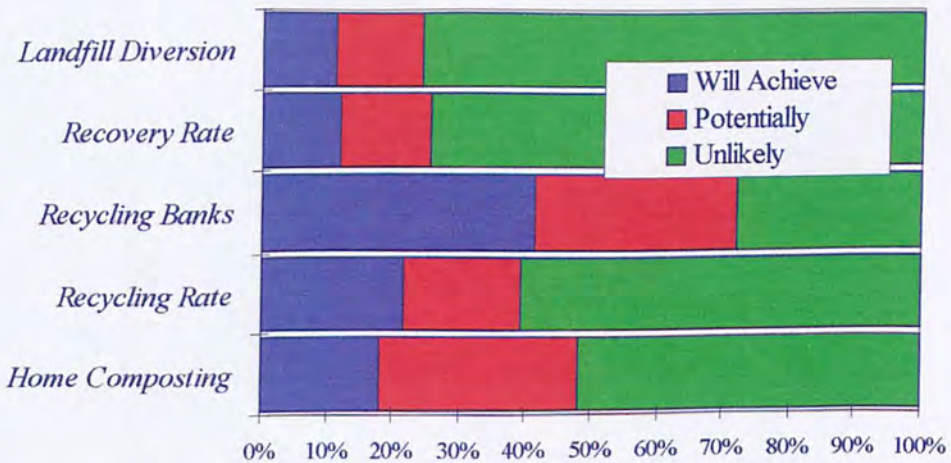


Figure 3.5. Achieving targets by the year 2000



In terms of the targets set, the national survey and subsequent interviews provide a wealth of information, and most importantly they provide an indication of the problems that authorities will face (Figure 3.5) in trying to meet the ‘statutory’ targets laid out in Waste 2000 (for a more detailed evaluation see Chapter 7).

Clearly, action is needed to help alleviate some of the problems and allow local authorities to facilitate the types of changes required to allow a greater degree of sustainability to be woven into the provision of solid waste management services at the local scale. By doing this it is anticipated that greater emphasis will be given to policy implementation issues and the attainment of government targets. The thesis suggests that in order to improve the chances of target achievement and policy implementation the following concerns must be addressed; new economic drivers (the landfill tax in Chapter 6); increased budgets and public involvement (Chapter 5), greater emphasis on sustainability as a policy goal (waste minimisation in Chapter 4) and the use of mandatory targets and improved decision-making protocols (see best value and the new waste strategy as discussed in Chapter 7).

CHAPTER 3 [II]

MAKING UK NATIONAL SOLID WASTE STRATEGY 'WORK' LOCALLY

MAKING UK NATIONAL SOLID WASTE STRATEGY 'WORK' LOCALLY

1. DEFINITIONS

Whatever its origins, whether household, industrial or commercial, waste represents the imperfect utilisation of raw materials, fuel and water, and hence financial loss for somebody [1]. There are numerous definitions for what constitutes waste, and many classifications exist which attempt to segregate and categorise waste materials, the most common of which focus upon the source of the waste generated. According to the Environmental Protection Act [2],

“waste is any substance which constitutes scrap material or an effluent or other unwanted surplus substance arising from the application of a process, or any substance or article which requires to be disposed of as being broken, worn out, contaminated or otherwise spoiled.”

Waste is something for which we have no further use and which we wish to get rid of. Solid wastes arise from unusable residues in raw materials, leftovers, rejects and scrap from process operations, used or scrap packaging materials and even the saleable products themselves when they are finally discarded (Blowers 1992). Under the EU Framework Directive on Waste (91/156/EEC), waste is defined as any substance or object which the holder discards or intends to discard [3] *‘any substance or object which falls into one of sixteen categories in Annex 1 of the Directive, which the holder must discard, intends to discard or requires to discard, which is an all encompassing definition’*. Waste is thus defined as any substance or object, which the holder discards or intends to discard and which falls into one of the following categories.

- *production or consumption residues*
- *products whose date for appropriate use has expired*
- *materials contaminated or soiled*
- *substances that no longer perform satisfactorily*

However, for the purposes of this work only ‘Municipal Solid Waste’ (MSW) will be discussed. Municipal solid waste includes household waste and any other waste collected by a Waste Collection Authority, or its agents, including municipal parks, beaches, commercial, office or industrial wastes and fly tipping. Municipal solid waste (MSW) accounts for only a relatively small fraction of total global waste production, currently under 10% of all wastes generated (Table 3.1) in England and Wales [4], yet is the most visible element of solid waste generated, being the responsibility of local government for its safe collection, management and disposal. Household wastes accounts for 90% of municipal solid wastes and includes waste from household collection rounds, wastes from street sweepings and litter collections, wastes from civic amenity sites and wastes collected separately for recycling or composting [5]. Additionally, household waste is an element of MSW, which by nature is one of the hardest sources of waste to manage effectively [6] due to its complex composition and diverse sources of generation.

2. CONTEXT AND RATIONALE

During the past century the environment has periodically become a significant issue on the political and social agenda. However, during the last few years there has been an unparalleled interest in environmental issues among consumers, voters and the media. Around the world, concern is growing for the environment [7], and never before in human history have environmental problems been such a central source of popular and scholarly concern.

Table 3.1. Waste arisings in the UK [4,5 and 6]

<i>Source</i>	<i>% of Total Waste</i>	<i>Millions of Tonnes</i>
Household	5%	20
Commercial	4%	15
Municipal Solid Waste	9%	35
Construction	9%	32
Other Industrial	19%	69
Sewage Sludge	9%	33
Dredged Spoils	8%	30
<i>Controlled Waste</i>	<i>54%</i>	<i>199</i>
Mining and Quarrying	25%	92
Agricultural Wastes	21%	80
<i>Total Waste</i>	<i>100%</i>	<i>371</i>

Today the onus is on local authorities to implement strategies to deal effectively with their environments [8] a sustainable, self-sufficient and environmentally acceptable manner. However, the question facing many local authorities is to what extent and how they should respond to this incarnation of the green challenge [9]. Solid waste management has been moved to the forefront of the public agenda [10]. More than ever before, solid waste management policy-makers world-wide need sound and reliable information on the technical performance, environmental impact and costs of solid waste collection, recycling, treatment and disposal. This sector inevitably impinges upon society and is a new and developing field of employment and research to which there are numerous opportunities attached.

The generation and disposal of municipal solid waste appears to have become an important policy problem in all industrialised economies [11]. Society has always produced waste, but to a growing proportion of society this reflects a squandering of resources that cannot go unchecked. The twentieth century and particularly the period since World War II (post 1945) has seen a dramatic increase in the production of all types of waste, reflecting unprecedented global levels of economic activity [10]. The growth in solid waste generation is placing considerable demands on waste management, disposal facilities and the environment. Waste production is increasingly being regarded as an antisocial activity rather than as the necessary and inevitable consequence of the demands of a consumer society [12]. Transposed to the political stage, this view has spawned a new generation of waste management strategies which emphasise waste minimisation, waste re-use and waste recycling as the primary objectives [13].

Geographers have made many contributions to the study of resources [14] that act as inputs to a modern consumer society, however, much less has been done on the waste outputs from the use of these resources, including the by-products of production, or products that have outlived their usefulness [15]. The '*geography of waste*' (types, quantities, spatial variations, management methods, and environmental impacts) is not a well-defined field [16], but is one that is increasingly important. This is because waste is growing in quantity, has the potential for polluting land, water and air, and is expensive to deal with effectively [17].

3. THE INTERNATIONAL ENVIRONMENTAL POLICY CONTEXT

Until comparatively recently the environment has had little or no real currency in policy terms. Perhaps the most important single publication to change all this was the Brundtland Report [18], which placed the notion of sustainability firmly and immovably on the policy agenda, internationally, nationally and locally. However, it is clear that sustainability and sustainable development remain contested concepts, and there is a wide range of interpretations as to their meaning. If environmental sustainability is the policy goal, however defined, environmental planning is the mechanism for getting us there [19]. Sustainability has now been accepted and adopted at an international level as a framework for guiding future development within which, social, economic and environmental goals must be adopted which are consistent with each other and mutually attainable [20]. Sustainability has now become established as a formal policy objective at local, national and global scales, and as a consequence of UNCED in 1992, the language of Agenda 21 has become increasingly familiar in policy-making circles [20]. The 1992 Earth Summit in Rio [21] set a series of Agenda 21 objectives for waste management. These included:

- *Minimising waste, stabilising waste production, quantifying waste flows, implementing waste minimisation policies, and developing national waste minimisation plans.*
- *Maximising environmentally sound waste re-use and recycling, by providing information, implementing policy instruments, developing national programmes, and raising public awareness.*
- *Promoting environmentally sound waste disposal, through the development of national waste plans and the application of the polluter pays principle to wastes.*

These goals have been translated through national policy in the UK into targets and strategies which local government must achieve and strive toward for recycling, reuse and energy recovery [22]. The Government's strategic approach to solid waste management [4] aims to ensure that valuable raw materials are used efficiently and not discarded unnecessarily, and that unavoidable waste is disposed of safely and efficiently.

To this end the Conservative Government stated they would: [i] encourage the minimisation of waste, [ii] promote recycling of waste, including recovery of materials and energy, [iii] tighten controls over waste disposal standards, and [iv] take action to curb litter, focusing upon the application of the waste management hierarchy at the local scale.

Clearly the environment and quality of life are of critical concern to public authorities, elected officials, businesses and ordinary people. Local authorities are at the centre of this system, and are in charge of organising it, controlling it and enforcing it. The traditional and more sustainable approaches to the management of MSW are detailed in Figure 3.6, indicating the obvious changes required for the effective management of MSW at the local scale.

Figure 3.6. Approaches to the management of MSW in France [26]

Following the growth in interest in implementing sustainable environmental management, there has been an associated growth in management tools designed to measure improved sustainability, (including an OECD set of environmental indicators, a UK Audit Commission set of indicators and Government sustainability indicators) which are designed to enable local government to monitor its performance in service delivery [23]. Indicators have long been recognised as effective tools for communicating complex processes, events or trends to a wide audience. Like it or not, the rush to quantify appears unstoppable. Waste Indicators as defined by the DoE [24] allow local authorities to assess the sustainable nature of their waste management services and activities [25];

- *household waste arisings per capita*
- *levels of industrial and commercial waste*
- *levels of special wastes*
- *% of material recycled and composted*
- *recycling levels for various materials*
- *levels of energy recovery*
- *wastes being landfilled*

4. UK MSW MANAGEMENT POLICY

Waste management policy, legislation and regulations are the primary means by which governments seek to control and influence waste management practice [3]. In principle at least, there are many different policy options available to government covering a broad spectrum from ‘carrot’ (financial incentives) to ‘stick’ (strictly enforced regulations).

Governments are increasingly implementing policies that are intended to impact on waste management practice, and many new initiatives have been taken in countries around the world over the last few years [27]. UK policy towards waste has evolved rapidly in recent years, partly in response to home grown public pressures to curb the environmental impacts of waste disposal practices, and partly due to the increase in concerns surrounding landfill availability [28]. In addition there has been important external influences from EU environmental policy and the wider debate on sustainability.

However, a common problem has emerged in countries that have embarked on policies promoting greater sustainability in waste management through recycling and reduction. The pace of policy making has not been matched by an equal effort to provide mechanisms for effective policy implementation [29, and 26].

Since 'This Common Inheritance' [30] there has been a general recycling target of 50% of the recyclable element of the household dustbin (25% of household waste) which local government should strive towards, and this proved to be the first element of Government support for recycling in the UK. The current Government's waste management strategy (a continuation of the themes initiated under the Conservative administration, but currently under review and out for consultation) reflects the principles which guide its overall approach to environmental protection, namely market forces and target setting.

The Government's White Paper 'Making Waste Work' [4] sets out the current strategy for waste management in England and Wales, developing the ideas initially put forward in 'Sustainable Development: The UK Strategy' [23]. The focus of the strategy is on increasing the emphasis on the options towards the top of the waste hierarchy through the setting of targets. The central objective of this White Paper, in common with many other developed countries, is to make waste management more sustainable by moving local practices up the hierarchy of options [31] as noted in Figure 3.7. It is currently the UK Government's primary waste management concern to move the management of municipal solid waste further up the hierarchy of waste management options, requiring the movement of waste practices from the lower rungs (disposal dominated) through treatment practices to the higher rungs of waste avoidance and minimisation [15]. However, it was stressed in 'Making Waste Work' [4] that the hierarchy is a flexible tool which should not be taken as gospel in all cases. However, to date, it appears that *'people, officers and policy makers have merely paid lip service to this hierarchy, acknowledging the supremacy of waste avoidance, minimisation and recycling and recovery, whilst in practice the vast majority of wastes still go to landfill or incineration for treatment and disposal'* [31].

This policy drive has clearly struggled to breach local authority practices and the reasons for this failure in policy translation and implementation are the key theme under investigation within this research programme [26].

Figure 3.7. The Waste Management Hierarchy [4]

This Strategy also emphasised the role of key stakeholders in driving forward the current waste agenda [32], and a central role has been proposed for the Government, along with the Environment Agency, Industry and Local Authorities [33]. Its central message is that more sustainable waste practices need not entail great expense or restrictive legislation. Perhaps the key elements of this strategy were the setting of a number of targets relating to waste management practices, which were designed to act as motivational tools and policy goals for MSW management in the UK (Table 3.2).

These targets are used within this research as the tools for assessing local MSW management performance, and are the drivers for change at the local scale in the UK. The implications of this White Paper may be far reaching for the waste management industry because of its obvious shift in national policy and strategy.

Table 3. 2. Targets for MSW Management [4]

1. *to reduce the proportion of controlled waste going to landfill from 70% to 60% by 2005*
2. *to recover 40% of MSW waste by 2005*
3. *to recycle or compost 25% of household waste by the year 2000*
4. *40% of domestic properties with a garden to carry out home composting by the year 2000*
5. *all WDAs to cost and consider the potential for central composting schemes*
6. *easily accessible recycling facilities for 80% of households by the year 2000*

In addition there has also been the launch of the 'Landfill Tax' [34] to make landfill disposal more expensive (relative to other waste management options by taking into account (in part) the environmental costs associated with methane production and leachates), and this has provided a new impetus for waste management in the UK. However, in the UK this legislative emphasis has simply raised the profile of MSW and not encouraged the movement of its management up the hierarchy away from landfill, due to inadequate financial and resource provisions. Thus the new Labour Administration launched their Consultation Document 'Less Waste More Value' [35] to review and revise national waste policy, and the new 'National Waste Strategy for England and Wales' will be published in 1999, which should prove interesting reading to see how far MSW targets have been revised and policy frameworks altered. However, according to the Environment Minister (Michael Meacher) the UK is '*highly unlikely*' to meet the government recycling target of 25% by the year 2000, but also stated that '*I am determined that we get to it as soon as possible thereafter*' [36].

5. UK WASTE MANAGEMENT PRACTICES

The problem of domestic waste probably needs little explanation, with over 20 million tonnes being generated by households in the UK per annum [37]. It has been widely acknowledged that the UK is facing a disposal crisis due to the growing volume of solid waste generated in the UK [1] and the diminishing availability of landfill void that can be utilised to dispose of these wastes [38], with perhaps as much as 59% of current landfill capacity in the UK used by the year 2010. This is acting as a spur for changes in practice at the local scale towards increased recovery and recycling.

In 1995-96 almost 26 million tonnes of municipal solid wastes were generated in England and Wales, with an average recycling rate of 6% and recovery 7% [36]. This is clearly indicative of the problems being experienced in the UK for attainment of the sustainable management of waste, in comparison with other developed nations around the world, where energy and materials recovery are more attractive and more widely adopted (Table 3.3).

Table 3.3 Treatment routes used in the regions compared to other European nations (% of MSW) [5, 6, and 39]

<i>Region</i>	<i>Recycled & Composted</i>	<i>Incineration</i>	<i>Landfill</i>
North East	2	29	69
South West	17	10	73
W. Midlands	3	20	77
South East	4	16	80
Yorkshire	3	7	90
Wales	9	0	91
East Midlands	3	4	93
East Anglia	7	0	93
North West	3	2	95
London Boroughs	3	19	78
Shire Counties	10	7	83
Metropolitan Boroughs	3	12	85

<i>Nation</i>	<i>Recycled & Composted</i>	<i>Incineration</i>	<i>Landfill</i>
Switzerland	29	59	12
Denmark	23	48	29
Sweden	19	47	34
France	13	42	45
Netherlands	19	35	45
Germany	18	36	46
Austria	24	11	65
Norway	11	22	67
Italy	10	16	74
Portugal	15	0	85
United Kingdom	2	10	88
Greece	0	0	100

Currently landfill is the most commonly used disposal route for MSW across the UK, varying from 67% in the North East region, to 95% in the North West region [5]. The low figure for the North is accounted for by the high reported figure of waste sent for incineration without energy recovery, about 25%.

The amount of waste that has had some value recovered from it through materials recycling, centralised composting or energy from waste schemes, is about 12%, compared to the target to recover 40% of municipal solid waste in England and Wales by 2005. The proportion of waste recovered varies from around 3% in the East Midlands and the North West, to 18% in the South East and the South West. Incineration with energy recovery makes a significant contribution to the recovered fraction in the West Midlands, the South East and Yorkshire. In the South West (17%) and Wales (9%) the recovered fraction is achieved solely through recycling or composting, although more typically figures for recycling are around 3%. The current state of play shows not only how the regions vary, but also indicates the obvious problems that exist in reaching Government targets for MSW [5].

This regional variation requires deeper investigation to assess why particular regions are more successfully moving towards sustainable waste management practices, and perhaps part of the reasoning is the barriers and constraints that exist at the local scale [22].

6. THE ROLE OF LOCAL GOVERNMENT

Primary responsibility for the control of waste and the environmental effects of waste rest with the Secretary of State for the Environment [22]. However, in England and Wales all the tiers of local government have a role to play in waste disposal, regulation and collection. Local authorities inherit a stream of municipal solid waste from local waste generators, and have a statutory obligation to collect or dispose of the waste. Local government is responsible for the collection and disposal of MSW in the UK at an annual cost of around £850 million [7].

Local authorities have statutory powers in relation to the management and control of many types of waste, principally those arising from households and commercial premises. Care for the environment has long been a concern of many services within local government, yet inevitably there has been a tendency for these services to be provided as relatively discrete areas of professional and departmental activity with too little attention paid to the ways in which they are interconnected [39].

The London Government Act (1963) and the Local Government Act (1972) established a full two-tier system of local government throughout England and Wales [33]. This system of local government maintained a division of functions between the two levels of authority and incorporated an important difference in the system operated in the more rural areas of the country as opposed to the metropolitan areas. In the rural areas the top tier of local government (County Council) was, and is, politically and functionally dominant, by contrast in the Metropolitan areas, the lower tier of authority (Metropolitan Boroughs) was the strongest tier, and is the only tier operating today [26].

An English County Council has two statutory roles related to waste management; [i] as the local planning authority for land use planning issues and [ii] as the Waste Disposal Authority (WDA) via waste contracts for the district collection authorities (Table 3.4). District level authorities have two key departments with a concern for waste matters. The first is the Waste Collection Authority, charged with the responsibility for collecting all waste under Schedules 1 and 2 of the Controlled Waste Regulations (household waste). The second comes under the Local Agenda 21 process. At the District level planners may have some role in waste planning but this is limited.

The collection of municipal waste is typically a service provided by local government, which can either directly employ labour or can use private sector companies on a contractual basis, and since the 1970's the use of private companies has been rapidly increasing in developed economies. In the Shire Counties, District Council responsibilities are limited to the collection of waste, a function which they may devolve to the private sector. In London and the Metropolitan areas, the position is different. In London the planning and operational roles devolve to the various London Boroughs, and waste collection is similarly devolved to the boroughs [37]. In other metropolitan areas development control, collection and disposal is placed with the borough or metropolitan districts. A key dimension to waste collection is the administrative and organisational relationship between the collection and disposal of waste and the inter-relationship between the practice of waste management and the structure of local government.

Table 3.4. Local Government MSW Management Responsibilities [1]

<i>Authority</i>	<i>Principal Duties</i>
Waste Collection Authorities	collection of household and commercial wastes, street cleansing and associated services.
Waste Disposal Authorities	disposal of collected WCA wastes through competitive tender, and nor permitted to dispose of waste itself.
Waste Regulation Authority	site licensing and enforcement, and production of waste disposal plans (now Environment Agency)
Local Authority Waste Disposal Company	arms length operation of all waste disposal and treatment facilities, formerly part of the WDA.

Local government nationally and internationally has been increasingly active in the area of the environment, undertaking initiatives, moving towards co-operation and experience sharing, and addressing the issues involved in the implementation of sustainable development before most national government have acted. Local authorities act as stewards of central government, whereby the broad outlines of environmental policy are determined nationally, and local authorities play a substantial part in interpreting those policies and mobilising the resources needed to bring them to fruition [40]. Local authorities are also working to deliver a national strategy for sustainable waste management that seeks to reduce the quantity of waste generated and make the best use of the waste that is produced. Both waste collection and disposal authorities have a vital role to play in moving towards the performance targets set in the Waste Strategy [4], and liaison and co-operation between these authorities is essential in developing fully integrated solutions which minimise economic costs and maximise environmental benefits [41]. However, it would appear that the existence of different tiers of authority with different functions places obstacles in the way of achieving an integrated approach to waste management [29]. Each council faces a different local environmental challenge, so there is no straightforward universal solution to the problems that they all face. But the current variation in their performance reflects differences in their understanding, enthusiasm, commitment, and environmental conditions [7].

Following the 1995 White Paper 'Making Waste Work' [4], the Government proposed to review the way in which Local Authorities could best contribute to the aims of the National Waste Strategy. As a result a review group was established to examine the role of local authorities, in particular how they should relate to the private and voluntary sectors.

In February 1997 the review group reported their findings, and the document '*Report of the Review Group on the Local Authority Role in Recycling*' [42] was circulated and responses received from the industry. The report proposes a flexible model for the role of local authorities, with adoption of waste reduction targets, promotion of source separation, and liaison with neighbouring authorities on waste planning issues. The report also suggested that disposal and collection authorities should together draw up a combined waste management strategy for consultation and implementation, which will allow authorities to benefit from economies of scale. The report proposed that municipal waste management strategies between disposal authority and its constituent collection authorities would help to ensure that contracts let by individual authorities are compatible, and comply with the proximity principle, and that a range of disposal and treatment facilities in an area are fully utilised.

7. LOCAL MSW POLICY IMPLEMENTATION

In the field of environmental policy there is little doubt that there is great current interest in local policy and practice [43], through recognition that both local policy and practice at the local government level, are an important determinant of environmental outcomes. The analysis of public policy has been one of the fastest growing fields of political science during the last decade, and is a branch of empirical political theory, which is concerned primarily with explaining the factors that affect decision making and so enable models to understand political phenomena [44]. Governments are increasingly implementing policies that are intended to impact on waste management practice, and many new initiatives have been taken in countries around the world over the last few years [6].

A common problem has emerged in countries that have embarked on policies promoting greater sustainability in waste management through recycling and reduction.

The pace of policy making has not been matched by an equal effort to provide mechanisms for effective policy implementation [10]. Traditionally the UK has employed a top-down approach or system of power in which legislative decisions are taken at the centre and then executed with little or no discretion locally [15]. In the UK broad outlines of environmental policy are determined nationally, whilst local authorities play a substantial part in interpreting those policies and mobilising the resources needed to bring them to fruition [9]. Hence the National Waste Strategy is transformed into local waste practice, allowing for a wide variation between similar or neighbouring authorities [22].

Implementation is about putting policies into practice [40], and it is often the complex process of planning, organisation, co-ordination and promotion which is necessary in order to achieve policy objectives. As an activity, implementation constitutes an important, even central, phase in the policy process [44]. It is the implementation phase that translates policies on paper into actual changes in behaviour. Approaches to implementation are therefore of great importance [45]. In general the involvement of different actors in both the creation and implementation of policy is the critical factor if policy is to stimulate new initiatives and to integrate environment into industrial decision making. Thus, there is a fundamental need to understand the more localised mechanisms by which policies are made and enacted [46]. This is important because national policy and strategy may not always give rise to the desired outcomes at the local scale, due to a number of factors and constraints, which are currently under investigation in this research [22].

A sizeable gap often persists between a policy decision and its implementation, and it appears that *the 'cards are stacked against things happening, as much effort is required to make them move, the remarkable thing is that new programs work at all'* [26]. The frequent failure of implementation to meet the expectations of decision makers concerns us not only because it belies the promise of abstract policies, but also because it functions as a constraint on the decisions made in the first and this is a key issue for current policy analysis work and environmental research.

This is clearly the case in the UK, where the different waste management planning and implementing bodies and their strategies in the UK are identified. What is evident is that the system is not only highly complex and complicated due to the different tiers of government and the different sections of an authority with responsibility for the management, operational and planning functions of waste management, but that national strategy and local practice are isolated from one another making the translation of one into the other an often difficult and sometimes impossible task [22].

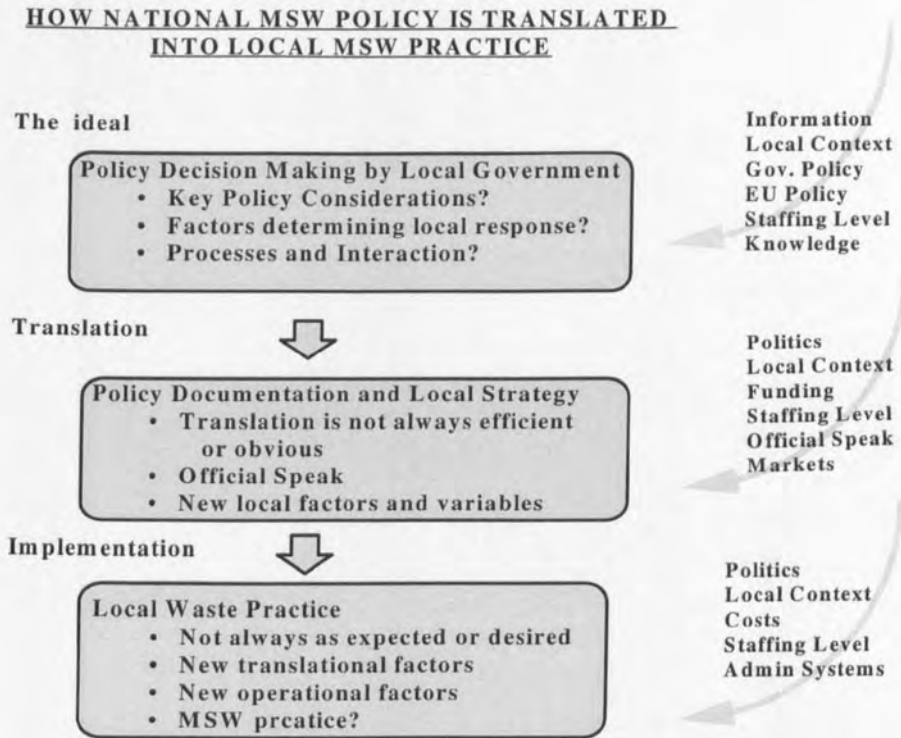
8. RESEARCH AIM

There is a clear need to develop an improved knowledge and understanding of MSW policy translation and implementation and determine the governing factors for the successful translation of MSW policy from national strategy through local policy and into local action [22]. On a practical level the research addresses English MSW management authorities, focussing upon local government policy translation, documentation, implementation and management. This focus has been determined because local authorities remain the facilitators, regulators and managers of local MSW services, as collection and disposal authorities, and are thus they key bodies in the policy adoption, translation and implementation phases, which are of key consideration within this research. This particular research programme is an analysis of local municipal solid waste management policy, using a local government survey and case study approach, to discuss the important factors and barriers operating during policy formulation, translation and imposition, as noted in Figure 3.8.

In order to achieve the overall aim of modeling MSW policy implementation by local government and inform the management decision-making process about constraints to successful implementation, a series of specific aims have been defined;

- 1. to understand national MSW management policy development and translation at the local scale*
- 2. to assess the significance of Government policy in shaping local waste management practices*
- 3. to devise a model to explain successful policy implementation*
- 4. to validate the proposed model in the field*

Figure 3.8 Policy Implementation (source: author)



The intended outcome of the work is to provide examples of Best Practice of successful implementation of national policy and attainment of policy targets, to be achieved through the development of Authority Typologies; [i] high performers, [ii] those improving local performance, and [iii] those that are struggling to alter local practice), which can then be tested through further fieldwork.

9. THE PILOT SURVEY

The justification for this research is the obvious failure of national MSW policy to alter local government practice [5, and 11] in line with sustainable development and the targets laid down in Making Waste Work [4].

The local level implementation of national environmental strategies have been a generally ignored area of investigation, and in order to successfully carry out this analysis those responsible for the development and implementation of local waste management policy and services must be surveyed. This is why the different tiers of local government have been selected as the sample, providing an invaluable source of information on the success of national waste strategy which have previously been untapped as merely a practical element of the service provision chain [47, and 33].

The pilot survey was carried out during August and September 1997. The purpose of the pilot work was to test the research methodology, and assess whether the research themes identified in the desk research were suitable as research avenues for the Ph.D. English local authorities were chosen to be the full sample to be investigated by the research, because they have historically been the most progressive section of local government in the UK [1]with regards MSW management, whilst providing a substantial number of replies from which to draw statistical relationships and detailed analysis. The survey was designed with a number of specific sub-sections;

- *Background Authority, Waste Management and Environmental details*
- *Involvement with specific MSW treatments, including changing practices*
- *MSW policy documentation available*
- *Current waste management policies, and policy decisions*
- *Waste management services provided and budgets*
- *Proposed attainment of Government Targets*

9.1 Research Framework and Timing

The pilot survey was carried out during August - September 1997, and was focused on local government departments responsible for waste management in Scotland, Northern Ireland and Wales. These three populations were chosen because of their representative nature in relation to the final population to be examined by the full survey, namely English local authorities, who are responsible directly or indirectly for the management of municipal solid waste in the UK, and are facilitators and operators of local public services. The materials used in the pilot survey can be found in Appendix 5.

English local authorities were chosen to be the full sample to be investigated by the research, because they have historically been the most progressive section of local government in the UK with regards the initiation and adoption of alternative waste management policies and strategies to landfill, whilst providing a larger population from which to draw statistical relationships and detailed analysis. Following an intensive period of assessment and redrafting post pilot survey, the main survey was sent out in January 1998 to all local authorities in England.

9.2 The Supporting Documentation

The covering letter was designed and redrafted over a period of months with numerous input from academic, private sector, and most importantly local government officers, to achieve the right blend of information. Numerous reference texts were consulted on examples of good and bad practice, and a number of the more significant themes were incorporated into the documentation. This was supported by the researcher's own practical experience of receiving a survey every two weeks as a local authority recycling officer, and what caught his attention, and what *'turned him off'*. The use of an accompanying brochure to provide the necessary documentation, was first suggested to the researcher in 1992 by a colleague who had used one during his ongoing PhD research, and the researcher gratefully adopted this method as part of his undergraduate research. Refer to Appendix 5 for a full set of the documentation used.

The researcher utilised his experience of brochure design, and his knowledge of marketing and promotions, gained whilst employed as a local government officer, to design a pleasant yet informative document which it was hoped would grab the attention of a local authority officer and convince them to spend some time completing the survey.

The brochure provides an introduction to the research topic and themes, and idea of why the research is important and for whom, the role of the survey in the research programme, some background information on the researcher indicating his interest and experience of the issues under investigation, and a contact address and telephone number, to allow officers to discuss issues or clarify points if required.

9.3 The Questions

The first section of the survey deals with background information about the authority allowing the subsequent data collected about waste management to be referenced against the types of authority that responded. Of most interest for the later analysis are the questions relating to region of the country, the type of authority (whether collection or disposal) the local environment (whether rural or urban) the size of the population from which refuse must be collected, and the political make-up of the council at present and during the last decade. These are all very important classificatory statements allowing the results to be grouped into a number of specific categories whereby comparisons of certain features and their impact on waste management practice and policy can be investigated.

There have been many reports that have discussed the impact of these and related factors on recycling performance, and thus the use of these questions will allow a brief assessment of some of this earlier work and provide the necessary framework within which more detailed statistical analysis can occur. It is generally believed that Conservative run authorities have adopted the principles of the hierarchy more readily than Labour run authorities, although financial aspects have restricted Conservative and Liberal programmes but not Labour strategies.

Rural authorities are generally considered to be less responsive to changing situations in policy and legislation at the national level, as many will have nearby landfill which can be utilised and do not suffer from the population density issues which are evident in urban areas and often act to spur changing local service provision.

The use of Environment Agency regions will allow some form of comparison of regional diversity in activity, because regions do have differing landfill availability which will to some extent govern their changing practices, and this will extend the researcher's earlier work on landfill availability and government influence.

The short second section focuses interest on waste collection and disposal statistics for the authorities being sampled, over a 20 year period asking for figures from 1985, 1995 and a prediction for the year 2005. The aim is to highlight trends in waste management practices rather than to discuss in detail the peculiarities of certain waste treatment and disposal options or the changing patterns of particular authorities. It is expected that landfill use will have decreased during the last decade in response to reducing void availability and the growing agenda at the local level for support of recycling programmes from the voluntary, private and public sectors (Read 1996). It is also expected that waste production figures will have increased due to the proliferation of the consumer society and the wasteful packaging that is associated with our throw away society. However, it is expected that production figures will be predicted at a lower level for 2005 in response to new laws and policies which are specifically targeting the production of packaging wastes, particularly the themes of producer responsibility. The figures provided, although expected to be broad and general, will provide some particularly interesting comparisons with the classifications provided in section one, allowing regional, political and locational dissimilarities to be assessed.

Section three is a little longer in format but uses a series of closed questions, thus reducing considerably the time required to complete the section. The section deals entirely with the authority's involvement with specific municipal waste management treatment methods, and the reasons for these changing practices, using closed questions which were devised through initial opinion forming interviews and discussions with local authority officers about the most significant factors acting at the local level. The idea behind this series of questions is to determine which factors are the most dominant for local policy implementation.

Historically costs have been the key issue for local decision making with regard to service provision, but this has recently been challenged by the environmental movement, and thus this series of questions will determine which factors (Politics, Environment, Public Concerns, Costs, or Landfill Availability) are the key issues for the local waste management officer in his strategy development, for each of the main forms of municipal waste treatment currently in operation in the UK. This will allow a comparison of the factors for waste management as a whole, and will allow a breakdown for the key factors for each waste management option which should provide some interesting and dissimilar data.

It is expected that landfill availability and costs will be particularly dominant for decisions relating to landfill use, whilst Standards and Legislation should be of greater significance for waste to energy plants, with recycling being supported by public concerns and environmental issues.

Section four is short and deals with the types and form of policy documentation that exist to promote waste management strategies and policies in the Authority and provide the public framework within which services operate. These three related questions discuss the availability of waste documentation, and the main points of the Authority's waste management strategy in order of importance, providing an assessment of the progress being made by the Authority and the likely direction that the Authority wishes to travel down, whilst indicating the role of the hierarchy at the local level. The final question is potentially the most interesting in the section as it discusses which of the waste management options have specific strategies or policies within the policy documentation and which are merely referenced to or have no mention.

The fifth section is the longest within the survey, and contains much of the key data to be analysed. It deals specifically with the current waste management policies of the Authority, and the role of individuals (officers, politicians, public, and government) and factors (landfill availability, environmental issues, government influence, and costs) in determining their role, purpose and content.

The majority of the questions focus on the encouragement and current promotion of alternative waste management practices to landfill disposal, and the reasons why these alternatives were being promoted. It is expected that there will be a general consensus of responses indicating the growing costs associated with landfill and the growth of government policy in encouraging local decisions, whilst it is hoped that there will be differences between the waste management options, which can then be in relation to the individual costs associated with the methods or the attention that has been afforded certain options from Government policy.

The final series of questions in this section highlights the different decision priorities that face a local authority when determining local waste management policies, in order to investigate their independent significance on shifting patterns. It is again expected that there will be variations amongst the treatment options, and there will also be an opportunity to assess regional, political and locational differences using figures from section 1, and relate the results to those of section 3 which discussed changing waste management practices and reasons for these changing practices.

Section six requires the Authority to provide more detailed information relating to the types of waste management services provided, their coverage, their frequency and their costs for Recycling, Composting and Minimisation. This will allow more detailed investigation into the local implementation of national strategies to be assessed through service provision figures and budgetary commitments. These figures will only be of great significance for Authorities who collect refuse, but should help to place earlier data and statements within a context of economics and service requirements.

Section seven is potentially the most significant because it discusses future policy directions which will be responding to recent and current policy guidance. The Authority's response to a number of recent policy documents and legal requirements is assessed through a closed question format and the likelihood of the Authority in achieving government targets for waste management is assessed. However, this section may also prove to be the most subjective, requiring opinion and statement rather than factual data, and will thus allow some bias to enter the survey.

There is also a discussion of why certain waste management options may be unsuitable for the Authority, relating inactivity by the Authority to local conditions, policy decisions and economics.

These figures should cross-reference nicely with earlier data relating to changing practices, and reasons for change, alone without the questions focusing on policy commitments and policy directors. The final series of questions in this section focus directly on the research questions of whether there is a policy implementation gap at the local scale, and whether there is one at the local scale. Again these questions are reliant upon the respondents opinion being reflective of the Authority, but they should provide informative reading in the final presentation of the data.

The final section is particularly short, and has been included only to maintain the representative nature of the survey, and to allow an indication of the significance of waste management services within the Authority's structure, which can be cross-referenced back to budget commitments and policy statements about waste management for the authority, to check for comparative results.

9.4 The Response

The response rates from the pilot survey were too low (average of 25%), particularly from Scotland (16%) for any real conclusions to be made regarding MSW policy and practice in these regions. However, this pilot phase remains a useful and essential part of the research programme, and the data collected will be used within this presentation to indicate trends in UK waste management and suggest ideas for further analysis of the English authority survey. The proposed development of new treatment options between 1995 and 2005 by the sampled authorities provided some interesting findings. The most striking results were that; (a) 80% of all authorities would probably or definitely develop minimisation, (b) 60% would encourage composting and (c) 100% would develop recycling due to its statutory nature, yet only 12% would support WtE, 6% incineration, and 52% landfill.

These figures suggest that the options nearer the top of the hierarchy will be supported (if only by lip service) whilst the traditional approaches of disposal and treatment (namely landfill and incineration) are not being supported. This should in time lead to a significant shift in local waste management practice, but only if policy is effectively translated and implemented, which is not always the case [22].

Landfill dominates MSW practices in the 3 regions of the UK, accounting for 97% of all MSW treatment and disposal, with recycling accounting for the other 3%. These figures do bear a close resemblance to published data on MSW practices [5] suggesting the validity of the research to date. The reasons for this pattern are quite obvious with economic considerations being the most significant issue for the continuing use and dominance of landfill, although resistance was raised in the guise of NIMBY issues and local policy considerations. Minimisation strategies are very poorly provided for according to the sampled authorities with only 10% of authorities in Northern Ireland and Wales having one. Kerbside recycling programmes do not fair much better with 40% of authorities in Wales, 20% in Scotland and 40% in Northern Ireland operating a service, with very similar results for composting systems, although as expected all authorities in the survey had a recycling system (of some sort), due to its more statutory nature.

Most significant has been the identification of a policy implementation gap (Figure 3.9) for MSW policy is a real problem for local government officers, who are striving to achieve Government targets but are falling short, particularly Ireland and Wales. On average 72% of the sampled authorities stated that they were experiencing policy implementation problems, which were clear barriers to local sustainable waste management. The most common reasons for this policy gap (Figure 3.10) have been; Costs of Implementation (30% of Irish Authorities and 100% of Scottish Authorities), Unsuitable Technology (30% of Welsh Authorities) and a Policy Vacuum (30% of Irish Authorities). These are the issues that need addressing if national strategy and goals are going to be effectively translated into local action, and are being closely investigated during the continuing research.

However, it appears highly unlikely that any of the targets set in Making Waste Work [4] will be met by the year 2000, whilst by the year 2005, the majority of Authorities are expecting to reach targets for landfill reduction, recycling banks, and home composting, but falling short for recycling rate and recovery rate, which are perhaps the two most important targets. This suggests that a lot of work at the local level is required if National policy and strategy is going to lead to the desired changes in local practice (Table 3.5).

Figure 3.9. The Existence of Problems with Policy Implementation

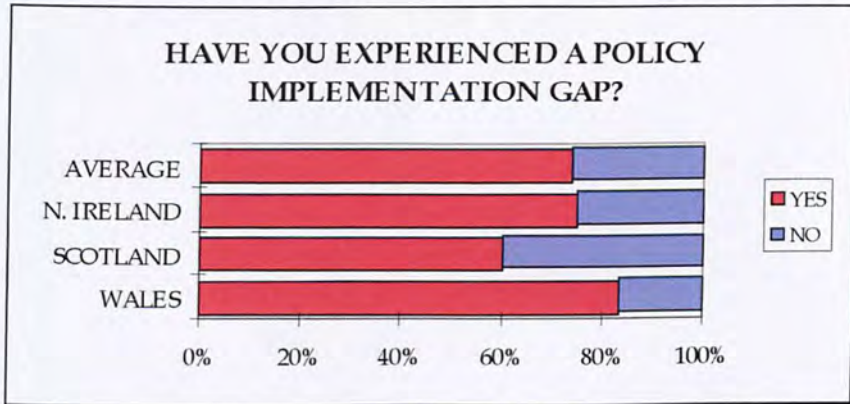
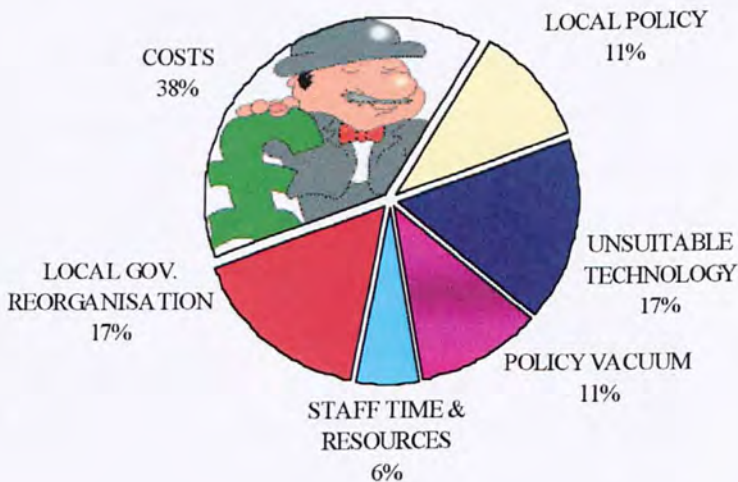


Figure 3.10. How Policy Translation is being actively blocked at the local scale



Clearly the justification for this research is the obvious failure of national MSW policy to alter local government practice in line with sustainable development and the targets laid down in Making Waste Work [22]. The apparent existence of '*a policy implementation gap*', is of central importance for the successful delivery of MSW policy at the local scale [26].

These preliminary results indicate that in Scotland, Wales and Ireland there are some interesting problems relating to the implementation at the local level of national MSW policy and the achievement of MSW targets, which justifies the extension of the survey to all English waste management authorities [22].

Table 3. 5. Will authorities achieve UK Government MSW targets?

	<i>By 2000</i>	<i>By 2000</i>	<i>By 2005</i>	<i>By 2005</i>
	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
Home composting from 40% of homes with a garden	16	84	52	48
Recycling Rate of 25% by 2000	10	90	45	55
Recycling Banks in easy access for 80% of homes by 2000	61	39	77	23
Recovery Rate of 40% by 2005	10	90	43	57
Landfill reduction from 70% to 60% of controlled waste	37	63	62	38
<i>Average Attainment of Targets</i>	<i>27%</i>		<i>56%</i>	

9.5 Changing the survey's emphasis

The results obtained have been used to edit the questionnaire and to justify the existence of some questions, whilst aiding in the decision to discard others. Some of the data collected will be retained for use in the evaluation of the survey, some will be utilised in the results when discussing the UK, and national trends, and some will be used to add to the quality of an associated research programme, surveying recycling and minimisation performance in the UK, in association with University College Swansea and the Institute of Wastes Management.

The poor level of response (25%) which is perhaps an indication of the current state of play in local government in Scotland, Wales and Northern Ireland. Poor response may indicate that waste management is a newly evolving local service which does not yet have enough staff or resources. However, this may also indicate the level of reorganisation that is currently sweeping the regions, and may represent the picture in the new unitary authorities in England. Yet, the response rate was not too discouraging, as it is expected that the return rate from the main survey will be nearer to 50%, once editing and refining have been completed.

It was stressed during the evaluation of the pilot work that the key variables and issues of direct relevance for the analysis and discussion of MSW policy implementation, and should be tightly focused upon within the survey. This is quite evident in the final edited survey, where certain questions and groups of questions have been reworked, edited or discarded to emphasise only the important themes, which are discussed in greater detail in a later section of this report. Following an analysis of the results obtained from the pilot work and the returns received, the research questions were narrowed, whilst other preliminary ideas were discarded due to the low return or poor quality of the data. Those themes that were deemed to be of real importance and significance, and which were addressed in the main survey were:

- 1. Are there certain types of Authority who are implementing and developing policy better than the majority of Authorities?*
- 2. Do certain types of Authority favour certain types of waste management practice, based on urban - rural or disposal - collection or labour- liberal - conservative categories?*
- 3. Which characteristics are the most important for determining sustainable waste management policy development and implementation?*
- 4. The existence of a policy implementation gap blocking the effective translation of national MSW management strategy into local MSW management practice.*

9.6 Editing the survey for English Authorities

The documentation and the survey need to be more actively 'sold' to the local government officers to encourage them to complete the questionnaire, as their time is limited and their priorities do not usually extend to academic surveys. It was found during follow-up discussions with local officers that when individuals completed the first page they were very likely to finish the whole survey due to the nature of the closed questions and the need for ticks only, making its completion a relatively timeless and simple process.

This realisation led to much editing and reworking of the support literature and the wording and structure of the survey itself, to improve its marketing potential, through the utilisation of the experience of the researcher, his support team, and colleagues in industry. In the letter and accompanying literature, an indication of the importance of recent changes in legislation and policy and the associated importance for shifting patterns of local government policy development and implementation were mentioned to show the officers that the researcher was well aware of the changing balance and legislative emphasis of MSW in the UK.

The high profile nature of the research was also re-emphasised within the survey of English Authorities to encourage some of those authorities who may not be willing to respond to complete and return their questionnaire, as their involvement will improve the quality of the study, which could prove to be an important snap shot of current practice. The Authorities must feel as though their information is important and that their time and opinions are worthwhile, whilst the benefits for them must be obvious and tangible, being stated clearly within the letter. These considerations have been adopted within the final survey. The material used can be viewed in Appendix 5.

The introduction letter was used as a marketing tool, selling the worth of the research, the researcher and the institutions involved. As such the letter has been edited and re-edited to increase the emphasis and flow of certain elements of the letter, particularly the worth of the research and the benefits for the participants.

As a member of ISWA, the IWM, the RGS and the CIWEM, it was decided that this should be on the brochure, supporting the claim that the researcher is a valuable candidate to carry out this research. It was also decided that personal contacts within the industry should be utilised where possible, particularly where authorities haven't responded to improve the return rate and the quality of the survey, by adding a more personal touch to the literature, reminding officers of previous contacts we may have had or conferences we were at, and through a final telephone reminder to authorities to encourage their participation.

Specific changes included;

- *Removed Welsh, Scottish, and Irish categories (Q1.1) as only England will be surveyed in the main questionnaire.*
- *There was a mixed response to the authority classification question (Q1.3). The dominant answer was 'mixture' which is perhaps a reflection of the over simplified nature of the question. Thus, an additional option was added (urban-periphery).*
- *Questions 2.1 and 2.2 proved difficult to obtain the necessary breakdown of tonnages for collections and disposal. As such the question was reworked asking instead for simply the proportions of the total MSW sent to each disposal or treatment route, and the proportion of commercial and household waste collected. Poor response to the question about MSW collected by Authority (Q2.1), indicated that it was not clear enough, so it was reworded to 'collected by or on behalf of your authority', as many WCAs contract out to the private sector.*
- *A poor response to the MSW disposal question (Q2.2), highlighted that tonnages from the past were unknown, and current tonnages are generally inaccurate. Thus, the emphasis was changed to proportions (%) treated by each route (with only 5 options) as these general trends are more important than specific tonnage data for the research.*
- *Deleted the question relating to Incineration without Energy Recovery (Q3.2), as this is no longer a realistic issue for local authorities due to the standards being set by new EU and UK legislation.*
- *In the questions relating to reasons for changing waste management practices (Q3.1 - 3.5) the options of 'tighter standards' and 'other' were discarded, as they were not used, simplifying the list of available options, making the survey more appealing to the eye by removing some of the congestion.*
- *In the question regarding waste documentation (Q4.1) 'Disposal Plan' was added as an option, to give the full range of waste literature currently (or potentially) potentially available from or by local government, making the question more comprehensive, and allowing Waste Disposal Authorities to answer.*

- *The question about the main points of the waste management strategy (Q4.2) has been edited to remove the open nature of the response, with a list of options available to be ranked in order of importance. These options came from the responses in the pilot survey, and from the experiences of the researcher in implementing a local waste management strategy. The options have been grouped to make the respondents job easier, with options relating to the hierarchy, integrated waste management, improved efficiency, education, and policy review now included.*
- *Questions 5.2 through to 5.5 had the optional responses standardised to aid in the completion of the survey, so that there was no additional bias or confusion added by misunderstanding the meanings of the optional response; Very Strong Influence, Strong Influence, Medium Influence, Weak Influence, No Influence.*
- *In question 5.3 (actively promoting?) there is a need to consider that minimisation is not a statutory requirement, and as such it should only exert a weak influence on policy, and should not be strongly promoted at the local scale. With regard to currently promoting (Q5.4), it must be considered whether there is a statutory requirement, and how this will affect activities and funding.*
- *The question relating to promotion of waste strategies (Q5.5) has been altered to increase the emphasis on household waste, thus discarding the role of commercial and industrial wastes which require more specific types of promotion. Thus 'seminars', 'training' and 'sponsorship' options were all removed along with 'contractual arrangements', as they are not specific to household waste, which is the dominant component of MSW, and this is the one of greatest concern for local waste management authorities.*
- *Question 5.6 was also edited in a similar fashion as Q 5.5 to improve the emphasis on household waste and the role of the local authority, with the 'Cost of Options' being reworked to 'Costs to Authority', and 'Income savings' edited to read 'Savings for the local authority.' On the topic of reasons for promoting alternatives (Q5.6) the benefit for the authority must be considered, as this will be of utmost importance for the officers, and then discuss the reasons for changing practices within this context.*
- *When discussing decision priorities (Q5.7) rewording of the optional answers was required, to take account of the Environmental Issues (who are they a concern for?), and the Costs which should be laid at the feet of the Authority. In question 5.7 there is a reference to 'decision priorities' but this is not adequately explained to the participants.*
- *When discussing the types of recycling service available (Q6.1) there was a need to specify the difference between a 'Doorstep' collection and a 'Bring' system of banks on a street corner, as this is an indication of progression in service provision, with doorstep services requiring greater financial commitment and management.*

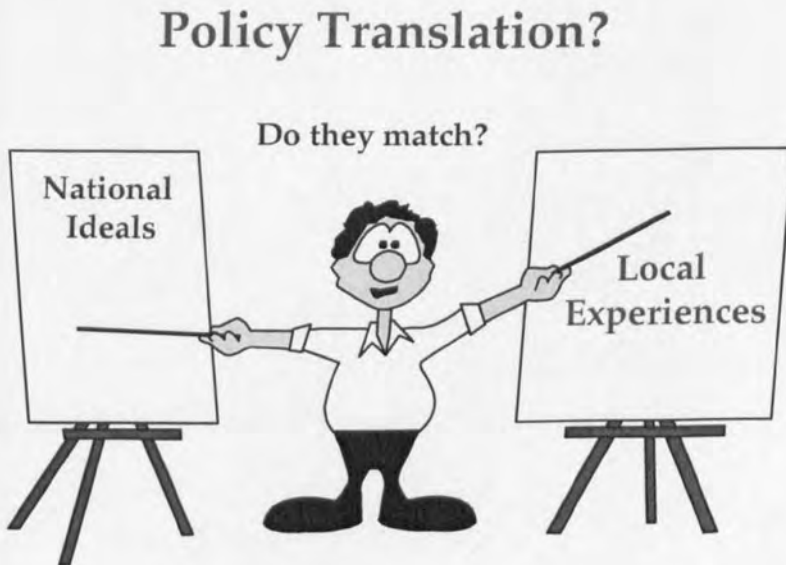
- *The 2 questions relating to number of bring sites (Q6.2) and number of recycling banks (Q6.3) were poorly responded to, indicating the poor quality of the likely response if asked in the main survey, and thus these questions were discarded as they provided little valuable information. This suggests a poor knowledge by the officers, a lack of adequate records which can be consulted, or a willingness to divulge their current service provision.*
- *The other questions which focused on the types of recycling service and their costs (Q6.5 through to 6.8) had negligible responses, and the actual data was of little use to the survey, and so they have also been discarded, as trends are more important for the research.*
- *When questioning about the annual recycling budget (Q6.9), the response was not very productive, but it was deemed that the question was valuable and was kept but in a modified form. The question was simplified, and changed to a closed format with a number of category ranges, one of which should be ticked, allowing authorities to avoid divulging specific details.*
- *The composting questions (Q6.12 - 6.14) had a very low response and were discarded, as this type of detail was not required for the national survey.*
- *The Composting budget question (Q6.17) was retained but was standardised to match the recycling question so that it could be easily completed and would allow simple comparisons of allocation of funding across the waste management options to be made.*
- *The question related to tonnes composted (Q6.18) was also discarded due to poor response and the non-essential nature of the data, as the proportion of waste composted is provided earlier (Q2.2).*
- *The question about Minimisation budget (Q6.20), has been standardised like those for recycling and composting. When discussing minimisation strategies (Q.6c) it needs to be explicitly stated that this must be written and published.*
- *The question that discusses tonnes removed by minimisation (Q6.21), has been discarded due to a very low response, and the difficulty in quantifying the amounts 'not' produced. This question would add very little quality to the final survey.*
- *With respect to future policy directions (Q7.1 and 7.2), it was decided that there was a need to edit and reword the options as many respondents may be unaware of the specific targets laid out in 'Making Waste Work', and so they were more explicitly stated. Whilst for 'minimisation trials', they were discarded because at present they are industrially oriented with little consideration of household waste.*
- *In question 7.3 one of the options for being potentially unsuitable is 'Space', but there is no qualification or clarification of this option. This is a discussion of landfill availability, and locational issues, and thus the required rewording was carried out. When discussing the unsuitability of options (Q7.3) the 'other' category was deleted as it was unused throughout the pilot survey.*

- *When discussing the policy implementation gap (Q7.4) there is a need to consider the operational difficulties affecting both the development and implementation of policy and practice. The question had been refined to provide two levels of inquiry. First is the gap that exists between national policy and strategy and local documentation, whilst the second discusses the gap between local documentation and local practices. This is fundamental for the success of National policy and strategy.*
- *'Controlled landfill' was reworded to 'landfill' to remain uniform throughout the survey (Q7.5 f).*
- *When asking about the reasons for a policy implementation gap (Q7.5) extra options were added to make the question more encompassing, they were staff time and resource and local government reorganisation. These were added due to the overwhelming support from the pilot survey for these options.*
- *When discussing whether authorities would achieve Government targets (Q7.8), the option relating to waste production stabilisation was discarded because it is not yet UK law, but emanates from the EC and has not been implemented.*

10. UK AUTHORITY SURVEY

The justification for this research is the obvious failure of national MSW policy to alter local government practice in line with sustainable development and the targets laid down in Making Waste Work, as noted in Figure 3.11.

Figure 3.11. The Research Rationale



10.1 English Authority Response

The response rate for the survey of English Authorities reached 67%, providing 287 surveys for analysis, with a relatively representative cross-section of urban and rural, small and large, collection, disposal and unitary authorities, and examples from all main political stances. The most notable results concern MSW management practices by Waste Collection Authorities across England as a whole which suggest that the data collected is representative of practices in the UK, because they do tally quite well with the data reported by the DETR [5];

- 87% by Landfill, and 3% by Incineration
- 7% by Recycling, 2% by WtE and 1% by Composting

10.2 Waste Management Practices

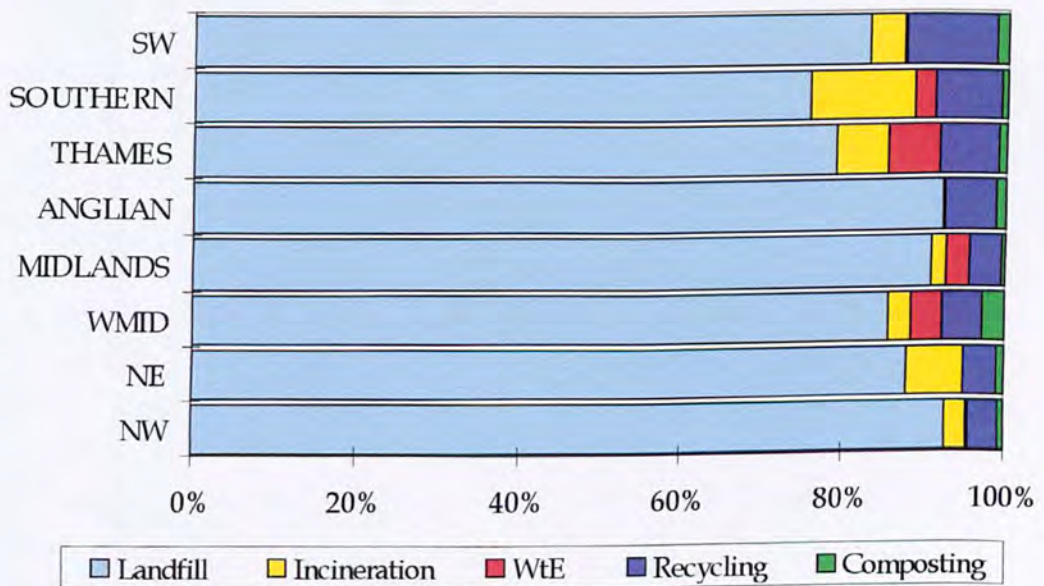
The initial analysis of the survey data suggests a clear regionalism (Figure 3.12) of MSW management practices in England. The South East Corner of England has the lowest use of landfill, with the Southern region, Thames and South west regions all with landfill rates of under 80%, compared the North West, Midlands and Anglian regions where the landfill rate exceeds 90% for MSW. This may be a reflection of landfill availability in these regions, with the South East being particularly concerned about future landfill void [47]. However, the variation and pattern observed may actually reflect the relative costs of the alternative waste management options in each region, or the political agenda of local and county politicians in making waste management planning decisions.

The pattern for composting is interesting, reflecting its generally low impact on MSW management practices across the UK, although there is a localised significant level of activity in the Midlands where composting accounts for 5% of MSW. WtE is most notable as a method of management in the West Midlands and the Thames regions, which may be a reflection of limited landfill availability in and around Birmingham and London, and also be historical with the redevelopment of old dockland and industrial sites in these cities where incinerators and waste to energy plants are now being constructed near to the waste generation sources.

Recycling is clearly more popular in the south of England with the South West region leading the way on 11% of MSW treated by this method. This has probably more to do with Liberal authorities who are abundant in the SW, and the type of people who live in these region, than landfill availability or costs, as recycling is generally the preserve of liberal councils and the middle class white consumers, who are abundant in this region. This summary is perhaps a little too simplistic, but certainly provides an indication of the type of regional differentiation that exists for the management of MSW. The figures also tally relatively closely with those reported by the DETR suggesting that the research data is representative of activities at the local scale in England.

The ongoing research intends to discuss these findings in more detail, and hopes to determine why this regional pattern exists and relate this to factors including landfill availability, local politics, local environmental conditions and economics [48].

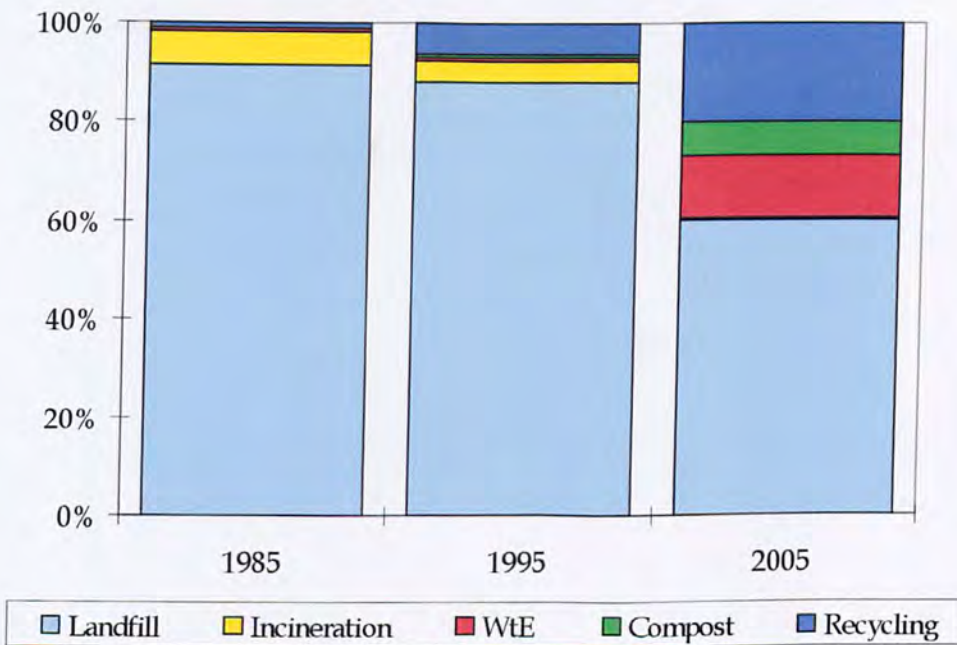
Figure 3.12. Regional MSW Practices (1995 reported)



Of great interest for the future management of MSW are the results from the Collection Authorities concerning trends in their management of MSW (Figure 3.13).

They suggested that on the whole Landfill has dominated and will continue to dominate MSW management in the foreseeable future accounting for 95% of MSW in 1985, 90% in 1995 and predictions suggest 60% by 2005. This decrease in landfill use will be matched by an increase in Recycling from 1% in 1985 to 4% (1995) and 22% by 2005, the development of composting from negligible levels in 1985 and 1995 to 6% in 2005, and the use of WtE (12% by 2005). These changes in use of options are as one would expect considering that regulations have become increasingly tighter on landfill, and new void has become increasingly more difficult to secure [49].

Figure 3.13. Trends in WCA Treatment Practices



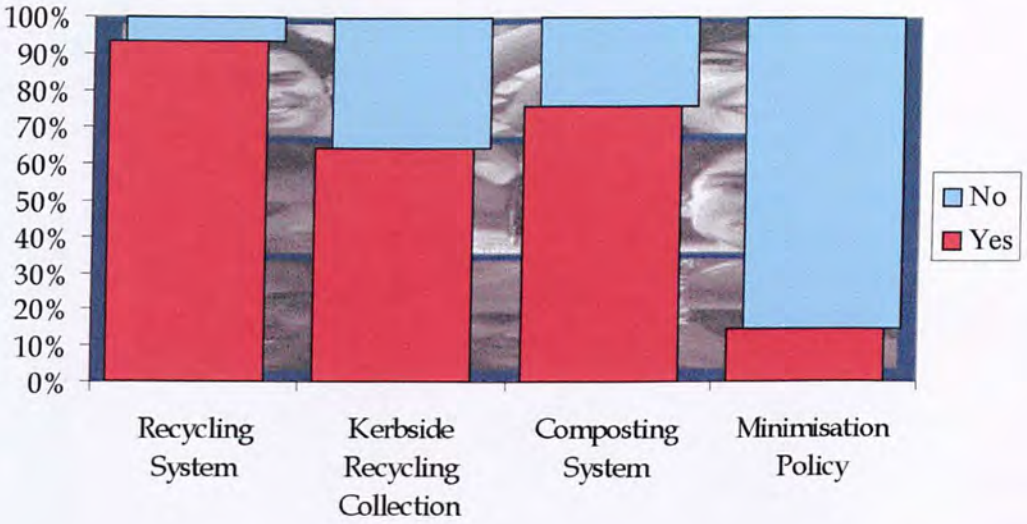
The predictions for 2005 would also bring England in line with its European neighbours in terms of waste management practice. However, the changes suggested are quite significant, with an increase in recycling rate from 5% to 22% (a 340% increase in a decade), the development of WtE from 2% to 12% (a 600% increase) and a decrease in landfill use from 90% of MSW to 60% (or a 30% reduction in use). Clearly a lot of significant change is expected for MSW management in England during the coming decade, but how realistic are these expectations?

Will recycling, composting and WtE be developed enough to reduce the nations dependence on landfill by one third, and how much will this shift in practice costs the authorities, and in the long term the residents? Clearly if these predictions are to come true, and achieve Government targets for MSW, policy at both a local and national level must be adequately implemented at the micro scale.

Data related to the provision of waste management services closely replicated the findings of the pilot survey. With 94% of authorities having a Recycling Programme, 62% offer a Kerbside Recycling Collection, 73% have a Composting System, yet only 12% have a Wastes Minimisation Strategy (Figure 3.14). These figures are quite informative of the current state of affairs in MSW management in the UK. Clearly Recycling is high on the local agenda, yet minimisation is almost not on the agenda at all, which reflects the difficulties associated with measuring the success of minimisation programmes for local authorities and the need for clear long term plans to be put in place which are an often alien concept for career minded politicians. Clearly the adoption of composting and kerbside systems by more authorities must be seen as the next critical stage of MSW management development in the UK, followed by a concerted effort to raise the profile of minimisation programmes and develop closer working networks with higher education and businesses who are already pioneering work in this field.

There is an obvious opportunity for development to occur in the fields of composting, recycling and minimisation at the locals scale. Clearly with targets set out in Making waste Work for composting, recycling, recovery and landfill diversion, one would expect the rapid development of these systems to allow local authorities to reach these targets. As Disposal Authorities do not get involved in waste collection, you would not expect them to provide recycling services as often as WCAs and UA (84% compared to 92%), and you would not expect any occurrence of kerbside recycling, although it was suggested by 14% of the WDAs (perhaps an error on their behalf, or referral to kerbside systems operated by their WCAs.

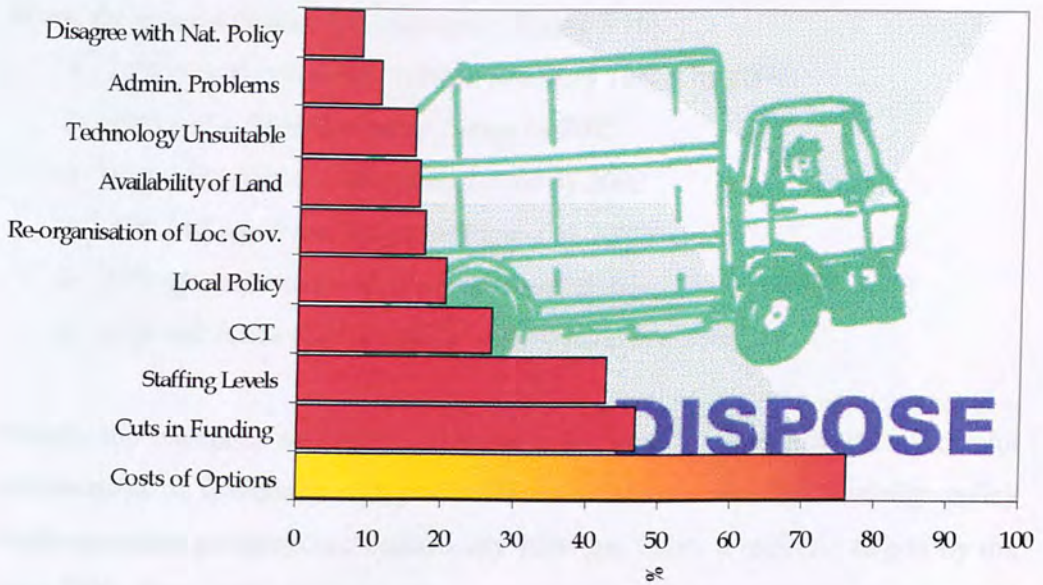
Figure 3.14. MSW Management Systems in use



This data supports the notion that certain MSW management options occur at certain tiers of local government; Composting (large-scale) by the WDA, Kerbside Recycling by WCA, and Minimisation Programmes by WDAs and UAs where their effect can occur over a larger space.

The survey also suggests that 62% of WCAs are experiencing a Policy Implementation Gap, whilst 37% are experiencing a more localised policy translation barrier. The key reasons for these policy problems are (in order of importance) (i) Costs, (ii) Staffing Levels, (iii) Privatisation and Contracting out, (iv) Cuts in Local Government Funding, and (v) Local Government Re-organisation (Figure 3.15). Undoubtedly the biggest problems facing local government for the successful translation of national strategy into local practice are; availability of skilled staff to carry out the work, sufficient funding to develop recycling and composting programmes, and supportive contractors who will help to finance and resource new developments.

Figure 3.15. Reasons for a Policy Implementation Barrier



There was also an interesting breakdown of authorities experiencing policy implementation problems (Table 3.6);

- 73% of Labour authorities have experienced policy translation problems
- only 50% of Conservative authorities agreed
- 80% of authorities in the West Midlands have suffered form policy barriers
- only 58% of authorities in NE and Thames regions agreed

Table 3.6. Experiencing a Policy Implementation Gap?

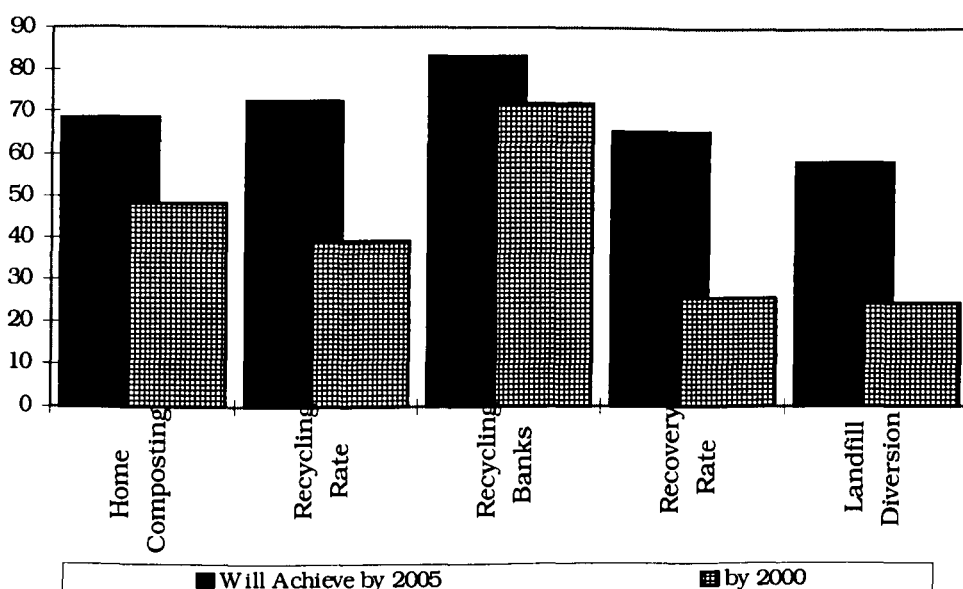
	<i>WCAs</i>	<i>CONSERVATIVE</i>	<i>LABOUR</i>	<i>LIBERAL</i>
% experiencing a policy gap		50	73	60
% experiencing a local policy gap		25	46	31
	<i>UAs</i>	<i>CONSERVATIVE</i>	<i>LABOUR</i>	<i>LIBERAL</i>
% experiencing a policy gap		50	71	33
% experiencing a local policy gap		0	45	20
	<i>WDAs</i>	<i>CONSERVATIVE</i>	<i>LABOUR</i>	<i>LIBERAL</i>
% experiencing a policy gap		38	80	75
% experiencing a local policy gap		17	29	33

On the subject of achieving Government MSW targets as laid out in Making Waste Work, the general picture was quite poor (Figure 3.16);

- 22% of authorities will achieve Recovery Target by 2000
- 64% will achieve Recovery Target by 2005
- 38% will reach the Recycling Target by 2000
- 73% will reach the Recycling Figure by 2005
- 22% of authorities will attain the Landfill Diversion Target by 2000
- 57% will reach the Landfill Diversion Target by 2005

Clearly the existence of policy implementation gaps is hindering the successful achievement of Government targets, as those authorities who acknowledge policy implementation problems are consistently 10% less likely to achieve targets by the year 2000. These authorities may be more realistic about the situation they face, or they may be more pessimistic about their chances, but whatever the underlying reason, there is a need to adequately address this policy implementation barrier if sustainable waste management practices are to be achieved by the turn of the century [22].

Figure 3.16. Summary of Authorities likely to achieve MSW targets



11. INTERVIEWS AND CASE STUDIES

It was decided that in order to gain a better understanding of local authority processes and the waste management agenda a series of interviews with policy officers would be required. Authorities were selected on a 'clustering' basis according initially to waste management practice and then by region so that authorities were being subjected to similar geographical influence. The regions used were Northamptonshire, London, Dorset, Surrey and Hertfordshire. Some of the promotional literature from these authorities is shown in Figure 3.17.

The clusters used are shown below

- *Top achievers (high recycling, good attainment of targets)*
 - *Hart DC / London Borough of Richmond / North Dorset DC*
- *Improvers (good recycling, expected improvement in target levels)*
 - *East Dorset / Kensington & Chelsea / New Forest / Watford*
- *Low performers (underperforming)*
 - *Hertsmere / Mole Valley*
- *No performance (waste is not an issue)*
 - *Harlow / Kettering /*
- *Unitary Authorities*
 - *Kingston Upon Thames / London Borough of Sutton*
- *Disposal Authorities*
 - *East Sussex County / Northampton County / Surrey County Council*

A series of 'blind evaluations' also took place with authorities from the same regions who had declined to return the survey;

Guildford / Elmbridge Waste Disposal Authority

11.1 Representative Interviews

The survey responses from the chosen case studies were then compared with the average data obtained from the survey to ensure their similarity and thus representation for the interviews. In all cases the interviewee authorities proved a close match for the main survey respondents, as noted in Tables 3.7 through to 3.12.

This is important because in the next section a series of summary points from the 18 interviews will be made and direct quotes used to highlight specific issues relating to solid waste management policy implementation in England. Without having confidence in these case studies as being ‘representative’ of the wider survey there would be little to gain from using these quotes or their discussions to generalize about the thoughts and activities of the English authorities in general.

Figure 3.17. Promotional literature from one of the case study authorities

Table 3. 7. Comparative data from Interviewees and Main Survey

<i>Authority Tier</i>	<i>Main Survey</i>	<i>Interviewed Authorities</i>
WCA	72%	11 (69%)
UA	12%	3 (19%)
WDA	16%	2 (12%)
<i>Location</i>	<i>Main Survey</i>	<i>Authorities Interviewed</i>
Urban	19%	4 (25%)
Mixed	60%	11 (69%)
Rural	21%	1 (6%)

Table 3.8. Comparative data

<i>Political control</i>	<i>Main Survey</i>	<i>Authorities Interviewed</i>
Conservative	8%	3 (19%)
Labour	48%	5 (31%)
Liberal	21%	6 (38%)
Split (hung)	19%	2 (12%)
Other	4%	0%
<i>Option</i>	<i>Main Survey</i>	<i>Authorities Interviewed</i>
Landfill	86%	86%
WtE (incineration)	7%	4%
Recycling	6%	9%
Composting	1%	1%

Table 3.9. Response from Interviewee Authorities on Service Development

<i>Service</i>	<i>Main Survey</i>		<i>Interview Authorities</i>	
	<i>WCA</i>	<i>WDA</i>	<i>WCA</i>	<i>WDA</i>
Recycling System	93%	88%	100%	100%
Kerbside Collection	69%	17%	86%	0%
Home Composting	65%	24%	67%	0%
Centralised Composting	16%	83%	44%	100%
Minimisation Strategy	13%	30%	25%	0%

Table 3.10. Existence of a policy implementation gap

	<i>Main Survey</i>	<i>Interview Authorities</i>
Policy Gap	64%	60%
Local Policy Gap	38%	38%
Costs	99%	100%
Cut-backs	55%	78%
Staff Time	51%	33%
CCT	31%	67%
Unsuitable Technology	23%	11%
Land availability	22%	11%
Re-organisation	21%	33%
Local policy	16%	22%
Administration issues	12%	33%

Table 3.11. Achieve targets by 2000

	<i>Yes</i>	<i>Perhaps</i>	<i>No</i>
25% Recycling			
Main Survey	25 (10%)	73 (29%)	152 (61%)
Interviews	3 (18%)	7 (44%)	6 (38%)
40% Recovery			
Main Survey	16 (7%)	46 (19%)	181 (74%)
Interviews	1 (6%)	5 (31%)	10 (63%)
60% Landfill			
Main Survey	14 (6%)	44 (18%)	181 (76%)
Interviews	1 (7%)	3 (18%)	12 (75%)

Table 3.12. Achieve targets by 2005

	<i>Yes</i>	<i>Perhaps</i>	<i>No</i>
25% Recycling			
Main Survey	46 (19%)	131 (53%)	68 (28%)
Interviews	6 (38%)	7 (44%)	3 (18%)
40% Recovery			
Main Survey	29 (12%)	129 (53%)	84 (35%)
Interviews	4 (25%)	8 (50%)	4 (25%)
60% Landfill			
Main Survey	23 (11%)	116 (56%)	68 (33%)
Interviews	5 (31%)	5 (31%)	6 (38%)

11.2 Summary Feedback from Case Study Interviews

In terms of the research programme and the need to investigate policy and its implementation, one authority said;

“Yes, if you were having problems as a Recycling Officer then you need to investigate whether that is the norm for local government, I understand that.”

It was generally agreed that my background in local government had helped inform my survey and make the research of more relevance to the officer’s asked to complete the questionnaire;

“Clearly it is beneficial that your interest in this research came from your time as a local government recycling officer, I assume you have faced many of these problems, tried to overcome them, and also understand the terminology and the processes involved in policy making and implementation.”

“We are interested in your findings and the excellent survey response rate reflects who the survey was sent to and the interest they have in the topic at large.”

However, the case study authorities were not surprised at the general lack of willingness to participate by other authorities in the case study exercise, noting the time of year, the increasing workload and the greater priority of dealing with public complaints as the main reasons for this lack of co-operation. However, a number of pertinent summaries were suggested, the most succinct of which stated;

“The poor response reflects the problems being experienced by authorities as noted in the survey, including staffing levels, resources, time, political commitment, and lack of genuine interest..... in both the topic and the job!”

The general consensus was that policy for solid waste management in the UK was in a state of chaos! The Government want more local government activity, but they have failed to provide the tools to deliver, particularly on budgets.

The other common belief was that there had been a general over-emphasis on recycling strategies and targets, when minds should have been focused on what was achievable and realistic, because without ‘real’ targets authorities would not even consider methods of getting there. Pleasingly, some authorities appear to be looking beyond Government policy and setting more challenging targets, or more realistic targets for their local and county situation. The general consensus amongst authority officers was that Government impact could and should have been more positive, a number of specific quotes are listed below;

“Central Government is low on the agenda for local authority waste management!”

“I think that the impact of Making Waste Work and the impact of legislation generally has been none!”

“I think one of those big issues is that Government policies have no legislation to back it up!”

“We all suffer from lack of resources, but waste has not been given a high enough priority by central government to influence local politicians.”

However, some officers did feel that the Government had helped to move things along through their targets and policy framework;

“I suppose government policy has achieved something, as everyone recognises that there is a policy. Waste management was in the dark ages for so long!”

“MSW practices have hardly changed nationally in the last 4 years, it is a slow and incremental process!”

“There needs to be more focus on the implementation side of it all.”

Almost every authority agreed that the targets proved to be a valuable framework even if they change, allowing comparison and performance measurement and providing the focus for increasing political pressure and inevitable funding.

The targets have undoubtedly made authorities look at recovery and recycling options and have helped to raise the profile of waste management with elected politicians and the general public. Without question, they have helped move the situation on, but it is a slow process. Although, it should be noted that some authorities believe that the targets should not exist! In terms of the specific targets under question, authorities had this to say;

“Less attention has been paid to voluntary targets, but is of political importance and concern for practical operations.”

“The 25% target is a national target, but I’m sure that most authorities have adopted it as their own. Certainly this happened with the initial recycling plans from the early 1990s that said things like; we are going to achieve the 25% target by doing this, this and this, without really considering whether it was achievable or not! I think that now, in the authorities in this region are more concerned with continuous improvement, and improving recycling rates, towards the ideal of 25%, which we are working towards, but only at our own speed.”

In terms of local authority policy and practice it is the officers who are responsible for policy implementation, although different authorities have different experiences. In summary one authority said. ‘Planners plan and operators do!’ whilst going on to say that ‘dialogue is not always open or effective.’ Some of the more pro-active authorities have been involved in county-wide planning and strategy programmes regarding facility siting and this has proved a valuable experience for all concerned.

However, it would appear that the relationship between Members, Officers, the Public, Central Government and the Private sector is far from straight-forward, making interpretation and assumption ‘dirty words’ in terms of solid waste policy and practice. In some authorities there was a blatant power struggle between elected members and officers about who was setting policy and designing service. Undoubtedly, there is a local struggle occurring between the elected members who think they know best and the local authority officers who claim to know best;

“It comes down to the question of who runs the council, the officers or the politicians? I’m sure that is a question that has been raised many times during your interviews.”

The summary from the interviews would suggest that in general Officers lead Members because they see the operational problems and they know what the opportunities are. However, that is not to say that Members can’t be active, it is more to do with the political agenda and whether local politicians are power hungry and thus use recycling as a political tool, or whether they are genuinely responsive to public demands.

Perhaps one of the most interesting topics for debate surrounded drivers for changes in practice (particularly recycling) and whether economic, political or social factors were more important for putting waste management on the policy agenda? It was agreed by all that the reason for decreasing the use of landfill (in those authorities that had done so) was a question of availability and not a repines to the national policy agenda or local public concerns;

“Landfill availability is the key driver, and as we all know necessity is the mother of invention..... increasing costs will force political decision-making to take action!”

“The Making Waste Work targets have provided a framework for action, offering aspirational levels similar to Continental Europe, and most importantly have given waste management a competitive element through league tables.”

“I agree entirely, policy delivery is becoming more of an issue for local authority officers and their political masters as new services, improved performance and the requirements of best value begin to be felt.”

In light of these issues, it was no surprise to hear from the majority of the interviews that national waste policy was a consideration when setting local (and county) strategies, but was little more than an ideal when it came to delivering services, clearly national strategy is failing to be effectively delivered at the local scale because of a number of operational barriers the most obvious of which are time, money and necessity.

So how does this manifest itself in terms of policy and more importantly in services? As expected recycling is everywhere, and although quality and frequency of service remains variable the coverage of kerbside collections continue to grow rapidly, although issues of efficiency must be addressed in the near future. Most authorities had investigated kerbside and were concerned most about encouraging greater public involvement in the schemes with most emphasis on feedback through newsletters.

All authorities noted the increase in attention in the organic waste stream reflecting the EU Landfill Directive and its requirements for organic waste restrictions to landfill. This was manifesting itself in new composting and separate organic waste collections which were being widely considered, although little had been implemented. The issue of addressing growing consumption and the need for wastes minimization was being addressed through the new wave of waste management strategies, although there was little evidence of what this would mean to the average member of the public or local business. One authority said;

“We need to consider waste stabilisation prior to focussing on recycling and recovery, how can you achieve 25% recycling if waste generation continues to rise? Percentage targets are terribly mis-leading as they never address the issue of waste generation.”

Another authority suggested a continuum of service delivery, as authorities strive towards greater recycling and waste diversion;

1. Banks, and more banks
2. Banks and paper kerbside collection
3. Banks, paper kerbside collection and home composting
4. Banks, paper kerbside collection, home composting and multi-material collections
5. Integrated systems of reduction, recycling and recovery

In terms of where the authorities saw waste management services heading in the coming decade, they could not see beyond the imminent implications of Best Value and EU Landfill Directive, with one authority officer claiming that these two issues were enough for a lifetime in local authority waste management!

“Best Value offers and enforces an entirely new way of viewing services and policy delivery, we are unsure of just what this will mean for frontline services like waste collection, but it will certainly put more emphasis on additional services including recycling and involve the public more in determining what services are available.”

Decreasing landfill and increasing costs will result in increased transportation and thus greater costs.

Thus, an increasing range of options will be affordable including WtE, Recycling, and Composting all of which are available today, and the development of new opportunities including Refuse Derived Fuel, Anaerobic Digestion, Pyrolysis and even Maceration.

“Systems and facilities will be left to the contractor to sort out, within a framework provided by the county strategy and the contract specification – national policy, apart from the statutory bits, will just provide the context.”

Perhaps of most significance were those authorities that felt that their diminishing landfill reserves and subsequent increasing disposal costs were forcing them to look at recycling and recovery options;

“We are definitely not responding to Government targets, their voluntary approach has failed to stimulate activity in this part of the country!”

“The Sweat Syndrome is significant - landfill availability and costs are the prime issues, although now we have best value we must consider what the public wants....

“The panic syndrome..... and landfill as a driver for change sums it up beautifully! We have not decreased landfill because of government policy but because we have had to!”

“I agree, it is a matter of necessity! There is decades of landfill void available in Dorset. The only reason we will start to limit the use of landfill is if we are forced to by the landfill tax or directive.”

“There are three issues; one is how close is an authority to cheap landfill; two how close they are to reprocessing plants with available capacity; and three in north of England the boroughs are very much more bigger. Watford is only about 2 miles long by 3 miles wide. But in Suffolk or Northumberland the boroughs are huge!”

Perhaps one of the fundamental lessons that needs to be learnt from this work is the need for adequate funding in order to implement the systems required to meet the targets.

“It is a question of Priorities, Priorities, Priorities.....”

“In other areas high recycling rates can be attributed to the amount of money being thrown at it from a high level. Although at the same time if all other factors were standard then enthusiasm and commitment would have an influence!”

“I think there is the realisation that costs are going to increase. The cost of landfill are going to go up eventually, and the idea, is to incorporate that with the positive environmental goals!”

To summarise in terms of policy and its subsequent implementation, some enlightened responses were forthcoming;

“There is national problem in terms of market availability and the abundance of cheap landfill although both are regionally skewed. It is not so much a disagreement with the policy (national) and the targets but disillusionment with them, because locally the issue is less evident and less tangible.”

“I would expect that the national problem (policy implementation) is simply a reflection of more common local failure but locally authorities won't face up to this! Perhaps contract design is important in overcoming this?”

“Strategies are not always operational - need money and political will!”

“I concur, the policy ideal and service reality are very different. There are many important criteria that affect policy adoption and delivery that are outside of the control of waste management.”

“There is only so much you can do and then you get stuck!”

Perhaps there has been too much attention placed on ‘recycling for recyclings sake’, and that it is time to really consider what is sustainable and what the BPEO is for any particular location and waste stream;

“Recycling is all part of the feel-good factor and nothing to do with waste management.”

“The aim is to increase composting and recycling to aid in the reduction of waste to landfill, rather than simply to increase recycling!”

“Those regions with the highest recycling rates are those with the biggest landfill problems.”

“It has to be a combination of everything. I don’t think you can have one thing pushing it through, or it will become too skewed off in the aims and agendas of that one thing. If it was all environmental, you would be blocked by costs, if you followed the public, you wouldn’t have recycling banks, if it was all about landfill availability you would choose incineration because it reduces the waste ream by the largest amount. So it is about getting the balance in policy drivers, and if this is right then there will be balance in policy as well!”

The over-emphasis on recycling is only part of the problem, the whole nature of waste management in the UK appears to be driven by meaningless targets and unclear policy frameworks;

“People aren’t doing things for any good reason except for the attainment of the targets, because of some competitive element. Service improvements are only being made to make certain figures work, and not for local benefit, because of this top-down approach that you mentioned, and that is ridiculous!”

“At least the Government in their last briefing (Less Waste More Value) did at least recognise that not all authorities would achieve the 25% and that they would look at some way of setting local or regional targets, and of supporting markets!”

These barriers unfortunately manifest themselves in the failure of local authorities to meet the Government’s targets, or in many cases provide even basic level facilities for their residents;

“Nationally we are failing! That is quite evident from talking with other officers and from the figures produced in your research.”

“National policy never will have a local context! Without this national policy will never be fully suited to the local scale, this is a major part of your policy implementation gap!”

“There have been some improvements in recycling, but clearly not as much as the Government had hoped for and had set targets for!”

“There are a number of problems that can affect the implementation of policy. Day to day running, operational issues, where is the next contract coming from, can we collect the bins- they are the important issues for a local authority officer!”

Most authorities felt that the targets as set by the Government were attainable, but only under the right conditions, which evidently are not widespread across England. It is not that the target levels are unrealistic, but that the resources provided and political will offered were too low to make the targets achievable. It was generally felt that aspirational targets had achieved all they could in positioning waste management politically and publicly in this country and that more mandatory targets would be required to take waste management service delivery to the next level;

“Targets are not always an operational concern, if the targets were statutory then money would flow! Policies have failed to deliver as expected, local concerns have been stronger than expected!”

The most common barriers to implementation appear to be visible even amongst the 'better' achieving authorities who noted;

"We have a few barriers blocking policy implementation at the moment. It is normally costs and UK regulations that are the main drivers..... closely linked with the 7 year contract cycle – that's when most change can occur."

"At present it (the barrier) is partly operational, partly markets and partly financial- but the bottom line is cost!"

"Nationally we will fail, but locally we are happy with the progress we are making on continuous improvement and working towards these goals. Because of the way we interpreted the targets at the local level we do not have your policy implementation gap, because we saw them as a national target which we would do our best to achieve given our local constraints, so by setting realistic local policy we have not got a policy implementation gap!"

"Yes it appears that there is a problem! I think there is a problem with implementing systems to achieve the 25%, but there aren't necessarily problems with the local implementation of what is said in a recycling plan. To initiate a kerbside scheme and home composting, these are less of a problem to implement the practicalities of what you want to do, than to achieve the fable 25%"

• Again, a commonly held belief was that concerning Unitary Authorities being in the best position to meet targets and improve implementation because of their control over the entire waste management system through collection to disposal;

"That has always been my perception, that Unitary Authorities are in a better position to achieve targets and impose change. They have a cradle to grave approach to waste and are far more clued-up concerning the overall picture. They can budget for every aspect!"

“Unitary authorities like Richmond and Sutton have the size and have the practicalities of that, but they also have responsibility for the waste throughout stream. So it is not just about tonnage, but about what you are doing with it!”

To conclude, most authorities felt that local concerns were much greater than the government had envisioned when setting its targets, and that until these local concerns were addressed little progress would be made towards 25% recycling and the other aspirational levels.

“Radical policies and voluntary targets will not change practice overnight”

“Local concerns are paramount; where is the funding come from, what land is available, how long until we have no landfill void, and what are the systems we have on offer today are the questions that need answers prior to the meeting of Government targets.”

It was noted by all that greater attention was required from central government on local policy concerns, and in particular the failure to implement the Government’s national strategy. If this problem (or series of barriers) is not adequately addressed, future policies and the goal of sustainable waste management will fall by the way side. However, some authorities felt that this was an interesting time to be reviewing the waste management policy arena;

“Solid waste management may not resemble current practices in a decade’s time because of the implications of regional control and strategic planning, greater co-operation between authorities, more funding opportunities and reduced landfill availability, all of which will drive change towards grater sustainability.”

12. CONCLUSIONS

Traditionally, a number of important issues have been overlooked when discussing environmental policies and MSW, particularly policy development and the implementation of MSW strategy, and this is the rationale behind the research.

There remains an obvious need for local government to test proposed planning strategies and management systems against their suitability within the local context (environmental, social and political) and their effectiveness once implemented, as many policies have negligible impact once they are documented [29, and 26]. This requires some form of evaluation of the planning process. This research intends to make a contribution to this growing debate, providing a potential tool for assessing the effectiveness of policy as a guide for local MSW managers.

The research should prove of great value to the waste industry in its broadest sense, due in part to the real practical element under investigation, and the controversy that surrounds national policy acceptance by local government, policy translation and implementation, and the effectiveness of local policy and activity.

The research findings should provide detailed data on those factors that influence the successful implementation of sustainable waste management strategies, providing useful information for all local authority departments involved in waste collection and disposal.

The data obtained will be used to help local government MSW managers to base their decision-making on sound scientific data, detailing those authorities that will struggle to achieve government targets due to their local context, and providing examples of 'good' practice so that authorities can learn from each other. The key challenge to this research is obviously to implement the methodology for effective implementation of policy and the proposals made into policy and practice at the local scale. This research may also provide a springboard for future research and investigations of MSW policy and practice. Research carried out to date has identified that a policy implementation gap for MSW policy is a real problem for local government officers [22], who are striving to achieve Government targets but are falling short.

The justification for this research is the obvious failure of national MSW policy to alter local government practice in line with sustainable development and the targets laid down in 'Making Waste Work'. The current Government, who have put procedures in place to review the national MSW management strategy [36], has acknowledged this failure.

What this research to date shows is that no matter how radical, rapid or innovative policy change and direction are from both the EU and UK policy dictators and legislators, they will fail to alter practices at the local scale in the short term. Policy that is driven by the centre often fails to adequately take account of local circumstances, funding problems, staffing issues and organisational barriers to change. These are the issues that must be faced by policy makers in the coming Millennium if MSW management practices are to move towards their ultimate goal of sustainability.

“I don’t know if we are really ahead of the game, it’s just that, I think that that is where we found ourselves because we have relatively enlightened officers, and we have had political support, and that hasn’t been linked with any political party but has remained constant even when control has changed. Other things have been bigger drivers for instance the requirement of us to divest ourselves of operations had a much bigger impact in all sort of ways, that Making Waste Work never did nor will have. I think that the new waste strategy will be eclipsed by the Landfill Directive, which is a far bigger issue!”

“Policies do not guarantee delivery!”

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CHAPTER 4

WASTE MINIMISATION

CHAPTER 4 [I]

WASTE MINIMISATION DRIVES SUSTAINABILITY

CHAPTER 4 - WASTE MINIMISATION DRIVES SUSTAINABILITY

Undeniably the greatest attention in municipal solid waste management has been on diversion from landfill and the growth in recycling. However, the interest has not been on recycling *per se* (re-processing of the materials for consumption) but on a stage earlier in the waste management cycle - the separate collection of materials through kerbside collections or the use of drop-off recycling banks. This emphasis is the result of a decade of European influence and growing environmental awareness by the general public. They like to feel that they are 'doing their bit' by leaving out their recyclables or taking their glass bottles to a local drop-off glass bank, and the local authorities have been happy to foster this approach as a means of reducing their reliance on landfill and to fuel the 'good will' of their public. But do the public buy 'recycled content goods' or the authorities have 'green procurement policies'?

However, this emphasis has been misguided, because even with an increase in recycling, the actual use of landfill by local authorities in the UK remains unchecked because for much of the UK waste continues to grow at a faster rate than recycling (see Table 4.1). Clearly, there is a need to focus on the real problem for waste management in the UK, the growing consumption and waste production that we all contribute to. It is time to focus attention on wastes prevention.

Table 4.1. Recycling in London Boroughs cannot keep pace with increasing waste generation (source: personal communication with authority officers)

	<i>Sutton</i>		<i>Richmond</i>		<i>Bexley</i>	
	Recycled (%)	Waste to landfill (t)	Recycled (%)	Waste to landfill (t)	Recycled (%)	Waste to landfill (t)
1994-95	15.9	42,950	21.6	48,583	10.3	95,603
1995-96	22.9	42,179	23.3	48,857	11.8	95,077
1996-97	27.5	43,360	23.7	49,572	15.5	94,459
1997-98	28.0	45,901	25.0	48,275	17.2	96,006

This section will deal with waste minimisation as a concept and as an operational policy goal for local authority and businesses alike.

The chapter will centre upon three papers using a theoretical overview and a series of case studies to develop the themes of ‘prevention being better than cure (or management)’, as noted in Figure 4.1, and how local authorities can use the principal tier of the waste hierarchy to drive more sustainable waste management practices in their area.

Figure 4.1. The ‘waste prevention’ message (source: ETBPP)

It is not as easy to promote the goal of waste minimisation to local government or the public as it is with businesses that can see the immediate benefits of cost reductions and improved performance, but nonetheless there is an important link between local authority policy and the performance of the businesses within the authority’s area. By facilitating improvements in business performance, the employees and customers begin to receive new ‘environmental’ messages from the company that may help to stimulate their actions in behaving more ‘acceptably towards the environment’.

The opening paper focuses on the development, implementation and success of waste minimisation project clubs. They have proved to be an effective tool in delivering significant change in local waste management practices for businesses and in altering the culture of the local authorities involved suggesting that there is hope for an overhaul in the approach that most authorities take on waste prevention and reduced consumption.

Some of the authorities discussed, including those in Surrey and Northamptonshire (see Appendix 6), are now actively promoting green consumption, green shopping, buy recycled and reduced packaging messages alongside their more traditional messages of recycle and re-use. Appendix 7 offers an example of how to measure the 'success' of waste prevention programmes from Boston in the USA.

With the introduction of the Waste Minimisation Act in late 1999, there has been an upturn in interest shown by local authorities to waste prevention and minimisation, and this trend does not appear to be slowing. With the increasing profile of the Environmental Technology Best Practice Programme (now Envirowise) more auditing of companies, case studies of best practice and advice are being made freely available every day.

The survey discussed in Chapter 3 was used to deliver comparative information on the development of waste minimisation policies by local authorities and to link this to active involvement in waste minimisation project clubs- the obvious vehicle to start the implementation of waste minimisation messages. Clearly, there is a great deal of regional variation, with the more active authorities in terms of sustainable waste management (recycling and recovery) appearing to have a better grasp of the need to promote waste prevention to their businesses and residents. These authorities also see waste minimisation as a fundamental pillar of sustainable waste management at the local scale (see Tables 4.2 and 4.3).

Where a serious commitment to waste prevention has been demonstrated by all the relevant stakeholders (including the local authorities, district and county) great strides have been made. Not only are these clubs an effective means of demonstrating and promoting resource management, they also show the inherent link that exists between the environment and economics (both pillars of sustainable waste management). Clearly, progress can be made and the path to sustainable waste management has been found, although there is still a long journey ahead which requires substantial funding (Chapter 6) and public acceptance and involvement (Chapter 5).

Table 4.2. Different Waste Minimisation Club Approaches (source: author)


	<i>Demonstration</i>	<i>Intermediate</i>	<i>Awareness raising</i>
<i>Initiative</i>	<i>LWMI</i>	<i>NREP (Stage 2)</i>	<i>NREP (Stage 1)</i>
Total No of companies	10	18	70
No of SMEs	5	16	50
Total Cost	£200,000	£100,000	£39,000
Total duration	24 months	18 months	6 months
<i>Form of assistance</i>			
Baseline audit per company	1 day	½ day	½ day
Extra consultancy	2 days	3 days	3 days
Graduate Expertise	If requested	Available	Available
Onsite meetings	Yes	Yes (when requested)	Yes
Network meetings	5 per year	9 per year	9 per year
Computer aids	No	Yes – Montage	Yes
Membership fee per company	£10,000	£500	Free
High Cost			Low Cost
Less Companies			More Companies

Table 4.3. Savings from the Leicestershire Waste Minimisation Initiative (source: personal communication with the Club)

<i>Company</i>	<i>No. of employees</i>	<i>Turnover (£ millions)</i>	<i>Rate of savings in Year 1 (£ Thousands)</i>	<i>Rate of Saving in Year 2 (£ Thousands)</i>
Engineering	1100	160	57	230
Food	900	65	100	100
Textiles	450	14	5	8
Engineering	245	83	270	390
Buildings	120	9	78	78
Brewing	120	35	19	34
Textiles	50	2	52	52
Total	3,979	271	747	1,266
<i>% of turnover</i>			<i>0.26%</i>	<i>0.47%</i>

To summarise, waste minimisation (or prevention) is the first stage prior to any form of management or treatment and this message needs to be remembered by all authorities. The best practicable environmental option in almost all cases will be prevention and avoidance, only once we have progressed this approach should we then consider resource and energy recovery systems. Waste Minimisation Clubs also offer greater social sustainability by encouraging the participation of employees in the solutions, and perhaps again there are lessons here for local authorities to learn in terms of recycling and other services provided to the public.

CHAPTER 4 [II]

UK WASTE MINIMISATION PROJECT CLUBS

UK WASTE MINIMISATION CLUBS

'A CONTRIBUTION TO SUSTAINABLE WASTE MANAGEMENT'

1. INTRODUCTION

Sustainable development has become a key issue in the UK, particularly since the Earth Summit in Rio de Janeiro in 1992. Following Rio, the UK was one of the first countries to prepare, in 1994, a national Sustainable Development Strategy [1]. The Labour Government, elected in May 1997, has launched a new consultation paper, during 1998, entitled 'Opportunities for Change', this is the basis for discussion about a revised UK strategy for sustainable development [2]. This sets out the vision of the Government; it explores what actions might be taken and poses questions, on which comments and suggestions are invited from a range of players including the general public. This vision of sustainable development is based around four broad objectives:

- *Social progress which recognises the needs of every person;*
- *Effective protection of the environment;*
- *Prudent use of natural resources;*
- *Maintenance of high levels of economic activity.*

The management of solid, liquid and gaseous wastes is recognised as central to the sustainable development debate. This is emphasised throughout the document, players are asked to consider:

"A central focus of a waste strategy guided by the need for sustainable development is not just how to dispose of the waste that is produced - or even how to recycle it - but also how best to reduce the amount that is created in the first place."

It is emphasised that sustainable development cannot be achieved without a significant reduction in waste production, along with much increased resource efficiency. This will only be achieved through new and dynamic partnerships that include producers, consumers and central authorities.

The current waste management strategy for England and Wales was published by the Conservative Government in December 1995. The White Paper, 'Making Waste Work: A strategy for sustainable waste management in England and Wales' [3], was declared by the then Government to be an advisory document rather than a statutory plan. The Government stated that it was its ultimate intention to draw up such a plan but that this could not occur until 1997, at the earliest, because a range of issues still needed clarification, such as the results from the planned national survey of waste arising. The waste management policy of the UK is not created in a vacuum, throughout the European Union it is governed by a Framework Directive (75/442/EEC, amended by 91/156/EEC) which sets out the requirements for countries, especially the need to produce a waste management plan.

The present national strategy is based upon a hierarchy of preferred options to deal with waste (see Figure 4.2):

- *Reduction (previously waste minimisation);*
- *Reuse;*
- *Recovery (including material recycling, composting and energy recovery);*
- *Disposal (landfill or incineration without energy recovery).*

The 1995 White Paper established a number of targets against which progress towards sustainable wastes management could be measured. The targets include:

- *To reduce the proportion of controlled waste going to landfill from 70% to 60% by 2005;*
- *To recover 40% of municipal waste by 2005;*
- *To recycle or compost 25% of household waste by 2000;*
- *Forty per cent of domestic properties with gardens to carry out composting by 2000;*
- *Easily accessible recycling facilities for 80% of households by 2000;*
- *One million tonnes of organic household waste, per annum, to be composted by 2000.*

Figure 4.2. Hierarchy of Waste Minimisation (developed by author from DETR)

The first two of these targets were described as primary while the third was said to be secondary in that it related to a particular waste stream and supports the first two. The rest are tertiary and support the secondary target. The overwhelming opinion of many in the waste industry is that these targets are arbitrary and random and not likely to be achieved, indeed in a new directive on recycling they are described as only indicative [4].

Widespread dissatisfaction with the 1995 White Paper resulted in the present Government publishing a consultation document on a possible new waste strategy for England and Wales [5]. `Less Waste More Value` describes the policy and seeks informed advice, from a range of players, to enable a more effective strategy to be developed and installed. Following this consultation paper, the Government received and considered responses and then prepared a draft strategy by mid 1999. This in turn was opened to discussion and a final strategy produced at the turn of 2000. The inadequacy of the previous strategy was made clear [5]:

"It did not recognise the scale of change required to meet its own targets for recycling and recovery; and it did not place its waste strategy squarely in the context of sustainable development and resource use."

Waste minimisation, particularly for solid and liquid wastes, is seen to be a key element of sustainable development. It is clearly stated that:

"The simplest and most effective way of dealing with waste is to ensure that it does not arise. The Government wants waste minimisation and reuse to be an important focus of the strategy. Up until now waste minimisation has taken place within industry and commerce. The new waste strategy will address whether and how to expand and develop such measures, and will consider how waste minimisation for households can be encouraged."

To facilitate discussion, the Government raises a number of questions, such as the role played by local authorities and the potential benefits from variable charging schemes for Municipal Solid Waste (MSW). The seven key commitments, around which the Government will base the new strategy are:

- *Substantial increases in recycling and energy recovery;*
- *Engagement of the public in increased reuse and recycling of household waste;*
- *A long term framework with challenging targets underpinned by realistic programmes;*
- *A strong emphasis upon waste minimisation;*
- *Using the waste hierarchy as a guide, not a prescriptive set of rules;*
- *Creative use of economic incentives like the landfill tax;*
- *Increased public involvement in decision-making.*

The requirements of the Statutory National Waste Strategy for England and Wales are laid out in Section 44A of the 1990 Environmental Protection Act (as amended by Section 92 of the 1995 Environment Act) [6].

In order to meet the requirements of Section 44A of the 1990 Act, the Government must produce policies for obtaining its objectives, including a key section on the principles driving waste minimisation policy, the waste hierarchy, the proximity principle, self-sufficiency, resource consumption, best practicable environmental option and life cycle analysis.

It is a requirement that they make transparent how these principles interact with each other and influence the instruments used to implement the overall waste policy, including pricing, regulation, direct support and information.

To further strengthen the national consensus on sustainable development, the UK Round Table on Sustainable Development was set up in January 1995, by the then Government, as a forum for discussion on major issues related to this topic. It has already produced two, influential Annual Reports, in parts stressing the need for monitoring environmental performance [7], [8].

Although it is a forum for discussion, it offers advice to the Government and seeks to build a consensus by identifying acceptable ways of achieving sustainable development. Following along a similar theme, in 1998 the Government launched a consultation paper on sustainable development and business [9]. It is recognised that sound waste management, particularly waste minimisation, techniques are essential for a competitive sustainable economy. It is pointed out that:

"Increasing numbers of businesses now accept that sustainability is a core issue. They monitor their environmental performance and have identified opportunities for cost savings through waste minimisation programmes."

The most far reaching summary, to date, on sustainable waste management in the UK has been recently produced (June 1998) by the highly influential Environment, Transport and Regional Affairs Committee of the House of Commons [10]. Their wide-ranging terms of reference include an analysis of the environmental impact of waste management options and the role that they should play in a future UK strategy.

They received written evidence from more than 120 key individuals and organisations as well as hearing oral evidence from 20 organisations.

Their first summary point is salutary:

"It is important to stress from the beginning of our Report our profound disappointment, on the basis of evidence we have received, that waste management in this country is still characterised by inertia, careless administration and ad hoc, rather than science based decisions. Lip-service alone, in far too many instances, has been paid to the principles of reducing waste and diverting it from disposal. Central Government has lacked the commitment, and local government the resources, to put a sustainable waste management strategy into practice."

The committee reaffirmed waste minimisation as being at the top of the UK hierarchy and, therefore, a key component of a national sustainability strategy, where waste begins to be considered as a potential resource, rather than something to be cheaply disposed of.

Industrial waste minimisation is considered a key area for action as this produces around three times the amount from household waste, on an annual basis. The main focus of the committee, however, is on domestic waste minimisation - an area that has been neglected, overall, in the UK [11]. In pointing the way ahead for minimisation, the committee links industrial / commercial developments with domestic. There is a realisation that citizens do not live in a cultural vacuum, if they minimise waste production at home they are more likely to do so at work. The committee recommends:

"The Government already provides guidance to industry upon waste minimisation: this guidance should be extended to local authorities and householders. There would be an immediate benefit in raising awareness of the need to reduce wastes universally; and an additional benefit in increasing consumers knowledge of the environmental choices made by industry."

2. WASTE ARISING IN THE UK

The UK has, at present, no accurate information about the nature and volume of wastes arising [10].

Because of this, it is difficult to plan for appropriate management options and to set meaningful targets for schemes such as composting. An associated problem in Europe is the lack of a uniformly applied definition of waste, thus hindering international comparisons.

In the UK, waste regulation is carried out by the Environment Agency who is termed the Waste Regulation Authority. County Councils have the function of being a Waste Disposal Authority and have a statutory duty to prepare disposal plans. Within a county, the District or Borough Councils carry out the function of being a Waste Collection Authority and they deal with the collection and transportation of MSW. In the case of Unitary Authorities, the functions of the Disposal and Collection Authority are combined under one layer of local government rather than the more common two-tier approach.

Household waste is that arising directly from households, civic amenity sites and a range of public buildings, as well as the small proportions collected as litter. Commercial waste comes from premises used for purposes of trade or business and industrial waste comes from factories used for transport, supply of water, gas, etc. Each of these has their own definition in section 75 of the Environmental Protection Act 1990 [6].

Household, industrial and commercial wastes are controlled waste and subject to stringent regulatory conditions whereas agricultural and mining wastes are not and classified as non-controlled waste. Household waste, and a certain proportion of commercial waste, constitute MSW. Estimated UK waste arisings are given in Table 4.4, and regional MSW arisings and disposal for England in Table 4.5 [12]. The statistical database for solid waste is poor [13].

There are a number of reasons for this but primarily it is because managing waste, especially MSW, is a responsibility of local authorities, many which do not have the resources, or requirements, for complete data collection.

More than 60% of Waste Collection authorities in England and Wales weigh less than half the loads delivered to landfill and around 25% weigh none at all. In Scotland, around 65% of household waste is weighed prior to disposal. Household waste is also poorly characterised with unreliable data on composition. Annual household waste arisings are around 29 million tonnes per annum, some 4 to 5% of the UK total. Industrial and commercial arisings are around 85 million tonnes per annum.

Table 4.4. UK waste arisings [12]

Source	Million tonnes	Estimate date	Percentage of total
Agriculture	80	1991	19
Municipal Waste	54	1996/97	13
Commercial	15	-	4
Industrial	69	1990	16
Demolition and Construction	70	1990	17
Mining and Quarrying	74	1996	17
Sewage Sludge	35	1996	8
Dredged Spoil	51	1996	12

**Table 4.5 English regional variation in MSW arisings and treatment in 1999
(total is for all England) [12]**

Region	% of total MSW	% of total households	% of regional MSW to landfill	% of regional MSW recycled
East Anglia	4.9	4.7	93	7
East Midlands	11.0	10.8	93	3
London	9.9	8.6	80	8
North	3.8	5.4	69	2
North West	18.7	2.3	95	3
South East	26.4	36.4	80	4
South West	8.8	11.6	73	17
West Midlands	10.4	12.4	77	3
Yorks & Humber	6.1	7.8	90	3

The UK has started to develop indicators, in the area of waste, for sustainable development but little can be achieved until the results of the national waste survey are published [13]. In retrospect, the cancellation of the National Household Waste Analysis Programme, in the middle of this decade, was a serious mistake. It appears that MSW is increasing, annually, across the UK at values between 5 and 12%, depending on the region. These are levels that are overtaking the present ability to implement recycling schemes in some areas [10].

3. WASTE MINIMISATION PROJECT CLUBS

In `Making Waste Work` [3], the Government encouraged industry to adopt better waste management practices, whilst ensuring that its products are designed to take account of the objective of sustainability, being reusable or recyclable with a high recycled content where feasible. Businesses are challenged to meet a range of targets, which include:

- *Seventy-five per cent of companies with more than 200 employees to have published environmental policies covering waste issues by the end of 1999;*
- *Fifty per cent of similar sized concerns to have management systems in place to realise such policies in the same time scale.*

How does the Government help industry move towards these targets? Wide ranging advice is potentially available from a bewildering number of organisations [14].

These include:

- *Environmental Technology Best Practice Programme (ETBPP); Energy Efficiency Best Practice Programme (EEBPP); Energy Technology Support Unit (ETSU); Joint Environmental Marketing Unit (JEMU);*
- *Environment Agency; Wastes Management Information Bureau; Utility Companies.*
- *Business in the Environment; Green Business Clubs; Small Company Environmental and Energy Management Scheme (SCEEMAS); Business Link;*
- *Environment Council; Regional Advisory Groups on the Environment; Regional Government Offices.*

The central thrust of the Governments contribution, however, is underpinned by the activities of the Environment Agency and the ETBPP.

In their consultation document, `Wastes Management and Regulation Strategy` [15], the Environment Agency outlines aspects of its future role. The Agency is developing Local Environmental Agency Plans (LEAPs) to integrate delivery of regulatory and environmental management actions at the local level. LEAPs will be the vehicle by which strategies are translated so as to have a real world impact. The Environment Agency has played a central role by helping to support and sponsor waste minimization clubs. They as Regulators are in a unique position to draw together, into a functioning group, the separate organizations that are required for a successful project. The Agency acknowledges that their role in Waste Regulation requires:

"The proper management of wastes, so as to reduce their overall impact on the environment, is essential to the environmental and economic well being of our society and its sustainable development in the future. These will be achieved by developing strategies for the reduction, reuse, recycling and safe disposal of waste and by encouraging the adoption of these by society."

The UK Department of Trade and Industry (DTI) takes action to encourage industrial waste minimisation through the ETBPP and the Technology Foresight Programme (TFP), both aim to spread Best Practice and encourage research, especially the TFP, into cleaner and more efficient industrial processes.

The TFP has been recently criticised in that it still tends to concentrate upon the commercial aspects of new technology with little apparent concern about their environmental impacts [10]. The ETBPP was set up in 1994 and aims to stimulate savings for industry, by 2015, of some £320,000,000 per annum by encouraging sustainable environmental practices that reduce costs. By 1998, total savings of around £28,000,000 per annum are estimated to have been achieved, including a reduction in solid waste production of 131,000 tonnes per annum.

This has been achieved through publication of free guides to industry, an Environmental Helpline and the establishment of regional waste minimisation projects, promoting a low cost, self-help approach.

The number of waste minimization clubs in the UK is a matter of some debate. The ETBPP recognizes a number of around 76, some 62 of these being clubs that have completed or are still active. The Environment Agency databases suggest around 120 clubs that have completed or are still active. The draft waste strategy suggests only 50 clubs have been or are still active in the UK and goes on to say that the number required to fully cover the UK is 100. Their geographical distribution is shown in Figure 4.3. The actual number is probably well in excess of 60, but very small clubs tend to work in isolation and those that are managed by trade organisations do not link with other projects or agencies [16]. The actual number is difficult to establish as very small clubs often work in isolation and those managed by trade organizations do not readily signal their existence by linking with other agencies. The ETBPP have instigated a thorough audit of the UK position; initial findings suggest that only around 2,000 UK companies have been involved in waste minimization clubs since the early 1990s.

A number of clubs have completed and published a final, report. These include: Aire and Calder [17], Dee [18], Hereford and Worcester [19], Humber [20], Keighley [21], Leicester Waste Minimisation Initiative (LWMI) [22], Project Catalyst [23], Waste Elimination from Textiles (WEFT) [24] and West Midlands [25].

A review of three of the early project clubs (Aire and Calder, Leicester and Project Catalyst), containing a total of 35 companies, was published by CEST in 1995 [26]. In the report, they place the development of such clubs into a historical context. Much of the early inspiration came from resource efficiency project developments in mainland Europe [27] as well as the UK [28].

In the UK, in 1992, CEST published a report on the efficient use of water, as a scarce resource [29]. The Aire and Calder Project, which followed soon after, ran between May 1992 and March 1993 and was used to demonstrate that companies, based in a restricted geographical area, could work closely together to evolve strategies to minimise the problems, caused by excessive water consumption and liquid waste production.

Following this, Project Catalyst commenced on the Mersey river basin in June 1993 and ran until May 1994. This project adopted a similar approach to Aire and Calder but was broadened to address all types of waste whether solid, liquid or gaseous. Its primary objective was to demonstrate how the planned management of production processes could reduce the reliance of companies on non-sustainable waste management. In 1994, the Leicester Wastes Minimisation Initiative (LWMI) began, completing in 1995, its primary objective was to demonstrate the effectiveness in cost, technical and environmental terms of sustainable waste management. Aire and Calder and Project Catalyst have been described as the two largest waste minimisation initiatives in the world [30].

Figure 4.3. Waste Minimisation Clubs in the UK [16]

The club approach, based upon common goals and mutual support in a limited geographical region has much to commend. Seventy per cent of participants in the CEST report found the approach useful overall [26]. The significant benefits identified were:

- *Inspiration, stimulated by the progress of other members;*
- *Pressure, caused by obligation, to keep to targets;*
- *Reassurance that others had similar problems;*
- *Experience of different methodologies;*
- *Sense of community.*

At the same time, analysis of the clubs has shown that such an approach can create problems. These include:

- *When companies were in direct competition, by being in the same sector, then there was a reluctance to share recently gained Best Practice;*
- *Being able to commit staff time to attending the club meetings;*
- *Meetings were some times badly planned and did not deliver enough novel training.*

Although there is no formal definition for the structure of such clubs, they fall, broadly, into the following categories:

- ***Demonstration.*** *These have been generously funded by external sources and there is a large input of external expertise. The aim of these is to demonstrate Best Practice to the region and nation, e.g. Project Catalyst.*
- ***Sector.*** *These are based around an industrial category, e.g. WEFT and the East Anglian Food and Drink Sector;*
- ***Project.*** *Based, essentially, upon training of the companies, teams and champions, in a given geographical area. The champion is the employee who oversees the introduction of waste minimisation methodology into the company and produces the action plan. There is limited use of external funding and the contribution from consultants, for audits, is kept to a minimum.*

The aims of the Hereford and Worcester Club (Table 4.6) demonstrate how such clubs hope to catalyse further activities in their region. Most clubs have aims that link waste minimisation with resource efficiency and so correctly concentrate upon the environmental and economic benefits for the members. Recent clubs have linked their activities with dissemination of waste minimisation methodology across the wider community (see Table 4.7 for a review of the different approaches in use).

Table 4.6 Aims of the Hereford & Worcester Waste Minimisation Club

1. *To promote the efficient use of resources by businesses in the county*
2. *To demonstrate the benefits of wastes minimisation to business in the county*
3. *To provide expert assistance in undertaking audits to identify the waste minimisation opportunities of individual companies*
4. *To achieve reductions in waste arisings by the participating companies*
5. *To disseminate locally the results achieved by the club*
6. *To encourage companies to develop their own environmental policies*
7. *To respond to the members of the club*

There is no overarching definition of waste minimisation adopted, in the UK, by the clubs. The UK Environment Agency defines waste minimisation as [31]:

"The reduction of waste at source, by understanding and changing processes to reduce and prevent waste. This is also known as process or resource efficiency. Waste minimisation also includes the substitution of less environmentally harmful materials into the production process."

The UK Institute of Wastes Management has suggested an alternative definition [32]:

"Prevention and / or reducing the generation of waste, improving the quality of waste generated, including reduction of hazard and encouraging reuse, recycling and recovery."

Table 4.7. Benefits and Disadvantages of different approaches (source: author)

<i>Demonstrator Clubs</i>	<i>Facilitated Self-help Sectoral Groups</i>	<i>Facilitated Self-help Multi-sectoral Groups</i>	<i>Self-help Distance Learning</i>	<i>Environmental Business Clubs</i>
A. Good forum for discussion	A. More common issues	A. Good forum for discussion	A. Reaches geographically isolated companies	A. Good way of finding out information about the local area
B. Encourages waste minimisation programmes to become structured	B. Share common problems and solutions	B. See the problems in other sectors	B. Encourages companies to become self-sufficient	B. Meet and network with local companies
C. Cost savings are achievable and quantified	C. Training emphasis promotes a company culture	C. Greater potential for 'waste exchanges'	C. Instills a sense of ownership to the programmes	C. Increases general environmental awareness in companies – <i>not just waste minimisation</i>
D. Short pay-back time	D. Encourages structured waste minimisation programmes	D. Encourages structured waste minimisation programmes	D. Avoids consultancy costs	
E. Consultancy based and thus lacking in ownership	E. Problems with competitors not working together	E. May be hard to solve problems on a group basis (vary by sector)	E. Limited progress as a lack of commitment by all to achieving targets	D. May be easier for companies to 'hide in the crowd'
F. Costs to join are high	F. Poor attendance at club meetings can affect the success of the project	F. Poor attendance at club meetings can affect the success of the project	F. May be seen as an 'academic' exercise	E. Less of a commitment to develop specific waste minimisation programmes
G. Lack of motivation once project is completed		G. Harder to get help and advice if problems arise	G. Harder to get help and advice if problems arise	

In the UK, waste minimisation has often been used as a broad term for a variety of measures that conserve resources through the reduction of raw materials consumption. It has meant different things to different groups and is often synonymous with a reduction in the amount of material used to make a product or, mistakenly, with a reduction of the amount of waste that goes to landfill [33]. The UK clubs have, therefore, not strictly been based upon waste minimisation alone, this can be seen in the opportunity techniques used by Dee and Humber (Table 4.8).

Table 4.8. Waste Minimisation Opportunities [18, 20]

Opportunity Technique	Dee	Humber
Product modification	4	13
Input change	7	45
Technology change	128	103
Procedural change	106	140
Good housekeeping	-	77
On-site re-use and recycling	22	-

The clubs have rightly concentrated upon a range of cost savings measures that include: energy management, clean technology, waste minimisation through process modification and control, reuse, recycling and alternative material use as means of dealing with solid and liquid waste. Most projects have adopted a `start of pipe` emphasis for prioritising the options for reducing waste [26].

Recent developments are often described as being resource efficiency projects rather than waste minimisation (see the advertising in Figure 4.4).

Figure 4.4. Promoting Waste Minimisation in Companies (source: personal communication with NREP officials)

Waste minimisation methodology is fairly standard across the UK, that used by Aire and Calder has been adopted by many other clubs (Figure 4.5). The key component is the waste audit and attention is here given to an analysis of the process review. The reasons why companies undertake waste minimisation activities are many.

Rarely is it for cost reduction only, this is because most companies are unaware of the true cost of their waste until they start the project. Reasons given include [26]:

- *Regulatory pressure;*
- *Company image;*
- *Supply chain pressure from customers;*
- *Media pressure;*
- *Cost reduction;*
- *Environmental concern;*
- *Sustainable development.*

Figure 4.5 Waste Minimisation Protocol [27]

4. REDUCTION IN WASTE ARISING

Using addresses obtained from a range of organizations, clubs were contacted by letter and requested to supply a copy of their final report. Some 12 clubs (48% response rate) provided a final report that included significant data on topics such as; club structure, costs, financial savings and reductions in waste arisings. The remaining 13 clubs had produced some form of report but it was of a very limited nature and only incomplete data was available.

Representatives of these 13 clubs were contacted in an attempt to obtain additional data that may have been collected but was not made available in the final report. Some 5 of these 13 clubs provided some additional data but it was found to be mostly anecdotal and so rejected. Despite repeated requests, the representatives of the remaining 8 clubs failed to respond in any way. It appears that once a final report has been completed and published, no obvious mechanism exists, except in a few cases, to revisit the results from the companies that were part of the club. Therefore, a potentially large amount of data, for a range of reasons, never enters the public domain.

It must be noted that not all clubs are successful and a significant number have ended prematurely or failed to produce a final report. It was found that there was no nationally accepted framework for the presentation of club data. In most published reports, data is available on club duration, number of participants and financial savings achieved. Some clubs give details on number of waste minimizing opportunities, payback period of investment and reductions in solid, liquid and carbon dioxide emissions. Overwhelmingly, very few details regarding organizational costs are published in the final report.

Methods to reduce solid waste production have grown in importance in the UK as it has been shown that landfill void is of very limited availability in several areas [34].

Added to this has been the introduction of the landfill tax, whereby non-inert solid waste is presently taxed at a level of £10 per tonne and is thought likely to rise in the near future [35]. The reduction in solid waste arisings for some of the clubs, that have published their results, are given in Table 4.9, where they are compared to those for liquid waste and water consumption. Because there is no standard means of reporting the results of clubs, it is difficult to directly compare many of the more recent projects with the early demonstration ones. These highly funded, projects provide a wealth of data, but it is a failure in the UK management of these, by the ETBPP and the Environment Agency, that there has not been an insistence on a standard reporting mechanism.

5. FINANCIAL SAVINGS

The costs incurred and the financial savings from a number of clubs is included in Table 4.9. As there is no standard method of reporting, the true costs of a project are difficult to calculate and therefore an accurate cost - benefit analysis is not possible in most cases. A large contribution to costs is the time spent by the company project champion, and other employees, on activities related to waste minimisation. It has been estimated that the time allocated for most companies on three projects was:

- *Aire and Calder* - between a half and 2.5 person years;
- *Project Catalyst* - between a half and 2.0 person years;
- *Leicestershire* - about 0.5 person years.

When the savings of the LWMI are compared to the first two, it can be shown that a fivefold reduction in time spent corresponded to a twofold reduction in savings. There are, of course, a number of factors involved, e.g. consultants' time, but it needs to be recognised that projects must evaluate how much staff time needs to be allocated before commencement. For Project Catalyst, the potential savings identified for each opportunity category are presented in Table 4.10. The implementation timescales and their annual savings are included in Table 4.11 for the same project. Payback periods for opportunities for the Catalyst and Dee Projects are included in Table 4.12.

Table 4.9. Summary of Waste Minimisation Project Clubs (source: author through personal communication with relevant officers)

<i>Club</i>	<i>Duration (months)</i>	<i>No. of firms</i>	<i>Cost (£ thousands)</i>	<i>Opportunities</i>	<i>Actual savings (£ thousands)</i>	<i>Potential savings (£ thousands)</i>	<i>Reduction in solid waste (thousands tonnes)</i>	<i>Reduction in liquid effluent (thousands m³)</i>	<i>Reduction in water demand (thousands m³)</i>	<i>Reduction in CO₂ (tonnes)</i>
Aire & Calder	36	11	400	-	3,350	-	4.8	623.4	-	30
Catalyst	16	14	1,000	67	2,300	8,900	12.0	1,800.0	1,900	-
Dee Catchment	21	13	200	222	4,550	-	87.0	-	475	990
Don Rother Dearne	34	24	208	88	565.3	1,080	5,100 m ³	-	275	4,500
Hereford & Worcester	12	37	18	-	250	250	-	-	-	-
Humber Forum	12	11	200	349	1,100	2,400	18.0	289.0	291	6,000
Knowsley	24	11	-	-	95	216	-	-	-	2,350
LWMI	12	10	200	70	1,300	3,000	13.7	114.2	-	600
Medway & Swale	15	14	-	215	2,155.5	-	116.0	940.0	-	1,700
Merseyside	-	22	-	243	5,300	10,400	-	-	1,600	-
Tayside Food	12	5	30	20	291	291	-	-	-	-
WEFT	18	8	-	22	371.6	-	0.1	-	18	3,288
WMWM	32	17	-	-	895	-	1.2	8.7	5	-

Table 4.10. Potential savings from Project Catalyst [17]

	Opportunity	Number of opportunities	Potential savings (£)
Inputs			
	Raw materials	149	4,645,790
	Operating costs	121	3,044,616
	Water	107	1,765,823
	Electricity	67	939,452
	Gas	52	936,817
	Oil	9	662,074
	Capital expenditure void	4	466,800
	Paper and packaging	24	236,227
Output			
	Waste to landfill	112	3,187,846
	Liquid effluent	151	2,863,258
	Air emissions	32	1,583,250
	Degraded products	14	485,626
	Packaging	7	148,340
	Incineration	2	1000

Table 4.11. Implementation times & annual savings for Project Catalyst [17]

Implementation Time	No. of opportunities	Annual savings (£)
0 – 16 months	114	2,321,312
17 – 22 months	68	976,922
23 – 28 months	85	2,730,558
Over 29 months	120	2,691,609
Never	12	186,500

Table 4.12. Payback periods for the Catalyst and Dee Waste Minimisation Project Clubs [16 and 17]

	Catalyst (£)	Dee (£)
Zero cost	2,488,849	2,500,000
<1 year	2,927,940	2,500,000
1-2 years	1,690,751	350,000
2-3 years	590,175	150,000
>3 years	430,934	450,000

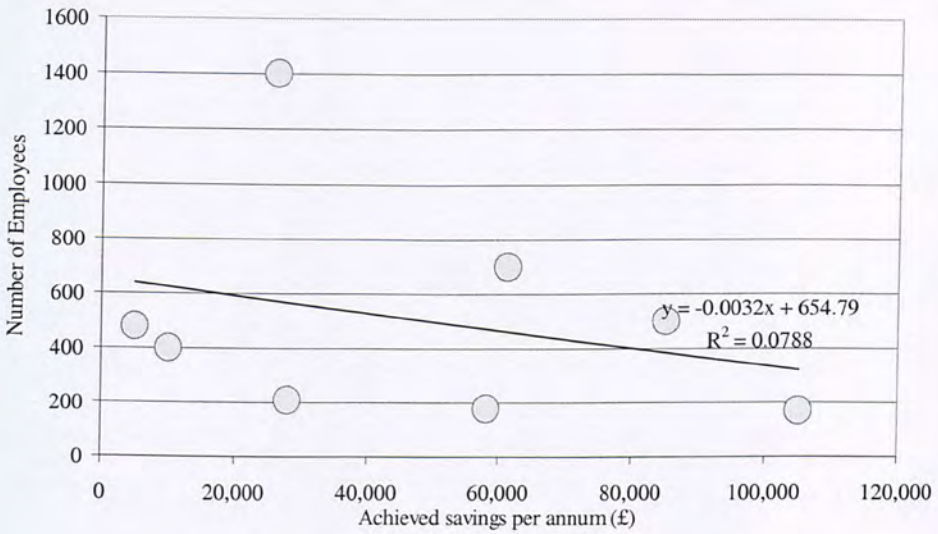
The results from the LWMI demonstrate that, for the ten companies involved, their initial perception of their waste cost was in the region of £500 000. Eventually, audits showed that it was £12 870 000, some 4.5% of total turnover. Some, £ 2 906 000 of savings were considered to be achievable and this corresponded to 1.1% of total turnover.

Year one, for LWMI, resulted in savings of £747 000, which was 0.26% of joint turnover. The total savings for year one and two was £1,266,000, which was 0.47% of joint turnover. But this is for all the companies totalled together, considering the whole club as one company. Some companies only achieved savings, in respect of turnover, of 0.09% after two years whereas some achieved savings of 2.6% in year one. It is important, when examining the outcomes of the clubs, to consider the median as well as the mean of the savings. It has been reported, for many of the early clubs, that with mean savings of 0.38% the median was only 0.27% [26].

For LWMI year one, the arithmetic mean of the individual clubs savings was 0.55% but the median was only 0.14%, the range being between 0.03 and 2.6%. For year two, the arithmetic mean of the individual club savings was 0.65% and the median was 0.30%, the range was between 0.09% and 2.6%.

Is there a clear relationship between savings and company turnover or size? The companies are from a range of industrial sectors and it has been recognised that there was a need to carry out an analysis on a single sector. This has become possible when the results, from the recently completed WEFT, which was based upon the Northern Ireland Textile Sector, were published [24]. Using the limited data in the public domain, the relationship between financial savings and number of company employees, for this one sector, is presented in Figure 4.6.

Figure 4.6. Relationship between size of company and savings achieved



6. RESEARCH INTO REGIONAL VARIATIONS

There are clear regional variations in MSW arisings and treatment options across the UK. It can be seen that some regions, e.g. East Midlands, have low recycling rates and are very dependant on landfill as the primary waste management option. Despite a national waste strategy there appear to be clear variations in the distribution of waste minimisation clubs, the North West of England having a significant number of successful clubs ahead of other regions, e.g. South West and East Midlands (Table 4.13). Traditionally, the UK has employed a 'top down approach' in which legislative decisions are taken at the centre then executed within the constraints of the local context, this means that national policy may have very little impact at the local level if there is not the expertise, or resources, to implement it.

A recent survey of the 6 counties of the East Midlands of England, a region that contains Northamptonshire and Leicestershire, demonstrated that there could be significant differences between the counties in a given region [16].

In an attempt to determine the extent to which minimisation had become an integral part of the wastes management culture of the East Midlands, 85 key regional environmental organisations involved in some way in waste / environmental issues were asked whether they had a minimisation policy. Only 19% claimed to have a written one and 60% had no policy at all. Such a low figure may explain why the development of clubs has been slower here than in some other regions.

Table 4.13. Regional variations in waste minimisation project clubs [16]

Region	No. of clubs	% of total	% of households
East Anglia	3	6	5
East Midlands	6	12	11
London	4	8	9
North east	5	10	5
North West	10	20	2
South East	3	6	36
South West	7	13	12
West Midlands	7	13	12
Yorkshire & Humber	6	12	8

Funding for future project clubs, or company specific schemes, is a major issue. Although there appears a diverse and extensive array of funding sources (see Figure 4.7), but in reality it is very difficult to obtain any external funds, at the present, for new initiatives. It appears that after the initial round of funding, resources are being diverted to a range of other environmental issues. In the competitive world of bidding for public funds, waste minimisation appears to be losing ground. This situation calls into question the role of key facilitators in the region who are responsible for guiding groups to suitable funding sources. Have successful projects catalysed further waste minimisation developments in the same region?

Figure 4.7. Funding Opportunities [16]

Table 4.14. Local Authority Survey (County Councils) from the East Midlands

County	Waste minimisation policy	Waste minimisation project	Waste minimisation officer	Plans for a future waste minimisation project	Other waste minimisation projects in area
Derbyshire	No	No	No	No	No
Leicestershire	Yes	Yes	No	Yes	Yes
Lincolnshire	No	No	Yes	No	No
Northamptonshire	No	No	No	Yes	No
Nottinghamshire	Yes	Yes	Yes	No	Yes

Table 4.15. Local Authority Comparisons?

County	Authorities with policy (%)	Authorities with a project (%)	Waste minimisation officer (%)	Plans to develop a project (%)	Involved in a county-wide forum (%)
Derbyshire	17	0	0	17	0
Leicestershire	29	29	14	43	43
Hampshire	80	80	20	10	90

Within the East Midlands there has only been one project club that has satisfactorily completed, the LWMI [22]. Other projects have been initiated, some making very little progress and terminating quickly while others struggled on with a very small group of companies, producing few positive results (North Kesteven). By mid-1997, only one successful club had occurred in the whole region (see Tables 4.14 and 4.15). The LWMI returned impressive savings for the 10 companies, after two years the savings were £1 266 000. Annual reductions for liquid waste were in the region of 8.5% while those for solid waste were 47%. Despite such impressive figures, the impact of the LWMI has been less than expected and it has not produced the hoped for increase in organised waste minimisation in the region. There were a number of design flaws in the LWMI that may account for this, these include:

- *Too few companies to demonstrate the true value of waste minimisation across a range of sectors - only 10 out of a total exceeding 15 000 in Leicestershire;*
- *Only 5 SMEs, so this vital size category was poorly represented;*
- *A limited number of industrial sectors;*
- *A dissemination phase that occurred, mostly, towards the end or after completion of the project. Interested companies were not able to observe the process taking place.*

In an attempt to stimulate waste minimisation in Northamptonshire, and in the rest of the East Midlands, the Northamptonshire Resource Efficiency Project (NREP) was developed. It was designed by a partnership that contained UK regulators, e.g. Environment Agency, facilitators, e.g. Business Link, and a local Higher Education Institution (HEI). In the early design phase, an analysis of the shortcomings of several completed clubs showed that there was a need to restructure projects to incorporate new features. The NREP was designed to improve on the LWMI by:

- *Recruiting more companies - eventually 70 for the initial audit;*
- *Recruiting a greater range of company size;*
- *Recruiting a greater range of manufacturing categories;*
- *Disseminating progress widely, from the start of the project, using every aspect of the regional and local media;*
- *Utilising a local HEI to provide low cost / high value expertise in waste minimisation;*
- *Utilising dedicated targeting and monitoring software package, based at the HEI;*
- *Developing new industrial and domestic projects to run concurrently with the NREP;*
- *Being of lower cost to the companies - £500 as compared to £10 000 for the LWMI.;*
- *Introducing an industrial training scheme with a Higher Education Certificatet.*

Cost is a significant barrier to waste minimisation uptake by companies, in the UK, and daily fees of £700 are common for consultants working on such programmes. This means that only the substantially funded Demonstration Projects have managed to use a significant amount of their time. The NREP has utilised the resources of the local HEI in a very cost-efficient way. Two graduate research assistants have worked on the project at around £60 per day - normal UK rates. They have operated targeting and monitoring software that is used to manage the utilities and material flows in companies. Data are sent from the companies to the HEI and the software used to identify excessive resource consumption. Targets can then be set so as to improve resource efficiency, the external consultant on the NREP then ensures that the company project team introduce the change in procedures that are required. The research assistants were trained in waste minimisation methodology and in a short period of time were able to:

- Liaise daily with companies and champions to facilitate change;
- Visit companies on a regular basis to monitor, advise and run training sessions;
- Staff a `one stop shop` where all companies could seek general advice on wider wastes issues;
- Recruit more companies for future projects;
- Disseminate the project by regularly updating the Internet site and liaising with the local media.

Such an approach has enabled high grade advice to be available to companies, without the barrier of the excessive cost of regularly using consultants for a wide range of tasks.

A survey of the NREP companies showed that 81% were very happy with this approach and that 86% felt that the majority of advice could be obtained by the HEI team, at a low cost. Consultants oversee the project and chart its direction but the majority of the day-to-day work is carried out the HEI team. This fulfils one of the key findings of a CEST report [26]:

"If external funding is not available, a mechanism should be sought which provides these benefits without the use of consultants."

The NREP team has disseminated widely during the first year of the project, e.g. some 22 articles in professional journals have been published, 15 broadcasts on local radio and 12 seminars to regional industry. Presently, 4 other projects are being organised, by members of the team, in the same region, as well as 2 outside of the region.

The expertise of the team will therefore be used to maximum effect and not dissipated. A consortium in Leicestershire have developed a second project, several years after the first one (LWMI) completed, but the time gap is such that momentum appears to have been lost and little progress is being made. To develop a legacy of waste minimisation training in Northamptonshire, the HEI of the NREP is planning to use European Funds to train teams and champions from across a much wider industrial spectrum. The project will then have achieved its main aim of generating a waste minimisation culture based upon extensive, certified training. The lessons learned from the NREP indicate that the Environment Agency and the ETBPP need to be more proactive in importing reflective expertise into a project at every stage of its cycle. Without this, many clubs will struggle as project teams often lack the capacity to review recent research and develop novel strategies to overcome unforeseen problems.

7. COST-BENEFIT ANALYSIS

There are problems in dealing with the data available from the clubs, close examination raises several points. Firstly, the meaning of “savings” is not entirely clear. Most reports state that savings are per annum, others give a numerical money value with no time scale. Presumably, benefits from new technology must accrue over lifetime usage of capital.

Analysis should account for all costs and benefits occurring during the useful life of a project. The suggested method for future use within clubs is Net Present Value (NPV). This is the sum of the present values of all project benefits and costs, discounted at rate r .

NPV is calculated as follows:

$$NPV(r) = C_0 + \sum S_t / (1+r)^t$$

Where t = time period

r = discount rate

C = cost

S = savings

Assessment must be sensitive to the choice of discount rate. It is proposed that SMEs have a higher discount rate than established multi-national firms. SMEs are likely to place a greater value on present values, due to uncertainty and the risk of investments. Table 4.16 gives an analysis of the costs and benefits associated with one waste minimisation project club.

Table 4.16. Costs and Benefits for the Humber Project

Factor	Description	Unit Value (£)	Total Value (£)
Cost of project	venues, consultancy, training, audits & administration		200,000
Cost of new clean technology	-	-	variable
Non financial costs			
Time	wage rate (assume 0.5 person years)	16,000	8,000
Opportunity cost	cost of tasks forgone	-	-
Total costs			>208,000
Financial savings	-	-	1,100,000
Reduction in solid waste	18,000 tonnes	£4 p. t.	69,300
Reduction in CO ₂	6000 tonnes	£20 p.t.	105,600
Reduction in liquid effluent	289,000 m ³	-	-
Reduction on water demand	291,000 m ³	-	-
Total benefits			> 1,274,900

Assessing the success of waste minimization clubs requires the use of cost benefit analysis. Cost benefit analysis (CBA) is becoming increasingly popular for evaluating policy and investment within the UK. It is often used when it is thought that the real costs or benefits of a project are not reflected by market prices and this is generally true for many environmental projects. CBA has the advantage of being carried out from a social viewpoint, including both the financial and social costs and benefits. Calculation of social values often requires the use of non-market valuation techniques such as the contingent valuation method and hedonic pricing.

The first stage in a CBA analysis is to define the costs and benefits involved. For waste minimization clubs they are as follows:

Costs

- *the actual fee to participate in a project;*
- *opportunity cost of other tasks the champion cannot fulfil;*
- *cost of project champion's time;*
- *cost of investment to realise financial/environmental saving.*

Benefits

- *financial savings;*
- *reduced effluent + value to the environment;*
- *improved efficiency of staff and capital equipment;*
- *potentially increased output capacity.*

For the majority of clubs, much of this information is unavailable or the categories too vague to accurately compare. Table 4.16 provides an example of the values involved in the cost and benefit structure of the Humber project. Table 4.17 shows the partial cost benefit analysis for 13 clubs, each result calculated using the same assumptions and method as in Table 4.16 .

The value of time is calculated using data based on the average time spent on the Aire and Calder, LWMI and Catalyst Projects. Hours in person years are assumed approximately 0.5 of the project duration time.

Table 4.17. Costs and benefits of the surveyed waste minimisation clubs

Club	Financial Costs (£)	Total Costs (£)	Percentage Difference	Financial Benefits (£)	Total Benefits (£)	Percentage Difference
Aire & Calder	400,000	>423,994	>6	3,350,000	>3,369,169	>1
Catalyst	1,000,000	>1,010,664	>1	2,300,000	>2,346,200	>2
Dee Catchment	200,000	>213,997	>7	4,550,000	>4,902,374	>8
Don Rother Deame	207,675	>230,336	>11	565,292	>644,492	>14
Hereford & Worcester	17,600	>25,598	>45	250,000	>250,000	>0
Humber Forum	200,000	>207,998	>4	1,100,000	>1,274,900	>16
Knowsley	-	>>15,996	-	95,000	>136,360	>44
LWMI	200,000	>207,998	>4	1,300,000	>1,363,536	>5
Medway & Swale	-	>>9,998	-	2,155,537	>2,632,057	>22
Merseyside	-	-	-	5,300,000	>5,300,000	>0
Tayside Food	30,000	>37,998	>27	291,000	>291,000	>0
WEFT	-	>>11,997	-	371,360	>429,317	>16
WMWM	-	>>21,328	-	895,000	>899,889	>1

Obviously, the overall cost is wage dependent and within industries and regions this is likely to vary. Assuming the project champion was employed full time previously, spending 3-5 hours per week on waste minimization may prevent them from undertaking other tasks, this is known as the opportunity cost, no value is allocated. In the case of effluent, no value can be confidently allocated. This is because the nature of the effluent is unknown and some categories are more hazardous than others.

Table 4.17 provides a summary of the financial and total costs and benefits of the 13 clubs. From this it is evident that in most cases there is little difference between the two cost and benefit categories. Although not all social factors are values, the difference between financial and total benefits is relatively low, ranging from between 1 and 27%. This implies that, in economic terms at least, the financial benefits are the key outcomes of waste minimisation clubs, the environmental benefits could be described as `added bonuses`.

To maintain investment, clubs must demonstrate the highest savings for a given financial input. With the data presently available, it is possible to rank clubs in terms of their savings to cost ratio. The Dee, a Demonstration Club was the most successful with a savings to cost ratio of 22. The success of lower cost clubs is well demonstrated by Hereford and Worcester which was a facilitated self - help grouping. The ratio of savings to costs is 14.2 and facilitators should be looking to this model as a type in which to invest future limited funds.

The data suggests that clubs are a suitable instrument to demonstrate and promote achievement of sustainable waste management, in that sense they are a vehicle for the UK Promotion Strategy. They demonstrate financial incentives for companies to reduce waste production and improve resource efficiency.

In order to carry out a rigorous CBA, a greater quantity of higher quality data must be made available from all clubs. The data should be clearly identifiable as net or gross over a specified time period (with or without discounting) and changes should be given in relative rather than absolute terms. If dissemination of Best Practice is an ultimate aim, then this data should be widely available in the public domain.

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In addition to this, clubs should begin to follow a standard framework for presentation of data, to allow clear cross-club comparisons.

Ideally the following should be made available:

- *output levels of solid, liquid and gaseous waste before and after club participation for each individual company;*
- *number of waste minimizing / resource efficiency opportunities put into action;*
- *total cost of club (a full valuation should include "contributions in kind" as made by the ETBPP).*
- *cost to each participant;*
- *turnover and size (number of employees) of each participant;*
- *nature of business of each participant;*
- *investments in new capital to minimize waste;*
- *level of savings achieved through waste minimization and increasing resource efficiency. Identified as one off savings or savings over a specified time period.*

Clubs must have a clear idea of what is required right from the start as initial audits will be required. The use of champions to carry out targeting and monitoring should not make the collection of this information too costly. Once an overall CBA has been done, researchers will be able to focus on the success of individual club types, to determine which are the most cost effective, this could be done either in terms of industry sector or company size. This information will aid future waste minimization initiatives and allow the limited funding available to be allocated to achieve the maximum benefits. However, future clubs will have to be designed to consider a greater range of issue that hitherto. They will have to introduce Best Practicable Environmental Option as well as the Proximity Principle. At the same time, the waste minimization actions for business must take account of Ecodesign, Life Cycle Assessment, Producer Responsibility, etc. This means that future clubs whilst being resources constrained will require a greater input from external support agencies. Local facilitators are going to have to develop new and novel partnerships in an attempt to drive forward the UK agenda.

8. NATIONAL LOCAL AUTHORITY WASTE MINIMISATION DATA

The clubs have demonstrated that significant reductions can be made in waste arisings, especially solid and liquid wastes. The introduction of minimisation methodology has resulted in improved resource efficiency, especially for water, and as such provides a model that points the way to more sustainable wastes management. Despite the apparent success of the demonstrator projects to date, many companies remain reluctant to embark upon such programmes. Thus, local government has a significant role to play in fostering and promoting the adoption of minimisation programmes, and this section reports from a national survey of local authority waste management sections. The initiation of these project clubs is often reliant upon local authority support and promotion, and thus a summary of local authority policy and practice may shed some light on the historical development of waste minimisation in the UK.

To determine what is happening amongst the different tiers of local government in England, a questionnaire was sent in December 1996 to every County Council in England (reported on previously in this thesis). Along with the completed questionnaire they were also asked to return any promotional literature about wastes minimisation that they were providing for businesses and households in their region. The response rate was quite encouraging but it did take a number of reminders (follow-up telephone calls) to get a minority of the Councils to respond. This survey thus provides a snap-shot portrait of minimisation practices and policies of the English Counties from January 1997.

A number of trends in waste minimisation strategy and practice by local government can be noted. From the 250 authorities (both WCA, WDA and Unitaries) who responded (60%) only 37 (15%) had a clear and documented waste minimisation strategy for their area. This is clearly a very poor level but does represent the historical inertia against which modern minimisation practices must compete (see Table 4.18).

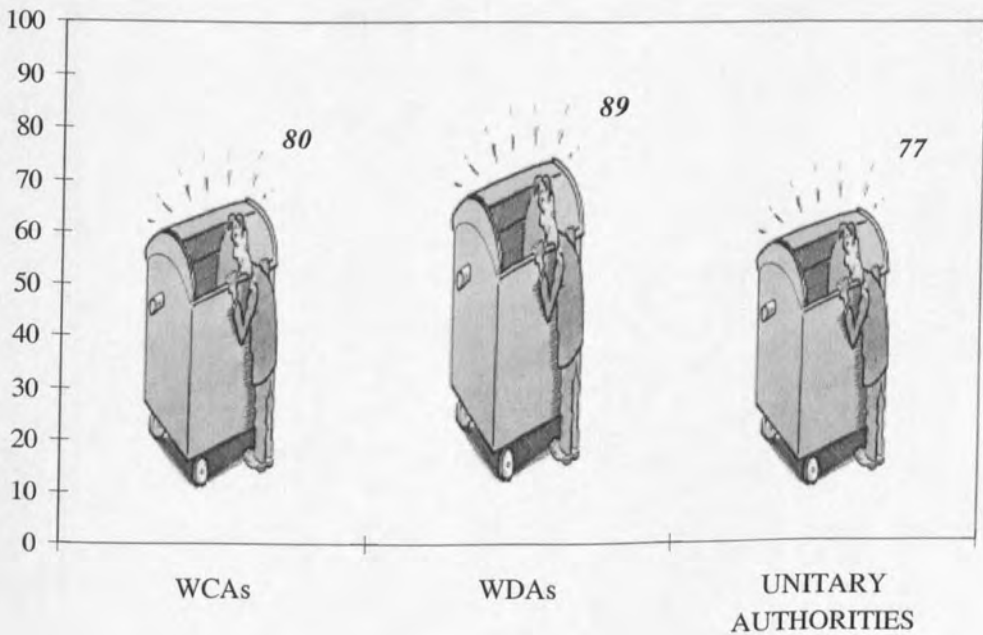
Table 4.18. English local authority waste minimisation performance

Type of Authority	Minimisation Strategy	No Strategy	% with a Minimisation Strategy
Collection	18	162	10%
Disposal	8	20	29%
Unitary	11	31	26%

Of interest though were the 29% of WDAs and 26% of UA's who had a specific minimisation strategy compared to only 10% of WCA's clearly shows that waste minimisation strategic planning and education is not a role for local waste collection authorities, who have historically not had funding available for this work, have not had national targets for minimisation to aim at and could not realistically 'see' the benefits of this work.

However, the situation is changing with the recent passing of the Waste Minimisation Bill (November 1998) which now actively allows local authorities to promote minimisation and fund programmes in their regions (see Figure 4.8).

Figure 4.8. Intended development of waste minimisation programmes



Perhaps the performance of Disposal and Unitary authorities is more easily understood. They are of course both responsible for waste disposal in England and are thus faced with high and increasing disposal costs in light of the landfill tax and decreasing landfill availability. They are thus keen to limit the amount of waste that they have to dispose of and see waste minimisation programmes and education as a vital component of efficient management and financial savings. Clearly the work of Hampshire and Leicestershire shows how this approach operates. These authorities are providing County-wide strategies for minimisation and recycling, and promote their constituent WCAs and US to get involved in co-ordinated programmes. They see their role as one of an educator and informer operating at the right scale or level, where the message is most efficiently delivered. On a related issue is the future development of waste minimisation programmes within local authority remits., with 80% of WCAs, 89% of WDAs and 77% of UA's currently developing its role.

Thus, minimisation is growing in importance as a management issue or concept for use by local authorities, thanks to the success of a number of waste minimisation clubs in the UK and the passage of the Waste Minimisation Bill through Parliament. Again, however, most emphasis is being put on minimisation from WDAs, perhaps because of their interest in limiting disposal costs, or because of the areal scale of their operations, or because they feel that they are better suited to promoting the minimisation message than any other tier of government. The most common reasons for supporting the development of wastes minimization are shown in Table 4.19.

Table 4.19. Reasons for encouraging minimisation- proportion of UK authorities surveyed who agree?

	%
Reduced landfill needs	95
Environmental concerns	90
Cost savings	80
Public relations	79
In line with government policy	75

All authorities were asked what reasons made minimisation an unsuitable management method for municipal solid waste in their region. The most significant findings included;

- *Costs being consistently the most important factor (64% of WCAs, 36% of WDAs and 48% of UA's)*
- *The higher level of unsuitability for minimisation according to WCAs than for WDAs or UA's, which may be explained by their lack of funds to push the agenda and their lack of visible achievement*
- *WDAs clearly see the benefit of minimisation, with generally very low levels of concern, apart from costs (36%) who claimed that funding was not available*

The figures are also slightly disappointing as the high figures for land availability (28% of WCAs and 27% of UA's) and environmental concerns (33% of WCAs, and 37% of UA's) show that these tiers of local government are missing the obvious benefits of waste minimisation. The techniques do not require capital expenditure, buildings or a labour pool, and can supply enormous environmental and economic benefits for all involved if only given the opportunity and ingredients necessary.

Generally then, waste minimisation as a technique and avenue available to local government is more popular with WDAs who see the potential benefits arising from reduced landfill disposal, treatment costs and educated green consumers.

However, the biggest barrier (in the eyes of all tiers of local government) is the costs issue. Local authorities have not been allowed to fund minimisation programmes, and in an era of local cut-backs have found service streamlining essential. Thus minimisation education and training programmes have been seen as non-statutory and thus surplus to requirements. However, the obvious short (and long) term savings that can arise from minimisation programmes should more than off-set the initial outlay and costs involved in education, training and labour. Perhaps the Waste Minimisation Bill, the success of Minimisation Project Clubs and increasing support from the DETR, DTi and the ETBPP will help improve this situation.

The final national issue to be touched upon is the need for local government funding of waste minimisation. Generally the funding made available to minimisation projects or clubs, or for education is minimal. Some 95% of WCAs, 75% of WDAs and 90% of UA's spend under £50,000 of their budget annually on waste minimisation.

Perhaps even worse is that in the majority of cases the minimisation budget is part of the Recycling budget (nationally no more than £100,000 annually) but has no defined value, and thus receives very little! Only at the Disposal (County scale) is money being provided and the examples of Hampshire, Leicestershire, and Northamptonshire are beacons of hope for what can be achieved through adequate funding.

Although these are times of financial constraint, a number of Councils have managed to divert resources into waste minimisation, and this would appear to be the way forward for the public and private sectors. Most authorities in the UK are supportive of the ideals surrounding the initiation and introduction of waste minimisation programmes, trials or clubs. Clearly waste minimisation can, when successfully implemented, reduce the need for landfill, and help attain environmental standards, whilst saving money and improving public relations opportunities. However, minimisation remains under funded and utilised by local authorities in the UK, due to the perceived problems that they associate with minimisation

8.1 Follow-up Survey

A follow-up survey of district councils (waste collection authorities) from a sample of these counties was initiated 5 weeks after the County survey, to assess the development of minimisation programmes at the local level, and relate them to broader County themes and strategies. The Counties were selected for their similar sizes (with regard to population and area) to allow comparisons to be made between local and county scale practices. Three counties were chosen who indicated that they had both a county-wide waste minimisation policy and a project as examples of '*better performers*', whilst three counties with neither a policy nor project were selected as examples of '*poorer practice*'.

The Counties were selected randomly from a table of county titles and were then approached by telephone. This would allow some form of analysis of the influence of county wide planning and policy on local waste minimisation policy to occur. The district and borough councils were surveyed using the same questionnaire and method as the counties (54 in total). The waste management or recycling unit of each authority was contacted, although in some cases there was a need to speak with the Local Environment Unit. The data collection for this paper was carried out during the Spring of 1997, soon after the launch of the landfill tax and the producer responsibility regulations for packaging.

All of the County Councils (100%) responded to the initial survey, although it did require a number of reminders and follow-up telephone conversations before the data collection was completed. The response from the local authorities (district and boroughs) was particularly impressive, with less need for follow-up correspondence, the figures are shown in the table below (Table 4.20).

Table 4.20. Response to the survey

County	Number of Authorities in County	Response Number (rate)
Derbyshire	9	6 (67%)
Hampshire	11	10 (91%)
Kent	14	12 (86%)
Leicestershire	8	7 (88%)
Northumberland	6	5 (83%)
Shropshire	6	5 (83%)
Total	54	45 (83%)

The initial response rate was variable and in some cases several reminders had to be sent. It was apparent that in many cases there was no official designated to waste minimisation. For Derbyshire the final response was 67%, for Leicestershire 88% and for Hampshire 91%, this in itself is informative. It must be emphasised that this survey presents data on a given time period in a very dynamic situation.

It traces the relative rates of development and as such is an investigation into the kinetics of waste minimisation development. Thus, the average response rate for the local authorities was 83%, with a slightly better return from the authorities in the counties considered as examples of good waste minimisation practice (Northumberland, Leicestershire and Hampshire) where the response rate was 88%, whilst in the poorer performance counties the return rate was lower at 79%, although the significance of this variation is questionable.

This may be little more than of passing interest, and may not suggest that minimisation practices of the constituent boroughs are related to County policies and practice, even though this would be the immediate conclusion to be drawn.

It must be emphasised that this survey presents data on a given time period in a very dynamic situation. It traces the relative rates of development and as such is an investigation into the kinetics of waste minimisation development. Since the time of the survey, progress has probably been made in most areas.

Data from the survey of local authorities suggests a trend (heterogeneous) very similar to that from the overall waste minimisation developments. Despite having a National Waste Strategy, with a significant amount of guidance, there are many factors that impinge to result in a wide variation of Local Waste Practice. What is apparent, and does give rise to concern, is that in several cases respondents were just not aware of significant developments in their own geographical area. This indicates a low priority being given to waste minimisation as compared to strategies such as recycling.

8.2 Results

The following discussion, will remain focused upon the 'state of play' with regard the adoption and development of waste minimisation at the local and county tiers of local government. The scope for further analysis is undoubtedly great, particularly along the themes of political analysis of the authorities and their programmes, regional comparisons, and a direct analysis of the variation that exists between urban and rural authorities, whilst the survey of borough authorities could be extended across the UK.

These issues, although important, are too complex and require much attention, which this paper cannot afford due to time and length constraints, but will form part of the ongoing research process focusing on wastes minimisation in the UK, which the authors are working on.

Question 1 - wastes minimisation policy?

20 Councils (59%) claim to have a wastes minimisation policy, whilst 14 (41%) do not. Only 18 (40%) of the 45 local authorities (borough, district and city councils) surveyed had a minimisation policy. Thus the two samples are somewhat similar in their response suggesting that this trend (between 40% and 60% of uptake) could be a national level for minimisation policies from local government, providing an indication of the need for action to be taken to move minimisation issues to the top of the waste management policy and planning agenda, with the average for the entire survey being a 48% uptake.

Several County Councils claimed that they had a minimisation policy within their already existing waste management strategy, which was not specific to waste minimisation alone. This is a common theme throughout all levels of local government in the UK, and although this is the ideal location for the policy allowing integrated waste management planning, under the current climate it would seem that minimisation needs greater encouragement through specific policies, strategies and programmes.

Question 2 - wastes minimisation project?

16 County Councils (47%) claim to have or have had a project that has been completed, whilst only 31% of local councils (14 of those sampled) have had any involvement with a waste minimisation project. This is not a positive response from either the Counties or the Districts and Boroughs. However, these figures should be interpreted in light of the separation of waste management responsibilities that exist between county and district authorities in the UK, thus hindering the development of integrated and co-operated waste minimisation programmes.

Minimisation is relatively new on the local government and business agenda, but it is developing rapidly and should prove a valuable theme of future waste related policies at all levels of government and for all businesses.

Question 3 - plans to develop a wastes minimisation project ?

Of those counties without a minimisation project, 11 County Councils plan to develop one, 4 in the remainder of 1997, 2 in 1988 and 5 in 1999 or later. This represents only 32% of the County Councils, but suggests that by the year 2000, 27 of the Counties (79%) will have participated in a minimisation project, a healthy figure considering the current government and industry emphasis being placed on waste minimisation initiatives in the UK. However, 13 of local district and borough authorities, who were sampled, are currently considering the initiation of a waste minimisation project in their area, which would mean that 60% of districts and boroughs will have participated in a minimisation initiative, a little less encouraging than for their County partners. This is one of the obvious directions for shifting patterns of waste management to proceed in throughout the UK, as businesses and authorities strive toward sustainable waste management practices in light of tightening legislative requirements, particularly the landfill tax and producer responsibility obligations for packaging, along with the impending EU Landfill Directive.

Question 4 - did Agenda 21 influence the setting up of the project ?

8 County Councils (50%) claimed that Agenda 21 had positively influenced the development of their project, whilst the other 8 (50%) claimed it had not. Only 29% of local authorities claimed to have been positively influenced by Agenda 21 when considering the initiation of their project. It has been generally been believed, particularly in local government circles, that Agenda 21 is a growing concern at the local scale particularly for the development of waste minimisation, but the data suggests quite the contrary. Perhaps authorities are only now beginning to link Agenda 21 and waste minimisation, and the benefits of this relationship should be evident during the next couple of years. Businesses remain wary of environmental groups whether they be voluntary or authority based, and will tend to shy away from Local Agenda 21 because of its environmental associations.

Companies are more likely to be swayed by financial arguments than environmental issues, because the shareholders have personal interests in mind, whilst local authorities do not spend their own funds, but are funded out of the tax payers purse, and this theme should be addressed when marketing minimisation strategies and programmes.

Question 5 - a designated waste minimisation officer ?

12 (35%) of the 34 Councils claimed to have a wastes minimisation officer, which is a rather low proportion of the English Counties, whilst surprisingly none of the local authorities had a designated waste minimisation officer. It appears that few local authority officers will have a specific role dedicated to minimisation, and the officers will often not be directly associated with other waste management officials in a local authority, being housed in the Environmental Projects grouping or within LA 21, making the promotion of minimisation a haphazard process.

A common theme, found when following up the survey, was that many recycling officers have responsibility for minimisation issues, whilst some authorities place waste minimisation within LA 21 officer structures. There is an obvious need for dedicated minimisation officers to take the minimisation message to residents and businesses, and to monitor existing and new trials and programmes to evaluate their success and implications. This is particularly the case at the local authority level (District and Borough Councils) where they will be the champions of minimisation, pushing forward the policies and projects to businesses and residents.

8.3 Summary of County Council - District Council performance

Initially the responses from the County Councils and the sampled local authorities are similar in their general detail (Table 4.21). The County Councils perform slightly better in relation to having a minimisation policy and having been involved in a minimisation programme, but their performance was not significantly better. Eighteen local authorities (district and boroughs) have a policy (40%) and 31% have been involved in a programme, compared to 59% of County Councils with a policy and 47% with a programme. The local authorities also fare slightly worse on plans to implement minimisation programmes, with only 29% considering this.

Table 4.21. Local Authority Follow-up Survey Results

County	Authorities with a Minimisation Policy	Authorities with a Minimisation Project	Authorities planning to develop Minimisation Project	Those authorities who will have a Project in place by the year 2000	Those whose projects were Influenced by Agenda 21	Waste Minimisation Officer
Shropshire	2 (33%)	0 (0%)	3 (60%)	3 (60%)	0 (0%)	0 (0%)
Derbyshire	1 (17%)	0 (0%)	1 (17%)	1 (17%)	0 (0%)	0 (0%)
Kent	4 (33%)	4 (33%)	4 (33%)	8 (67%)	1 (25%)	0 (0%)
Poor Counties	7 (30%)	4 (17%)	8 (35%)	12 (52%)	1 (25%)	0 (0%)
Northumberland	1 (20%)	2 (40%)	1 (20%)	3 (60%)	0 (0%)	0 (0%)
Leicestershire	2 (29%)	0 (0%)	3 (43%)	3 (43%)	0 (0%)	0 (0%)
Hampshire	8 (80%)	8 (80%)	1 (10%)	9 (90%)	3 (38%)	0 (0%)
Good Counties	11 (50%)	10 (45%)	5 (23%)	15 (68%)	3 (27%)	0 (0%)
Borough Total	18 (40%)	14 (31%)	13 (29%)	27 (60%)	4 (29%)	0 (0%)
County Total	20 (59%)	16 (47%)	11 (32%)	27 (79%)	8 (50%)	12 (35%)
Total	38 (48%)	30 (38%)	24 (30%),	54 (68%)	12 (40%)	12 (15%)

What these figures suggest is that the waste minimisation process is slowly taking shape at the local level where it is hoped its impact will be greatest, as it is these authorities (districts and boroughs) which deal daily with businesses and residents and can thus raise the profile of minimisation and spread the message of its benefits. However, it would seem that local authorities are behind in the progress being made at the County level, and may actually be responding to initiatives and policy at the County Council tier of local government, which one would expect given the style of waste policy and the structure of local government operating in the UK. For this to be confirmed further district and borough waste minimisation surveys will need to be completed, forming part of the research team's on-going investigation into the implementation of local waste management policy and practice.

Of greater interest is the influence of Local Agenda 21 on the minimisation process, with 29% of local authorities stating it had a significant impact upon their decision to implement a waste minimisation programme, compared to 50% of the County Councils. Although one would expect greater awareness and involvement with Local Agenda 21 by the local authorities where the Agenda 21 process is occurring, rather than with the County Councils, who are generally less directly involved in the Agenda 21 process because of the non-local scale of their operations. These figures suggest that county-scale planning and waste management policy decision-making are the level of government more likely to utilise the Local Agenda 21 process to further waste minimisation.

However, the most significant figures relate to the proportion of local government authorities with a designated waste minimisation officer. Surprisingly, none of the local authorities had a designated waste minimisation officer, compared to 35% of the Counties.

One would expect local authorities to have such an officer because this is where most activity with business and residents will need to occur, but this does tally with earlier comments relating to the development of waste minimisation policy, which has been generally slow to progress at the local level, and is being directed from county and regional tiers of governance in the UK at present.

Perhaps this situation will change in the near future as more authorities that expressed an interest in developing minimisation policies and projects appoint officers to educate, inform and disseminate waste minimisation information to their communities. Although waste minimisation issues at the local borough and district scales may be currently managed by recycling officers who have adopted some of the minimisation issues under their remit. This situation may persist until the Waste Prevention Bill becomes law, when there will be potentially more money, more opportunities and more obligations at the local scale for the promotion of waste minimisation initiatives.

It appears that local authorities (District and Borough) are slower in their response to the potential of waste minimisation in the UK, perhaps waiting to see what happens at the county scale and take their lead from this, as the majority sampled do not have a policy or programme in place. Thus, they may not need an officer dedicated to waste minimisation at present to monitor progress as they have no trials to monitor and evaluate, but are waiting guidance from County minimisation officers before responding with their own ideas and plans. However, it will not be long before many more local authorities have waste management officers with responsibility for minimisation or dedicated minimisation officers to push forward the agenda and respond to and work alongside County minimisation officers in the implementation of county-wide integrated programmes.

However, it must be remembered that many authorities now have Agenda 21 officers who may be responsible for some of the elements of minimisation, whilst the rest may remain within the remit of the recycling or waste officers, thus limiting the progress of dedicated minimisation officers.

9. DISCUSSION

National waste management policy, in the UK, is undergoing a period of thorough examination. The requirement to seek sustainable approaches to wastes management [1] has resulted in the production of a consultation document on a possible new waste strategy [5]. It has been frankly admitted that the previous strategy [3] was inadequate. The analysis of the present situation by the Environment, Transport and Regional Affairs Committee of the House of Commons is disturbing [10].

They say:

“--wastes management in this country is still characterised by inertia, careless administration and ad hoc, rather than science based decisions --”

Future developments in UK waste management must incorporate strategies for sustainable development [2], [9]. To that end, the waste hierarchy has been reaffirmed with waste minimisation being placed at the top and being confirmed as a key component in a national strategy for sustainability.

The waste hierarchy is increasingly seen as a guide to Best Practice, rather than a static list, in that it informs decision makers who must take into account a range of issues. One such is the proximity principle, this involves the reduction of transport of waste and recyclable materials and so can be used to foster cooperation between different authorities and enhance the role of local processors and operators. The previous aspirational targets for waste management are no longer supportable [3]. Future targets must be based upon sound data, but there are serious methodological problems in the generation of UK waste statistics [36]. The national waste survey, by the Environment Agency, should produce a sound baseline and yield accurate information that can be used to design strategies for more sustainable waste management [37].

Waste minimisation, within the UK, has primarily concentrated upon industrial and commercial waste. There is, however, a growing awareness that the domestic context has been neglected. There have been calls for an increased emphasis upon domestic waste minimisation [10] and strategies are being developed along with suitable training packages to inform local decision makers [11]. A summary of recent quantitative household waste minimisation projects has been published [38]. Analysis of data revealed that there were small but significant reductions in waste arisings over the lifetime of the projects but this was rarely maintained for longer than three months after project completion. A key proposal for the future is the production of a National Minimisation Strategy for domestic waste to be implemented across the UK [38].

Developments in domestic waste must not be allowed to evolve in a piecemeal fashion, future work must take account of industrial / commercial issues to construct a holistic strategy, as employees can feed back to the home context.

Domestic waste minimisation has often been associated with the voluntary sector working in partnership with local authorities. One significant recent development has been the initiation of the Waste Minimisation Bill, which has Government support, and at the time of writing is in its final stages before being adopted [39].

This Bill, for the first time, gives local authorities the formal power to prevent and minimise waste, in addition to fulfilling their responsibility to manage waste through collection, recycling and disposal. Using the proposed new powers, local authorities will be able to promote and assist waste minimisation by providing people with useful information, e.g. about purchasing less wasteful products and the availability of repair schemes for household appliances in an attempt to reduce the amount of waste going to landfill. The Bill was initiated by the Women's Environmental Network (WEN) who recognised that there are few established mechanisms in place to encourage minimisation, hence movement towards a low-waste (sustainable) society is unacceptably slow. There is growing momentum, in the UK, to link domestic and industrial projects and the voluntary sector is a key driving force.

A central feature of the UK approach for encouraging industrial / commercial minimisation has been the formation of project clubs. The ETBPP and the Environment Agency have figured strongly in the formation and running of such clubs. There have been around 60 such clubs, in the UK, recognised by the ETBPP. Data on the number of other clubs outside of the ETBPP management is scarce, some industrial networks and associations have had waste minimisation initiatives, e.g. Chemical Industries Association, but as yet no definitive overview of all of these has taken place.

The distribution of the clubs does give rise to concern as certain administrative regions, e.g. South West, have had few developments whereas others, e.g. North West, have had a greater number per household unit (Table 4.22). The reasons for this have not yet been fully addressed. The urban / rural ratio appears to be a key factor, predominantly rural areas seemingly lagging behind in club development.

A recent history of decline in heavy industry allied to high unemployment and environmental degradation (Project Catalyst) seems to be a spur to the formation of some clubs, perhaps because of specific grants, e.g. Single Regeneration Budget, being readily available for this activity in those regions.

Table 4.22. Regional variation in waste minimisation clubs

Region	% of total MSW arising	% of total MSW disposals	% of population (A)	% of minimisation clubs (B)	Ratio of B:A
Anglian	12.5	16.4	10.6	14.7	1.38
Midlands	18.8	22.4	16.6	16.4	0.98
North	19.8	16.6	12.3	18.0	1.46
East					
North	17.7	13.9	14.5	16.4	1.13
West					
Southern	8.8	10.0	10.9	4.9	0.44
South	8.4	9.0	9.7	14.8	1.52
West					
Thames	14.0	11.7	25.4	14.8	0.58

The club approach has been adopted because of the success of the early Demonstration Projects, e.g. Aire and Calder. These were developed from a model that originated in mainland Europe [27]. This model was adopted by a range of UK organisations, including service providers that then became the main drivers for many of the early clubs. It could be argued that the introduction of such clubs, into the UK, came about because service providers sought to create new markets when environmental issues were becoming increasingly prominent in the UK. The formation of a club has been said to have significant advantages, e.g. inspiration, reassurance and exchanged Best Practice [26].

At the same time, it has been recognised that there are underlying problems; members of sector clubs are often reluctant to share recently developed Best Practice because it is conceived as possibly bestowing a competitive advantage on rivals. Clubs have often concentrated upon training the company champions over a period of time, normally between six and twelve months.

It has been assumed that they will then import the methodology into the company as they train up the company team, keeping costs down as service provider time is kept to a minimum, e.g. Hereford. Training over a prolonged period means that the company champion has not been fully inducted into the methodology until almost the end of the project. It is better to train over a short, intensive period early in the project rather than over a prolonged timescale, then the champion can begin the waste audit, and the formation of the company team, as early as possible.

Where clubs have stated their aims, e.g. Hereford and Worcester, it is possible to evaluate their achievements in relation to their stated aims. In the Hereford and Worcester report the results of on-site interviews of companies, using a questionnaire, are included [19]. Some 77% of the participating companies, who attended the training sessions, said that the programme had fully or partly met their objectives. The 23% of companies whose objective had not been met, felt that the training programme was overtly complicated, did not stimulate interaction and gave little opportunity to discuss individual problems.

There appears to be acceptable levels of company satisfaction. However, it must be borne in mind that the identified club savings of £250,000 was for the 37 companies in the club, yet only 3 companies account for the majority of that sum. Whether the project met a number of its other aims, such as the dissemination of results locally is not clear and there appears to be very little analysis of the success, or not, of the project.

Other recently reporting projects, e.g. Keighley Business Forum [21], have not stated any aims in the final report, they are merely a collection of individual company reports and it is difficult to draw quantitative data from an evaluation exercise. What often happens, even in well-documented cases, is that a list of conclusions is given which is felt to be a pointer towards Best Practice [24]. If clubs are meant to be the catalyst for the uptake of waste minimisation by the wider industrial / commercial community then there appears little evidence to support this. The follow up to the LWMI, in the same county, has proved less satisfactory with few companies enrolled and there appears to be little industrial demand for this development. For clubs to be deemed successful they must be able to prove that they have stimulated an adoption of waste minimisation methodology by a significant proportion of industry in their local region.

The reduction in waste arisings is significant. The most comprehensive analysis of the results from one club has been that for the LWMI [22]. Liquid waste was reduced by some 8.5% and it is assumed that reductions in water consumption were in the same order. Solid waste was reduced by some 47.4%, a very significant figure. Other significant reductions have been achieved, in the Aire and Calder case the reduction in liquid effluent was 31% of the potential and that for solid waste was 100% of the potential.

The reductions have been made by a wider range of opportunity techniques than just waste minimisation. It must be recognised that the activities of the clubs have transcended waste minimisation alone and they could better be described as resource efficiency projects.

The application of a range of opportunity techniques to a range of categories has shown that the largest savings are made in raw materials, with operating costs next and water consumption third. It has been demonstrated that the financial savings from the introduction of waste minimisation can be made relatively quickly and this is important when recruiting members for new projects. Payback period is another key question for companies. A very significant proportion of savings (84% for Catalyst) are made within 12 months.

The clubs have demonstrated that it is possible to move towards more sustainable production as raw material input is reduced. This is aided by the adoption of a sound, quantitative methodology, however, it would be unwise to equate the technology modifications to a shift towards clean technology. Clubs can make members aware of new, clean technology and so catalyse movement towards even more sustainable approaches to production. The evaluation of financial savings is fraught with some difficulty; rarely is it made clear whether savings are on an annual basis and for how long they are expected to continue.

There is a requirement for a detailed cost - benefit analysis to be carried out on a future programme that has been designed in such a way that it yields accurate financial data. Nevertheless, impressive financial savings have been made in some cases.

The gains from the early Demonstration Projects are unlikely to be repeated due to funding constraints as it is not likely that very high levels of external funds will again be available. Even so, smaller clubs with very little external money, e.g. Hereford and Worcester, have made savings of 14 times the stated cost of the programme.

Cost savings cannot be simply predicted from the company turnover, as is shown by the correlation coefficient ($R^2 = 0.0771$) of the plot of achieved savings (% of turnover) versus turnover. The same is true for the size of the company, as represented by number of employees. It may be argued that such an analysis was not possible, on the 4 projects evaluated, as there was a diverse mix of company categories so making comparison difficult.

The results from the Waste Elimination From Textiles (WEFT) project [24] has enabled an analysis of a single manufacturing sector to be carried out. Even in this case, in a single sector, the correlation coefficient of the plot of achieved savings per annum versus number of employees is such ($R^2 = 0.0771$) that it cannot be used as a predictive tool. Indeed, this is recognised in the report, which concludes:

“The tables (data) cannot be used to compare the companies because the results depend upon a number of factors, including the extent of previous initiatives to reduce waste.”

It is not the mean savings, stemming from a project club, that matter but the median. This better reflects the actual activity amongst the set of companies in a given project. Nevertheless, savings of 0.5% - 1% of turnover seems very achievable for a range of company types and size [22].

A national waste management policy must do more than merely inform regional decision makers. It negates a national sustainable development strategy when there are wide regional variations in the uptake of wastes minimisation methodology by industry and commerce. Certain regions of the UK have had very few waste minimisation project clubs and, at the present, the distribution of the clubs is unsatisfactory, furthermore, there is little evidence of a regional strategy to remedy this. This is an area that requires urgent attention in the next few years.

The East Midlands of England is a region with little previous history of successful wastes minimisation project clubs apart from the LWMI [16]. The results of a survey of key environmental organisation in the East Midlands gives an insight into possible reasons why. Of 85 key regional organisations questioned only 19% claimed to have a waste minimisation policy and 60% had no policy at all.

The lack of a clear policy within many of the key environmental organisations is probably a major reason why so few successful developments have taken place. Such organisations should be the focus of well-orchestrated campaigns where local industry / commerce is made aware of the clear benefits of minimising waste, they should act as facilitators.

Funding for future projects may be problematic. Although there appears to be a range of possible funding sources, in reality it is very difficult to obtain external funds at the present. Future project clubs will have to be designed to be essentially self-funding, where industry / commerce contributes the majority of the costs. Facilitators need to make use of more diverse sources of external funding, in particular those that are available from the UK landfill tax [35].

Advice given to managing project clubs has developed little over the past few years. The early case studies were based upon Demonstration Projects, such clubs had the capacity to overcome a range of problems that were unforeseen by the initial planning process. Less well-funded clubs have had to face similar problems without the resources to deal with them.

The NREP underwent rapid organic evolution within the first few weeks of its programme as the management team recognised its shortcomings, it being initially designed on the basis of information from previous, better-funded programmes. What is lacking in the UK is a central authority that regularly reviews the data flowing from clubs in an attempt to identify Best Practice and has the resources to input this into clubs. The availability of the local Higher Education Institution enabled the management team to utilise a range of academics to produce new and novel insights so that they could respond to altered circumstances.

This will not be possible in the case of every club and so the Environment Agency or the ETBPP needs to enhance their role and to provide this expertise. At the present, this does not occur and the support of the Environment Agency and the ETBPP, due to resource constraint, is less than required. Many clubs, therefore, founder through lack of expertise and the inability to respond to new, unforeseen challenges.

Recent UK Government publications outline a range of issues by which we can qualitatively evaluate the contribution of waste minimisation clubs to the development of a national, sustainable waste management culture.

In `Opportunities for Change`, emphasis is placed upon the prudent use of natural resources as well as the maintenance of high and stable levels of economic growth and employment [2].

Clubs have demonstrated that the application of minimisation methodology results in improved resource utilisation and that the financial savings lead to enhanced company profitability that could result in enhanced employment security. They have not, however, demonstrated the requirement that such projects encourage producers to design more sustainable products or enter into increased communication and dialogue with key stakeholders.

`Sustainable Business`, emphasises the need for industry to send the correct signals and information to consumers so as to empower them to move towards sustainable patterns of consumption [9]. This has rarely been a key issue with the clubs and it needs to be addressed in future developments. Market transformations are essential for a sustainable future and consideration must be given to accurate information on labelling, regulated minimum standards, incentive schemes for consumers to replace inefficient appliances and sector agreements for improved environmental performance of product ranges.

In `Less Waste More Value`, the hierarchy, with minimisation at the top, is emphasised as a key component of the proposed national strategy [5]. Clubs have demonstrated that the hierarchy is a functional concept and that significant savings can be made by reducing waste at source. Finance, for the development of future projects, is essential if new and original types of clubs are to be developed.

Facilitators need to be aware of the request in 'Less Waste More Value' that they explore the opportunities for funding through the Environmental Body scheme funded by landfill tax [35]. So far, very little of the available funds have gone towards sustainable wastes management. The planned Regional Development Agencies need to give urgent attention, on their formation, to the linking of domestic and industrial projects so that holistic minimisation strategies are developed that efficiently integrate national policy into a regional context.

The Environment, Transport and Regional Affairs Committee, draw attention to the role of the Environment Agency [10]. They consider that the Agency is contributing little to the present developments and that the lack of direction for waste minimisation is endemic, with little incentive for companies to commence projects. They suggest a way ahead:

"This being the case, it would appear to us that the DTI, DETR and the Environment Agency will have to reassess their approach to such projects, perhaps providing for a tougher regulatory approach in cases where no effort is made to minimise waste or alternatively, holding out to companies greater incentives than the promise of cost savings to come."

Waste minimisation clubs have pointed a way ahead and demonstrated that sustainable waste management is a feasible option. The next generation of projects needs to build upon the recently developed Best Practice, recognising the causes of recent failures. Regulators need to be more proactive and set a context so that the majority of industrial and commercial companies are encouraged to implement waste minimisation strategies.

10. CONCLUSIONS

Waste Minimisation Clubs have demonstrated that the application of minimisation methodology results in improved resource utilisation and that the financial savings lead to enhanced company profitability that should result in enhanced employment security.

There is little doubt that 'local demonstrator projects' (minimisation projects and clubs) provide the necessary focus for companies' waste minimisation activities and potentially accelerate progress.

However, cost savings rather than environmental improvement remain the key motivating influence but companies still find it difficult to allocate sufficient human resources, and this theme must be used more in promotional work in support of waste minimisation. Minimisation Clubs have also demonstrated that the hierarchy is a functional concept and that significant savings can be made by reducing waste at source. The clubs have demonstrated that it is possible to move towards more sustainable production as raw material input is reduced. Waste minimisation clubs have pointed a way ahead and demonstrated that sustainable waste management is a feasible option. The next generation of projects needs to build upon the recently developed Best Practice, recognising the causes of recent failures. Following a number of interviews, it is that regions where projects have developed have had a committed group of core individuals who have driven the agenda at both levels of local government (Red 1999), and this would appear to be the way forward!

The first industrial / commercial waste minimisation clubs were formed, in the UK, during the early 1990s. Since the first, generously funded Demonstration Projects there have been around 60 such clubs across the UK. The clubs receive support and advice from the Environment Agency and the ETBPP, who monitor progress and disseminate the results as case studies of Best Practice.

The clubs have demonstrated that significant reductions can be made in waste arisings, especially solid and liquid wastes. The introduction of minimisation methodology has resulted in improved resource efficiency, especially for water, and as such provides a model that points the way to more sustainable wastes management. There are, however, marked regional variations in club distribution and the proposed Regional Development Agencies need to consider strategies to translate national policy into an effective local context.

Not all clubs have met their objectives, the Environment Agency and the ETBPP need to develop management expertise, based upon an analysis of recent research, which they make readily available to project teams. Attention must be given to the stimulation of a greater uptake by industry and commerce as well as the linking of such projects to domestic minimisation. This will require a proactive role by regulators.

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CHAPTER 5

PUBLIC EDUCATION

CHAPTER 5 [I]

THE SOCIAL FACTOR

CHAPTER 5 - THE SOCIAL FACTOR 'CORRECTING SOCIETY'S FAILURES'

It has been noted repeatedly throughout this thesis that without effective public participation in a scheme and acceptance of a policy or strategy, most schemes will fail and all chance of policy implementation will disappear. This chapter intends to deal specifically with the issues of public acceptability of policies and services, and opportunities for encouraging their greater involvement in systems at the local scale.

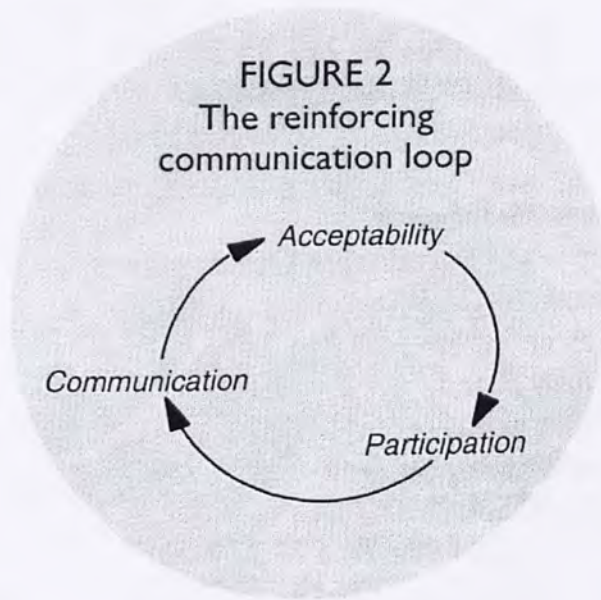
This section will deal with public education campaigns and how they utilise motivational techniques to promote participation schemes, whilst attempting to educate residents about sustainable waste management (see Appendix 8). The three papers presented will discuss local authority promotions in theory and use a range of case studies to look at their success in delivering services that the public are happy to use and want to participate in. The papers will also develop the themes of barriers to participation, funding of programmes, education and quality of participation. From the outset it should be stressed that recycling is clearly popular with the general public with in excess of 90% when surveyed claiming they support recycling (see Figure 5.1). The question is not one of whether they support the notion and ideal of recycling, but of how to motivate them to participate and what they feel is essential for them to decide to take part.

Figure 5.1. Everybody does some recycling (source: author)



One of the clearest messages to come from the papers is the need to continually promote waste management to the public. It is not good enough to raise awareness once and then assume that people will respond in the desired manner, one must continue to promote recycling (etc.) with clear and simple messages, with good visuals and never be afraid to re-invent the message to ensure people take notice (as demonstrated in Figure 5.2).

Figure 5.2. The Communications Loop (source: author)



There has been an absolutely abundance of waste related education and awareness campaign conducted in the last four years, many of which have received significant funding from the landfill tax credit scheme (see Chapter 6 for more details). Undoubtedly, much of the active promotional campaigns and the research into recycling behaviour and awareness would not have been possible but for this revenue source. This is very much the case for the two primary case studies evaluated in this Chapter; the Royal Borough of Kensington & Chelsea and Daventry District Council.

Until there is greater understanding of what makes someone recycle and why they choose to participate, many promotional campaigns may only have limited success in changing habits and behaviour (as noted in the advertising in Figure 5.3). It is essential to understand the market-place before offering a new service or scheme, otherwise it may become under-utilised and a drain on the public purse.

Figure 5.3. Challenging the public to recycle in Kensington & Chelsea
(source: author)

The Recycling Roadshow Campaign in Kensington and Chelsea offers the opportunity to review how and why residents participate in the doorstep recycling scheme and what barriers they perceive to their effective contribution to the scheme's development. By reviewing this through doorstep interviews and providing immediate feedback to residents on how the scheme works and what can be achieved greater participation in the scheme was achieved. Not only this but the research programme enabled the authority to review its services and promotional literature in direct response to the customer's requirements and comments.

The Roadshow campaign interviewed (see Figure 5.4) in excess of 8,000 residents providing a wealth of data on behaviour, attitudes, barriers and scheme effectiveness, which are reported on in detail (noted in Table 5.1). It is clear from this data, that the scheme is effective but that previous promotional campaigns have failed to reach the majority of the public and that the convenience of the system has never been adequately conveyed to the general public. All of these problems have been rectified through this programme.

Figure 5.4. The door to door Roadshow Campaign (source: author)



Table 5.1 Summary data on recycling behaviour from 4 crew areas (source: author)

<i>Crew</i>	<i>Number of Interviews</i>	<i>Proportion of residents spoken to</i>	<i>Proportion who recycle</i>	<i>% of non recyclers who didn't know about scheme</i>	<i>% of non recyclers who will try service</i>	<i>% who Recycle every week</i>
k3	669.0	24.7	46.6	81.2	31.9	85.9
k5	766.0	26.4	56.4	76.7	40.4	80.8
k8	508.0	19.8	35.2	81.3	21.1	77.1
k15	585.0	19.6	46.5	84.3	29.2	83.0
<i>sum</i>	<i>2528.0</i>	<i>22.6</i>	<i>46.2</i>	<i>80.9</i>	<i>30.7</i>	<i>81.7</i>

The Roadshow programme is one example of what can be achieved through the use of landfill tax credits to promote sustainable waste management. Perhaps an even more successful example is the Daventry District Council Green Waste Scheme. This originated as a pilot scheme and achieved a diversion rate from landfill of 50% through centralized composting of the separately collected organic waste and the collection of recyclables. Now the scheme has gone district-wide the diversion rate is at 44% making it the highest in the country excluding authorities that use Energy from waste plants (incinerators). This scheme has proved very popular with the public who are in full support of the alternating weekly collections of organics and refuse and who participate freely; although it is suggested that they must participate in the organic and recycling collections because their waste bin will overflow between fortnightly collections. This is an example of what can be achieved, and where authorities need to be heading in terms of sustainability and diversion from landfill. This case study is also a perfect example of how the targets laid down in the EU Landfill Directive could be met (discussed in depth in Chapter 7).

Even in light of the successes that have been achieved, questions arise for the rest of the UK, linking back to the problems experienced in implementing policy discussed in Chapter 3. Recycling may not always be the best practicable environmental option if markets for the reprocessed materials are not available. The public's blind belief that recycling is good is in effect unhealthy in terms of the ultimate goal of sustainability, because under certain circumstances the energy content of the material or the prevention of the waste at source may be more beneficial for the economy and society.

However, if we assume that there remains a general drive to ensure greater participation in the schemes on offer then we need to consider what would encourage people to actively participate (discussed in great detail in Appendix 8), and how to ensure greater public responsibility for the solution to our waste problem? Will mandatory targets deliver increased participation, I think not, but locally based charging systems for waste, or differential charging for waste as opposed to recyclables may help to shift the emphasis. In the end the issue of responsibility is something that can be promoted through education campaigns and runs in parallel with the promotion of waste minimisation (as noted in Chapter 4). With these messages the route to more sustainable waste management is becoming clearer for many of the authorities and stakeholders involved.

CHAPTER 5 [II]

OVERCOMING LOCAL BARRIERS TO RECYCLING PARTICIPATION

OVERCOMING LOCAL BARRIERS TO RECYCLING PARTICIPATION

1. INTRODUCTION

The Environmental Protection Act [1] created a framework within which local authorities, contractors and individuals within the industry would be stimulated to recycle more waste. In the Government's White Paper on the Environment 'This Common Inheritance' [2] the Government set a target for the recycling of 25% of household waste by the year 2000, which has acted as a further impetus to recycling in this country.

Seymour suggests that 'when archaeologists of the future try to make sense of this age in which we live they might well name it the Rubbish Age', for wherever they sink their hi-tech spades they will turn up rubbish! [3]. Sinclair [4] noted that 'one of the most disparaging features of modern day cities is the problem of increasingly huge amounts of solid waste.' He also went on to suggest that there are 3 major geographical implications of the solid waste management issue; [i] an environmental impact; [ii] consequences for the man-land nexus; and [iii] the spatial or locational dimension. Many approaches to waste management and treatment (including source separation recycling) requires the participation of the consumer in at-source (home) separation processes, making the consumer the first, rather than the last, link in a waste material distribution network; the consumer is thus an intrinsic part of the waste cycle, and as part of the problem, each person should be part of the solution.

However, a common perception to date has been that the responsibility for waste management and disposal belongs to someone else. In effect, consumers are never made aware of the ultimate consequences of their actions when they contribute to the waste stream, and there is no mechanism that provides them with a distinct incentive to adjust their consumption patterns in accordance with a less wasteful way of life [4].

2. UK ENVIRONMENTAL ATTITUDES

According to a survey by the Onyx Environmental Trust of 1,000 people, when consumers were asked about their major concerns 'the environment' did not rank as highly as perhaps we would think with only 9% of the survey acknowledging the environment and pollution as important [5]. This should be compared with health and social services (39%), or education (34%) which were considered much more significant.

A survey by Waste Watch (1999) of 1000 people suggests that the vast majority of people consider themselves environmentally conscious (79%), and 98% consider recycling to be an acceptable method of waste treatment [6]. However, only 41% of respondents recycled some products every week and 9% recycled less than 4 times per year and 11% never recycled! The main reasons for not recycling were laziness (30%) and lack of convenience (19%) or inadequate local facilities (12%), whilst 20% claimed that they recycled as much as they could, and 6% claimed they had received inadequate information! Yet 88% of households without a kerbside collection claimed that they would recycle more if such a service were provided [6].

3. WASTE MANAGEMENT PRACTICES

There are some obvious variations in UK MSW management performance (noted in Table 5.2) due to the type of authority being considered [7]. The clearest data to come from this table is that in London only 78% of waste is landfilled, unlike the other authorities where landfill exceeds 83%. This is because London does not have any available landfill and must export it to the surrounding counties (Shire Counties) which only utilise landfill for 83% of their MSW. There is currently a lot of concern surrounding availability of landfill void in the South East of the UK generally, and this is reflected by the relatively lower figure for landfill in London and the South East. Waste to Energy is clearly more popular in London and the other Metropolitan Boroughs (18% and 7% respectively). These urban authorities have limited land availability, and increasing MSW generation, which has encouraged the adoption of WtE as an effective treatment method for reducing an authority's reliance on landfill [7].

The development of Waste to Energy (WtE) in these regions may also reflect the previous dominance of heavy industry in the major cities of the UK that have provided available land for development. The current state of play shows not only how the regions vary, but also indicates the obvious problems that exist in reaching Government targets for MSW [DETR 1997], and more specifically in developing the role of recycling. Thus, it appears that the current policy drive has struggled to affect local authority practices, and perhaps this is due to poor communication channels between the local authority (policy implementers) and the public (who must act and participate within local schemes).

Table 5.2. Million tonnes of waste treated in England and Wales [7]

<i>Option</i>	<i>London</i>	<i>Metropolitan Boroughs</i>	<i>Shire Counties</i>	<i>Wales</i>	<i>Total</i>
Landfill	2.92 (78%)	4.16 (85%)	10.55 (83%)	1.05 (92%)	18.68 (83%)
Incineration	0	0.17 (3%)	0.75 (5%)	0	0.93 (4%)
W to E	0.69 (18%)	0.34 (7%)	0 (0%)	0	1.03 (5%)
RDF	0	0.09 (2%)	0.11 (1%)	0	0.2 (1%)
Recycled	0.13 (4%)	0.13 (3%)	1.25 (11%)	0.08 (8%)	1.58 (7%)
Total	3.74	4.88	12.66	1.14	22.42

It appears that local authorities made little progress in the development of recycling [8] household waste (Table 5.3). This failure may be due to a number of key factors operating at the local scale; [i] lack of markets for recycled materials, [ii] fluctuating prices for recycled materials, [iii] lack of adequate local authority funding, [iv] lack of clear policy direction from National Government, [v] lack of staff to devote to the development of recycling and [vi] lack of public participation.

According to Coslett [8] *'Recycling doesn't work up here, because it is a good life activity, was one of the excuses offered by a worker in the technical department of Wear Valley District Council, which has bottomed out with a 0% recycling rate for the second year running.'*

Wear Valley certainly has a disadvantage in terms of its rural spread and sparse population, but it is not fair to claim it is not worth trying to spark up recycling in an area because it contains high unemployment and low income blackspots.

Table 5.3. Local Authority Recycling rates in England & Wales 1994-95 [20]

Recycling Rate (1994-95) %	Number of authorities at this rate	Recycling Rate (1994-95) %	Number of authorities at this rate
1	11	12	5
2	35	13	4
3	57	14	4
4	47	15	4
5	55	16	2
6	29	17	0
7	39	18	4
8	28	19	2
9	25	20	0
10	24	21	1
11	12	22	1

Here clearly is a council struggling to cope with the recycling revolution of the 1990s. At the other end of the scale are the high achieving councils that seem to be on the right track for reaching the recycling target of 25%.

4. EFFECTIVE COMMUNICATION

Recycling, and other forms of waste management, need to be adequately communicated to the public, so that resident's habits, behaviour and traditions can be changed for the better, enabling local authorities to achieve Government goals of recycling and recovery [9]. There are a number of guiding principles which need to be considered when planning and carrying out service promotion, obtained from experience in North America, which include; [i] enhancing motivation, [ii] incentives to participate, [iii] enhancing convenience, [iv] 'appealing to norms', [v] use of the neighbourhood effect, and [vi] providing effective information, whereby promotions should be timely, specific, and provided as close as possible to the point where the desired activity takes place [9].

A successful refuse collection and recycling scheme needs to be both user and operator friendly [10].

This will require both the scheme and its promotional material to be both simple to operate, participate in and understand, and free for the residents. Several techniques have been regularly used to try to motivate or ‘prompt’ individuals to participate in recycling programs, including adverts, newsletters and special events [11] as noted in Figure 5.5 and Table 5.4.

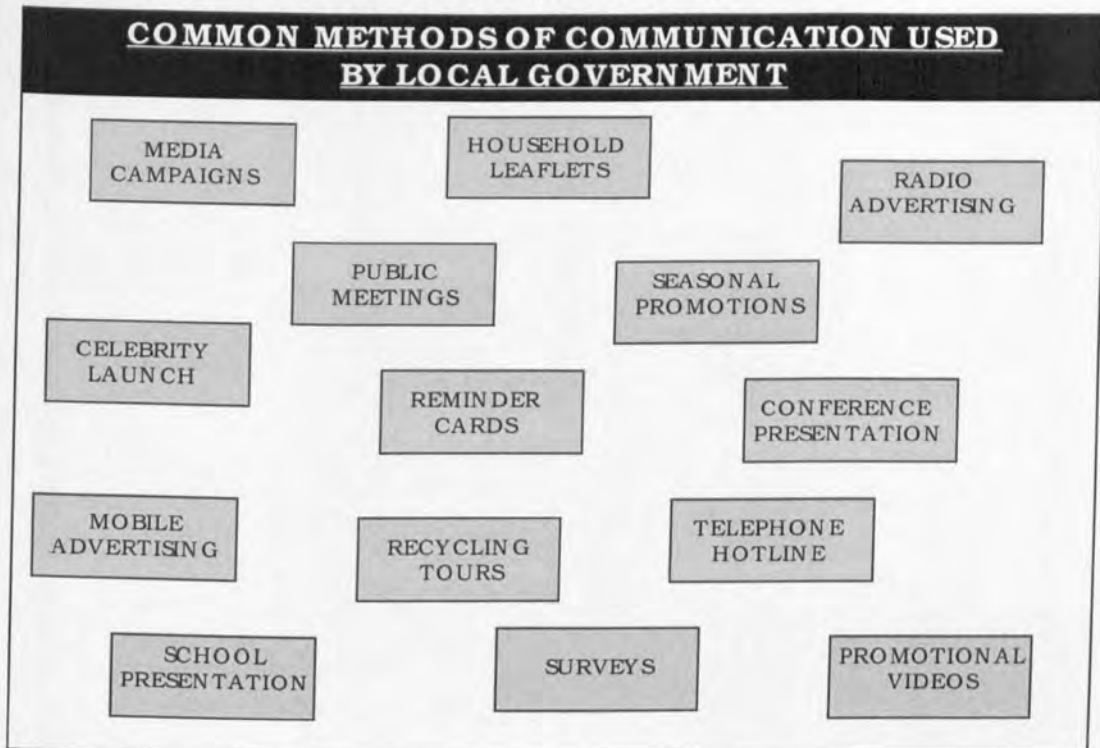
Table 5.4. Common methods of local government communication promoting waste management [11, 12, 13]

<i>Passive Approach</i>	<i>Active Approach</i>	<i>Inter-active</i>
Advertising on collection vehicles	Cards delivered door to door to explain the system	Door to Door surveys and education
Displays for use at fairs and public events	Collection receptacles provided free to residents	Presentations in schools, to groups or at conferences
Household Leaflets	Promotional videos	Public Meetings
Newspaper articles each month covering waste	Seasonal promotions to encourage participation	Radio spots, adverts or phone-ins
Reminder cards, answering questions	Community newsletter	Telephone Hotline
Stickers to designate recycling bins	Display Boards	Visits to the Recycling Centre / Education facility

The level of public participation in recycling schemes can be highly variable, the reasons for which are still unclear [14,15,16,17]. Without public contributions, recycling from domestic waste would be almost impossible [15], as only dirty MRF’s and Waste to Energy plants would allow any form of energy or materials recovery from the domestic waste stream without the need for source separation. Thus, in order to support recycling projects it is important to try and understand who recycles, how they recycle and why they recycle [9]. Without the public’s conscious and collective decision to support an alternative route to landfill for their waste, there will be no raw material for the post-consumer waste recycling industries, reliant upon the goodwill of the public! Research in Canada [18] has shown that the use of home advisors to promote environmentally responsible behaviour in the home, is a particularly successful form of service communication, particularly in bringing about ‘one time’ behaviour changes (altering shopping habits to buy recycled goods) [19].

This research is an analysis of the success of one type of communication process in promoting and sustaining increased resident participation in recycling practices within an example London Borough [20].

Figure 5.5. Methods of Communication (source: author)



4.1 The need for Communication Programmes?

With the introduction of the Landfill Tax, Recycling Targets and the Packaging Directive, (and the imminent Landfill Directive), local authorities are being faced with a vast waste management problem, and yet the population is largely unaware of what is going on. It has been suggested that some local authorities do not adequately promote and advertise waste minimisation and recycling. In a great number of cases, the small amount of publicity that is produced has little or no effect [13,19]. Some of the more important considerations to take account of when designing and implementing a waste management promotional campaign [13] include targeting the audience, the need for quality materials, a clear message and the use of a range of different media (see Table 5.5).

Table 5.5. Key communication programme criteria [40]

a. Target audiences?

- *Too much emphasis is placed upon teaching children to recycle.*
- *Insufficient promotion is targeted at the low-recycling groups in society.*
- *Provision of facilities needs to be arranged in consultation with residents.*

b. Education, publicity and promotion?

- *Quality promotion and publicity on a regular basis, will produce better performance.*
- *Poor quality promotion, or none at all, will result in low recycling rates.*
- *Provision of a service, should include full education and publicity.*

c. What to promote?

- *What do the public want to know about ?*
- *The Waste Prevention Bill will allow increased local government funding.*
- *Minimisation and re-use must be pushed with local residents.*

d. The choice of media?

- *Local newspapers are not the best means of informing the public.*
- *An environmental newspaper can put forward the authorities policies and strategies.*
- *Use of in-house produced material addresses localised issues.*
- *Regular leaflets help to maintain public awareness.*
- *Broaden the types of media used to include radio and television.*
- *Home visits could provide a real boost to participation*

Throughout 1997 and 1998 many local authorities around the UK have started (or re-launched) a variety of recycling initiatives. Much of their press coverage has been limited to describing the activities of collecting the material, with little attention given to the need for on-going messages about waste minimisation and recycling. An example of this is Brent Council who have unveiled the 'Waste Warriors', three cartoon characters it hopes will encourage the Borough's residents to recycle more of their household waste [21]. The council had spent the past couple of years developing its recycling infrastructure, but has only achieved a recycling rate of 3%, so the time was right to increase interest and awareness. However, little is mentioned about the education and publicity of the scheme, and much less is given over to the on-going message about waste minimisation and recycling.

5. WASTE MANAGEMENT IN LONDON

The disposal of London's waste is a major issue of strategic planning concern [22], as London is the centre of a regional system of waste creation and disposal. London Boroughs act as their own waste disposal authorities with contracts for disposal largely determined on grounds of cost, and with existing arrangements for the strategic co-ordination being fragmented and subject to breakdown [23]. This represents a severe weakness in London's system of waste management and is something which can only be remedied by the creation of a more organised, cohesive and long term frameworks for managing and planning for the disposal and treatment of London's waste.

There are three basic principles which should act as the basis for strategic and local action to optimise the treatment and disposal of London wastes; [i] London should aim to deal with the waste it creates as much as possible in line with the Government's waste management hierarchy, [ii] when arrangements for collection, treatment and disposal of waste are made, every effort should be made to ensure the fullest use of the proximity principle, and [iii] Boroughs need to co-ordinate their waste collection, treatment and co-ordination activities in terms of waste groupings [24].

Central to kick starting effective waste reduction and recycling in London is the need to establish a London wide multi material door to door recycling collection, and to develop long term contracts with industry to buy the recycled materials at set prices to allow infrastructure development and funding to be found. The immediate goal of the London Pride partnership is to meet its 25% domestic recycling target by the year 2000. In 1993 London recycled 17,000 tonnes of municipal waste (4.9%), and by 1996 the tonnage level rose to 25,000 (7%). At this rate London will reach a recycling rate of 10% by the year 2000, some way short of the Government target. London's recycling system is predominantly reliant upon bring systems, with only 2 boroughs operating borough wide multi-material kerbside recycling schemes in 1996 (one of which was The Royal Borough of Kensington and Chelsea), and 2 other boroughs were preparing to launch their schemes.

There are also only 2 central composting sites, whilst home composting has been sporadic and generally under-utilised. There are 3 MRFs (one of these is also in Kensington) and 4 mini-MRFs, whilst 3 other boroughs are in the process of developing their own sorting facilities. It would seem that Recycling has been a 'bolt on' addition to the general waste collection and disposal system, with only Kensington & Chelsea having sought to integrate recycling and general refuse collection through the use of split-back vehicles and mixed collections, although 4 other boroughs have combined collection and recycling within a single collection contract. Within the existing organisational structure, recycling is clearly under resourced and lacks adequate political support and local participation [24].

It would appear that inner London Boroughs have the lowest rates of recycling, of the bottom 16 London boroughs according to recycling rates 12 (75%) are inner boroughs or contain parts of inner London. The two highest ranking inner London boroughs, Kensington and Chelsea and Westminster, both have operational multi material kerbside schemes, which are intensive and take some of the emphasis away from source separation and the use of bottle banks. The top seven boroughs are all southern Outer London boroughs, and 6 of these 7 (86%) operate their own disposal arrangements, rather than being members of a statutory authority, and 5 of them (71%) have formed their own voluntary (single) disposal consortia to arrange their disposal through [23]. This has provided them with more autonomy as individual boroughs to integrate collection and disposal policies, than those borough groupings where statutory disposal authorities determine the disposal strategy for the WCAs. Clearly there are some trends occurring in the recycling performance of MSW in London that must be taken account of before discussing in more detail the approach of a particular borough. Inner London boroughs have a more difficult task to achieve increased recycling level because of lack of available space for separate collection receptacles and for sorting facilities, because of the degree of high rise and multi-occupancy housing, the very mixed nature

6. THE CASE STUDY LOCATION

The Royal Borough of Kensington and Chelsea is an inner London Authority home to 138,000 residents, in approximately 78,600 households [25]. The amount of household waste produced in the last decade has remained relatively static at approximately 0.75 tonnes per household per annum, although the total municipal waste generated in the Borough has increased from approximately 80,000 tonnes [25] in 1985 to 90,000 in 1996 [26]. The Borough's doorstep recycling service is available to approximately 65,000 households; the waste is collected twice every week from the kerbside, and at the same time mixed recyclables are collected from the door in 'used carrier bags' through the use of special 'split-back' refuse collection vehicles [27].

This twice weekly refuse collection is provided out of necessity rather than luxury, due to the high proportion of small flats and single occupancy homes with little or no storage room for their rubbish. In 1993 following a trial scheme the most comprehensive recycling scheme, at that time, in the UK was launched, offering a recycling service to all its residents in order to achieve the Government's target of recycling 50% of the recyclable content of household refuse by the year 2000. Simplicity is the key characteristic of the initiative, as households only have to separate the recyclable content of their refuse in used carrier bags.

The Borough's doorstep recycling scheme is the direct product of unique technical innovations and a bold initiative taken by the Council. The split-back refuse collection vehicle which is integral to the doorstep recycling collection was specifically developed by Dennis Eagle for Kensington and Chelsea. It features a twin compaction body, one compartment for rubbish and the other for recycling. The split-back has a total payload of around 7 tonnes, 2 of which are for recycling and the remaining 5 for household waste (see Figure 5.6). Cremorne Wharf is a purpose built materials recycling facility owned by the Borough but operated by BFI Waste Systems (see Figure 5.7). It was built in 1993 specifically to handle the recyclables from the Borough's doorstep recycling collection, and the MRF is capable handling 15,000 tonnes of recyclables per year.

According to the Director of Waste Management [28];

“The recycling initiative in the Royal Borough is targeted to collect a set number of tonnes per year, currently 7,500 for 1996/97, and the target is politically set to increase by between 15 and 20%. The education of young children through schools and other methods of communication could not be relied upon to achieve these tonnage targets. Consequently the Roadshow was launched with the aim of reaching new recycling levels, and for the purpose of communicating to those residents who had previously been unaware of the service provided.”

Although the Borough’s extensive doorstep recycling collection service had been in operation since May 1993, and despite extensive publicity many residents still claimed to have never seen any publicity relating to the scheme, which supports the notion that mail-shots are ‘often binned without reading’ as they are regarded simply as junk mail.

Since the recycling service was already Borough wide and could not be expanded any further, effective promotion was the only avenue available to increase recycling diversion and public participation rates [29]. The Recycling Roadshow was introduced in September 1995, with the aim of knocking on every door in the Borough, and talking to as many residents as people, in the hope of boosting recycling participation [19]. According to The Director of Waste Management [28];

“The education of young children through schools and other methods of communication could not be relied upon to achieve our targets. Consequently the Roadshow was launched with the aim of reaching new recycling levels!”

The Borough’s Recycling Manager (Mrs Sharon Ross) also stated that [27];

“Despite extensive promotion of the Council’s recycling service using traditional methods of posters, leaflets, and newspaper adverts many households still claimed that they were unaware of the service. The Council places great emphasis on the education function of the recycling scheme and believes that an effective, comprehensive promotion and education programme is an indispensable part of any integrated waste management system. Thus the Council was forced to find a more effective way of communicating with its residents.”

Figure 5.6. Loading refuse and recycling into the split-back vehicle
(source: author)

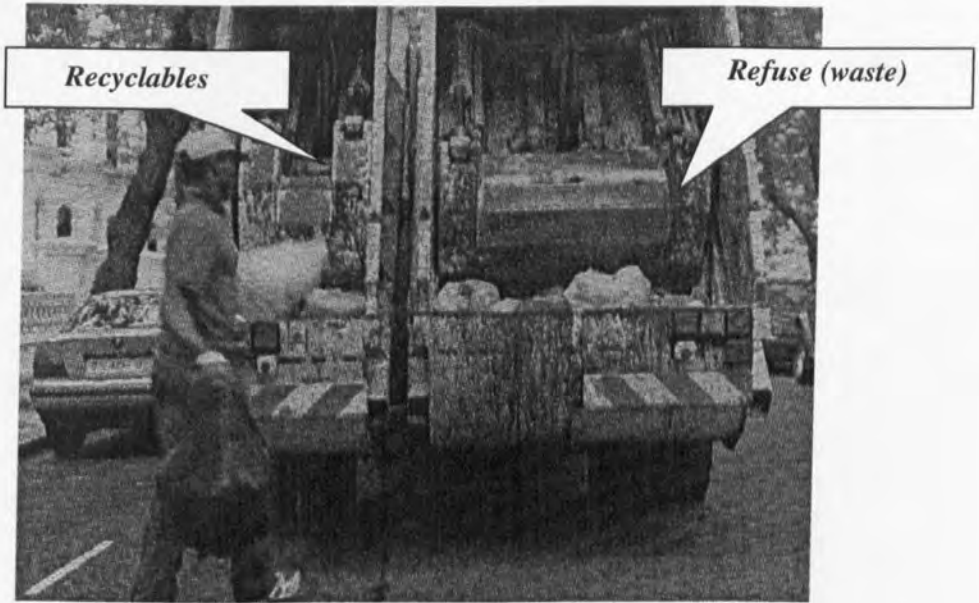


Figure 5.7. Split back vehicle tipping at the MRF (source: author)



For waste management to become more sustainable and cost effective for the residents of the Borough, greater participation in the recycling services must be encouraged, and this is the prime aim of the Recycling Roadshow. The doorstep recycling scheme is designed to deliver a cost effective service for the ratepayers of the Borough [30].

The Director of Waste Management (Mr Norman Cook) commented that [28],

“Communication with the general public to improve recycling habits is vital. An immediate involvement by the adult population is vital to get sufficient momentum into recycling to make it anything like cost effective. The general public cannot be relied upon to read literature and freebie type newspapers. The Roadshow offers a physical communication which can convey a recycling message in an understandable language- whoever is the recipient.”

7. THE RECYCLING ROADSHOW

According to Evison [31], quality promotion and publicity on a regular basis, will produce better recycling performance figures, whilst poor quality promotion, or none at all, will result in low recycling rates. Thus, the Borough’s reliance on local newspaper adverts and posters was abandoned and a concerted effort was made to take to the streets with the recycling message, with the launch of the Recycling Roadshow [32].

According to the Recycling Manager [27], the aim of the Roadshow was simply;

“to saturate an area with personnel, armed with information leaflets and wearing easily identifiable clothing, to take the recycling message to resident’s homes in order to boost participation on the Council’s doorstep recycling service.”

The recycling unit’s staff took to the streets dressed in recycling shirts and armed with an assortment of leaflets, stickers and badges, and knocked on every door in the chosen crew’s area (round) talking to all residents that were at home during the hours of 10 am and 5 p.m (see Figure 5.8). This communications programme aimed to knock on the door of every household in the Borough to inform residents of the doorstep recycling service and to attempt to persuade non-recyclers to try the service, and raise general awareness surrounding waste management issues [30]. The main themes of the Roadshow initiative were to measure in a crude sense participation levels in the recycling systems provided, and to educate the residents about waste minimisation, composting and recycling and the services provided by the Borough. The Roadshow’s progress will be a vital ingredient in raising participation levels and promoting waste reduction during the near future.

Figure 5.8. The Roadshow Team (source: author)



Conceptually this initiative marks a major rethink in the way that recycling is perceived, placing recycling at the heart of an integrated waste management strategy rather than a peripheral activity. The Royal Borough is at the leading edge in developing a new role for local authorities, with the Borough acting as a facilitator to lever private sector organisations to invest in environmental improvement strategies.

8. THE DATA

The average weekly tonnage of recyclable material collected in the Borough rose from from 107 to 132 tonnes following the Roadshow Programme (Figure 5.9), even though the recycling collection system itself has not been expanded, due in part to greater participation by the Borough's residents. Eighteen months after the launch of the Roadshow, 8% of all households in the Royal Borough of Kensington and Chelsea have been spoken to as part of this re-education programme.

The average proportion of households interviewed in each crew round was 9.4%, with the lowest response coming from households in crew area kc3 (4.5%) perhaps due to the time of year when the survey was conducted (during the Summer), and the greatest response from households in crew area k1 (12.7) due in part to it being the first area to be surveyed and because it was saturated with staff, resources and promotional material. In the next leg of the Roadshow, other people who were missed by the first Roadshow event will need to be contacted so that in total a greater number of residents in each crew area are informed and educated about the recycling services, this may be best achieved through evening and weekend visits.

The average proportion of households interviewed that actively participated in the recycling service was 57.3% which is a particularly impressive figure, as it was believed by the local authority that perhaps only 20-30% of residents in the Borough were regular participants. However, the range of participation rates was rather broad with 41.7% in crew area k9 and 69.6% in crew area k2. However, when you consider that at present only 11% of municipal waste in the Borough is being recycled annually, it suggests that participation rates would need to increase further to perhaps levels of 80 to 90% if the Government target of recycling 25% of household waste is to be achieved by the year 2000.

Experience suggests that not all residents who stated that they recycle do on a regular basis, and more importantly very few of the participants actually recycled the full range of materials, choosing to focus upon paper and bottles. This may also be indicative of the type of participation that is common throughout the UK with regards recycling, that is infrequent and ineffective with few of the potential materials being recycled every week, or on a regular basis. Perhaps the issue of effective participation needs to be dealt with, encouraging more regular and full use of the service by residents, which is in part the reasoning behind the initiation of the Roadshow [30]. The intention of the Roadshow is to correct these trends by increasing participation, by focusing upon those households that do not currently recycle, and by improving recycling levels by re-educating the public so that they are fully aware of all materials that are acceptable for recycling.

Figure 5.9 The Impact of the Roadshow Campaign on Average Monthly Recycling Rates (April 1995 – December 1996)

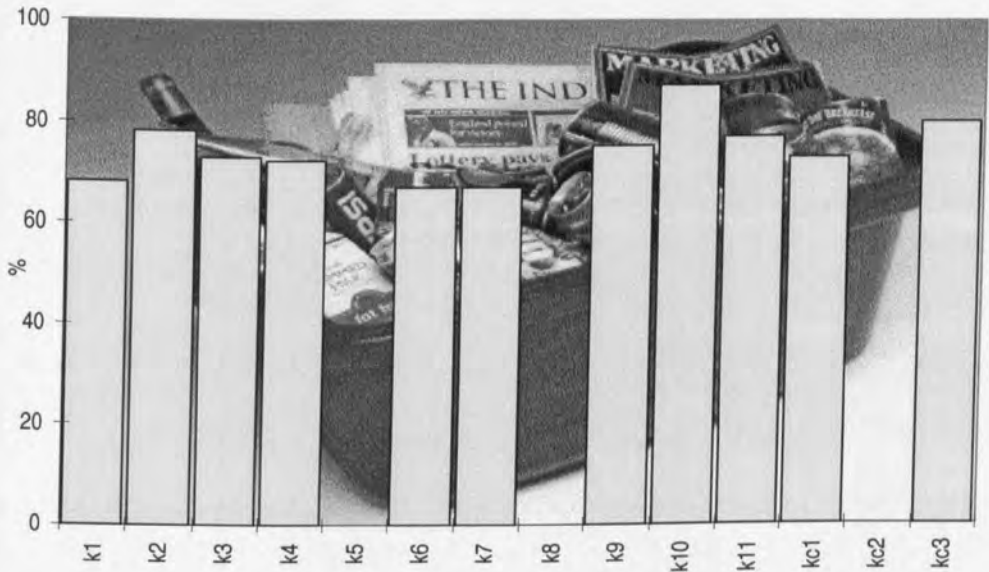


Perhaps some of the most interesting figures relate to the proportion of residents that had not heard of the doorstep recycling service, and those that used this as an excuse for not participating, which in some cases was exceedingly high. On average 31% of households had not heard of the doorstep recycling service, ranging from 24% in area k2 and k6 to 44% in k9. This is particularly high indicating that awareness of the service is not at the level required for the efficient running of the service.

Lack of knowledge of the service was cited in almost all cases as being the prime reason for non-involvement with the service, with on average 73% of households stating this as their reason. The other most commonly quoted reasons for non-participation were 'did not know the day', 'not interested' and 'too difficult' yet these reasons accounting for only 25% of responses when aggregated. 87% of households interviewed in crew area k10 stated that they didn't recycle because they did not know about the services provided, whilst the lowest response was 67% for crews k1, k6 and k7.

On average 57% of households interviewed participated in the doorstep recycling service, ranging from 70% participation in k2's area to 42% in k9's, with an obvious trend being that higher participation rates lead to increased recycling levels. As participation increases so does the level of recycling, and thus if recycling targets are to be obtained, greater participation levels are essential. perhaps participation rates in the order of 90% would achieve the Government recycling targets (Figure 5.10).

Figure 5.10. Households that don't recycle because they were unaware of the service on offer



Of less statistical significance, but of greater interest, is the relationship that exists between post Roadshow percentage increase in recycling and pre-Roadshow non participation rates due to lack of awareness. What this suggests is that the Roadshow will on average be more successful in realising the potential of an area when the initial participation and awareness of services was poorest. This indicates that the Roadshow can have a significant impact particularly where initial participation rates are at their lowest, and perhaps these are the areas that need the greatest attention and programming for future Roadshows. Perhaps participation rates would need to increase substantially to perhaps levels of 80 to 90% if the Government target of recycling 25% of household waste is to become a realistic target [33].

This may also be indicative of the type of participation that is common throughout the UK with regards recycling; infrequent and ineffective with few of the potential materials being recycled every week. Perhaps the issue of effective participation needs to be dealt with, encouraging more regular and full use of the service by residents, which is in part the reasoning behind the initiation of the Roadshow [32].

Thus there are clear associations between recycling tonnage and awareness of the scheme, and perhaps there are some lessons to be learnt from this (Figure 5.11). In general it appears that residents are not participating due to lack of awareness on their part and poor public communication on behalf of the local authority, it would thus seem appropriate to conclude that if the residents are educated and informed, then participation and recycling rates will increase in turn. What is required is for more people to be informed of the services in an efficient manner to provide the necessary minimum level of participation required to make the doorstep recycling collection a cost effective local government service.

Figure 5.11. Comparison of pre-Roadshow recycling tonnage and participation levels

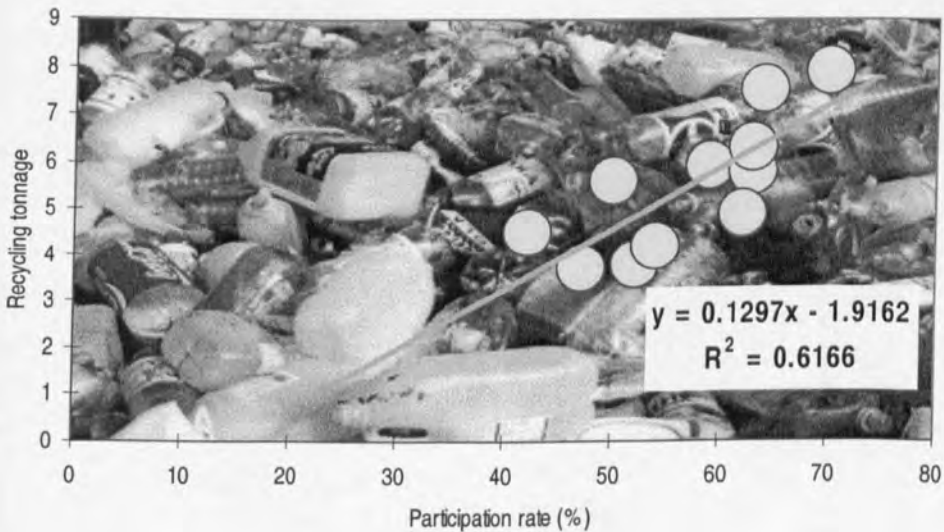
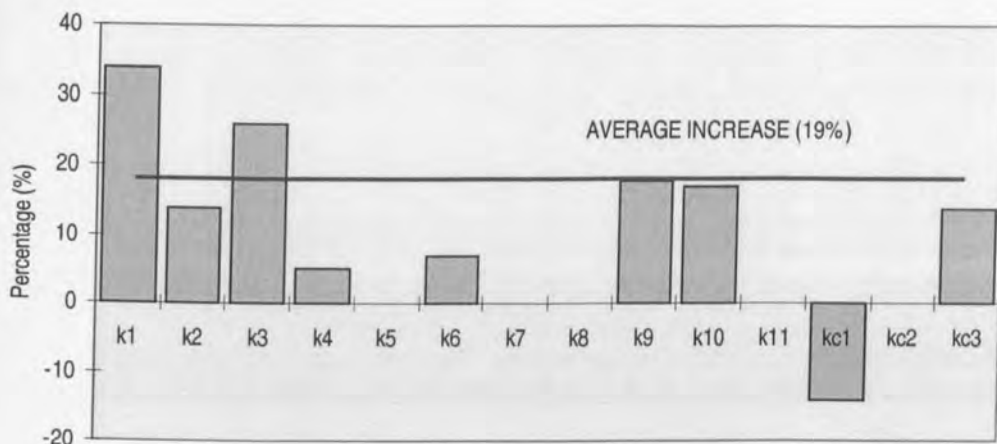


Figure 5.12. Increase in weekly recycling tonnage collected post-Roadshow in the crew areas visited

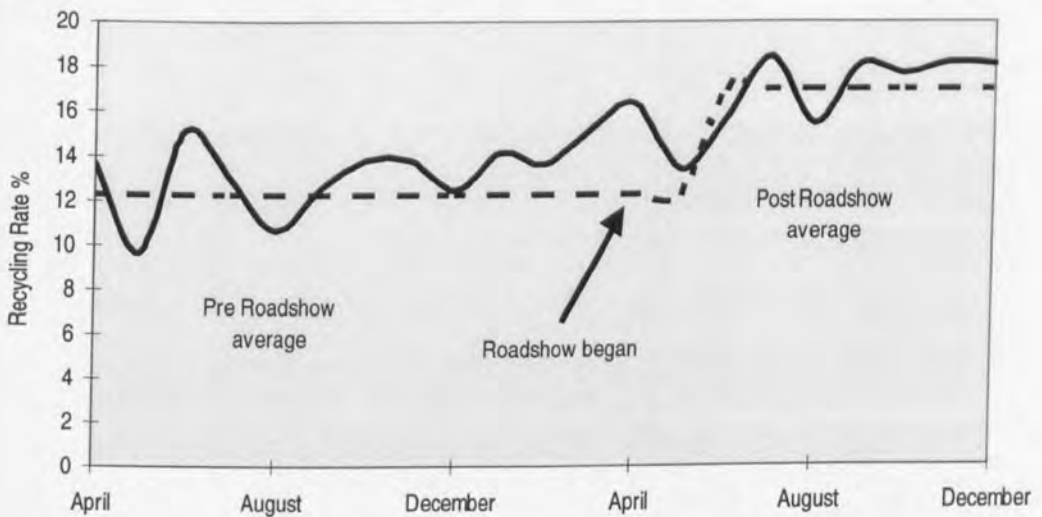


Of greater interest for the Authority was the impact of the Roadshow on recycling tonnage and on recycling rates. The average increase in recycling tonnage post-Roadshow is 19%, which is based on a 4 week pre and post Roadshow average (Figure 5.12). However, the range of impact is rather broad from no impact in some areas to almost 35% in crew area k1, and a negative impact in area kc1. In 8 of the 11 (73%) of the crews already visited the impact has been an increase in recycling rates, whilst two areas experienced little change. On average the increase in tonnage collected post Roadshow is 0.6 tonnes greater than the average pre Roadshow (Table 5.6), and if this figure is extended to all of the crews (12) then a weekly increase of 7.2 tonnes is expected. Over a year this weekly increase would equate to a minimum additional 375 tonnes which would raise the recycling level of the Borough from 11.5% to 12.1%. If this increase in recycling rates could be maintained through future Roadshow programmes, then this would approach would prove to be a very effective tool for increasing recycling performance and participation.

The final crew area to be discussed is that of k2, results are shown in Figure 5.13, which has historically had the greatest recycling rate of all the crew rounds. Pre Roadshow the recycling rate was 13%, whilst post Roadshow the recycling rate had risen to 17%.

This is a significant increase on what was already a particularly effective recycling rate. Undoubtedly, the Roadshow has increased tonnage and the recycling rate of individual crews and the doorstep service as a whole, and is thus an effective additional measure available to local authorities for promoting residential behaviour changes and participation in local government voluntary services. Again there is a trend similar to that experienced in k1 area, where post Roadshow there are quite wide variations in recycling rate between 8% and 12%. Perhaps there is a common trend here which needs to be further investigated, that of widely varying and changing recycling rates in the post Roadshow era.

Figure 5.13. Monthly recycling rate for collection crew k2



9. EVALUATION OF THE PROGRAMME

This awareness campaign indicates the clear need for continual and sustained efforts to improve participation rates in recycling services, which is perhaps the main barrier to totally costs effective and efficient recycling services for many local authorities. The Roadshow has helped to improve the doorstep recycling scheme's recycling rate from 9% in April 1995 to in excess of 11% by October 1996 (and it is now almost 13%) and has raised the perception of residents throughout the Borough. However, this form of communication must work in parallel with more traditional forms promotion and education so that all groups are targeted within the Borough.

Table 5.6. The impact of the Roadshow on crew recycling levels

<i>Crew</i>	<i>% Households interviewed</i>	<i>% who recycle</i>	<i>% who don't recycle who haven't heard</i>	<i>% who hadn't heard of scheme</i>	<i>pre Roadshow average tonnage</i>	<i>post Roadshow average tonnage</i>	<i>% increase in recycling tonnage</i>
K1	13	52	68	33	3.8	5.1	34
K2	11	70	78	24	7.9	9	14
K3	9	54	73	33	4.2	5.3	26
K4	8	47	72	39	3.7	3.9	5
K5			NOT	YET	SURVEYED		
K6	10	64	67	24	7.5	8	7
K7	11	59	67	27	5.9	5.9	0
K8			NOT	YET	SURVEYED		
K9	8	42	75	44	4.5	5.3	18
K10	9	63	87	32	5.8	6.8	17
K11	10	63	77	28	6.3	6.3	0
kc1	10	62	73	27	4.9	4.2	-14
kc2			NOT	YET	SURVEYED		
kc3	5	50	80	40	5.6	6.4	14
TOTAL	8	57	73	31	60.1	66.2	19

However, it is apparent that there needs to be a continual and sustained effort to improve participation rates in an area that has previously struggled from lethargy and disinterest from the public; this is perhaps the main barrier to effective recycling services in the UK. But at what cost can such a promotions campaign be maintained? The true costs of the Roadshow remain unidentified, that is the real costs are hidden within the Recycling Unit's annual budget, and are not detailed or listed in any formal Borough documentation.

On average the Roadshow required an officer from the Borough and a representative from the Recycling Contractor to form the core members of the Roadshow team (Table 5.7). An estimate of the 'manpower' costs of the Roadshow would be about £15,000 per annum, as the Roadshow required 2 officers for 6 months of the year. There were no additional costs for materials because the same promotional leaflets, stickers and newsletters were used as the traditional communications approaches. Sweatshirts, T-shirts and hats were produced, so that the residents would automatically recognise the message that was being provided, and a car was required for some of the crew rounds. Thus, the annual estimated cost of the Roadshow education programme was about £20,000. Thus not only does the programme effectively costs the Borough nothing, it results in positive environmental behaviour, and helps raise awareness.

Table 5.7. Costs of the Recycling Roadshow

Manpower	£ 15,000
Literature & Materials	£200
Vehicle & Transport	£5,000
Time	unknown
TOTAL	£20,200

Table 5.8. Savings attributed to the Roadshow

Weekly increase in material	6.1 tonnes
Extrapolated increase (annually)	317.2 tonnes
Disposal savings (at £50 per tonne)	£15, 860
Recycling Credits (at £22 per tonne)	£6, 978
Total Savings	£22, 838
<i>TOTAL COST OF ROADSHOW</i>	<i>£20, 200</i>
<i>ECONOMIC BENEFIT</i>	<i>£2,638</i>

The estimated savings in disposal costs (at £50 per tonne) and income through the recycling credit payments (at £22 per tonne), for the Borough amount to about £22, 838 per annum (Table 5.8), which more than covers the costs of the Roadshow. Thus not only does the programme effectively not cost the Borough anything, it results in positive environmental behaviour changes, raises awareness and aids the Borough as they attempt to move towards the 25% target. The Roadshow, albeit at a simplistic level, should be considered a cost-effective social marketing technique with many positive benefits that are difficult to quantify.

If the success of the Roadshow on doorstep collection rounds, could be transferred to all municipal waste collected in the borough through education and awareness raising, then an additional 2,500 tonnes (approx.) of waste would be recycled, leading to savings in excess of £160,000 per annum (through reduced landfill costs, and recycling credits), which is a significant sum for a local authority who are struggling with ongoing cut-backs in local government funding (Table 5.9).

10. A SUCCESS STORY?

It was found that the main advantage of face to face contact for the promotion of recycling services is that this type of contact is responsible for the changing of personal habits, because the Roadshow team are all well versed in the benefits and issues of recycling within the borough and can thus provide the necessary supportive evidence and arguments often required by unsure residents.

This type of contact also provides the local authority with important feedback from the residents relating to collection problems that they experience, and the recycling team can then act immediately to remedy these problems and improve the efficiency of the service provided. Residents appeared more likely to change their behaviour after having spoken to an officer personally about the topic who can answer all their questions. Those residents that were already taking part were often not using the system to its optimum, and were only recycling certain materials. The results go to prove that there is no substitute for getting out of the office and talking to residents if you want their participation in council schemes [34].

Table 5.9. Potential savings for the borough as a whole

<i>Increased recycling rate due to the Roadshow campaign</i>	<i>9% to 11.8%</i>
<i>If transferred to 80,000 tonnes of MSW, how much extra will be recovered</i>	<i>2240 tonnes</i>
<i>Landfill Disposal Savings (£50 per tonne)</i>	<i>£112,000</i>
<i>Recycling Credit Income (£22 per tonne)</i>	<i>£49,280</i>
<i>Total potential Savings</i>	<i>£161,280</i>
<i>Additional Costs</i>	<i>£20,000</i>
<i>TOTAL ECONOMIC BENEFIT OF ROADSHOW</i>	<i>£140,000</i>

One of the common problems associated with the Roadshow approach was the resident suffering from the ‘salesman syndrome’ where they wouldn’t listen to what you had to say but immediately jumped to the conclusion that you were trying to sell them something which they obviously didn’t want, and thus closed the door and told you to go away. Many residents would state that they were simply too busy to deal with you and would request that you return at a time more suitable to them.

At the other extreme were the residents who on hearing that you were a council official would then deliver a list of demands / requests / or problems that they had expecting you to provide them with answers and solutions. Less infrequent were the residents with strange behaviour, mistaking the council officers for the police, boyfriends/girlfriends or relatives expected for tea, which often lead to confusion.

This has resulted in a low turn out (under 12%) of households actively being interviewed, and this may be a poor representation of the views and behaviour of residents in the borough, only addressing those people who are at home during the day, but this will hopefully be partially corrected by the second round of Roadshow which will involve evening communication. Other ways that this biased sample could be improved is through early morning visits, or return visits at a more convenient time.

According to the Director of Waste Management for the Royal Borough of Kensington and Chelsea [29],

“It is difficult to evaluate the precise degree of success of the Roadshow. With other efforts and the Roadshow our recycling targets have generally been achieved. The feedback from residents and from the Roadshow teams reflect the initiative as a pleasing and successful venture. The Roadshow is undoubtedly reaching parts which other parts of communication could not reach. Our recycling tonnage are now levelling off, but our enthusiasm for the Roadshow continues, although one must accept that being a labour intensive operation, using skilled academic staff does have a cost that probably cannot be maintained in the longer term.”

11. THE NEW ‘RECYCLED’ ROADSHOW

There is little doubt that kerbside recycling schemes will be a crucial element for local authorities in achieving local statutory recycling targets as laid out in the new National Waste Strategy [35]. And the most important aspect of these voluntary recycling schemes is public participation – without this a scheme will be ineffective in diverting waste from landfill and will be a financial drain on local budgets!

Since 1997 recycling rates in the Royal Borough have failed to peak beyond a plateau of 10%; even though the Borough offer a twice-weekly kerbside collection of mixed recyclables, which are then sorted by the contractor (SITA) at the Borough’s recycling facility – Cremorne Wharf. So it was decided that re-visiting the households to test opinion and encourage participation might be a valuable addition to the Borough’s extensive promotions campaigns. Thus in 1999, the Royal Borough in partnership with Business Eco Logic and Kingston University put together a proposal for landfill tax credit funding to test approaches to ‘doorstep promotions’ and monitor recycling behaviour in the Royal Borough [36].

The programme was developed to provide a more thorough approach to public promotions, utilising the social survey expertise of Kingston University, and the local 'hands-on' knowledge of the Borough's recycling team to deliver a more detailed survey of recycling behaviour and a programme designed to reach a greater proportion of residents through evening and weekend visits.

It was widely acknowledged, by all parties involved in the original Roadshow campaign, that the potential of this approach to public education was considerable for a densely populated Borough like Kensington & Chelsea. Discussions with other departments within the authority centred upon the use of the Roadshow as a public educational vehicle promoting many messages to the Borough's residents on an annual basis. This never really took-off because of the financial implications involved and the problems with inter-departmental projects at that time.

However, those involved in the operational side of the work also realised the need for the programme to evolve and develop to make it a potentially more effective tool for promoting public participation in recycling and for measuring participation in recycling services;

- *one consideration was the development the Roadshow to something akin to the green home visits being experimented with in the USA, where sustainable lifestyle issues are encouraged in general without the specific focus on waste*
- *another concern was that only 8% of the Borough's households had been interviewed and that left a vast number of the boroughs residents who had not experienced the 'personal' nature of the Roadshow*
- *the Roadshow programme could be timetabled to work at weekends and in the evenings in order to reach elements of the Borough's population that are not at home during the day*
- *the Roadshow could be more effectively used to monitor and evaluate the performance of the recycling service by gauging public participation, awareness and opinions regarding the services on offer*

These issues were central to the proposal for a revised Roadshow project in late 1998 to the Western Riverside Environmental Fund (WREF), and the participation of many of the original parties in this 'recycled' project was invaluable to its successful development and inception. The project was formally registered with ENTRUST in May 1999 and received funding from April 2000.

11.1 Project Methodology.

The research programme involved the close collaboration of a diverse research team, and the development of partnerships between key stakeholder groups; Project Management (Kingston University), Roadshow Team members (students), Operational officers of the Royal Borough (Recycling Unit), Waste Collection Company officials (Sita GB), Project Auditors and regulators (ENTRUST and Business Eco Network), and the Funding Body (WREF).

From these stakeholders a Steering Group was organised with responsibility to monitor the progress of the project and make decisions regarding the programme and timetable. This group consisted of – Adam Read (Kingston University & Project Manager), Professor Guy Robinson (Kingston University, budget holder), Greg Hall (Business Eco Network, Environmental Body), Sharon Ross (Royal Borough of Kensington & Chelsea), Lynda Thomas (Royal Borough of Kensington & Chelsea) and Steve Jones (Roadshow Team leader). Figure 5.14 shows the new leaflet designed for the programme.

Figure 5.14. The new Recycling Leaflet

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Figure 5.15. Taking to the street (source: author)



Figure 5.16. Discussing recycling approaches with the general public (source: author)



Figure 5.17. Did you know we take all your recyclables every week? (source: author)



Figure 5.18. Did you know we collect your recyclables twice every week? (source: author)



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Having completed the survey, the residents are offered advice about the local recycling services, asked to try the twice-weekly kerbside multi-material recycling collection, and are left a leaflet explaining the service. If there is nobody at home then the team will leave behind a leaflet, which explains the services available, in the hope of prompting their participation in the scheme.

11.3 Response of the Residents

The response rate to the Roadshow team targeting continued to show promise throughout the duration of the project. In excess of 8,000 residents were interviewed across the 15 crew areas compared to only 4,800 in the original Roadshow campaign. This is equivalent to 25% of households in each of the crew areas being interviewed compared to only 12% in the original campaign (Table 5.10). Therefore it is safe to conclude that this current project has been a success in reaching more residents in the Royal Borough as was intended from the outset, despite there being a varying proportion of interviewees in individual crew areas. This ranged from 15% in k11 (South Kensington/Knightsbridge) and 32% in k13 (King’s Road). This higher response rates correlate with the higher average evening ‘at home’ rate of 24.4% compared with the lower Saturday ‘at home’ rate of 19.3%.

Table 5.10. How successful were the home visits in gauging public opinion about recycling?

<i>Crew</i>	<i>Month</i>	<i>Number interviewed</i>	<i>% interviewed</i>	<i>% interviewed in Evenings</i>	<i>% interviewed on Saturdays</i>
k3	July	669.0	24.7	24.5	25.4
k5	June	766.0	26.4	25.3	29.4
k8	June	508.0	19.8	20.4	18.9
k15	July	585.0	19.6	19.4	20.6
Summary		2528.0	22.6	22.4	23.6

One important lesson that was learned from meeting the residents was the general lack of knowledge concerning the recycling doorstep collection. The Council have received literally thousands of calls following residents returning home to find the literature that the Roadshow team had left behind being surprised that this scheme was on offer to them or simply clarifying some points regarding what they already do.

The Recycling Roadshow has provided invaluable information concerning this type of campaign where home visits play the major role in its objectives. Although indicative of Kensington & Chelsea the lessons learned from the evening and weekend visits can be adapted and used elsewhere in other areas where this type of campaign is intended.

11.4 Recycling Performance

The data obtained in this latest Recycling Roadshow campaign are similar in content to the original campaign of 1995. However the data set available is far greater due to the development of the survey and the number of questions used in its construction. Fewer residents claimed to recycle (42%) than in the previous campaign where 57% of residents claimed to be recycling in one way or another. There is however some key differences between the two campaigns that needs to be addressed.

Firstly the original survey only covered 11 crew areas compared with the current 15. These 11 crew areas were visited during the weekday only and would therefore target a different type of resident (housewives, maids, the unemployed and retired for example) whom may have more time to be aware of recycling and the doorstep collection scheme (see Table 5.11).

It is encouraging to see that of those who claim to recycle they do so on a weekly basis, with 77% of recyclers being the lowest proportion that do put out their recyclables for collection or use a drop-off bank at least once a week (k8) and 97% the highest (k6). As previously mentioned frequency of participation is as an important part of the quality level to which any scheme operates as is the level of materials which are captured by the scheme so this is an important indicator when considering those residents that do participate since if the longer recyclables are stored the less likely it is they will reach a reprocessor. It is also important in crew areas that have a lower than average proportion of recyclers that they have a high rate of weekly participation amongst those that do recycle which will help compensate for poor participation overall (all this data are available in Table 5.11).

Table 5.11. Data collected from the Recycling Roadshow

Crew	No. Interviewed	% spoken to	Recycle?	% of non-recyclers who didn't know	% not interested	% of non-recyclers who will try
k1	716.0	29.8	66.1	92.6	3.3	90.2
k2	564.0	28.0	53.7	91.6	3.1	87.2
k3	669.0	24.7	46.6	81.2	5.7	31.9
k4	509.0	22.8	36.9	87.8	4.3	83.2
k5	766.0	26.4	56.4	76.7	5.9	40.4
k6	570.0	29.3	57.1	89.0	3.4	87.7
k7	505.0	21.6	42.4	80.1	7.6	86.4
k8	508.0	19.8	35.2	81.3	7.9	21.1
k9	349.0	23.9	37.0	94.4	1.0	86.9
k10	370.0	27.7	35.7	90.5	5.7	81.5
k11	284.0	15.2	31.7	96.8	1.9	91.1
k12	736.0	31.7	45.0	88.9	5.8	86.9
k13	577.0	31.7	33.9	91.5	3.9	91.8
k14	352.0	22.1	38.5	85.6	5.2	73.7
k15	585.0	19.6	46.5	84.3	6.7	29.2
Summary	8060.0	25.0	44.2	87.5	4.8	71.3

Table 5.11. Data (continued)

Crew	% using banks	% using doorstep	Recycle Glass	Recycle Metals	Recycle Papers
k1	3.8	96.2	94.1	76.7	97.5
k2	8.4	91.6	81.2	58.1	86.7
k3	13.1	86.2	83.3	54.5	92.0
k4	10.4	71.3	82.5	60.6	88.8
k5	26.8	87.3	80.3	53.0	85.4
k6	44.3	94.9	88.5	75.8	96.5
k7	11.1	96.7	74.9	52.1	93.0
k8	4.8	70.4	79.9	60.3	91.1
k9	7.0	93.2	98.5	55.8	99.2
k10	28.7	86.4	91.7	47.7	88.6
k11	15.1	77.8	84.4	38.9	88.9
k12	24.0	84.6	93.1	32.0	91.5
k13	2.8	76.0	89.8	48.5	92.4
k14	22.2	87.4	80.7	43.7	93.3
k15	10.6	53.5	80.8	48.0	83.4
Summary	15.5	83.6	85.6	53.7	91.2

Table 5.11. Data (continued)

Crew	Recycle every week (weekly & twice weekly)	% using clear sacks	% using open carrier bags	% with a designated bin
k1	96.4	1.8	14.5	83.3
k2	90.3	4.7	52.8	29.8
k3	85.9	13.0	61.0	15.2
k4	92.0	9.3	63.4	24.6
k5	80.8	11.1	61.5	16.5
k6	97.5	11.0	48.0	37.3
k7	95.8	5.9	56.3	12.0
k8	77.1	10.1	56.4	15.9
k9	93.0	22.5	30.0	15.8
k10	92.4	3.7	62.3	2.6
k11	87.8	10.0	61.4	12.9
k12	95.8	25.5	30.0	53.6
k13	91.3	21.6	63.1	5.4
k14	93.3	20.0	83.9	1.7
k15	83.0	24.6	58.6	7.6
Summary	90.2	13.0	53.5	22.3

Figure 5.19. Proportion of 'recyclers' using kerbside collections or drop-off facilities

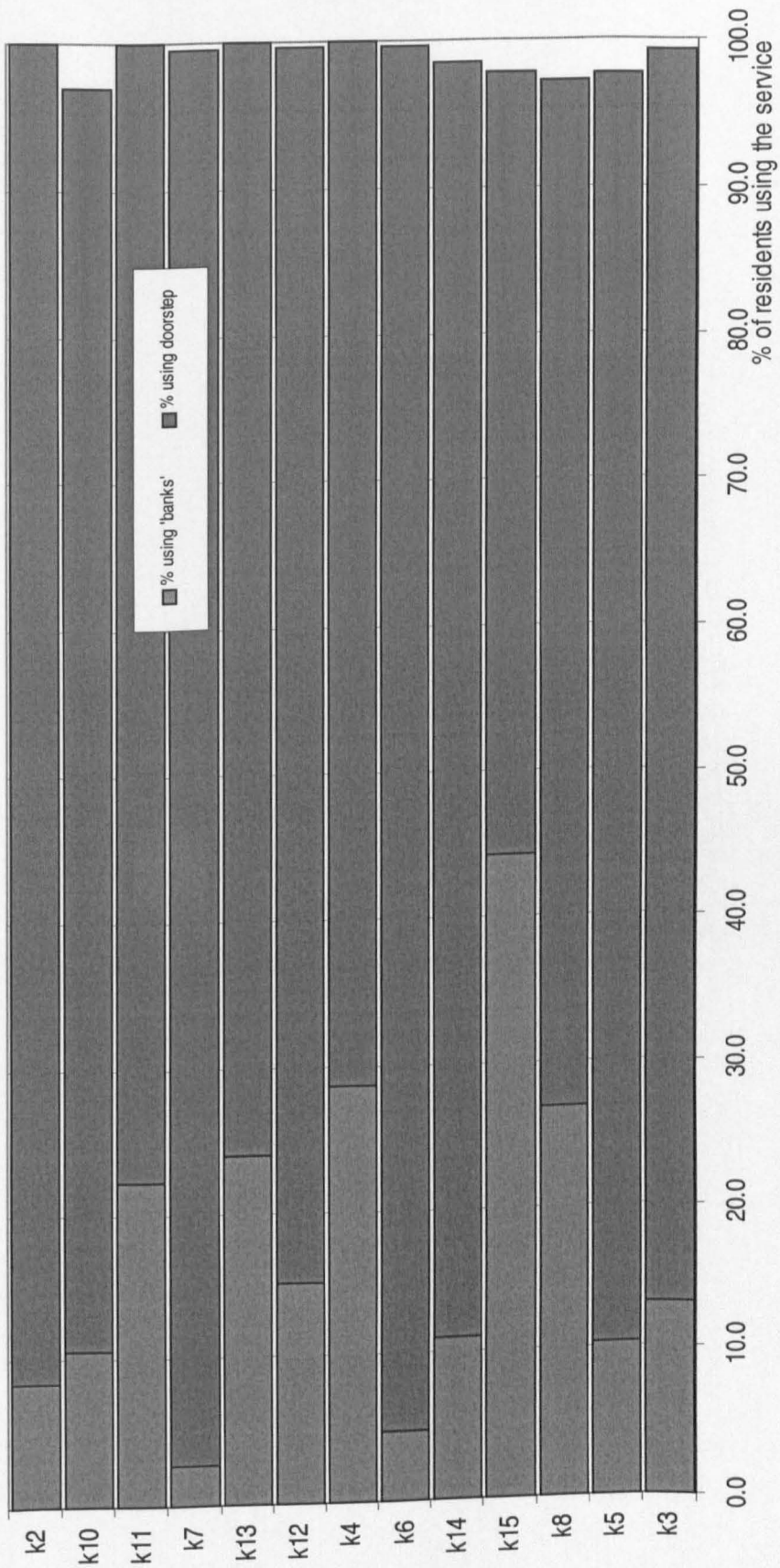


Figure 5.20. Convenience is an issue – residents who walk to use the drop-off banks

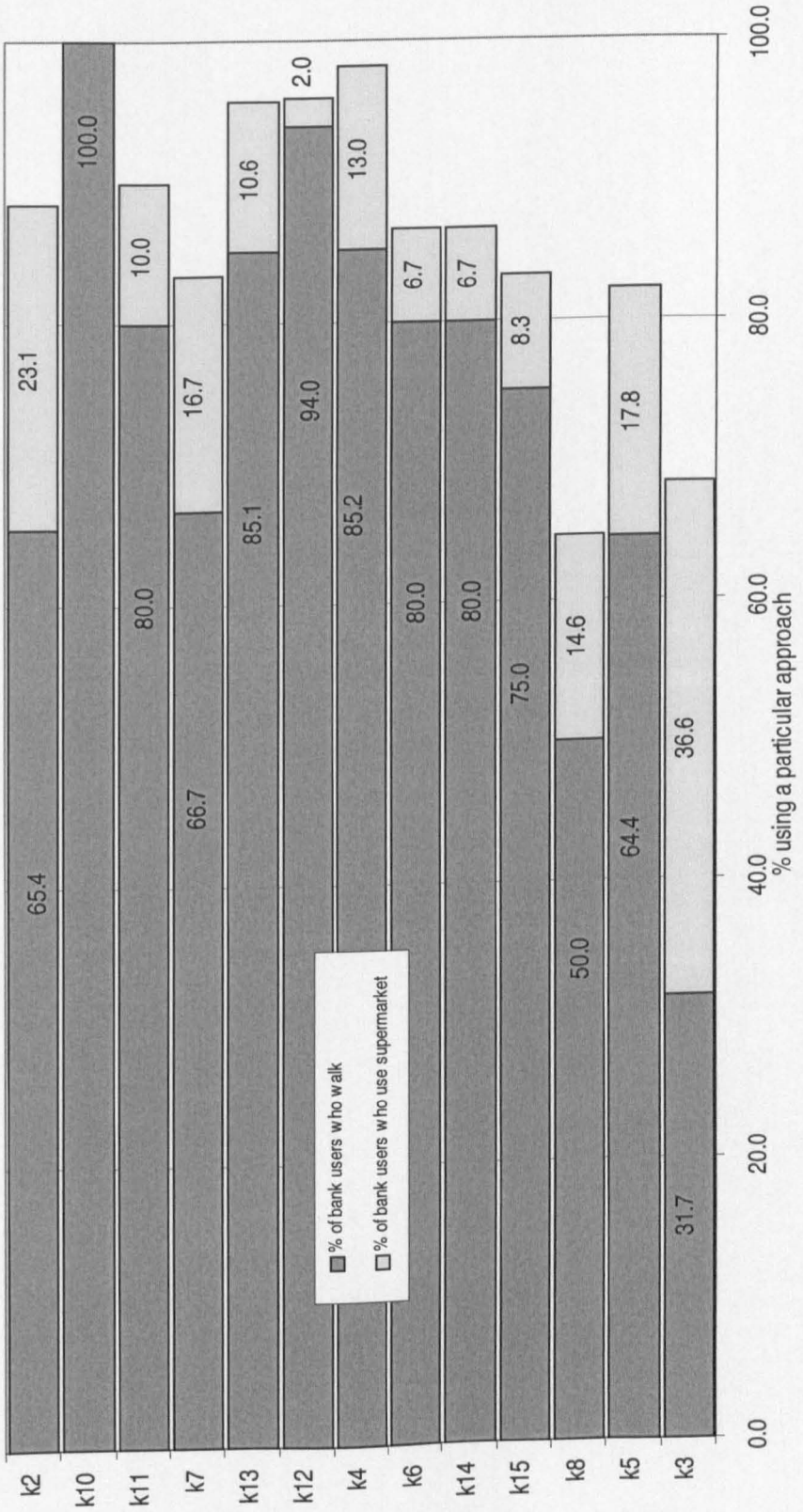


Figure 5.21. Method of kerbside recycling used

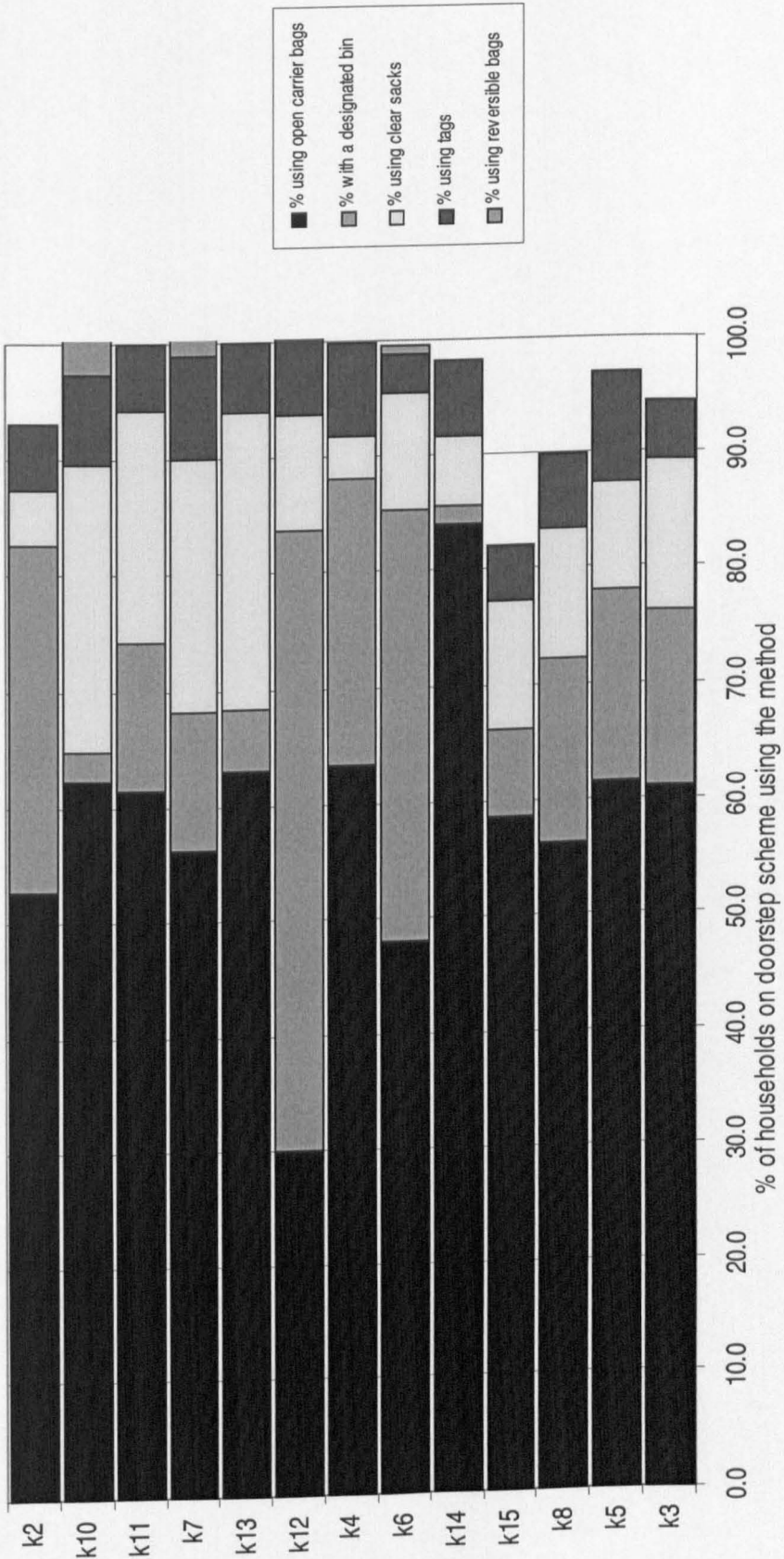


Figure 5.22. Proportion of residents interviewed that were unaware of the kerbside recycling service

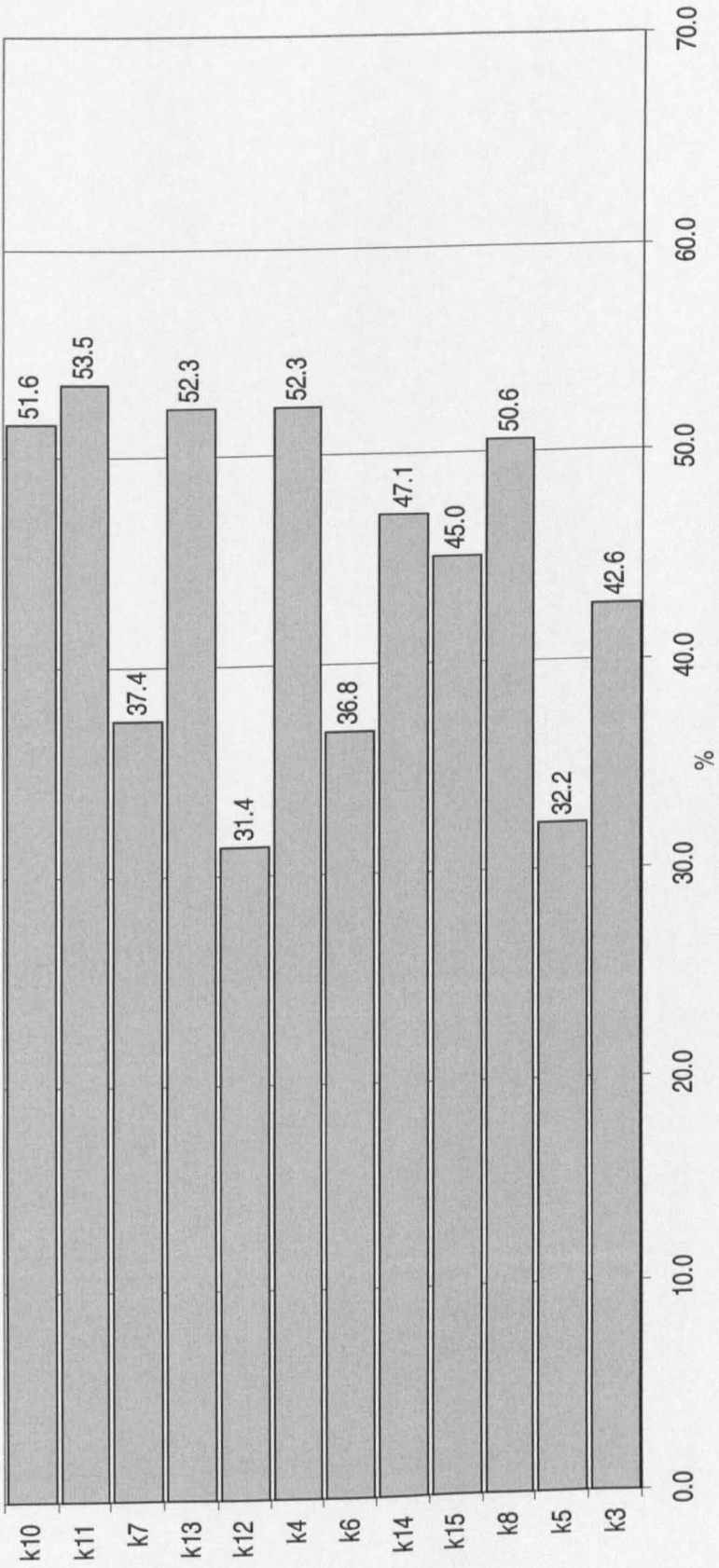
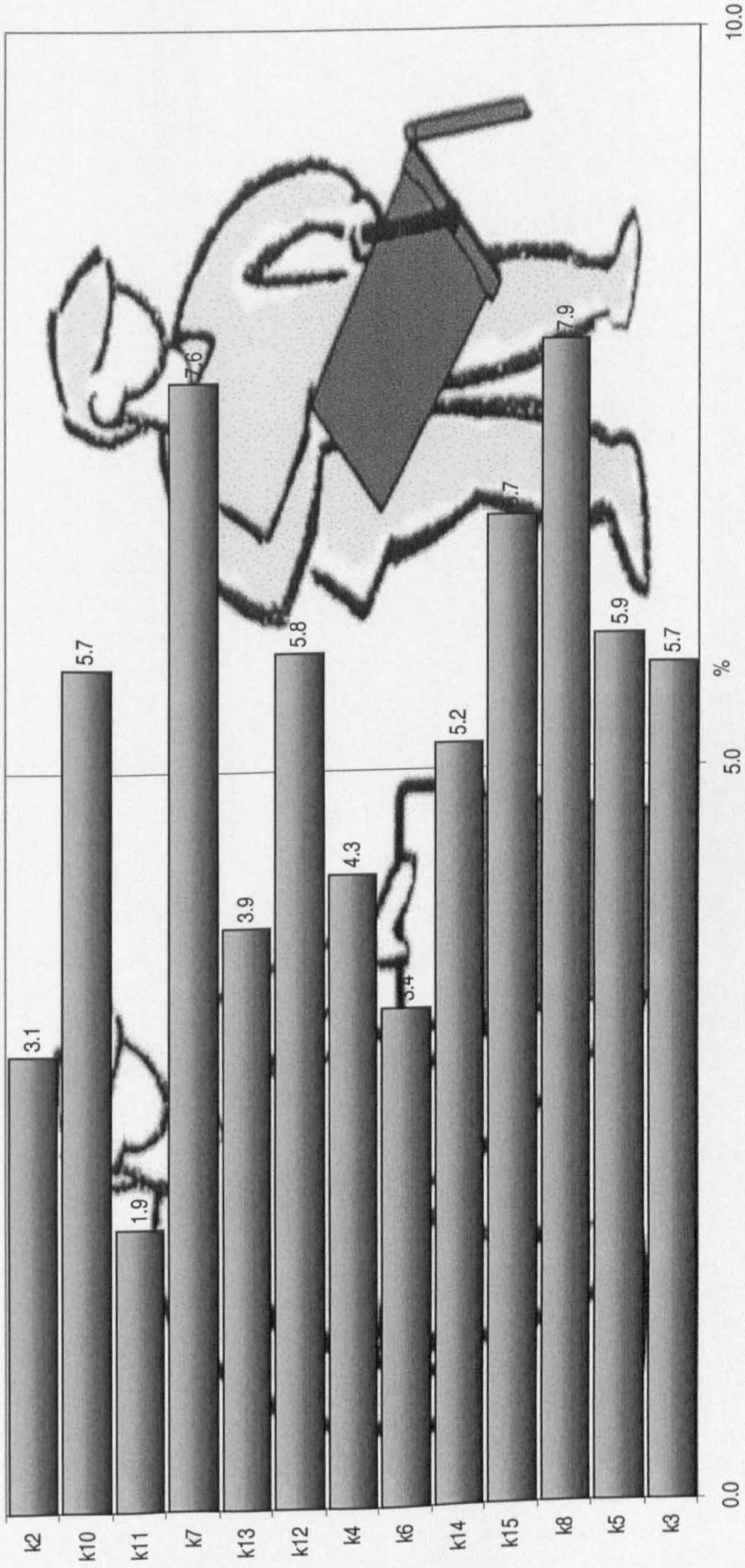


Figure 5.23. Proportion of residents interviewed that 'we're not interested in recycling'



11.5 Recycling Method

Residents who claim to recycle do so via the doorstep collection service or a drop-off bank located within the Royal Borough. Amongst those residents who recycle it is not surprising that the all in the one bag doorstep collection scheme is the most popular as it provides the resident with the least effort method of making their rubbish available for recycling. Apart from bulk separation from the residue refuse it is very much like the conventional way of disposing of household rubbish. 85% of recycling respondents use this 'keep it simple' method of collection as opposed to the 15% remainder who still choose to segregate their rubbish into individual fractions and transport them to a drop-off site (see Figure 5.19). 71% of those using drop-off banks as their main method of recycling walk to their nearest site. 14% use the banks at their local supermarket such as 37% of the recycling residents in k3 that use drop-off banks at the Warwick Road Tesco and Homebase sites (see Figure 5.20). The remainder take a car journey. It is encouraging to see the minority taking a car journey since this is not considered sustainable as it can often offset the energy recovered by recycling as opposed to manufacture materials from virgin materials.

Examining firstly the 3,145 residents who use the doorstep collection service, it would be sensible to suggest at this point that there were those individuals who despite using this service did 'not keep it simple'. Some participants insisted on segregating the individual waste fractions into separate carrier bags. There were those that would even purchase designated recycling bags from the Council and practice this complex method! Furthermore it was discouraging to hear that some residents, although participating were discouraged to do so by the fact that despite their efforts to segregate the individual waste fractions the bin-men would put them all into the same section of the truck.

Clearly these individuals were not fully aware of the scheme on offer to them and the Roadshow team were in place to put them straight and make their lives even simpler. There were those however that were quite comfortable to continue their complex practice and the team would not discourage them from doing so since their recycling behaviour was of a good quality and obviously better than non-participation!

Why residents choose the doorstep collection service to recycle is simple – because *it is*. However there are some residents that would rather not use this effective service because they prefer a method that to them suits their lifestyles. Drop-off banks have shown to be almost as equally popular with the doorstep collection service in one crew area than in any other. With k15 having 44% of its recyclers using the scheme it fares well above the 15% Royal Borough average. The lowest use in drop-off banks was in k7 area where only 3% of recycling residents used them. With the doorstep collection service being the most obviously convenient method to recycle borough-wide the question of what makes the drop-off banks more popular in this particular area needs to be addressed.

It will not be surprising that in the vicinity of k15 (West Brompton area) there are at least eight of the twenty-five drop-off sites in the Royal Borough. These cover a range of materials which can be deposited including bottle banks (green, clear and brown), card and paper banks, can and plastic bottle banks at seven of the eight locations with one of the locations catering for mixed recycling bins. In addition four of these sites provide a shoe bank (not textiles). It is also worth noting that the Materials Recycling Facility at Cremorne Wharf, Lots Road falls within this collection area which also provides drop-off sites for scrap, metal, fridges, unwanted furniture, green garden waste, used engine oil and small electrical appliances. Having so many of these locations so close to home would naturally attract residents to recycle their rubbish at their own convenience so that they did not have to wait until their two collection days a week. Therefore dropping materials when walking to work or going shopping etc would not mean having to go out of the way to find a drop-off bank, hence many more users.

This does not mean that those using the drop-off banks never use the doorstep scheme, but they simply prefer to use the drop-off scheme frequently – perhaps daily- and therefore keep the minimum of rubbish on their household premises, leaving mainly only the refuse for the bin man to take away. So long as residents were recycling the same materials as are accepted by the doorstep collection service, they were encouraged to keep up their good work.

On some occasions where a resident was only recycling the common materials such as paper and glass, the Roadshow team would encourage them to use the all in the one bag doorstep service to capture the materials previously excluded from that households recyclable waste and if necessary instruct them to try the service to manage all their recyclables to ensure minimal leakages.

Like k15 the residents living in k4 (Ladbroke Grove East side) were also keen to use the drop-off banks. 29% of them of them were likely to have been using the eight-bank locations in and around their collection area. The Roadshow team noted that many of the residents living in the Portobello Road area enjoyed the use of the banks at the bottom of their road. 60% of those recyclers interviewed in Tavistock Road used their nearby banks for the reason that they would rather walk a few yards than too wait for the bin men to collect their rubbish, particularly since the street got messy enough with the pedestrian traffic of the Portobello Road market.

Three of the four crew areas (k4, k11, and k13) which have a higher than average participation in the use of drop-off banks have a lower than average (44%) recycling participation rate amongst their residents between 32 and 37%. The exception to the four is k15, which as already stated has the MRF on its collection round, with a 47% recycling participation rate.

11.6 Doorstep collection method

The Royal Borough offers a great deal of flexibility to its residence as far as the way in which they can leave their recyclables on the doorstep for collection. As the all in the one bag service suggests, the only thing residents have to do to have their recyclable materials collected is to leave them all in the one bag or bin so that they can be identified by the refuse collection crews as non-refuse and kept separated as recyclables from the rest of the rubbish. There are several options that the resident may choose from. The most simple (as far as effort from the resident is concerned) of these is to put all recyclable materials into a carrier bag and leave it open at the top so that the refuse collectors can see inside that the contents is recyclable and therefore put it into the appropriate side of the refuse collection vehicle (RCV). Maintaining the use of carrier bags is the addition of the yellow tags that can be applied to a bag as a dual tie and bag indicator.

This allows the refuse collection crews to easily identify which bags contain recyclables. These tags are available from all municipal buildings or can be ordered from the Recycling Unit at the Royal Borough. Caution must be taken by collection crews however since tags can fall off and consideration must be given that the resident may not have used tags on all their bags containing recyclables. In multi-occupancy buildings, residents may have use a combination of different methods to identify their recyclables.

Those residents that shop at Sainsbury's supermarkets located within the Royal Borough will have noticed and may have seen the promotional regarding the reversible carrier bags which the supermarket supply their customers. This bag design solves the problem of needing to tag the bag and prevents the refuse collectors having to look into bags, which can slow down their collection times. Thus the supermarket provides both refuse and recyclable bags all in one. It is a pity that more supermarket chains have not yet followed suit!

A more expensive option for the resident, but like the Sainsbury's bag, more easily identifiable for refuse collection crews, are the clear recycling sacks which are obtainable from the Royal Borough in packs of 50 for £3 from Council Offices. Although an additional cost to the resident these clear sacks are larger and more durable and so reduce the chances of a bag splitting and the need for so many carriers bags outside a property at any one time which can often lead to complaints from other residents in that it causes an eyesore and invites other people to use their streets as a dumping ground. On one occasion a resident in the Earls Court area complained that when he used to put his rubbish sacks by the lamppost outside his property other larger items would appear which quite often would include mattresses from neighbouring bedsits.

The final option that residents could use to separate their recyclables from the rest of their refuse is to use designated recycling bins. These are simply dustbins that are marked by a Recycling Bin Sticker placed on the sides and lid. It is then up to the resident to ensure that whatever they put inside this bin is accepted by the doorstep recycling service.

Again this makes the collection of recyclables easier for the collection crews since they do not have to take time in identifying a few carrier bags containing recyclables amongst many more that will not.

As part of the Recycling Roadshow promotion the Royal Borough offered those residents who were not using a designated bin or those who simply required an additional one the chance to get a free bin. Such was the demand that during the late stages of the Roadshow operational main phase the team were instructed by the Councils Recycling Unit that there was as much as a two month delay in residents receiving a bin due to stock shortages.

An option for residents that already had too many bins was to use an existing bin as a designated recycling bin. Many residents expressed concern that they would not have enough room for their rubbish. However, once a Roadshow team member had explained that the size of their rubbish bags would reduce once they segregated recyclables and therefore would not require so much bin space - they were quite willing to convert to using the bins in the future as they adopted the doorstep collection scheme.

As would be expected there was a mixed use of the different types of doorstep collection method that residents could use Borough-wide (see Figure 5.21). Not surprisingly the open bags was claimed by 49% of residents using doorstep collection to be the way they preferred to leave their recyclables out for collection. There was much variation in crew area in the use of this and other methods with open bags being preferred by 84% of residents using the scheme in k14 but only 15% of residents in k1. These differences of preference are dependent on the popularity of other packaging methods such as residents using a designated bin. Open bags are a lot easier for a resident to use in that all it involves is repeating the behaviour one would use anyway with the normal rubbish – put out bags in their front gardens or on the street for collection as normal but without having to tie them up. Once a resident is committed to a good quality of recycling behaviour then this is the easiest way forward for them.

There are some residents (7%) who use the doorstep collection service but prefer to use the special yellow recycling tags, which can be used to tie the bag, closed and identify a package as containing recyclable materials.

The preference of using tags for collection varies between residents some of who do it simply because it is a good way of sealing the bags and preventing the rubbish from spilling out on to their front gardens and highway due to accidental splitting or from vermin breaking bags whilst scavenging. Others do it because they feel it makes their bin men job easier since they use carrier bags for both their recyclables and the rest of the rubbish.

It can be seen here that there are those residents who give some thought of how they can do that little extra bit to help ensure that what is put out to be recycle is kept part of that waste stream and not leaked into the refuse destined for landfill. By defining carrier bags with tags ensures that if the refuse collection teams are doing their job properly and placing any tagged bags into the relative side of the RCV destined for the MRF then their efforts will make a difference to the Royal Borough's recycling rate.

Using tags has drawbacks from a resident's viewpoint. The refuse collectors do not distribute them and so it is the added responsibility of the resident to collect or send off for additional tags from the Council. Residents have also pointed out that on occasion tags can come loose from the bags and in these cases it is possible that if the bags have been tied with a knot then the collection crews will not be able to quickly identify that they contain recyclables in which case they will be added to the refuse side of the RCV. This demonstrates the importance of residents being aware of exactly how the doorstep scheme operates so that any effort made by them to segregate recyclable material for collection ends with that material being recycled.

The reversible carrier bags that Sainsbury's supply to their customers as part of the regular end of till packing service are an added bonus to those residents of the Royal Borough that have been used to using carrier bags to package their recyclables for doorstep collection or for those customers that want to start recycling in this simple way. These bags were a new addition to the doorstep collection and were only being introduced as the Recycling Roadshow began.

This method eliminates the need for tags, which have to be collected or sent off for, whereas carrier bags are normally collected on a regular basis as a matter of course whilst shopping weekly or even more frequently.

Unfortunately despite this method being easier than tagging and simply leaving a carrier bag open for the refuse collectors to inspect it is not widely used. Only 1% of residents using the doorstep collection scheme claimed to use this method. Although the bags were only just being introduced to the two Sainsbury's outlets located in the Royal Borough as the Recycling Roadshow was being conducted, there will always be limitations to their use. Firstly Sainsbury's customers will only use the bags. Even if every Sainsbury's customer visiting the stores was to take these bags away, only those living within the Royal Borough and served by the doorstep collection service would ever be able to use them as a recycling bag. So it is not surprising then that the greatest proportion of recycling residents who use the Sainsbury's reversible bags actually live within the collection area k9 where a store is located on Cromwell Road, SW7.

Despite residents having to pay for clear recycling sacks obtainable from the Council, a significant 11% of those participating in the doorstep collection service claimed to use them regularly. This varied from just 2% of participating residents in k1 to 26% in k13. There is no obvious reason to this variation except that gathered from conversation with occupants using this packaging method. Many feel that it is the easier way for them to ensure that the bin men know what is for recycling. By being a transparent sack there is no excuse for them to make a mistake in putting the sack into the correct recycling section of the RCV. Also from a residents point of view one large sack saves on having to put out numerous carrier bags, which if one has a large household population can be an inconvenience. Although there is no evidence to suggest this, it was noted by the Roadshow team that those using the clear recycling sacks only participated in one of their twice-weekly collections since they would rarely fill a sack in under a week. However as collection monitoring shows in k13 67% and 24% of residents recycled twice weekly and weekly respectively, ensuring that at least some of those using clear sacks participated in the doorstep scheme regularly and minimised the risk of loose of recyclables to the refuse stream.

Residents only used designated bins where there was storage space for them i.e. in front gardens/communal storage sheds and areas. Therefore their use is already limited for residents that living in buildings where there is insufficient storage space i.e. no or little front garden or where there is multi-occupancy and not enough bin space for all to use.

As previously mentioned the Royal Borough's Recycling Unit had been promoting a free recycling bin offer in two pilot collection areas prior to the Recycling Roadshow. This is where they (the Council) would provide a free green bin to a resident for them to put all their recyclables in to await collection. Deemed successful in the two pilot areas the offer was extended borough-wide and integrated into the Recycling Roadshow promotional material. Despite this promotion in just two of the fifteen-crew areas a significant 30% of recycling residents use this method to segregate their recyclable waste. The highest proportion of residents using designated bins can be found in the k1 area where the Councils Recycling Unit piloted the initial free bin promotion. This area has a high proportion of terraced housing with significant space in front gardens for dustbins and is therefore a more preferred option than having to leave bags loose in the front of a property.

How each crew area compares now that the Recycling Unit has cleared its backlog of demand for free bins can only be left to the scope of a future survey. Measuring use simply by relying on the figures for demand would be a statistical risk as many residents may be abusing the free offer and simply use the bin for other purposes and therefore give a false indication over the potential use of designated bins.

11.7. Materials

The doorstep collection service offers a comprehensive recycling facility that accepts almost all types of domestic household wastes. Exceptions, which were frequently questioned by residents, include batteries and household chemicals. The main types of material that dominate the spectrum accepted by the doorstep recycling scheme as well as those more commonly deposited at a drop-off site are not unexpected. 91% of recycling residents using both doorstep and drop-off sites recycle their paper followed by 86% who recycle glass.

The proportion of residents recycling other materials then significantly falls borough-wide with 60%, 56% and 16% segregating plastic, metals and textiles respectively. There is little reason why the proportions of residents recycling each type of material should vary significantly as far as the doorstep collection service is concerned since this is a borough-wide scheme, which accepts a uniform range of materials in all fifteen collection crew areas.

However since the consistency of drop-off material acceptance varies between each drop-off location this may provide some explanation why some crew areas have a higher acceptance of the more unusual materials that are not often expected to be liable for recycling, at least by the general public.

In crew collection area k1 (North Kensington) the proportion of recyclers segregating plastics and textiles is high all round as is the real term figures. 369 (78%) residents of the 473 who claimed to recycle included plastic in their recycle mix, as did 103 of these residents' separate textiles from their regular refuse. In this area, other than the regular doorstep collection scheme, local residents have shoe and textile banks that they are able to use.

Although it is not apparent why inclusion of these materials is higher in this collection area than others, particularly in the south of the Royal Borough near the MRF at Cremorne Wharf where there is a good range of multi-material drop-off banks, one explanation is that residents are more aware firstly of where their nearest drop-off banks are (15% of all residents who were interviewed in k1 did know) and secondly know exactly what materials these sites accept. Like so many residents in the Royal Borough that do participate in the doorstep collection service, there are many that are not aware of the full potential of this comprehensive scheme and so un-deliberately exclude recyclable materials from their mix.

11.8 Not Recycling? – Why ever not?

Over the total twenty weeks that the 8060 residents were interviewed by the Recycling Roadshow team, 3,867 admitted not to recycling anything whatsoever either via the doorstep recycling service or the drop-off bank locations within the Royal Borough. With 54% of all residents interviewed not recycling it is important to understand why, with such a simple service to be able to participate in, so many people are not taking part.

As previously mentioned there are those residents who are recycling in one way or another that do not recycle as much as they could in terms of material variety. So one obvious question to ask is 'how many people do not know about the service (doorstep collection) in any way whatsoever?'

It would be hard to imagine that this could be a significant reason as to why this proportion of residents were not recycling since the 'RECYCLING...keep it simple' theme is widely advertised borough-wide. Adverts for the doorstep collection service are visible on the side of RCV's, street cleansing vehicles and carts, as well as on the sides of street litter bins, buses, lampposts and even at one point on London Underground trains, which travelled through the Royal Borough. There are the usual mail shots that go out with municipal post also and yet with all this publicity ignorance to the scheme is by far the greatest reason for non-participation. A Recycling Roadshow is then the next best choice to get the attention of this majority who are ignorant of the Royal Boroughs waste services.

With so much unawareness the best way to attempt to tackle the problem is to take the recycling services to the residents which the doorstep collection scheme does and give them a wake up call letting them know their local Council has not gone to sleep over the ever more controversial issues concerning waste management and neither should they.

On average 88% of residents not recycling claimed that they had not heard of the doorstep collection service and therefore were only putting their refuse out. Many of these were even unaware that there was a second weekly collection. Other residents falling into this 'ignorance' category include those that had heard something about a recycling service operating in the Royal Borough but had no details, including those residents that thought that the second collection day was for recyclables but they were not sure what ones. Some residents even claimed that they did not recycle, as they did not have the necessary different coloured bags to put their various recyclables into (see Figure 5.22).

A majority of collection crew areas exceeded the borough average of ignorance to the doorstep collection service. The greatest proportion of non recyclers who had not heard of the scheme were found to be living in the k11 collection area (South Kensington and Knightsbridge area) close to the border with Westminster City Council. In another collection area on the bordering the neighbouring London Borough the lowest proportion of unawareness can be found. However this still results in 77% of non-recyclers in k5 still being ignorant of the 'simple' service.

It is not only the doorstep collection service that is of vagueness to the Royal Boroughs residents. Among those that recycle using the doorstep service as well as those that do not at all is the issue that 86% of residents interviewed do not know where their nearest drop-off banks are. This can be seen as an additional weakness in the Royal Boroughs recycling strategy since the drop-off banks are often a preferred method of recycling among those people who do not want to have to store materials in the home for any period of time and can just as easily drop them daily to a bank site. Apart from this aspect, drop-off banks can also act as an additional service to those people who do still use the doorstep collection scheme, perhaps with those people that have had their second weekly collection and do not want to have to wait until after the weekend for their next collection and so drop-off their recyclable materials instead.

Naturally ignorance was not the only factor affecting why residents do not recycle using the kerbside service. 5% of non-recycling residents were plainly not interested in recycling and some because of the scheme itself (see Figure 5.23) as they thought that it would involve managing an extra bag, which despite having the space they could not be bothered to do. Naturally it was explained to these few that the size of their main refuse bag would be significantly reduced if they adopted the doorstep collection service. Some accepted this fact and decided that they would try the service whereas others were adamant that it was not a case of rubbish volume but the number of bags they would have to manage, even if this meant just one more single bag!

To a much lesser extent there were those residents that claim they do not recycle because they have 'no time' (2%) or 'no space' to do so (1% of non-recyclers). With the scheme being as simple as it is perhaps these few should be included in the category of residents that do not recycle because they are not aware of the service details? When examined closely the all in the one bag doorstep collection scheme does not require any other behaviour from the waste generator other than using a separate bag and being able to identify what materials are what.

It is the obvious responsibility of the Royal Borough to provide this detail and then the responsibility of the individual household to ensure that if they do indeed adopt the scheme that they abide by the detail to ensure a good quality result to the service.

There are no additional complications to this method other than deciding how to package the recyclables and to know on what two days a week the refuse and recyclables are collected. This information is usually displayed on lampposts in each street, although like the scheme itself, residents were unaware of these signs. Even when they did use the service they did not actually know what day the service ran, only that it was at least two days a week so it would not be out on the street for too long.

Only 18 residents claimed that they did not recycle because they 'don't produce enough rubbish'. Thankfully this an insignificant amount of people who obviously do not understand the beauty of the scheme in that it accepts all recyclables in one bag and therefore does not mean that residents either put out almost empty individual bags for different material types or have to store their materials until they fill a bag with recyclables.

The same principle applies to the one resident that claimed they do not take part because they 'won't store recyclables'. With a twice-weekly collection nobody has told them that they had too! Although it is a disappointment to have to acknowledge this factor for non-participation, there were those residents that had been using the scheme previously and had since decided that they would discontinue with it due to deeming it a 'bad service'.

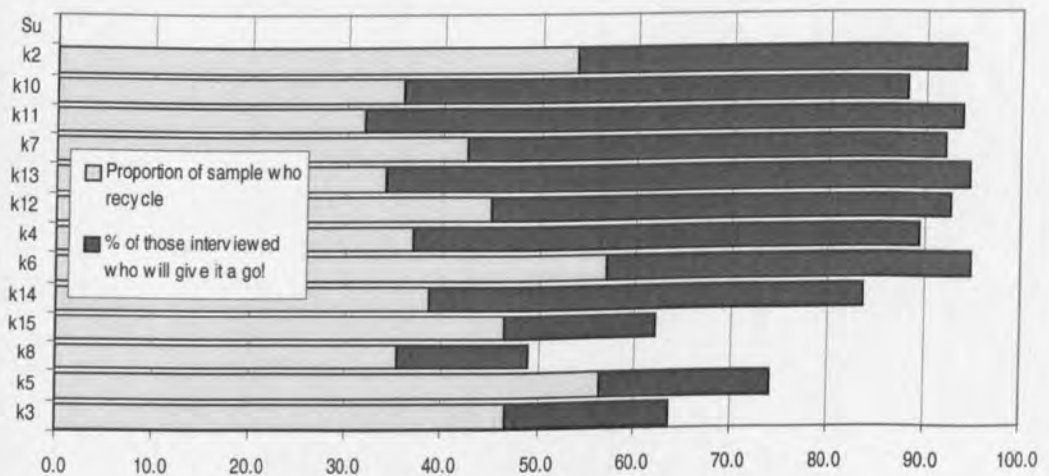
Perhaps less significantly only 2% (69 residents) of non-recyclers stated this. 21 of residents stating that the doorstep service was a bad one claimed that they had seen crews throwing recyclables away. This is assumed to mean that they have seen their bin men putting recyclables into the larger side of the split back vehicle designated for the refuse. However as previously mentioned this is not always the case as some residents admitted believing that there were in fact two separate vehicles: one to collect the refuse and another to collect the recyclables. So because of their lack of service knowledge they had stopped using a perfectly good recycling scheme. There were residents who had been individually separating different types of materials that stopped using the scheme as they were fed up of separating the materials to see them thrown into one single compartment. Again, lack of knowledge has caused a loss of recyclables to the overall tonnage of materials going into the MRF.

With the Recycling Roadshow team informing residents of the full range of waste services available to them, including where their nearest drop-off banks are but more so the precise details of the somewhat simpler service of a kerbside collection, just how many residents thought the service would work for them and give the scheme a try?

Like so many residents who claim to be participating in the doorstep collection service there are many now claiming that they will try this same service now that they are aware of just how simple it really is and how little effort it will take to be able to make a difference to their Royal Borough's waste management and recycling efforts. In all 68% of the 3867 residents that do not recycle at all have said that they will at least try the service. These individual households will have been given full and precise details of the service and would have had the opportunity to talk to the Roadshow team about any part of the scheme that they are unsure of.

This means that if they do indeed participate quality of their efforts will be high as the information given by the Roadshow team member will have been complimentary to the literature the resident has been left with to look over. No materials that are accepted by the doorstep collection service and generated by the resident should therefore end up in the refuse (see Figure 5.24).

Figure 5.24. Potential Recyclers – those that do and those that say they will



12. SUMMARY

In terms of future success, the 71% of non-recycling residents who expected to participate in the scheme is a very significant figure, suggesting participation rates across the borough of as high as 90%. Clearly this level of regular and effective participation is essential if the UK is to meet the Government's new recycling targets [37].

Unquestionably, kerbside recycling is the only approach for effective recycling in urban situations, because of the problems associated with locating recycling bins on street corners when they generate such local public resistance. Throughout Kensington kerbside collections are the dominant method of recycling, used by 84% of those residents who claimed to recycle, as compared to only 16% of who used the drop-off recycling bins. However, at the local level there are significant variations in the use of drop-off facilities. In crew areas k5, k10, k12 and k14 the use of drop-off facilities exceeds 20% of the recycling households, and in crew area k6 almost 45% of households who recycle use the drop-off banks. These variations can be explained by the uneven distribution of the 22 drop-off sites across the borough, with an active concentration in these areas. Most residents will walk to these facilities (over 75%) and so convenience and proximity are major determinants of drop-off facility use.

The most popular approach for kerbside recycling is the use of open carrier bags for mixed-recyclables (54%) with designated recycling bins (22%) the other significant approach. The open bags system was the original approach to kerbside recycling implemented in the borough, and indicates that the public are often slow to adapt to new services on offer if they are happy with the older systems that were in use. Slowly, alternatives to the open-bag system are becoming more widely adopted with significant pockets of developments across the borough. Designated bins are the most significant route in use in k1, k6 and k12 where the housing stock is larger with more storage space and gardens, whilst clear sacks purchased from the Council have proved more popular in k9, and all of the Chelsea crews (k12 through to k15) which are the wealthiest parts of the borough and where the additional cost of clear sacks is a minor issue.

In terms of the materials being recycled the picture is very much as expected. With almost all recyclers putting out glass and paper (85% and 91% respectively) and half recycling metal cans (54%). These are the most recognizable recyclable items, are the bulkiest ones in terms of the household rubbish bin and are thus the simplest to recover.

13. CONCLUSION

All parties involved in the design and operation of the Recycling Roadshow project are happy with the progress that has been made during the initial pilot phase and the subsequent 4 -month programme. This awareness campaign indicates the clear need for continual and sustained efforts to improve participation rates in recycling services, which is perhaps the main barrier to totally costs effective and efficient recycling services for many local authorities.

It was found that the main advantage of the face to face approach for the promotion of recycling services is that this type of contact is responsible for changing of personal habits, because the Roadshow team are all well versed in the benefits and issues of recycling within the Borough and can thus provide the necessary supportive evidence and arguments often required by unsure residents. Residents appeared more likely to change their behaviour after having spoke to an officer personally about the topic who can answer all their questions [8].

This type of contact also provides the local authority with important feedback from the residents relating to collection problems that they experience, and the recycling team can then act immediately to remedy these problems and improve the efficiency of the service provided [37]. The results go to prove that there is no substitute for getting out of the office and talking to residents if you want their participation in council schemes. In conclusion Sharon Ross (Recycling Manager) had this to say [36];

“The main advantage of this programme is the face to face communication that is more likely to change behavioural patterns, of which recycling is one. Once the householder makes a commitment on a face-to-face level he/she is more inclined to carry out that pledge. The other major benefit is that any misunderstandings about the scheme can be easily rectified and feedback about the service and the scheme can be obtained.”

She went on to conclude that [36];

“The Roadshow is not a ‘quick-fix’ solution for increasing participation as the whole tonnage increase obtained need not necessarily be maintained over the long term.”

This example should be viewed as a case study of best practice for other local authorities who face similar difficulties in raising awareness and involvement in local authority services, but it is by no means the only solution or in all cases the best solution [38]. The Roadshow is a useful additional marketing tool to be used in conjunction with more traditional forms of advertising and promotion. Roadshow is part of a range of options available and open to innovative local authorities that are finding limitations with traditional methods of communication [32]. Clearly, this type of promotional campaign offers local authorities the opportunity to meet the public, who are the users of local services, and get their feedback on how the systems operates and what is wrong with it [39]. This in turn allows the authority to respond directly to their needs and offer a refined service, which is potentially more effective. Public education is essential if recycling targets are to be met [40].

Public surveys are essential if we are to offer the type of service that the public wants and would positively respond to. The landfill tax credit system has enabled this public education campaign to occur, and the funders should be acknowledged for their foresight in funding such an important element of sustainable waste management – the social aspect of participation.

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CHAPTER 5 [III]

TOTAL KERBSIDE RECYCLING

‘TOTAL KERBSIDE RECYCLING ’ HOW TO EXCEED 50% WASTE DIVERSION

1. THE LEGISLATIVE DRIVERS

The National Waste Strategy [1] has set some challenging targets for local authority waste recovery and recycling, looking to achieve an average recycling and composting rate across all Waste Disposal Authorities in England and Wales of 17% by 2003 – a far cry from the 9% currently being achieved! By 2005 authorities must aspire to recycle or compost at least 25% of their household waste and recover value from 40% of their municipal waste. By 2015 these levels must have increased to 33% of household waste, and 67% of municipal waste. To ensure that all local authorities contribute to these targets statutory recycling targets will be introduced. There should be different standards for different groups of authorities, in recognition of differing local circumstances and current performance figures [2].

The standards for 2003 are set at the following levels;

- *waste disposal authority areas with a recycling & composting rate below 5 percent in 1998-99 must increase their rate to a minimum of 10%*
- *waste disposal authority areas with a rate of between 5% and 15% 1998-99 must double their recycling rate*
- *the remaining higher achieving authority areas must achieve a recycling & composting rate of 33% or better*

Whatever the target, there is little doubt that a great deal of change is on the horizon for municipal solid waste management in the UK. The National Waste Strategy and the EU Landfill Directive [3] have set tough targets for the reduction of organic waste from landfill, and this is currently forcing waste managers in the UK to develop alternate ways of diverting organic waste from landfill.

As a result tackling the organic fraction of the domestic waste stream will become more of a priority for local authorities, and a number of local authorities have developed garden and kitchen organic waste collection and composting schemes.

These include; Eastleigh Borough Council (Hampshire), Wealden District Council (Sussex), Ashford Borough Council (Kent), Castle Morpeth Borough Council (Northumberland), St Edmundsbury District Council (Suffolk) and the London Borough of Sutton

All of these authorities have realised that the collection of dry-recyclables alone will not necessarily allow them to achieve the recovery and recycling targets set by central government [4], and rather than embark upon recovery systems centered on Energy from Waste incineration [5], they have focused on the organic waste stream (approximately 30% of household waste).

Perhaps the leading authority in this field is Daventry District Council (Figure 5.25). Not only have they initiated an innovative kerbside collection for recyclables and organic material [6] but they also embarked upon a 12-month communication and education programme, which was delivered by Waste Watch from August 1998 until September 1999, re-iterating comments made in my last editorial regarding the need for tailored promotional campaigns to go 'hand in hand' with local services – an absolute must if local participation is to be encouraged and maintained! For more details about this promotions campaign see the Waste Watch Report 'Diverting Messages' [7] .

2. DAVENTRY DISTRICT COUNCIL

Daventry District covers 666 km² of south Northamptonshire, with 66,000 people (19,000 of whom live in Daventry town) and 29,500 households [8]. The residents produce just in excess of 1 tonne per annum of waste. Daventry District Council has, during the past two years developed its waste collection services to a degree that is enabling recycling results, which places it amongst the top in the UK – if not the leading authority in materials recycling! Daventry's approach differs from that applied in many authorities by virtue of a 4 bin system; a 240 litre 'grey' bin for refuse (landfilled), a 240 litre 'brown' bin for kitchen and garden organic waste (composted), a 'blue' recycling box for cans, glass, aerosols and plastic bottles (recycled), and a 'red' recycling box for newspapers, pamphlets and textiles (recycled). This is depicted in Figures 5.26 and 5.27 [9].

Figure 5.25. Daventry and it's location in Northamptonshire [8]



Figure 5.26. The bin system in use in Daventry DC (source: author)



Since 1995 the Council's waste management team has operated a weekly kerbside collection services for 'dry' materials that is presently supported by over 80% of the district's 29,500 households, but they were achieving only a 9% recycling rate in 1997-98 [10]. Thus, in 1998 a decision was made by the Council to go that important step further and to target for recycling the 30% of landfilled household waste that is defined as organic.

Figure 5.27. Recycling boxes in use in Daventry (source: author)



3. THE TRIAL SCHEME

A large-scale trial was set up in August 1998 to bring some 5,400 households into a scheme requiring them to separate designated 'green' waste for recycling. Every week the two recycling boxes were collected and sorted at the kerbside initially by the householder into the red box for newspapers and textiles, and the blue box for steel and aluminum cans, aerosols, glass and plastics, and then by the crew at the side of the vehicle. The brown and grey wheelie bins were collected on alternate weeks in a standard refuse truck, thus minimizing additional costs [9].

The trial started on August 28th 1998 in the Moulton and Brixworth area (see Figure 5.28). More than 5,000 householders achieved a recycling rate of 48.5% over the first 18 weeks - knocking the spots off Government and European targets for recycling!

The scheme cost £10,000 for the kitchen pre-sort bins, £6,500 for the bin stickers and newsletters, and an additional £7,000 for the waste composition analyses.

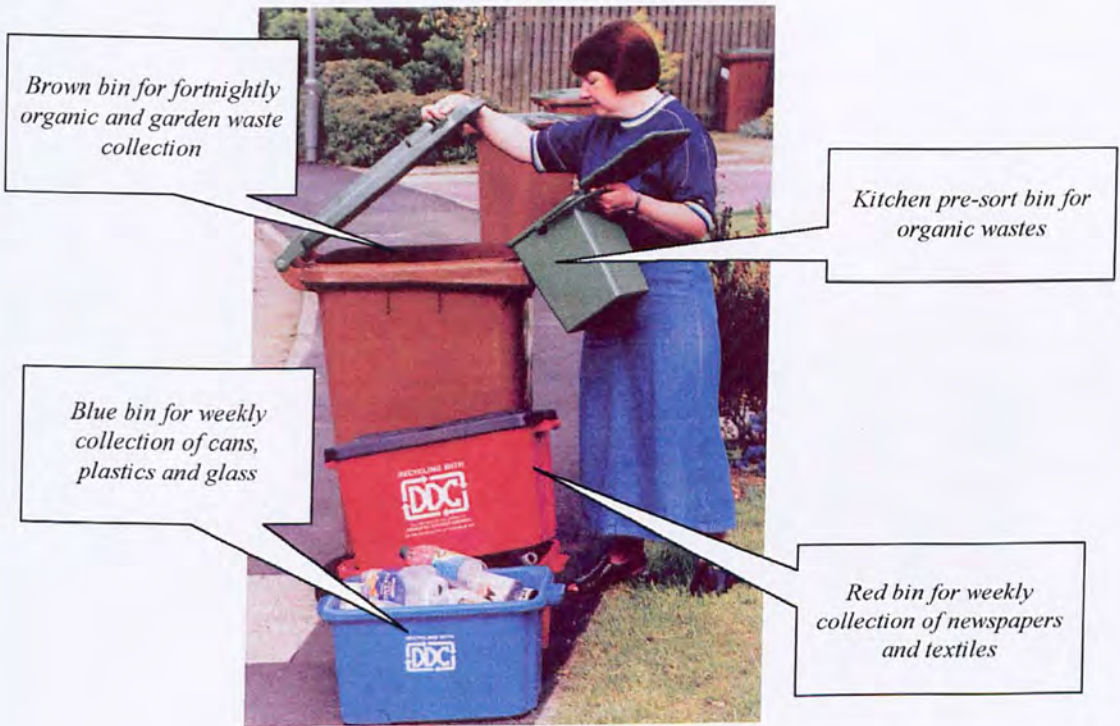
This pilot scheme was funded through Landfill Tax Credits (worth £80,000) with the money being used to develop targeted educational and promotional material, provide each of the households with a kitchen pre-sort bin for organic waste, and fund an officer to run the project, deal with the public and monitor progress (see Figure 5.29).

Figure 5.28. Daventry District and the trial areas

This again refers back to earlier chapters where I have championed the use of landfill tax credits to promote public participation in recycling and to develop infrastructure for recycling and composting at the local scale. A telephone hot-line was installed at the Council and a leaflet and newspaper advert campaign were used to inform residents in the pilot area about the new scheme, whilst one-off home visits could be arranged with council officers if there were problems with the service.

At the start of the trial a sticker for the brown organic bin listing the materials allowed and the collection days was provided to each of the households in the trial, and prior to the first green waste collection, a bright yellow reminder was stuck to each refuse bin. The refuse crews checked for contamination and if there was present in the recycling or organics bins then a sticker saying so was put on the bin and it was left un-emptied. A tough decision by the authority but one that immediately paid off in terms of improved waste awareness and better environmental behaviour by the majority of the Council's residents.

Figure 5.29 The 4-bin system in operation (source: author)



The calls to the Council's 'hotline' provide an interesting insight to the smooth operation of the scheme.

The most common enquiries were;

<i>Assistance with extra waste –</i>	<i>47%</i>
<i>General enquiries -</i>	<i>25%</i>
<i>Non delivery of organic bin -</i>	<i>11%</i>
<i>Missed collection -</i>	<i>9%</i>
<i>Assistance with rejected bin -</i>	<i>8%</i>

A detailed analysis of dustbin contents in Daventry District by the Waste Watch organisation has shown that the new multi-bin waste management system has the potential of achieving a staggering 70% recycling rate [7]. The aim of the analysis was to discover how the introduction of the alternate-week kerbside collection scheme - organic waste one week, waste for landfill the next - has affected the waste disposal habits of residents within the Green Waste Moulton / Brixworth trial area. It was found that 12% of household waste was put out in the brown bins for composting, and another 14% of dry recyclables were put out in the red and blue boxes, giving a recycling rate of 26% for this selection of households. But, analysis of the contents of the grey bins put out for collection the following week revealed that a further 24% of waste could have been composted, and another 21% could have gone into the red or blue boxes. If this had happened, these households would have achieved a 71% recycling rate!

In the non-trial area where grey (regular waste) bins were emptied weekly, it was discovered that the 80 (selected households for analysis) recycled just 7% of their total waste in the red and blue boxes, but their grey bins held a further 28% of potential dry recyclable waste which could have gone in the boxes - giving a potential recycling rate of 35% without the use of the brown bins (see Figures 5.30, 5.31 and 5.32).

Figure 5.30. Potential recovery of materials from dustbin compositional analysis [7]

Figure 5.31. Realistic recovery potential (taking account of contamination and difficult items) [7]

Figure 5.32. MSW actual treatment in the pilot study area [7]

A further 34% of waste generated from this area was found to be compostable and therefore if brown bins were made available, there would be a potential recycling rate of 69%.

Waste Watch concluded 'the results from this first waste analysis are very promising. The introduction of the alternate collection in the trial area is having a positive effect on the amount of organic and recyclable materials that are being diverted from landfill' [7].

The average recycling rate in the trial area was 12%, compared to Daventry's district-wide recycling rate of 9%, and this is why the area was chosen; they were already the keenest recyclers and would in theory be most open to the introduction of a new organic recycling scheme – and they were! The first collection of organic wastes yielded 71.5 tonnes of green waste and boosted the recycling rate to almost 50% for that collection round! Throughout the year long trial the average recycling rate was 51%, with the dry recyclables being collected increasing by 35% - a bonus knock-on effect! The scheme went district-wide during the period April to September 1999 and has achieved fantastic results with the District's recycling rate [8] increasing from 9% pre-scheme initiation to in excess of 46% in the current year!

The additional cost of this service, including brown wheelie bins, kitchen pre-sort bins, equipment for processing the waste, and the additional cleaning of the refuse vehicles totaled only £500,000, or an additional £6.50 per resident served per annum (a mere 12.5 pence per week!)

4. CUSTOMER SATISFACTION

In a waste survey conducted in May 1999 by Waste Watch in the pilot area some very positive results were attained when compared to the initial waste composition analysis (conducted soon after the scheme's launch in October 1998); the percentage of organic waste in the refuse (grey) bin had fallen from 33% pre-trial to only 21% post-trial, whilst the quantity of waste collected in the organic bin (brown) had increased five fold! Not only had the quantity of organic waste collected increased, but also the contamination in the organic bin had decreased from 4% to only 1% - a win-win situation!

At the same time the proportion of kitchen organic waste in the refuse bin had decreased from 31% pre-trial to only 19% post-trial. Clearly this service was proving very effective at diverting organic waste (usually 30% of the household waste stream) from the refuse bin and ultimately from landfill. However, an unexpected but equally positive impact was the 45% increase in dry recyclables collected in the 2 recycling boxes. According to Brian Bird (former Head of Daventry Council Services) *'some households - particularly families - found they had to join the red and blue box scheme or they ran out of space in the grey bin before the fortnight was up!'*

Prior to the system's introduction 80 tonnes of refuse were collected every week in the trial area. After the scheme's initiation the average weekly figures (over a two-week period) were; 60 tonnes of refuse, 40 tonnes of organic waste and 20 tonnes of recyclables. Although this indicates an increase in overall waste collected, this can be attributed to the kerbside collection of garden waste that would otherwise have gone to the County's CA sites.

According to Sue Reed (Daventry's Waste Management Officer) *'it may appear that the amount of waste collected increased during the trial, but this is due on the most part to the collection of garden waste that was previously taken to the CA sites which is now collected at the kerbside and weighs on average 25% more than average household waste – waste generation has not increased above the rate experienced throughout the county. What is most important is that the refuse collected weekly has been cut in half allowing 50% diversion of waste through recycling and composting!'*

As a result of the pilot scheme, the combined recycling rate of organic and dry recycling had increased from 12% prior to the organic collection, to 26% two months into the pilot project, reaching 52% after nine months of service provision. Much of this increase was attributed to organics diversion, which had increased from 12% in October 1998 to 39% in May 1999 (see Figure 5.33 for an indication of the composting process).

Figure 5.33. Composting of the organic waste collected in the brown bins (source: author)



Not only was the scheme proving a success in diverting waste from landfill, but it was also popular with the district's residents. Some 98% of those surveyed thought that the recycling of kitchen and garden waste was a good idea, whilst more importantly 90% found the new scheme manageable!

Clearly, the introduction of alternate weekly collections of waste and refuse along with weekly recyclables collections can be achieved, if the right amount of planning, publicity and support is provided; an important lesson for all waste collection authorities around the country.

5. EXPANSION OF THE SCHEME

Members of the District Council's Environment Committee voted unanimously on January 19th 1999 to extend the 'Ultimate Recycling' scheme to the whole of Daventry District, with 8,419 households in Daventry town the next to come on board in April 1999 [9].

From April through to September 1999, the remainder of the district was converted to the fortnightly collection system (Figures 5.34 and 5.35 show the type of vehicle in use and the sorting of the recyclables at the vehicle).

Former Chairman of the Committee, Councillor Angela Campling, commented that *'we have a fantastic result from the trial. It is a tremendous feather in this Council's cap to take recycling forward with a green waste scheme District-wide. We will be a front-runner nationally with our new scheme.'*

The District's Chief Executive at the time congratulated all concerned, *'The green waste trial has proved to be even more successful than originally anticipated, with a very high degree of support from residents. The extension of the scheme to the whole District is fully supported, based on the evidence of the trial and the requirement from the government to substantially increase the recycling rate.'*

In December 1999, the Council carried out a follow-up public survey of their scheme, to evaluate its performance. Over 500 residents responded to the postal survey giving an insight to their acceptance of the new service. From the public's response the most important findings were; 98% supported recycling, and 94% supported the green waste recycling scheme, whilst most pleasing were the 61% of residents who found the new bin system manageable.

See Table 5.12 for more data and Figure 5.36 for a graphical representation of how successful the scheme has been at delivering participation.

Figure 5.34. Kerbside sorting of the recyclables into a compartmentalized vehicle (source : author)



Compartmentalised vehicle allows kerbside sorting

Highly motivated 'Recycling' crew members sort materials at the kerbside

Green waste one week and then refuse the next are stored in the compactor unit at the rear of the vehicle

Figure 5.35. Kerbside sorting of mixed recyclables in Daventry (source: author)



Table 5.12. Public feedback on the new service

	<i>Yes</i>	<i>No</i>	<i>Undecided</i>
Do you agree with Recycling?	98.3 %	0.6%	1.1%
Do you agree with Green waste Recycling?	93.7 %	5.0%	1.3%
Do you compost at home?	50.8 %	47.3 %	1.9%
Is the new service manageable?	61.9 %	34.3 %	3.8%
If we could resolve your difficulty would you support the scheme?	86.0 %	6.1%	7.9%

'It is very much a three-pronged waste management scheme, with each of the three parts of the scheme playing a vital balancing role. Households need both the wheelie bins and the red and blue boxes to make it work,' said former Head of Council Services, Brian Bird.

Figure 5.36. Diversion from landfill achieved through the improved system [10]

6. DISCUSSION

In 1999, the diversion rate for MSW in Daventry exceeded 36%. Success of the overall programmed has resulted from thorough research, testing and trials of the system combined with a broad ranging and on-going consumer education campaign [6].

Having recently visited the District to view the system from collection through to materials reprocessing and composting at their landfill site, I am most impressed. This system is well suited to the District's needs and has proved that high levels of diversion are achievable. The composting product is being used as a soil improver and as a substitute landfill top cover. This system, using weekly collections of recyclables and alternating weekly collections of waste (residues) and organic material has achieved an exceptional level of diversion from landfill – a level which every authority in the country would be proud to achieve. In 1997/8 91% of the District's waste was landfilled, yet this is due to be reduced to only 50% for the year 2000/01, and the level continues to fall as more people effectively participate in the scheme.

The District has facilitated a practical approach to waste minimization, having effectively halved the bin capacity available to householders each week. Through challenging residents to think more about what they throw away, individuals have begun to accept responsibility for the production and disposal of their waste!

However, it must be noted that this system may not be suitable for central London [11] or many of the other metropolitan authorities in the UK but it does suit rural Daventry with its collection of villages and small market towns! Nonetheless it should be viewed as an example of 'best practice' for waste diversion, and the lessons that it has to share with other authorities in terms of local recycling projects, collection systems, landfill tax funding, and public education campaigns are enough for the District to be considered as a '*best practice or beacon council*' - one that other authorities can strive to emulate!

"Daventry, at the leading edge of economic waste recovery and recycling in the UK – a real beacon in the recycling wilderness" [6].

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CHAPTER 6

LANDFILL TAX FUNDING

CHAPTER 6 [I]

ECONOMIC DRIVERS & LANDFILL TAX FUNDING

CHAPTER 6 – ECONOMIC DRIVERS AND LANDFILL TAX FUNDING

Undoubtedly, finding the necessary revenues to instigate new recycling services or enter into long-term sustainable waste management contracts is a major problem for almost every local authority in the UK. Because of the current market position with regard to relatively cheap landfill (due to the abundance of old quarries) and the expense attached to increased waste collection frequencies, sorting, the building of recycling facilities and the increased contractual requirements there appears little opportunity for recycling's full-scale development in the UK. One needs only to refer to the information gained from the surveys and case study interviews in Chapter 3 to see just how significant the economic problem is for policy implementation and the movement towards greater sustainability in solid waste management. But, as a word of warning, sustainability has as one of its three pillars 'economics' and as such environmental improvement with public (social) support cannot proceed without consideration of the financial implications.

This problem of the uneven market has been noted by this and previous Government for some time, and the landfill tax was first suggested as a potential solution as long ago as 1991. The landfill tax is all about changing the financial structure of the solid waste management market place to enable the market to work more effectively and thus encourage recycling and recovery where appropriate. Essentially, the introduction of the landfill tax addressed the 'costing' of externalities associated with landfill disposal, those costs that were not taken into account in the price per tonne for disposal including long term pollution, health risks and disamenity. The tax was set initially at £7 per tonne for 'active' wastes (those that would degrade in a landfill and thus potentially cause pollution) and this level has been increased to £12 per tonne in April 2001.

This section will deal with the historical introduction of the landfill tax, its development as a deterrent to landfilling, and most importantly the introduction of the landfill tax credit system as a means of funding sustainable waste management.

There are three papers included in this chapter, using theoretical and case study discussion to develop the themes of market imbalances, economic drivers and funding sources for sustainable waste management, particularly education programmes (see Chapter 5) and recycling services (noted in Chapter 3). The three papers in question are;

- *The landfill tax; an overview of the system and its introduction (see Appendix 9)*
- *Landfill Tax funding procedures and agendas*
- *and Opportunities for driving sustainable waste management and recycling*

The landfill tax is all about the correcting market distortions and facilitating increased funding, and as such is a value attempt at correcting the funding barrier that is so evident in policy implementation discussions. The papers consider the data provided from ENTRUST (the scheme's regulatory body) and makes predictions concerning the future use of the available money (some £90 million per annum and rising) for funding the implementation of new recycling services, as noted in Figure 6.1. This section provides an important link with those that have gone before. The landfill tax and the associated credit scheme offer an opportunity to fund waste minimisation clubs, new recycling services and widespread education campaigns, all of which are invaluable to the delivery of greater sustainable waste management and assist in the implementation of Government waste management policy at the local scale.

The scheme has proved a great success with hundreds of millions of pounds of tax being donated to worthwhile environmental projects. Some of these have been in close proximity to existing landfill sites as a means of putting something back into these communities for the disamenity associated with the landfill site, whilst others have been more strategic in their use of the funding looking at national and regional education campaigns, and the financing of new officers and services.

However, not everything associated with this scheme is positive. The scheme is a voluntary one reliant on the landfill companies donating their tax credits to a registered body for use.

The scheme does not stipulate that only sustainable waste management projects can be funded, with the result that a great deal of the money spent to date (perhaps £120 million) has gone to the refurbishment of old church roofs and community centres with little impact on sustainable waste management projects. Some of the impacts of the tax itself have been negative as well with an upturn in 'fly tipping' and the associated extra costs incurred in the clean-up of this illegally dumped rubbish.

Figure 6.1 Cumulative contributions (£millions) to the landfill tax credit scheme by landfill operators (maximum available approx. £90 million)
(source: ENTRUST)

What is important from the three papers is that the landfill tax sends a clear message that landfill is clearly not the best solution in all cases, and where previously recycling and recovery could not be considered on cost-grounds they can now be effectively brought to the table for greater debate. The landfill tax credit scheme can then help to finance pilot projects, campaign programmes and inception studies to test the alternatives. If they prove successful then the implications are the full delivery of these new schemes and the successful implementation of policy at the local scale. Two excellent examples of this are provided in Chapter 5 where the Recycling Roadshow Education Campaign and the Daventry Green Waste Pilot Scheme were funded from landfill tax credits.

CHAPTER 6 [II]

APPLICATION & USE OF LANDFILL TAX CREDITS

APPLICATION AND USE OF LANDFILL TAX CREDITS

For a review of the historical development of the Landfill Tax and the Credit Scheme refer to the extensive paper included in Appendix 9, which details some of the earliest work completed on this topic by the author in 1997.

1. LANDFILL TAX AND THE LANDFILL TAX CREDIT SCHEME

Despite the fact that economic instruments were recommended by the European Commission in 'Towards Sustainability' [1], there has been little progress in their use throughout Europe since then. However, interest in ecological taxes has been steadily growing in Member States as witnessed by the number of countries that have introduced such levies including Denmark, Belgium, Sweden, France, Germany, the Netherlands and the UK, and the variety of programmes that they have initiated. Charges are imposed on lubricants, fertilisers, pesticides, carbon dioxide emissions, volatile organic compounds, CFCs, water and electricity consumption, and in some cases waste [2]. The use of ecological taxes has been supported and encouraged by the EU for a number of years, and in the realm of waste management this was underlined as follows [1]: -

"The Commission will endeavour to promote the use of economic instruments in the waste sector, though it remains obvious that many economic instruments, in particular charges and levies, fiscal incentives or disincentives or state funding - will first of all be used at the level of the Member State."

In its White Paper This Common Inheritance [3] the UK Government recognised that a change was necessary in the way both industry and householders disposed of their waste. The Government also recognised that there was a well established hierarchy of waste reflecting most desirable methods of waste management in order to achieve a reduction in the quantity of waste generated and ultimately disposed, in line with the principle of sustainable development. It also acknowledged [3] that the UK managed most of its waste by disposing of it in landfill sites, which was a means of managing waste at the bottom of the waste hierarchy [4].

There was therefore a need to push the management of waste in the UK further up the hierarchy towards recovery/recycling and reuse and, at the top, reduction.

To promote more sustainable waste management practices the UK Government published a National Waste Strategy, "Making Waste Work" [5], which set challenging waste management targets and introduced the Landfill Tax on the 1st October 1996 [6]. Landfill Tax was introduced as a direct levy on the disposal of waste to landfill, considered by many to be the first truly "green tax" in use in the UK. Its main purpose is to reflect the impact of landfill on the environment and encourage more sustainable waste management by raising the cost of disposal [7].

2. PURPOSE OF THE TAX

The purpose of the tax [8] is firstly *"to ensure that landfill waste disposal is properly priced so as to reflect its environmental cost"* and secondly *"to promote a more sustainable approach to waste management in which less waste is produced and more waste is either reused or has value recovered from it"*

There are two main ways in which this purpose may be interpreted. The first interpretation is that the tax may be used solely to increase the cost of landfill to force industry and, through local authorities, households to act in such a way as to push their waste management approach up the hierarchy. The justification for this is that landfill is too cheap and therefore, at the moment, a relatively easy option for managing waste [9] The second interpretation is that the tax not only increases the cost of landfill and promotes the better management of waste by this expedient alone but also raises money which itself may be used for the promotion of a more sustainable approach to waste management.[10] In his Budget speech of Tuesday 28th November 1995 the Chancellor of the Exchequer stated:

"This is a tax on waste in order to reduce the tax on jobs. The money raised by landfill tax will allow for a matching cut in the main rate of employers' National Insurance contributions by a further 0.2% to 10% from April. This will cut the costs of employment by £500 million and make it cheaper for business to create new jobs."

A Landfill Tax Credit Scheme (LTCS) was introduced in order that at least some of the money raised through the tax is used to promote more sustainable approaches to the management of society's waste.

The LTCS was introduced under the Landfill Tax Regulations [11] as a means of enabling some of the tax to be invested in promoting better waste management, through research, education and general dissemination, as well as enabling some of the tax to be invested in public amenity projects close to landfill sites, as a way of "*putting something back into the local community*".

3. OPERATION OF THE TAX AND THE CREDIT SCHEME

The tax is collected through the operators of licensed landfill sites who must register with the Customs and Excise. A disposal of waste is liable to the tax if the material is disposed of as waste by way of landfill. Waste is for these purposes material, which the producer disposes of intending to discard it or throw it away even if it could have been re-used. The tax is currently levied at a rate of £2 per tonne for inactive or inert waste and £11 per tonne for all other waste (increasing by £1 every year until the scheme is reviewed in 2004). The weight will normally be calculated by the use of a weighbridge although if no weighbridge is available then the Customs and Excise may agree an alternative method of calculating the weight of the waste e.g. the maximum weight that the lorry can carry or estimated volumes of waste converted to weight [12].

The landfill operator will have to account for the tax collected quarterly and keep records of: tax due, any credits of tax or adjustments (where permitted), the tonnage of waste accepted and the rate of tax attributable to that tonnage. Records must be kept for 6 years. Landfill operators can claim a credit against their Landfill Tax payment if they make a voluntary contribution to an approved Environmental Body [12].

To participate in the Scheme, organisations must be enrolled with the Scheme's regulator ENTRUST before receiving landfill tax credits. Once enrolled, these organisations are referred to as Environmental Bodies.

The LTCS therefore provides an opportunity for landfill site operators to make voluntary contributions to Environmental Bodies [12]; up to 20% of the Landfill Tax they collect. In doing so up to 90% of the contribution can be reclaimed but the total credit in any 12-month period must not exceed 20% of the total landfill tax bill (of the landfill operator).

According to Regulation 33(2) of the Landfill Tax Regulations [6], landfill tax credit contributions must be spent on approved projects. Projects being conducted under the Scheme must therefore focus on one or more of these approved objects (generally referred to as categories).

There are certain restrictions in relation to these operations which are: that any reclamation or remediation under a) or b) will not be regarded as an approved object if it is for the benefit of a person who carried out or knowingly permitted the contaminating or polluting activity. Also the landfill operators must not directly benefit from any of the schemes of Environmental Bodies. If the contributions are not spent on approved purposes then the credits may be recovered [12].

In order for a landfill operator to claim tax credits under the scheme the environmental body must be registered with Environmental Trust Scheme Regulatory Body Limited (ENTRUST). This body also gives approval for to projects, which are to be funded under the Tax Credit Scheme. This is the sole regulatory body of the scheme and is itself funded by registration fees and administration fees, which are charged on approval of each project. This fee is a percentage of the tax related funding, currently 5%.

4. TYPES OF LANDFILL TAX FUNDS

There are two main sources of landfill tax credits: direct from landfill operators or through landfill tax credit funds.

4.1 Landfill Operators (LO)

The number of landfill operators participating in the Scheme has increased year on year (see Figure 6.2), with all of the major operators now taking part and a total of £494 million having been contributed to Environmental Bodies by the end of the financial year 1999 - 2000 (see Figure 6.3).

As a prospective user of the landfill tax credit scheme, establishing whom to contact for funds is not always a straightforward task. Establishing an Environmental Body (or a project) that would interest the LO can be even more difficult. With respect to landfill operators, they are not purely at fault here.

Currently there is no detailed list of key contact points within the LTCS. The main source of information is Customs and Excise's Landfill Tax Register, which gives details of every landfill site currently registered to operate. Unfortunately, the register frequently does not list the parent company or the head-office. Better sources of information come from contacting the waste disposal authority, the local government body who let the disposal contracts, ENTRUST or the Environmental Bodies Council (EBCo), who represent the interests of EBs.

Figure 6.2. Landfill Operators participating in the LTCS [13]

Applying to landfill operators directly for funding is also not a straightforward task. Most request a one or two page summary of the project [14, 15] yet few provide adequate information or guidance on what this should contain and how it should be structured. When applying to landfill operators, patience, personal contact and networking with the company to ascertain their interest, and persistence are important assets. It is important to consider that for the LO who is awarding landfill tax credit funding the responsibility may be frequently ‘tagged on’ to a member of staff’s existing job responsibilities, and as such awarding funding often becomes an evening occupation [16]. Examples of landfill operators who fund EBs directly include Viridor Waste Management, Ecovert, UK Waste, Cory Environmental and A J Bull.

Figure 6.3. Cumulative Landfill Tax Contributions upto August 2000 [17, 18]

4.2 Environmental Bodies

The term “Environmental Body” is gradually being re-defined by many in the LTCS [19]. The total number of Environmental Bodies enrolled with ENTRUST has increased significantly (see Figures 6.4 and 6.5) since January 1999 when many organisations began to realise the significant sums of money available for environmental research and projects.

There remains a marked discrepancy between the number of EBs that exist and the number that have secured funding, but this represents the competitive nature of the funding procedure and the high level of interest shown from the environment and local community sectors in securing monies for their own projects. Further categorisation, mainly by Environmental Bodies themselves is gradually emerging to indicate their areas of interest, operation and practice. Common acronyms and categories include Receiving Environmental Bodies (R-EB) or Project-led Environmental Bodies (P-EB), Distributive Environmental Bodies (D –EB), and Funded Distributive Environmental Body (FD-EB).

Receiving Environmental Bodies (R-EB) or Project-led Environmental Bodies (P-EB)

These are organisations who are enrolled with ENTRUST and apply direct to landfill operators or Funded Distributive -EBs for funding for their projects. There are many small EBs that operate in this way, particularly research-based EBs including universities and consultancy companies.

Distributive Environmental Bodies (D –EB)

These are organisations, enrolled with ENTRUST whose main activity is centred on applying to landfill operators and FD-EBs on behalf of other environmental bodies or organisations who are not enrolled with ENTRUST (i.e. they are not EBs). D-EBs often fulfil ENTRUST requirements on behalf of other organisations, and retain a percentage of funds received to cover their administration costs.

D-EBs therefore offer an important service to smaller, less experienced organisations especially those who are only seeking relatively small amounts of funding for one or two projects. Examples include the Tidy Britain Group, the Trust for Oxfordshire’s Environment, the Environmental Trust for Berkshire and many of the Groundwork organisations.

Figure 6.4. Enrolled Environmental Bodies [18]

Figure 6.5. Environmental Bodies which have received funding [18]

Funded Distributive Environmental Body (FD-EB)

FD-EBs are environmental bodies which normally have a contractual agreement with landfill operator(s), whereby the landfill operator(s) pass over some or all of their landfill tax credits for the FD-EB to distribute to other environmental bodies.

Despite the fact that the majority of landfill tax credits are now managed by FD-EBs, of the 721 Environmental Bodies that had been funded by November 1999, 594 had been funded direct by landfill operators with only the remaining 127 (18%) receiving funding from FD-Ebs [17]. Since most F-DEBs began managing funds towards the end of 1997 and even as late as 1998, it is likely that this figure will change significantly in the coming couple of years. Many operating within the LTCS predict that FD-EBs will dominate and control the scheme from now until the scheme's Government review in 2004.

A number of national and area specific FD-EBs exist, and examples at the national scale include Biffaward (established, 1997) and the Hanson Environment Fund (established, 1997) which are managed by the Royal Society for nature Conservation (RSNC), the RMC Environment Fund (established 1998,) which is managed by the Environment Council, The Onyx Environment Trust [19] EB Nationwide (which manages a large share of the landfill tax credits from Shanks Waste Solutions) and the SITA Environment Trust.

Regional specific FD-EBs include the Staffordshire Environmental Fund, the Western Riverside Environmental Fund (London), the Cleanaway Havering Riverside Fund and the Cory Environmental Trust's. There are some key advantages for landfill operators to work in partnership with Funded Distributing Environmental Bodies in managing their landfill tax credits [20], which include:

- *Landfill operators have to allocate their landfill tax credits within the same financial year that they are generated, whilst Environmental Bodies can hold landfill tax credits for up to two years before designating them for a particular project.*
- *Environmental Bodies can use some of the landfill tax credits they receive for the management of projects under the scheme, this includes fund management. (shifting administrative responsibility and cost from the landfill operator).*

- *Managing landfill tax credits does not normally fit neatly into a landfill operators daily activities, thus passing over the responsibility to an Environmental Body removes landfill operators of the perceived and realised burden.*
- *Working in partnership with an Environmental Body provides independent verification. Environmental Bodies, such as the Royal Society for Nature Conservation (RSNC) who manage both Biffaward and the Hanson Environment Fund, bring additional expertise in assessing applications and managing projects.*

5. APPLYING FOR LANDFILL TAX CREDIT FUNDING

This is not only a complicated business, it can prove to be quite exclusionary for those that are not part of the waste management sector or who do not have working relations with landfill operators and waste management companies [21].

5.1 ENTRUST Procedures

For most organisations, the first step in applying for landfill tax credit funding is to become enrolled as an Environmental Body with ENTRUST [12]. This requires that the organisation's constitution reflects and includes at least one of the six approved objects or categories within the landfill tax regulations. Registration currently costs £100. ENTRUST's advice to potential Environmental Bodies is to establish if a landfill operator or landfill tax fund would be interested in funding the type of project that the Environmental Body would be conducting before becoming enrolled and before gaining project registration, thus saving unnecessary administration and expense. In reality, this is not so easy. Most landfill tax funds have a standardised application procedure, which requires that the organisation is enrolled and the project registered with ENTRUST before applying, and often landfill operators do not have the time to discuss potential applications for funding from as yet non-enrolled EBs [12].

Organisations which are planning to apply for a relatively small amount of funding, or who only wish to conduct a few projects are probably better off contacting a Distributive Environmental Body (D-EB) to establish if they need to enrol or whether they would be better off applying through the D-EB to the landfill operator.

Once a project has been registered and an organisation has been approved for funding by a landfill operator, D-EB or F-DEB, the environmental body conducting the project has to notify ENTRUST that the funds have been received and that the project is about to start. Throughout the life of the project, the EB has to maintain an audit trail of expenditure. In addition to this, Environmental Bodies must submit annual statements of their accounts using ENTRUST forms. Figure 5 gives a summary of the process of landfill tax credit funding.

5.2 Restrictions on Landfill Tax Credit Spending

There are areas of restriction that need to be considered before applying for Landfill Tax Credits: those made by the Landfill Tax Regulations and the Scheme's regulator ENTRUST and those of the individual landfill operator or landfill tax credit fund. Tables 6.1 and 6.2 summarise the restrictions made by the Landfill Tax Regulations and the Scheme's Regulator ENTRUST and those often required by landfill operators or landfill tax credit funds.

Figures 6.6 and 6.7 gives summaries of the way in which applications are assessed and monitored by a FD-EB, in this case the RMC Environment Fund [15]. Due to restrictions in the Landfill Tax Regulations, landfill operators and landfill tax funds cannot gain much from agreeing to fund a project, apart from a 'warm feeling' (of knowing they are helping to improve the local environment or move waste management towards greater sustainability) and limited publicity associated with the projects operation and outputs. Most landfill tax credit funds will encourage their logos to be included on all publicity material, as well as acknowledgements in press releases and annual reports. If an organisation plans on re-applying for another project or further funding, such requests should be honoured [12].

Table 6.1. General comparison on the main restrictions on Landfill Tax Credit Funding - The Landfill Tax Regulations and ENTRUST [15]

- a. Organisations must be enrolled with the Scheme's regulator, ENTRUST, prior to receiving landfill tax credits;
- b. Projects must be registered with ENTRUST prior to landfill tax credits being spent on any project;
- c. Projects must fit with one of the six objectives or project categories, as detailed in the Landfill Tax Regulations;
- d. Projects must not result in a unique benefit or commercial gain to any landfill operator or third party;
- e. Site based projects must normally be within a ten mile vicinity of a landfill site;
- f. Audit trails for each individual project must be retained by the Environmental Body, to which the project is registered, demonstrating compliance with the above conditions. Such information is used to demonstrate the project's compliance to ENTRUST, utilising standardised templates.

Table 6. 2. General comparison on the main restrictions on Landfill Tax Credit Funding - Landfill Operators and Credit Funds [15]

- a. Most funds require that an organisation is enrolled with ENTRUST prior to making an application;
- b. Many funds require that projects are registered with ENTRUST before applying for funding;
- c. Projects must fit with one of the six objectives or project categories, as detailed in the Landfill Tax Regulations and in addition some funds may be object specific, and may require the project to meet additional criteria where specified
- d. Projects must not result in a unique benefit or commercial gain to any landfill operator or third party;
- e. Site based projects must normally be within a ten mile vicinity of a landfill site, and in addition, many funds require that projects be within a set vicinity of the landfill operator to which the application is being made.
- f. In addition to the audit trails required by ENTRUST, most funds require regular project reporting. This ensures compliance with ENTRUST and the Landfill Tax Regulations as well as with the original application form (project brief).

Additional Requirements often include:

- g. That applications do not exceed a maximum funding limit per annum (frequently between £50,000 to £150,000);
- h. That projects do not exceed a maximum project length (often 3 years);
- i. That applications are not made for the purchase of land, to support an organisation's core activities, or to conduct a feasibility studies;
- j. Preference is frequently given to projects where a third party contributor has been secured to fund the 10%.

Figure 6.6. General Project Development and Funding Process for Projects under the Landfill Tax [15]
(Source: Information Sheet 1 – Introduction to The Landfill Tax Credit Scheme © The Environment Council)

Figure 6.7. Overview of RMC Environment Fund's Funding System © The Environment Council [15]

6. FUNDING TRENDS

The Government's Waste Strategy for England and Wales (Waste 2000) [22] places an emphasis on the Landfill Tax Credit Scheme in driving and delivering sustainable waste management. There is a general consensus that funding for category C, sustainable waste management projects, should be between 30 - 50% [21, 23] of the landfill tax credits awarded however they are not prepared to make this statutory in law. Those who support a 50% allocation to category C projects are mainly seeking to ensure that the Landfill Tax Credit Scheme serves the ultimate purpose of the Landfill Tax Regulations, in reducing waste going to landfill.

Figure 6.8 contains information on the money spent through the LTCS per category to date [17, 19, 24]. The percentage of landfill tax credit funds for sustainable waste management projects (category C) has increased with a corresponding fall in public park and amenity projects (category D). This change in allocation could be attributed to a number of factors: [a] the development time of sustainable waste management projects, which for research and development in particular is often longer than those for creating a children's play area for example; [b] the initial allocation for funds by landfill operators to projects which could improve the perception of their company in the local community within which they operate, however the amount of public park and community projects which can be conducted in one specific area will generally reduce after a given time, once major projects have been completed.

Landfill operators and landfill tax credit funds often have individual targets and ultimate aims, which determine how their landfill tax credits are distributed. This is reflected in Figure 8, which demonstrates the variance of category preference within five different FD-EBs. Drawing comparisons from these figures is however difficult, due to the varying timescales and different project categories being used. Object categories A and B are included as contaminated land, C as sustainable waste management and D and E as local community and the environment [6, 12].

Figure 6.8. Breakdown of LTCS money spent per category (1997-98 £39.3 million spent; 1998-99 £44.1 million; 1999-2000 £50M) [13]

In relation to the funds discussed in Figure 6.9, the Royal Society for Nature Conservation act as a F-DEB for both Biffa and the Hanson, receiving in excess of £16 million in credits during the first 2 years of operation (1997-99). During this period they had received 575 applications for funding and had supported 120 projects worth a total of £10 million [14, 16]. In June 2000, the Hanson Environmental Fund published its annual review for October 1998 to December 1999, recognising the Government's emphasis on sustainable waste management projects under the Landfill Tax Credit Scheme, and highlighting the current lack of well thought-out sustainable waste management projects being submitted for consideration, the Fund called for an increase in these projects [14].

With 26.5% of Funds being allocated to such projects during 1998/9, this Fund currently sits mid way between the range of landfill operator Funds (and their project expenditure) considered in this article (see Figure 6.8) and is approximately 10% below the 1999 average landfill tax credit spend for this category (see Figure 6.9).

Figure 6.9. Comparison of funding spent through the LTCS per category (£s) by different F-DEBs [13]

The Hanson Environmental Fund has taken a dual approach to managing the landfill tax credits generated by Hanson, with the Fund handling requests for larger projects, those over £5,000 and a smaller Fund, (the Community Grants Scheme) which helps support projects between £250 to £2,000. Recognising the burden of administrative requirements made under the Landfill Tax Credit Scheme, these smaller projects may not need to be registered with ENTRUST by the organisation conducting them before being granted an award.

Biffaward's Review [16] for 1997-1998, reflects the Fund's commitment to addressing the nation's waste problem as well as to supporting local community projects, with almost 61% (currently this figure has fallen to 50%) being allocated to sustainable waste management projects.

The Fund anticipated the reliance of Waste 2000 on the use of the Landfill Tax Credit Scheme for driving sustainable waste management practice, supporting such projects as a review of separate collection of organic waste for composting, kerbside collection of compostable material (Progressive Farming Trust – £20,000) and a waste minimisation guide for businesses in London (Wastebusters - £5,000).

Similar to Biffaward in its allocation to the different categories, the RMC Environment Fund has the highest contribution to sustainable waste management projects; just under 62% of those Funds discussed in this paper [15]. It is however, important to note that the figures for this Fund are based on cumulative allocation, rather than annual project data. This Fund's criteria for projects stipulates that they must demonstrate community participation/stakeholder acceptance, environmental benefit and/or awareness raising and education/ dissemination of good practice. The Fund therefore aims to ensure that there is a healthy allocation of funding between the different categories. Recognising the relatively high proportion of funds being awarded to sustainable waste management, over the last 2 years the Fund has called for more community and environmental projects from areas close to RMC operations to apply.

The figures from both Biffaward and the RMC Environment Fund are therefore well above the collective landfill tax credit spend of 37% in 1999 on category C (sustainable waste management) projects and are comfortably well above the suggested allocation of between 30-50% of landfill tax credits. The figures presented in this paper to demonstrate individual landfill tax fund allocation has used spend per pound calculations. Figures 6.10 and 6.11 provide an example of the actual difference when figures are presented for the to number of projects that have been awarded funds. In this case, the figures for the RMC Environment Fund reflect the Fund's actual aims as regards an equal allocation of funds.

The Onyx Environmental Trust manages funds from all 12 active landfill sites (which accept approximately 2 million tonnes per annum) and provides an income to the trust of approximately £3 million every year, under the control and guidance of a General Trust Manager [23].

There are 6 Regional Panels who receive the initial applications for funding; (South and South West, London & Home Counties, Birmingham & South Midlands, North West Midlands, North East Midlands, North and North West) each with representatives from the Environment Agency, Wildlife Groups, Onyx and other locally significant partners. All applications go to the Trust Manager where they are vetted for compliance and if successful the projects are asked to complete an application form (which has proved quite arduous in the past).

Then the project will be considered at the 'Regional Panel', where on average 30% are discarded, 10% are asked for more information and 60% are passed. The projects are then prioritised in that particular region and the list is sent back to the Trust Manager. From here the trustees must then make a decision on funding. Usually 50% of the projects assessed by the trustees will be funded. To date, 136 Projects have been awarded funding and 43 Projects have been completed, with a total spend of £7,308,027. The project breakdown is denoted in Table 6.3.

Figure 6.10. RMC Environment Fund – distribution of funds per project category (no. of projects) [15]

Figure 6.11. RMC Environment Fund – distribution of funds per project category (no. of projects) [15]

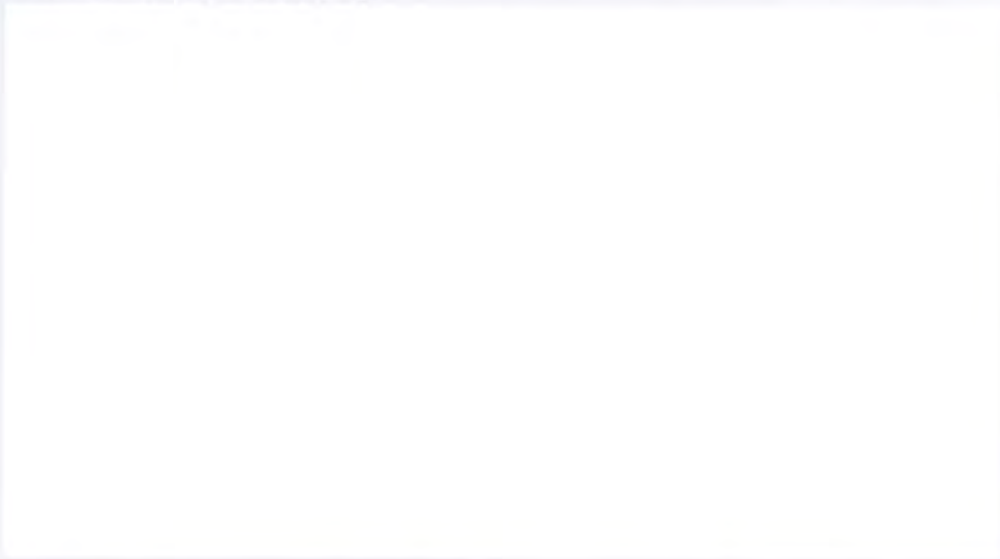


Table 6.3. Project expenditure by the Onyx Environmental Trust 1997-2000 [21, 23]

<i>Remediation</i>	4%	<i>Parks & amenities</i>	72%
<i>Pollution</i>	2% (1 project)	<i>Wildlife</i>	3%
<i>Waste Education</i>	9%	<i>Churches & Historic Building</i>	10%

The Onyx Environmental Trust has one of lowest levels of contribution to sustainable waste management projects, at just under 10%. However, it is clear that the organisation is working to ensure this level of funding is dramatically increased, with a commitment from Lord Gregson, Chairman of the Trust to make £500,000 available for such projects during the coming year. Unlike Biffaward and the Hanson Environmental Fund, whose annual reports indicate they recognise a distinction between sustainable waste management projects and projects which are local community focused, the Onyx Environmental Trust appears to see its role in furthering environmental protection.

Different to the other Fund’s so far discussed, the Staffordshire Environmental Fund has a clear area or regional focus.

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Figure 6.12 Comparison of pre-approved (registered) projects with active (or completed) projects [17, 18]

This interpretation by ENTRUST of their role as regulator, significantly laid the framework for landfill tax fund management, but should not necessarily be interpreted as a negative response. The assurance to landfill tax fund managers of a project being approved by the Scheme's regulator, and therefore helping to ensure compliance with Landfill Tax Regulations, and in minimising risk including that of "clawback" (of the money received), provides a much needed "comfort blanket" without which it could be argued many projects may not have seen daylight. [20].

In mid-2000, without any apparent external consultation, ENTRUST announced that it would no longer be pre-approving projects (thus removing this 'comfort from landfill operators and fund managers), although projects which have established a funding source would be registered by ENTRUST. This move, a result of an amendment to the Landfill Tax Regulations in late 1999, was anticipated would benefit the overall operation of the LTCS, and help prevent criticism of the Scheme which has centred on the number of pre-approved projects compared to those that have been successful in receiving funding (see Figure 6.12).

This move resulted in a number of concerns from major landfill tax funds claiming that they would have to conduct more detailed compliance checks before agreeing to fund a project, or have to face potentially embarrassing situations. ENTRUST have recently issued further guidance to state that projects can be registered before or after funding has been agreed.

8. CONCLUSIONS

Irrespective of the different approaches used for landfill tax fund management, all aim to fulfil the individual landfill operators and environmental bodies aims and objectives, whilst hoping to promote sustainable waste management and improve local community public relations. This undoubtedly can make gaining funding under the LTCS a complicated affair. The L TCS is however a valuable innovation, which allows a proportion of a national tax to be redirected by landfill operators and Environmental Bodies to projects which can assist in driving sustainable waste management and improve the quality of living for those communities who live close to landfill sites. It is in effect a 'polluter pays' fund, which can channel monies into local community projects and research and education programmes, centred on improving waste management practices [27].

The discussion in this paper has demonstrated that approaches to managing landfill tax credits can vary widely, with landfill operators having control over the allocation of funds and as a result each landfill tax credit fund has different (though often similar) aims, the variations in management of such funds are somewhat inevitable.

From examining the data and presented it can also be concluded that all nation-wide based funds, including Biffaward, RMC Environment Fund and the Onyx Environmental Trust have a similar commitment to supporting sustainable waste management projects, therefore contributing to Waste 2000 as well as giving something back to the communities in which the landfill operators they serve operate. However, area-based funds, such as Staffordshire Environmental Fund have a clear focus in working with local communities to improve the environment, with less of a focus on supporting sustainable waste management projects.

The influence of ENTRUST in providing a framework for such funds to be established has also been demonstrated.

The success of the first “green tax” scheme has shown itself to be markedly productive in the direct recycling of landfill tax credits into beneficial social and environmental projects nationally [13]. Large sums of money have been spent on sustainable waste management research and development and education, community amenities and building restoration and maintenance. In summary of the benefits of the LTCS can be grouped as;

- *Subsidiary - the landfill tax allows decisions to be made at the closest point of delivery on funding issues*
- *Local Benefits - local communities are re-imbursed for disruption and disturbance caused from landfill practices*
- *Flexibility - local trusts and groups can respond through the system to specific problems and situations as they arise*
- *Environmentally - through the creation of environment centres, community involvement and recycling of waste the environment clearly benefits*

According to Lord Cranbrook (Chairman of ENTRUST) ‘there cannot be many innovative schemes which achieve almost 80% of their theoretical maximum (in donations) in their first two years of operation. We now look forward to an even better year where, with increased recognition of the scheme, we aim to get nearer to utilising 100% of the available funds to support worthwhile environmental projects nationally’ [17]. However, the success of the scheme as earmarked in Waste 2000 for delivering effective and sustainable waste management solutions remains to be seen [27].

If the UK Government is serious about meeting the targets set for waste management in the National Strategy, and about achieving a more sustainable approach to waste management, then funds need to be found and be focused. The landfill tax is an appropriate source of funds but the Tax Credit Scheme in its current form does not focus funds sufficiently towards better waste management.

According to Michael Meacher (Minister for the Environment) “*if we are going to retain private sector status for this scheme ... there is a limit to the extent to which one can force more public expenditure into recycling*” [28]. Clearly the scheme is expected to deliver significant funds to recycling projects otherwise the scheme as a whole could be under threat. It is up to us, as an industry, to ensure that the funds are not only maintained but are channelled into the most appropriate uses for the benefit of all.

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CHAPTER 6 [III]

LANDFILL TAX DRIVES SUSTAINABLE WASTE MANAGEMENT

LANDFILL TAX DRIVES SUSTAINABLE WASTE MANAGEMENT

1. INTRODUCTION

In its White Paper *This Common Inheritance* [1] the UK Government recognised that a change was necessary in the way both industry and householders disposed of their waste. In the UK the predominant method of disposing of waste has been, and still is, by depositing it in landfill. Currently landfill takes about 84% of Municipal Solid Waste (MSW) [2].

Since 1st April 1996 the Environment Agency has taken on the responsibility for regulating local authorities' waste collection and disposal [3] and local authorities dispose of waste either directly, by operating their own collection and disposal service, or indirectly by employing private companies to carry out these tasks [4]. It has been found that there are fewer voids to dispose of the waste, that such disposal could cause long term problems in that the sites have to be monitored, for example for gases created by the waste, and maintained [5]. The Environment Agency, local authorities and Central Government foresee these problems to be costly so are now keen to transform practices so that less waste is created as well as disposed of in a more environmentally acceptable manner.

In *The Common Inheritance* [1] the government recognised that there was a well established hierarchy of waste. This hierarchy reflects the most desirable methods of waste management in order to achieve a reduction in the quantity of waste generated, in line with the principle of sustainable development. It further recognised that the UK managed most of its waste by disposing of it in landfill sites which was a means of managing waste at the bottom of the waste hierarchy. There was therefore a need to push the management of waste in the UK further up the hierarchy towards recovery/recycling and reuse and, at the top, reduction. To promote more sustainable waste management practices the UK Government published a National Waste Strategy, "*Making Waste Work*", which sets waste management targets [6] also the Landfill Tax was introduced on 1st October 1996 by the Finance Act 1996 and the Landfill Tax Regulations 1996.

2. PURPOSE OF THE TAX

The purpose of the tax as stated in the March 1998 Review Report by the Department of Customs and Excise is firstly *"to ensure that landfill waste disposal is properly priced so as to reflect its environmental cost"* and secondly *"to promote a more sustainable approach to waste management in which less waste is produced and more waste is either reused or has value recovered from it"*[7].

There are two main ways in which this purpose may be interpreted. The first interpretation is that the tax may be used solely to increase the cost of landfill to force industry and, through local authorities, households to act in such a way as to push their waste management technique up the hierarchy. The justification for this is that landfill is too cheap and therefore, at the moment, a relatively easy option for managing waste [8]. The belief is that if it were more expensive waste producers would think of other ways of disposing of their waste. When a landfill tax was proposed it was pointed out that at that time the cost of landfill was much higher in other parts of Europe [9].

Under this interpretation the twofold purpose may be achieved merely by virtue of the tax raising the cost of landfill. The money itself raised by the tax is not an essential part of the equation in achieving its purpose.

The second interpretation is that the tax not only increases the cost of landfill and promotes the better management of waste by this expedient alone but also raises money which itself may be used for the promotion of a more sustainable approach to waste management.

Prima facie the tax is not interpreted in this second way. In his Budget speech of Tuesday 28th November 1995 the Chancellor of the Exchequer stated:

"This is a tax on waste in order to reduce the tax on jobs. The money raised by landfill tax will allow for a matching cut in the main rate of employers' National Insurance contributions by a further 0.2% to 10% from April. This will cut the costs of employment by £500 million and make it cheaper for business to create new jobs."

The UK Government of the day appeared to see the tax as primarily a way of raising money for general purposes.

With Government earmarking the tax for purposes other than projects to push waste management up the hierarchy there is a risk that government will rely upon such funds as general income and will itself have incentive to increase landfill tax due to the revenue that it brings in.

Although this seems to be the Government's favoured interpretation of the purpose of the tax, a Credit Scheme was introduced in order that at least some of the money raised is used to promote more sustainable waste management. It appears that the importance of the Credit Scheme in promoting a more sustainable approach to waste management is far beyond the status that government has accorded to it, if that is to be judged by the 20% that may be claimed for environmental projects. It is apparent from the tenor of the Review Report that the present targets (much less more stringent standards that are proposed) put forward by the government in the National Waste Strategy "*Making Waste Work*" [6] are not likely to be met unless there are alternatives to the management of waste which are both readily available and cheaper than landfill.

In assessing the extent to which the landfill tax is effective two questions need to be asked:

- *To what extent has the presence of the landfill tax improved the management of waste?*
- *To what extent is the money raised being used through the Tax Credit Scheme to promote better waste management?*

3. OPERATION OF THE TAX AND THE CREDIT SCHEME

The tax is collected through the operators of licensed landfill sites who must register with the Customs and Excise. A disposal of waste is liable to the tax if the material is disposed of as waste by way of landfill. Waste is for these purposes material which the producer disposes of intending to discard it or throw it away even if it could have been re-used.

The tax is currently levied at a rate of £2 per tonne for inactive or inert waste and £7 per tonne for all other waste, although this figure is to be raised to £10 per tonne following the budget speech on March 1998.

The weight will normally be calculated by the use of a weighbridge although if no weighbridge is available then the Customs and Excise may agree an alternative method of calculating the weight of the waste e.g. the maximum weight that the lorry can carry or estimated volumes of waste converted to weight.

The landfill operator will have to account for the tax collected quarterly and keep records of: tax due, any credits of tax or adjustments (where permitted), the tonnage of waste accepted and the rate of tax attributable to that tonnage. Records must be kept for 6 years.

Landfill operators can claim a credit against their Landfill Tax payment if they make a voluntary contribution to an approved Environmental Body. Up to 90% of the contribution can be reclaimed but the total credit in any 12 month period must not exceed 20% of the total landfill tax bill.

Non-profit making 'environmental bodies' (EBs) apply for registration with ENTRUST to receive funding (Table 6.4). ENTRUST examines these applications and if the EB's meet certain criteria they can approach landfill operators for funding, which is when they must sell the projects to the landfill sector. If they desire the landfill operators can then divert a proportion of their tax payments directly to approved projects.

Table. 6.4 Organisations registered as Environmental Bodies? [11 and 12]

<i>Type of EB</i>	<i>%</i>	<i>Type of EB</i>	<i>%</i>
<i>Educational Organisations</i>	21	Groundwork Trusts	8
<i>Heritage or Religious Trust</i>	23	Unknown	7
<i>Research unit or University</i>	8	Waterway Groups	4
<i>Nature or Environmental Institutes</i>	26	Museum or Institute	3

According to Regulation 33(2) of the Landfill Tax Regulations [10] the contribution to the Environmental Body must be spent on one of the following approved objects:

- a) Reclamation, remediation or restoration or any other operation that facilitates the economic, social or environmental use of land where its use has been prevented or restricted because of previous use. This may include the creation of new wildlife habitats or public parks.
- b) Any operation intended to prevent or reduce any potential for pollution or to remedy or mitigate the effects of any pollution on land polluted by a previous activity. This will include contaminated land.
- c) Research and development, education or collection or dissemination of information about waste management practices, the purpose of which is to encourage the use of more sustainable waste management practices. This will include research, pilot schemes, demonstration projects or training schemes aimed at waste minimisation, reuse, recycling, composting and energy recovery.
- d) For the protection of the environment, the provision maintenance or improvement of a public park or public amenity in the vicinity of a landfill site. This will include the creation of wildlife habitats, conservation areas, urban forestry and positive land management.
- e) For the protection of the environment, maintenance, repair or restoration of a building or the structure of religious significance or of historic or architectural importance that is open to the public and is in the vicinity of a landfill site.
- f) The provision of financial, administrative and other related services necessary to the functioning of the Environmental Body.

There are certain restrictions in relation to these operations which are: that any reclamation or remediation under a) or b) will not be regarded as an approved object if it is for the benefit of a person who carried out or knowingly permitted the contaminating or polluting activity. Also the landfill operators must not directly benefit from any of the schemes of Environmental Bodies. If the contributions are not spent on approved purposes then the credits may be recovered. In order for a landfill operator to claim tax credits under the scheme the environmental body must be registered with Environmental Trust Scheme Regulatory Body Limited (ENTRUST). This body also gives approval for to projects which are to be funded under the Tax Credit Scheme. This is the sole regulatory body of the scheme and is itself funded by registration fees and administration fees which are charged on approval of each project. This fee is a percentage of the tax related funding, currently 5% [10].

3.1 Approved Projects;

According to Regulation 33(2) of the Landfill Tax Regulations. The contribution to the Environmental Body must be spent on approved objects.

Table 6.5 provides an indication of the types of project that are currently registered for funding under the landfill tax credit system.

Table 6.5. Some examples of ENTRUST approved Project Summaries

EB Name	Project Description
Category A Projects	
Abriachan Forest Trust	Purchase of Abriachan Forest to ensure its preservation
Cheshire Environmental Services	Removal of contaminated soil from Northwich F.C. Ground
Northern Environmental Projects Ltd	Decontamination of Old Forge
Category B Projects	
Loch Awe Improvement Association	Clean Sweep operation
Mersey Basin Trust	Project officer to work on Riva 2005 clean river project
Wildlife Trust (Cheshire)	Reedbed extension at Owley Woods Community woodlands
Category C Projects	
Arena Network Northern Ireland	Survey of existing environmental management practices
Landtrust	Funded PhD- methods of cleaning sewage sludge
Wastesavers Recycling Association	Pilot Study of a blue box scheme for kerbside collection
Category D Projects	
Aberdare Little Theatre	Construction of car park & landscaping area at a theatre
British Waterways	Selby Canalside: cycle and footpath improvements
Enventure Limited	Arts-based specialised garden project
Environmental Preservation Initiatives	ECO Heroes: design of various 'garbage' related characters
Environmental Trust for Berkshire	Creation of a pond and bog garden
Category E Projects	
Beacon Environmental	Essential repairs to St Hubert's Church, Corfe Mullen
Bluebell Railway Trust	Maintenance, repair and restoration of Imberhorne Viaduct
Fenland Archaeological Trust	Flag Fen: reconstruction of bronze age farmsteads
South West England Environs-Trust	Funding an MSc in Woodland Management Research
Category F Projects	
Cory Environmental Trust	Set-up costs
Wildlife Trust (Warwickshire)	Environmental Body Services

4. THE EFFECT OF THE LANDFILL TAX AND CREDIT SCHEME

ENTRUST has published a series of statistics relating to the Environmental Bodies and projects that have been funded through the Credit Scheme. The estimated total amount raised per annum by the Tax is £450 million of which only 20% (£90 million) would be available under the current tax credit system [13].

The available statistics show a good response from Landfill Operators in the first two years with around two thirds of the potential £90 million under the scheme being claimed through tax credits. The approved categories which attracted the most projects in both 1998 and 1999, were those focused on Environmental Protection and Research, as noted in Table 3. The proportional distribution of approved projects has remained relatively static since the scheme's initiation in 1997, with over half of all the projects registering having an environmental protection focus [11]. The ENTRUST statistics contain not only the number of projects but the contributions made under the Tax Credit Scheme in relation to each project. It was noted that the number of projects within a category did not reflect the amount of the contributions (Table 6.8).

Although only 10% of the approved projects were for building restoration they received 22% of the total available funding. Research and Education accounted for 30% of the total number of approved projects and yet only received 15% of the total value of the contributions, a considerable mis-match. There are currently 1,330 enrolled Environmental Bodies yet only 467 are receiving funding (35%), indicating the very competitive market that has developed for this environmental project fund. With in excess of 6,000 approved projects worth almost £500 million, there would appear to be a great deal of interest in the scheme from potential beneficiaries, but clearly not enough money to go round! However, the scheme appears to taking some time to become fully operational with only 1,116 projects currently active or completed, representing only 20% of the approved projects to date. Of the £153 million already donated only £44 million has been spent, equivalent to 29% of the available fund, or 9% of the money being sought. On average each of the active projects has received £39,500, although the range of projects funded has ranged from as little as £5,000 for a small pollution project to in excess of £1 million for large environmental remediation and education programmes.

4.1 Review of Activities in 1999

In 1999, 91% of the theoretical maximum of contributions was forthcoming through the scheme, which was a significant improvement on the funding donated in 1998, when only 67% of the theoretical maximum was made available. In excess of 2000 projects were being funded directly through the LTCS of which 1,300 actually began in 1999! Clearly the figures look positive (see Figures 6.5 and 6.6).

In 1999 about £50 million was spent on projects through the LTCS, of which £6 million went on recycling, £2.5 million on landfill technology and WtE, £8 million on nature reserves & public parks and £3 million on canals.

Table 6.6. Classification (%) of Approved ENTRUST Projects 1998/99 [11]

Category	Approved projects	Contributions (% of total money)
a) Land Reclamation	4.0%	13.0%
b) Land Redemption	3.0%	3.5%
c) Research & Education	30.0%	15.0%
d) Environmental Protection	52.9%	46.0%
e) Building restoration	10.0%	22.0%
f) Administration	0.1%	0.5%
Total Projects (approx.)	6181	

Table 6.7. Summary Statistics on the LTCS in 1999

	January 1999	January 2000
Enrolled Ebs	1,212	1,862
Spending by EBs in previous year	£40 million	£49 million
Active or completed projects	1,100	2,000
Cumulative contributions	£145 million	£235 million
Participating Landfill Operators	450	600
Approved Projects	5,000	8,400
Revocations	0	2
EBs receiving funding	460	780
Contributions	80% of theoretical maximum	91%

For all these successes, there have been many criticisms of the system focusing on the lack of funding that has been directed towards Sustainable Waste Management (Category C). The breakdown of funding on project categories can be seen in Tables 6.8 and 6.9, indicating the obvious dominance of local community projects (Category D) which allow the landfill companies to gain available PR opportunities whilst ploughing some of their funding back into the communities who have been hit hardest by the activities of the company through time. Table 6.9 provides a clearer picture of the funding that has gone on sustainable waste management (Category C).

In light of some of these problems a House of Commons Review into the Landfill Tax Credit Scheme began in 1998 and reported its extensive findings in mid 1999. A number of issues were discussed in great depth and consultation with landfill operators, environmental bodies and other interested parties. Issues raised included;

- 1. the nature of the projects receiving funding - overemphasis on high-profile nature reserves and building restorations*
- 2. the scope of the approved projects- many favour the funding of local authority recycling*
- 3. the relative roles of the private and public sectors - are authorities exercising undue influence?*
- 4. the role of third parties - scheme expected operators to find the 10% but more and more alternatives are being sought*
- 5. the contributions period - contributions had to be used in the year designated*

The most important conclusions to come from this review were;

- Need to demonstrate value for money
- The uneven distribution of funds between the available categories
- The need to evaluate the scheme's environmental benefits more efficiently
- The need for better information to measure the scheme's effectiveness
- The need to monitor EB administrative costs

Table 6.8. Breakdown of Spending through the LTCS over the last 2 years [11]

	1998 £s	%	1999 £s	%
Category A	2,600,000	6.7	3,800,000	8.0
Category B	200,000	0.5	50,000	0.1
Category C	12,250,000	31.3	17,800,000	36.0
Category D	21,850,000	55.7	23,700,000	48.0
Category E	2,100,000	5.4	3,600,000	7.0
Category F	200,000	0.4	200,000	0.4
Totals	39,200,000		49,150	

Table 6.9 Sustainable Waste Management (Category C) [11]

	£s in 1998	£s in 1999
Waste minimization procedures	700,000	1,030,000
Green waste management projects	350,000	1,100,000
Materials Recovery & Recycling	3,900,000	5,800,000
Research & Development programs	1,000,000	2,050,000
Education & Information campaigns	4,400,000	6,050,000

The scheme's success has on many fronts outstripped its originator's wildest expectations. In the last 12 months 91% of the theoretical maximum of credits were contributed by landfill operators, whilst there were 50 new EB enrolments every month and 230 project proposals every month. The scheme has also resulted in many new partnerships between landfill operators and local communities, with funding in excess of £4 million being made available every month for beneficial projects.

4.2 Summary of ENTRUST Approved Projects as of January 2000

- Category A - £18,265,000 in 'proposed' projects
 - 65% for Parks & Amenities
 - 10% Greens & Grasslands
 - 8% Residential & Commercial
 - 5% Restoration
 - 5% Research & Development

- Category B - £1,930,000 in 'proposed' projects
 - 70% Research & Information
 - 18% Feasibility Studies
 - 4% Waste Management
 - 4% Non-Canal Water

- Category C - £105,301,000 on 'proposed' projects
 - 30% Education & Information
 - 20% Research & Development
 - 20% Recycling
 - 15% Staffing

- Category D - £271,213,000 on 'proposed' projects
 - 27% Village Halls & Community Centres
 - 20% Nature Reserves
 - 12% Parks & Amenities
 - 10% Tree Planting
 - 8% Foot & Cycle Paths
 - 7% Woodlands
 - 6% Canals

- Category E - £134,733,000 on 'proposed' projects
 - 80% Restoration

Category C - £16,060,000 implemented

40% General Waste Management

20% Recycling & Recovery

15% Education

8% Research & Information

As a summary of the types of projects currently being funded through the LTCS refer to Table 6.10. This shows projects that have been registered in the southern region of the UK and that have been successful in securing funding.

Table 6.10. Projects funded in the 'Southern Region'

Environmental Body Name	Category	Cost	Project Description
British Waterways	a	£200,000	Improvement of canal towpath
Trieda	a	£200,000	Remediation and reclamation of brewery site
Suffolk Wildlife Trust	a,d	£612,000	Restoration of Lackford Wildfowl Reserve
Oxford Brookes Env. Trust	b	£47,470	Risk assessment Cripsey road allotments
BRE Waste & Env. Body	c	£58,850	Assessing combustibility of landfilled material
British Waterways	c	£3,000	Grand Union 'Recycling by Boat' - Pilot project
Essex Environment Trust	c	£10,000	Essex Waste Minimisation Club
Waste Recycling Env. Body	c	£44,000	Pyrolysis Techniques - study of Europe & US
British Waterways	d	£140,000	Provision of new village hall, Preston on Stour
Cleanaway Pitsea Marshesd Trust		£870,000	Provision of Country visitor centre
Kew Environmental Body	d	£30,000	Conservation of sculptures & garden ornaments
RSPB	d	£1,500,000	Creation of a new wetland nature reserve
Waste Recycling Env. Body	d	£55,000	Installation of Gallery for community arts
Amberley Chalk Pits Museum	d/e	£210,000	Edwardian School House refurbishment
Historic Buildings Commission	e	£350,000	Totnes Castle - Motte Slippage Repairs

4.3 To what extent has the presence of the Landfill Tax improved the management of waste?

The Customs and Excise Review stated that it was difficult to measure the success of the provisions since the pre tax data lacked precision. There is some research [12], quoted in the Review, which stated that a third of companies were considering waste management measures as a result of the introduction of the tax.

In addition a recent survey indicated that the tax had prompted about two thirds of businesses, councils and contractors to reduce the amount of waste that they produced and about half the respondents claimed that their disposal costs had risen by 10% since the introduction of the tax [13]. There was also a general feeling amongst respondents to the review that industry was taking action to reduce its waste.

Domestic waste on the other hand was generally agreed by the respondents to be increasing. The Review report suggested that this may be due to smaller businesses disposing of their waste through the domestic collection system such as Civic Amenity Sites. Even if this were so the indication is that the domestic households are not reacting to the increase in cost. It is submitted that there are two reasons for this.

Firstly the tax will not have affected the domestic household until the next local authority rate demand and secondly many domestic households are unaware of the waste management alternatives or they are (or at least feel) impotent to do anything about waste management and its related costs.

As the charges for landfill are aggregated and spread according to criteria other than waste production there is nothing in the landfill tax to reward the efficient household. A local authority waste management policy is only as efficient and effective as the total amount of its waste. It will be interesting to see if any parties at a future local election will seek to obtain votes by claiming that they will reduce rates by reducing landfill tax or by implementing a waste management policy that will put waste higher on the hierarchy.

In the absence of clearer evidence the best that can currently be claimed for the mere existence of the tax is that the increased costs that it represents has made a proportion of industry more aware of waste and put it on the agenda of more company board meetings. Charging more for landfill *per se* would not appear to be enough to improve waste management to fulfil the targets of the National Waste Strategy. This brings us to the second question.

4.4 To what extent is the money raised being used through the Tax Credit Scheme to promote better waste management?

The ENTRUST Press Release dated 27th September 1997 declared that some 93 landfill operators had "contributed" £8.5 million (£4 million since August of that year) to 90 Environmental Bodies (although over 440 had registered) for over 1,000 projects. By the ENTRUST Press release of the 7th November 1997 the total number of landfill operators had increased to 200 and the contributions were some £42 million (the largest contribution being £3.5 million) to 200 Environmental Bodies (with over 500 having registered) for over 1,500 projects. The January 1998 press release showed a total of some 300 landfill operators contributing over £60 million to some 250 Environmental Bodies (out of over 600 enrolled) for over 2300 approved projects.

The estimated total amount raised by the tax is £450 million of which only 20% (£90 million) would be available under the tax credit system.

This shows a good response from landfill operators in the first year since they are contributing, through tax credits, around two thirds of the potential £90 million under the scheme.

Attached to each press release is a list of the approved projects as at that time. Although there was a substantial rise in the number of approved projects between September 1997 and January 1998 the increase was *pro ratio* as between each category. The categories which attracted the most projects in September continued to attract a proportionate number of projects notwithstanding any increase in overall numbers. Over 50% of the projects were in category d) with 30% in category c) 10% in category e) and 4% and 3% in categories a) and b) respectively [11].

The January Press Release contained a list of contributions made under the Tax Credit Scheme in relation to each project. It was noted that the number of projects within a category did not reflect the amount of the contribution.

Although only 10% of the approved projects were for building restoration they received 22% of the total funding. Research and education accounted for 30% of the total number of approved projects and yet only received 15% of the total value of the contributions (Table 5).

In 1997 a survey was carried out in relation to the Counties of Surrey and Northamptonshire [14] to *inter alia* assess the waste management industries initial response to the tax credit scheme and, as part of that survey, to see which environmental bodies the industry would be likely to fund. The aggregate results were that 36% of the companies favoured building restoration; 29% favoured land restoration; 21% preferred the funds to be used for research and 14% said they would choose education. Although these survey classifications do not exactly fit the approved projects classifications nevertheless they do give an idea of what projects the industry favoured. It will be noted that building restoration and research and education were initially first and second preferences respectively. Both are still preferred areas to fund with building restoration having the third highest number of projects and the second highest amount of funding and education and research having the second highest number of projects and the third highest amount of funding.

However land restoration/environmental protection has in fact been the most favoured area for both the number of projects and funding. It is submitted that the reason for this was the potential usefulness to the industry was not at first fully appreciated. It is however now seen an important means of improving public relations.

5. DISCUSSION

Firstly, the credit system is a success in that £60 million of the £90 million has been claimed in the first year of operation. However these figures are also disappointing. There is only £90 million of a potential £450 million, the remainder is used to reduce employer's National Insurance contributions. It is likely that even under the present scheme the full 20% will be claimed by the end of the second year which will leave some Environmental Bodies without funds for their projects. The figure of 20% is therefore too low.

Secondly, the figures indicate a considerable increase in the last quarter of the year in both contributions and projects. This must partly be due to more Environmental Bodies becoming registered and all parties getting used to the operation of the system. However by looking at the projects it is submitted that it is also partly due to landfill operators being aware of what the credit scheme could do for them. There is nothing wrong with this provided the benefits to the operators and to the aims of the scheme are mutual.

This highlights a weakness both in the method of funding and the categories for which funds may be contributed namely that it is the landfill operator that decides whether or not to take part in the Credit Scheme and secondly what Environmental Body will receive a contribution, taking account the projects in which the Body is or is likely to be engaged.

It is likely that landfill operators will select the beneficiaries of their bounty and this will lead to only those Bodies and projects being funded which will, at least, not reduce the profitability of the operator in so far as landfill is concerned and may indirectly be of benefit to the operator. Category d) offers the landfill operator an opportunity to indirectly benefit by way of a public relations exercise as all the projects must be within a 10 mile radius of a landfill site.

Operators are able to woo residents and ease the obtaining of permission to enlarge or obtain new sites for landfill by reducing the number of protests by putting something back into the community through the funding of amenity projects. The tax is thereby being used to fund local environmental projects as a form of compensation and mitigation of the effects of landfill sites [15]. However such projects do not contribute to more sustainable waste management.

Lord Cranbrook, Chairman of ENTRUST acknowledged that landfill operators perceived this *"in terms of the marketing opportunities to existing and new clients , as well as the obvious public relation advantages in the localities of the sites."*[13]

A demonstration of a reluctance of landfill site operators to contribute to some Environmental Bodies is the recognition by both ENTRUST and the Customs and Excise that Environmental Bodies are reimbursing landfill site operators the 10% of their contribution that they are not able to reclaim by way of tax credit. This in effect reduces the contribution that is being made. It is difficult to see what purpose the 10% requirement serves and only vitiates against projects that are less popular with landfill operators.

The Customs and Excise Review Report refers to *"a perceived intention of the scheme"* being that *"site operators should contribute from their own pockets"*. Why should they be required to do so? The scheme should have an expressed intention to direct public funds raised by landfill to promote better methods of waste management and that such an intention should not be reliant upon the beneficence of the landfill operator or any other person.

Thirdly, to obtain a clear picture of which projects are preferred by landfill operators it is necessary to look at the amount of money being contributed and not merely consider the number of projects to which contributions are being made. Category c) relates to education and research which includes projects which directly seek to push the management of waste further up the hierarchy, such as re-recycling projects, composting and increasing awareness of alternatives to landfill. Although 30% of the projects are within this category only 15% of the contributions are paid for such work.

Whereas high profile building restoration which may do much for the landfill operators image but does little for the improvement of waste management receives 22% of the funds but only accounts for 10% of the number of projects. As noted in relation to the second issue there is a risk that the Credit Scheme will become an alternative National Lottery fund. The credit scheme must ensure the money is better focused if it is to do more than just pay for "good works".

Fourthly, the categories of approved projects themselves are disappointing. For example, category c) relates to education and research etc. This appears to uphold the very purpose of the tax, the investigation of alternatives and the educating of industry and households. The category refers to pilot schemes and demonstration projects the very things to set the process of raising the management of waste up the hierarchy. It may therefore be expected that there would be further provisions in this or another category to support longer term programmes. However this is where the possible development to achieve the proclaimed purpose of the tax begins and ends.

Fifthly, there is a detrimental limitation in that local authorities are prohibited from establishing Environmental Bodies. The Customs and Excise Review Report states that the respondent local authorities suggested that they should have some influence over the projects which should receive contributions. It is submitted that such involvement would make the contribution a matter of "public expenditure". However Environmental Bodies could be established which could fund local authority waste management schemes. These could be set up at the instigation of local authorities but run independently to ensure the monies are spent on environmental projects and do not become just an alternative source of public funds.

Reference was made in the Review Report to local authority recycling schemes. However in the light of the limited number of projects in categories a) and b) this may be an opportunity to direct funds to the remediation of contaminated land. The Government Consultation Paper *Paying for Our Past* [16] followed by the policy document *The Framework for Contaminated Land* [17] recognised that the principle of the polluter pays was ineffective in many cases of contaminated land since the polluter was no longer available to accept liability.

Under the Environment Protection Act 1990 as amended by the Environment Act 1995 the responsibility of remediation where a polluter cannot be found is the local authority. Also the continued presence of a tax exemption for landfill from contaminated land indicates that on-site remediation appears to be under-researched. A local authority instigated Environmental Body may be an appropriate method of funding research and remediation.

6. NEW SURVEY OF LANDFILL TAX POLICY

The reviews of the tax have been concerned with assessing the general effectiveness of the tax and so surveyed a variety of persons who are involved in waste management. The review conducted by the Environment Sub-committee of the House of Commons Environment, Transport and Regional Affairs Committee on the Operation of the Landfill Tax, published in June 1999, was relatively comprehensive and ENTRUST has published a good deal of statistical data [18]. Nevertheless there remain questions still unanswered by the Reviews in relation to the operation of the LTCS, and ENTRUST has not been prepared to publish data relating to specific landfill operators contributions to the LTCS which has meant that certain aspects of the LTCS have not been evaluated.

The purpose of the survey was to obtain data to answer the following questions, the information not being obtainable from any other source:

- 1. How many landfill operators contributed to an environmental body under the landfill tax credit scheme nationally and regionally?*
- 2. What was the extent of the operator's contribution?*
- 3. Which of the approved categories did the operator's contribute to and what was the extent of the contribution in each category?*
- 4. In which regions were the environmental bodies situated with a view to assessing the extent to which the LTCS is regionalised with particular reference to East Anglia?*
- 5. What emphasis in relation to funding do the operators place on waste management when making their contributions and how satisfactory do they consider the project categories overall?*
- 6. How accessible is information relating to the operation of the scheme for EBs seeking funding for projects?*

6.1 The Data

This survey focused on landfill operators in England and Wales. Replies were received from 22 operators out of 48 canvassed, 19 of whom replied directly and 3 of whom replied through the environmental bodies to which they make contributions. Some 28% of the respondents operated nationally. Each of the regions were represented by the 72% that operated regionally. Of the 72% that operated regionally a number operated in several regions. Table 6.11 gives the % of those who responded who operated in each region.

Table 6.11. Proportion of Landfill Operators in each Region

Region of operation	% of those companies that operate regionally
London	20
Wales	7
Anglian	27
East Midlands	13
West Midlands	13
North West	27
North East	27
York's & Humber	13
South East	27
South West	20

Some 86% of the respondents had made a contribution to an EB under the LTCS since it was introduced. Of these 77% had contributed the full 20% maximum permitted. 82% said that already they had plans to contribute in the future. Many respondents contributed to more than one category. Table 6.12 lists the percentage of the companies that contributed to each category. Respondents allocated funds in varying proportions to each category. Table 6.13 shows the mean contribution made by an operator to projects within each category.

Respondents were able to identify the regions in which the EBs were situated (see Table 6.14). Some 27% respondents contributed to EBs in the Anglian region and 8% of the EBs that received contributions were situated in the Anglian region. Table 6.15 shows the distribution of EBs, which received contributions in the Anglian Region.

Table 6.12. Number of operators who contributed to each category

Category	% of operator's who contributed to the category
A	68
B	26
C	79
D	84
E	68
F	67

Table 6.13. Average % of contributions made by landfill operators to projects

Category	mean % of contributions made by operators
A	18
B	2
C	23
D	42
E	12
F	4
Total	100

Table 6.14. % of EBs to which operators contributed by region

Region	% of EBs that received contribution by region
London	13
Wales	2
Anglian	8
East Midlands	13
West Midlands	6
North East	6
North West	8
York's & Humber	8
South East	17
South West	13
National	6

Table 6.15. Distribution of EBs that received contributions in the Anglian Region

County	% of EBs in Anglian region
Lincolnshire	9
Cambridgeshire	18
Northamptonshire	27
Rutland	0
Norfolk	18
Suffolk	18
Essex	9
Total	100

Of the companies who responded, 18% (4) knew what percentage of their total contribution that was made to EBs in the Anglian region, which was: 75%; 60%; 13%; and 10% respectively. 68% of respondents stated that they intended to increase their contribution to category C in support of sustainable waste management. The same 68% stated that they planned to fund waste management projects under the LTCS in the coming year.

The approved project categories were felt to be adequate by 55% of respondents but 27% considered that they should be increased (18% suggesting recycling initiatives). 14% thought that the categories should be reduced, specifically mentioning category e) and 41% of respondents felt there should be a specific category for waste minimisation.

7. DISCUSSION OF THE NEW SURVEY DATA

The respondents were representative of all the regions under consideration with 27% of the companies having operations in the Anglian region. In all the reviews landfill operators express the opinion that the LTCS works very well and the survey reflected this view with 86% having made a contribution and 77 % of these having contributed the full amount permissible to obtain credit under the LTCS. In relation to the future 82% said that they planned to make further contributions under the LTCS.

The survey's findings in relation to the contributions that landfill operators made to projects within the approved categories generally corresponded proportionately with the ENTRUST figures in relation to categories b, c, d and e but the survey respondents attributed a much higher proportion of contribution to category a (Table 6.16).

Table 6.16. Comparison of actual expenditure and number of completed ENTRUST projects in each category (up to May 1999)

Object Category	Object Category as % of total Spend	Projects completed as % of total completed	mean % of contributions made by survey respondents
A	7	4	18.20
B	1	3	1.90
C	32	29	22.80
C	55	53	42.00
E	4	10	11.60
F	1	1	4.12
Total	£ 44.1 million	1,200 projects	100.00

One respondent viewed the LTCS as being *"an excellent opportunity for operators to build bridges with local communities"*. Although its strong regional bias is one of its successes, nevertheless it is also one of its disadvantages.

Since the distribution of EBs receiving funding under LTCS does not correspond to the waste arisings or number of households. This is confirmed by the survey with specific reference to the Anglian region. Some 27% of the respondents contributed to EBs and 8% of the EBs that were receiving a contribution from respondents were situated in the Anglian region. However the Anglian region only accounts for 2.2% of waste arisings and 2.3% of households nationally (Table 6.17). Northampton appears to be the most active county in relation to the LTCS having 27% of EBs from the region.

Table 6.17. Regional MSW Arisings & EBs (DTI)

Region	Waste Arisings (% of total)	Households (% of total)	EBs (% of total)	% of EBs that received contribution by region
London	9.7	8.3	8.3	12.5
Wales	2.2	2.3	11.1	2.0
East Anglia	4.8	4.6	9.8	8.0
East Midlands	10.7	10.6	11.4	12.5
North	3.8	5.3	4.1	6.0
North West	18.3	2.3	11.4	6.0
South East	25.8	35.6	15.1	17.0
South West	8.6	11.4	11.2	12.5
West Midlands	10.2	12.1	8.9	6.0
Yorks & Humber	5.9	7.6	8.7	8.0
Total	100	100	100	100

Over a quarter of the respondents considered the categories should be increased and that recycling initiatives should be the additional category. Perhaps more significantly 40% of respondents felt that waste minimisation was under represented. There appears to be a dearth of information about the LTCS for Ebs. For example an EB in a particular region is currently unable to find out which landfill operators have funded certain categories of projects in the past and so may be receptive to applications in the future. This exacerbates the lack of focus on waste management projects, and duplication referred to in the reviews. Some operators may be flooded with applications many of which may be for projects which the operator does not favour leading to a considerable waste of effort on behalf of EBs.

The Anglian region appears to be doing relatively well in relation to the LTCS with EBs receiving contributions. However the emphasis is on general environmental projects rather than sustainable waste management and waste minimisation in particular. However landfill operators are aware of this skew and indicate that they would make contributions to waste minimisation projects if these were promoted more through the approved project categories and EBs. A suggested way of doing this is to establish a fund administered by a national body with close regional links to direct the funding of waste minimisation projects.

8. THE POTENTIAL FOR THE SCHEME

Perhaps one of the areas that is offered the greatest potential for future funding would be on recycling pilot projects and infrastructure development. Table 6.18 provides an indication of some of the projects that have involved infrastructure development and have received funding through the LTCS.

Table 6.18. LTCS Projects – Category C ‘Recycling Infrastructure Projects’

EB Name	Project Description
Alloa Community Enterprises	Purchase of glass recycling vehicle
Auldathie Trust	Re-activation of recycling plant
Bradford Environmental Action Trust	Operate a kerbside recycling project
East Anglian Business Environment Club	Funding to support Information and Liaison Manager
Enventure Limited	Pilot materials reclamation facility
Greenlight Environmental	Continue the glass collection service in Argyll & Bute
The Wales Environment Trust Ltd	Kerbside Recycling Scheme
Track 2000	Waste wood reclaim project
Wildlife Trust (Cambridge)	Environment education officer

As of the 1st January 2000 the Regulations concerning the LTCS have been altered which should significantly benefit the potential development of new sustainable waste management projects by allowing ‘recycling’ projects to be more readily funded.

The Amended Landfill Tax Regulations will allow the following;

- *Recycling & the development of products and markets for recycled materials to be eligible objects*
- *The position of 3rd party contributions to be brought within the Regulations*
- *The Regulations to be more prescriptive reflecting the evolution of the scheme’s use*

9. CONCLUSIONS

Since the 1st January 2000 there have been a series of amendments in operation to the Landfill Tax regulations, which have primarily made 'Recycling & the development of products and markets for recycled materials' eligible objects for funding.

This clearly signifies a growth of interest in the use of the LTCS for funding recycling at the local scale. According to DETR Officials the Government would like to see greater use of the LTCS to fund Category C projects in general, whilst ensuring that as much of the available 'pot' is used each year. With the impending new 'National Waste Strategy' and the implications of the Landfill Directive, the Government clearly needs and wants funds to assist in meeting recycling and recovery targets!

The LTCS has been highly successful with substantial sums of money being used for a range of environmental and community projects, and long may this continue. Money is changing hands! However, the bonanza may be short-lived. Ministers are particularly keen on raising funds for use by local authority recycling projects and pressure has grown on the Government to use this 'pot of money' to provide the impetus to drive forward recycling in the UK. It has been suggested that the funds should be given to an arm's length Government body with responsibility for judging projects and allocating funds, which would prevent the use of landfill tax money by landfill operators for public relations purposes. Many within the industry would like to see the system changed so that half the tax credits would go into a new sustainable waste fund to allocate money directly in accordance with Government priorities, whether that be local compensation projects, environmental improvements or recycling programmes, whilst a further proportion should be made available directly to national waste management projects.

The Government have expressed some concern over the direction of funding, with Earl Cranbrook having commented that *'we hope that the pattern of contributions will change in favour of funding sustainable waste management.'* Money is available for environmental projects, but there has been relatively limited influence on the promotion of sustainable waste management.

The most significant conclusion to come from this review work is that although, via the credit scheme, money is available for general environmental projects through contributions from landfill operators, little of this goes towards promoting sustainable waste management, which is one of the two main purposes of the tax – and this needs to be corrected. We in the industry (research institutes, landfill operators and local authorities) have the power to change this by working in partnership to direct funds to the development of recycling.

If the UK Government is serious about meeting the targets set for waste management in the National Strategy, and about achieving a more sustainable approach to waste management, then funds need to be found and focused. The landfill tax is an appropriate source of funds but the Tax Credit Scheme in its current form does not focus funds sufficiently towards better waste management.

According to Chris Mullen (Junior Environment Minister) speaking at the ENTRUST Annual Roadshow in January this year, *“the aim of the Landfill Tax was to promote a more sustainable approach to waste management and the development of alternative means of dealing with waste. However, only one-third of current funding is directly supporting sustainable waste management projects and the Government (DETR) would like to see this figure significantly increased!”*

Whilst Environment Minister - Michael Meacher had this to say in 1999; *“we have certainly made our wish to ensure that there should be some increase in recycling but, of course, if the scheme retains its private sector status, there is a limit to which it can be controlled by a public authority. But I repeat, if we are going to retain private sector status for this scheme, and that is what the Government is proposing, there is a limit to the extent to which one can force more public expenditure into recycling.”*

The LTCS has proved a success over the last 3 years and is allowing substantial funding of environmental and community projects which would have otherwise not been available. However, not enough of the money is being directed at sustainable waste management, education and research, which is perhaps the ‘future’ for the industry and waste management in general in the UK.

The Government need to meet targets, local authorities need to meet targets and the waste management problem continues to grow, clearly it is time to re-direct funding and help put the infrastructure and campaigns in place that will help effectively manage society's waste in this new millennia.

To conclude;

- *Partnerships between many different groups of stakeholders is vital for the proposal and delivery of landfill tax credit funded programmes*
- *The industry needs to be pro-active and go out and find the right partners to work with*
- *Projects need to be high profile putting landfill operators in the public eye for the right reason and allowing the benefits of the projects to be rapidly and effectively disseminated to the widest possible audience*
- *The scheme is capable of delivering sustainable (integrated) waste management at the local, regional and national scale if correctly applied!*

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CHAPTER 7

THE CHANGING POLICY FRAMEWORK

CHAPTER 7 [I]

THE NEW POLICY AGENDA

CHAPTER 7 - THE NEW POLICY AGENDA

The intention of this chapter is to provide a timely review of some of the new policy drivers affecting solid waste management authorities in the UK. This section will deal with new targets, new decision-making frameworks and statutory requirements for solid waste management performance. The chapter consists of four papers using theory and case studies where appropriate to develop the themes of integrated solutions and best value. The specific papers in this Chapter are;

- *New Policy Targets in the UK Government's 'Waste Strategy 2000'*
- *Integrated Waste Management Approaches (Appendix 10)*
- *EU Landfill Directive and the development of composting (Appendix 11)*
- *The Best Value Regime for local authorities*

The National Waste Strategy 'Waste 2000' (DETR 2000) shifts a great deal of emphasis to mandatory targets, having taken on board much of the criticism concerning voluntary targets, including that of this thesis (as presented in Chapter 3). The new strategy also considers new time frames and new target levels for recycling and recovery to bring UK waste management practice in line with Europe and the Landfill Directive requirements (as discussed in detail in Appendix 11). The key measures in the Waste Strategy include:

- *New plans to require Government departments to buy recycled products, starting with paper;*
- *Statutory local authority recycling targets and action plans;*
- *More use of the landfill tax credit scheme to deliver an increase in recycling, particularly of household waste;*
- *The new Waste and Resources Action Program dedicated to developing new markets for recycled waste;*
- *Tradable permits limiting the amount of waste local authorities can send to landfill sites;*
- *Extending producers' responsibility to recover their product, for example newspapers, and junk mail; and*
- *Continuing to raise public awareness, working with the National Waste Awareness Initiative.*

Clearly, the agenda has moved on from the policy guidance issued in 'Making Waste Work' (1995) but will this strategy be more implementable and operational than the last?

The new targets include;

By 2005

*to recycle or compost at least 25 percent of household waste
and to recover value from 40 percent of municipal waste*

By 2010

*to recycle or compost at least 30 percent of household waste
and to recover value from 45 percent of municipal waste*

By 2005

*to recycle or compost at least 33 percent of household waste
and to recover value from 67 percent of municipal waste*

To ensure that all local authorities contribute to these targets statutory recycling targets will be introduced. The standards for 2003 are set at the following levels;

- *waste disposal authority areas with a recycling & composting rate below 5 percent in 1998-99 must increase their rate to a minimum of 10 percent*
- *waste disposal authority areas with a rate of between 5 percent and 15 percent in 1998-99 must double their recycling rate*
- *the remaining higher achieving authority areas must achieve a recycling & composting rate of 33 percent or better*

If the targets are met then an overall recycling rate of around 17 percent by 2003 will have been achieved for England and Wales.

Government figures for 1998 showed people in England and Wales recycled just 8 percent of their household waste compared to 52 percent in Switzerland and 45 percent in the Netherlands. Scotland fared even worse at only 6 percent.

This shows the scope of change required in a relatively limited timeframe, which will undoubtedly incur costs for all involved in the management of society's waste, and again raises questions regarding policy implantation barriers as discussed in Chapter 3.

However, the Environment Minister has stated that *'If local authorities failed to meet their recycling rates, the first course of action would be to offer advice on potential service improvements. If they still failed, then councils may be required to enlist the help of consultants or adopt the practice of one of the beacon councils. The ultimate sanction would be to remove the service from the council and give it to a private sector body!'*

I question whether we are better off today then we were in 1995. Many of the problems remain, some have even escalated and the new strategy imposes tighter restrictions and tougher targets with undoubted increased costs. Clearly, some additional funding will be available but will it be enough to successfully overcome the barriers discussed in great depth earlier? The national waste strategy has made changes, and on the most part for the right reasons, but will it deliver the desired change? I still feel that a lot will be left to the individual boroughs and districts to convince their residents of the need to change their ways and pay more money for the suggested services.

The EU Landfill Directive was the foundation stone for the development of Waste 2000, with its requirements for the UK to reduce biodegradable wastes going for ultimate disposal. The Landfill Directive targets relating to municipal waste are;

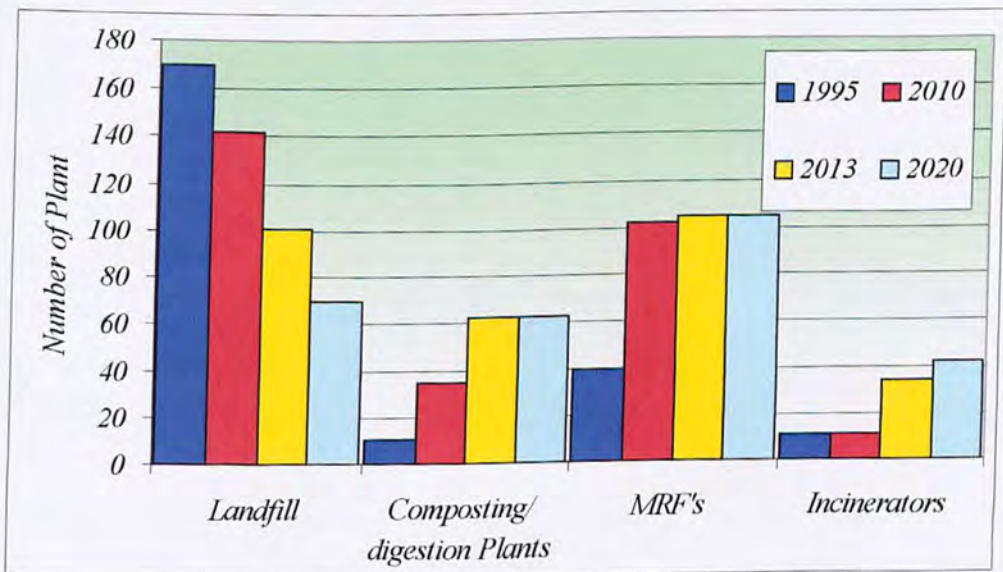
- *By 2010 to reduce biodegradable municipal waste landfilled to 75 percent of that produced in1995*
- *By 2013 to reduce biodegradable municipal waste landfilled to 50 percent of that produced in1995*
- *By 2020 to reduce biodegradable municipal waste landfilled to 37.5 percent of that produced in1995*

The Government in the supporting documentation to the Waste Strategy (2000) detailed 4 proposed models for achieving these targets;

- *Option 1; maintain existing recycling rates & meet the targets through energy recovery (perhaps an additional 166 incinerators)*
- *Option 2; maintain existing recycling rates for non-organic waste, and increase kerbside recycling of paper and compostable waste, the rest of the target being met through energy recovery (up to 196 more composting sites and 128 incinerators)*
- *Option 3; increases kerbside collections of all recyclables, and energy recovery is used to meet the rest of the target (up to 223 more MRFs, 116 more composting sites and 112 incinerators)*
- *Option 4; same as option 3 but assumes a greater provision of kerbside recycling (up to 316 more MRFs, 164 more composting sites, and 89 incinerators)*

Whatever approach is adopted it requires a lot of new facilities (there are only 12 municipal waste incinerators operational at present).

Fig 7.1 Number of facilities required to meet EU Landfill Directive targets (source: author)



With all the inherent problems associated with policy implementation including financing, suitable sites, NIMBY and timescales, it would appear that the challenges are great and the opportunities scarce for achieving these targets. Both national and local planning authorities will need to bite the bullet and push waste management facilities through the planning system otherwise by the end of the decade we will be in an increasingly difficult position. Landfill void will be decreasing and costs increasing, the landfill tax will have increased, and waste levels will have risen too, not to mention we will be in line for a heavy fine from Europe for having failed to meet the Landfill Directive Targets. I think that this Strategy provides the initial steps in the process of change and it is definitely time to act! Perhaps policy implementation will finally become an issue of concern and with it the process towards greater sustainability begins to take shape.

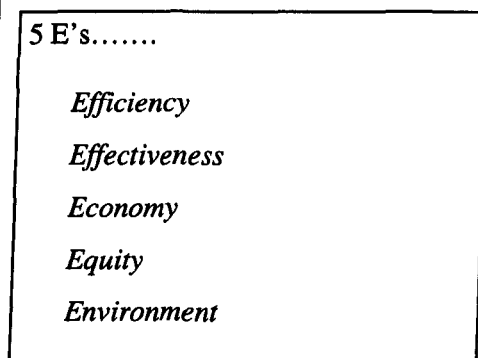
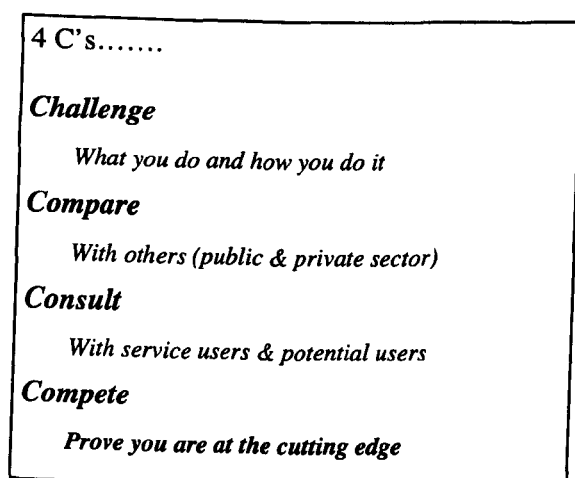
In the paper in this chapter on the EU Landfill Directive (Appendix 11) a great deal of attention is given to composting and the role that it could play in helping to reach the targets set. Perhaps this legislative driver will help to push home composting (as a means of waste minimisation) and kerbside collections of organic waste to the forefront of local authority strategic waste management thinking. This was clearly in the minds of Daventry District Council (discussed in Chapter 5) when they implemented their Green Waste Diversion Scheme.

However, even if composting's profile is raised there are no guarantees that people will adopt this age-old gardening technique to minimise their organic waste production. Clearly, the problems of communication, education and awareness (as discussed in Chapter 5) will need to be revisited for composting, and probably for waste to energy as well. Because without the significant growth of recycling, recovery and composting this country will fail to meet EU requirements, even if there are certain authorities who have proved what can be achieved (as discussed in the Best Value paper in this section).

Best Value and the associated Beacon Council scheme offers perhaps the most likely route to greater sustainability in waste management services, providing a framework within which to make informed decisions and achieve target levels. The Duty placed on authorities under Section 3 of the Local Government Act (1999) states that;

“to make arrangements to secure continuous improvements in the way they exercise their functions having regard to a combination of economy, efficiency and effectiveness”

The new framework is centred on the 4Cs and the 5Es;



This new framework should enable better local authority waste management services, but the question is how do we build on the last 2 Es of equity and the environment? These issues are addressed in the paper, and the results of a survey on the impacts of best value for service providers and local authorities considered. Best Value is one of the most dynamic issues facing local authorities today and in tandem with the EUI Landfill Directive promises great change in the way that services are offered and performance evaluated.

The final paper in this section offers an indication of where the future of solid waste management in the UK may lie (Appendix 10). It draws heavily from experiences in North America and Continental Europe and considers the development of integrated waste management.

It is argued that integrated solutions to waste management problems will take an overall approach placing the management of society's waste within the broader context of sustainable development, manage waste in an environmentally and economically sustainable fashion (policy goals of the UK and EU), involve the use of an optimum combination of treatment options at the local scale (to overcome the bias towards recycling), and deal with the entire solid waste stream (rather than focus on particular elements like household waste at the expense of other commercial or industrial streams). The paper goes on to show the development of integrated concepts in the UK with the use of integrated contract sin the Royal Borough of Kensington & Chelsea and Surrey County Council, and the use of integrated systems with recycling and recovery at the heart of waste management policy and practice in Hampshire, the Isle of Wight and Kirklees.

It would appear that progress is being made in the field of delivering sustainable waste management. We are making the real economics, people and the environment more important in local and regional waste management decision-making and in turn making sustainability a key policy issues at all levels of government. The Beacon Councils are leading the way in achieving the targets in Waste 2000, and offer alternatives to how waste system implementation can be achieved.

However, for all the improved decision-making and greater 'inclusivity' of the approaches advocated, there remains a great need for individual people, like you and me, to take a more active part in the solution through waste minimisation at home, participation in kerbside recycling and composting programmes, and involvement in the debate concerning the location of new energy from waste plants and landfill sites which will be required in the years to come.

CHAPTER 7 [II]

THE NEW LEGISLATIVE SCENARIO

THE NEW LEGISLATIVE SCENARIO

1. THE CONTEXT

Production of waste in the UK across all sectors of manufacturing, industry and municipal sectors generates in excess of 400 million tonnes per year [1]. Of this, households generated 25.1 million tones in 1998/99. This equates to 0.42 tonnes of waste per head of population. At current growth rates of 3% per annum, waste quantities will double in twenty years and by 2020, the UK will require twice the number of waste facilities (and twice the processing capacity) than at present [2]. This is a significant challenge for all of those involved in the management of society's waste, particularly local authorities who facilitate collection and disposal and the private sector companies who are contracted to collect, recycle, treat and dispose of this waste.

Collection and disposal of domestic wastes in the UK has historically been provided through the two-tier levels of local and county authorities acting in their roles as Waste Collection and Waste Disposal Authorities [2]. On a more specific level, waste management services include the following municipal services: refuse collection, street cleansing, recycling, waste disposal and civic amenity sites. These services deal with all aspects of household waste from generation to treatment to final disposal. Local authority waste services deal with the 'end of pipe' solutions, waste collection, recycling etc.

There exists a wider context and role for local authorities to implement strategies for waste education, promotion and awareness. If we are to deliver sustainable development and make a step change in attitudes towards waste, local authorities must work in partnership with businesses, community groups and the public. Persuading people to change attitudes towards waste is probable the biggest challenge that we face, and all parties must take responsibilities [3].

However, according to the House of Commons Select Committee [4] 'there were striking inadequacies in the 1995 UK Waste Strategy which need immediate attention... it did not recognise the scale of change required to meet its own targets for recycling and recovery; and it did not place its waste strategy squarely in the context of sustainable development and resource use.'

They went on to report [4] that 'it is important to stress from the beginning of our Report our profound disappointment, on the basis of evidence we have received, that waste management in this country is still characterised by inertia, careless administration and ad hoc, rather than science based decisions. Lip-service alone, in far too many instances, has been paid to the principles of reducing waste and diverting it from disposal. Central Government has lacked the commitment, and local government the resources, to put a sustainable waste management strategy into practice.'

Waste continues to be a highly emotive and politically charged issue both at a European Union, UK Government and local level. Although the ideal of sustainable waste management is well acknowledged and generally accepted it is proving more difficult than hoped to implement [3]. This is essentially because, the public are unwilling to change their consumer habits, households are not directly charged for waste collections and disposal, local authorities have historically suffered from under-funding of their waste management services, and because local authority politicians have been unwilling to make difficult decisions regarding the location of required processing and disposal facilities [3].

2. THE NEW POLICY AGENDA

A revised National Waste Strategy 2000 [5], published in May 2000, recognised that much needs to be achieved in a short period of time, indicating that previous Government policies [6] have not worked [3]. The Strategy introduced a range of legislative targets to focus attention on maximizing recovery/recycling and reducing dependence on landfill to enable the UK to meet its requirement as a Member State of the European Union under the Landfill Directive.

Much of the final Strategy is built on the drafts and consultation documents that have been circulated over the last 2 years, and the Strategy looks at the stages required to move towards a more sustainable waste management system and to meet the requirements of the EU Landfill Directive.

“Tough statutory targets for recycling; developing new markets for recycled waste; turning public sector purchasing green; giving more producers responsibility for recycling of used products; and enlisting householders in the drive to recycle and compost more waste. These moves are key to tackling our growing waste mountain”, Environment Minister Michael Meacher said as he published the Waste Strategy for England and Wales.

He also pledged that the public sector’s requirement to buy ‘recycled’ will help increase the demand and stabilise the markets for recycling schemes, whilst the Strategy also acknowledges the need for waste minimisation to counter the trend of 3% per annum municipal waste growth, with emphasis on *‘breaking the link that exists between economic growth and increased waste production’*.

Key measures in the Waste Strategy include:

- *New plans to require Government departments to buy recycled products, starting with paper;*
- *Statutory local authority recycling targets and action plans;*
- *More use of the landfill tax credit scheme to deliver an increase in recycling, particularly of household waste;*
- *The new Waste and Resources Action Programme dedicated to developing new markets for recycled waste;*
- *Tradable permits limiting the amount of waste local authorities can send to landfill sites;*
- *Extending producers' responsibility to recover their product, for example newspapers, and junk mail; and*
- *And continuing to raise public awareness, working with the National Waste Awareness Initiative.*

'Without determined action from everyone', Michael Meacher said, 'councils could otherwise be handling a massive 50 million tonnes of household waste a year by 2020. Acting now to cut waste will avoid the need for hundreds of extra new waste facilities in the coming decades. We are simply throwing money away; even at today's recycling rates, for example, recycling aluminium cans saves £21million a year, producing 95% less greenhouse gas emissions than using raw aluminium'.

He went on to say at the Strategy's launch "waste is a growing problem which is costing us all dear. Much of our waste can be reused or recycled - meeting this challenge will help deliver a better quality of life for future generations. The Waste Strategy shows how we can achieve our prime objectives of cutting waste and making the most use of the waste we do create. It will not only help save money and space, it will help our fight against climate change - recycling saves energy and cuts down on the amount of methane emitted from landfills."

The central policy issues of the new Waste Strategy for England and Wales were 'mandatory' recycling and recovery targets for local authorities (which would double recycling rates in only 3 years) and confirmation that tradable permits would be the route used for diverting biodegradable municipal waste from landfill in accordance with the EU Landfill Directive. This will allow authorities to decide whether to landfill additional waste above their quota (by buying permits from another authority) or to invest in alternative means of waste treatment and disposal. The Welsh Assembly is yet to agree on their mechanism.

Other themes raised in the document include; action to curb junk-mail through producer responsibility initiatives, the piloting of green procurement projects within government, a focus on metal wastes, the need to develop composting and markets for compost, and the achievement of an agreement for higher targets to be set for the recycled content of newsprint (up to 70%).

3. STATUTORY RECYCLING TARGETS

Many 'consultants, officers and employees' within the waste industry expected little to change from the draft Waste Strategy A Way With Waste (published in June 1999) and on the whole they were right. That is apart from the relatively radical shift in policy to mandatory recycling targets for local authorities! The Strategy sets out recycling and composting targets of 17% by 2003 (nationally) – which is double the current level, and this must be doubled again to 33% by 2015 (see Figure 7.2).

The Targets are;

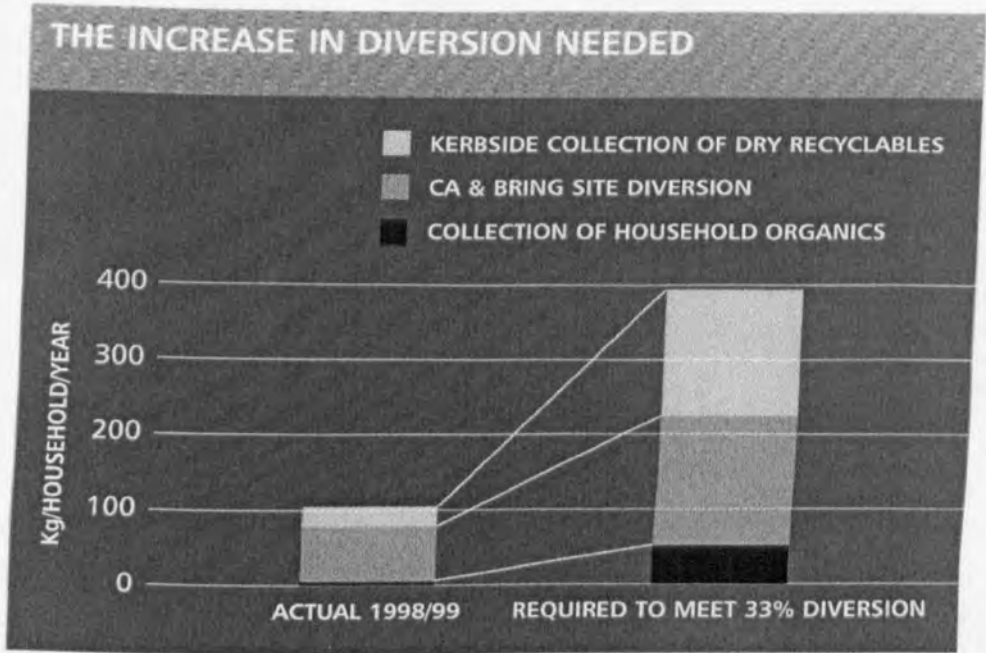
- *By 2005 –*
 - o *to recycle or compost at least 25% of household waste*
 - o *to recover value from 40% of municipal waste*
- *By 2010 –*
 - o *to recycle or compost at least 30% of household waste*
 - o *to recover value from 45% of municipal waste*
- *By 2005 –*
 - o *to recycle or compost at least 33% of household waste*
 - o *to recover value from 67% of municipal waste*

To ensure that all local authorities contribute to these targets statutory recycling targets will be introduced. There should be different standards for different groups of authorities, in recognition of differing local circumstances and current performance figures.

The standards for 2003 should be set at the following levels;

- *waste disposal authority areas with a recycling & composting rate below 5% in 1998-99 must increase their rate to a minimum of 10%*
- *waste disposal authority areas with a rate of between 5% and 15% in 1998-99 must double their recycling rate*
- *the remaining 'higher achieving' authority areas must achieve a recycling & composting rate of 33% or better*

Figure 7.2. Meeting the Diversion Target (source: author)



If the targets are met then an overall recycling rate of around 17% by 2003 will have been achieved. Government figures for 1998 showed people in England and Wales recycled just 8% of their household waste compared to 52% in Switzerland and 45% in the Netherlands. Scotland fared even worse at 5.8%. This shows the scope of change required in a relatively limited timeframe, which will undoubtedly incur costs for all involved in the management of society's waste.

However, the Environment Minister has stated that the DETR did not plan on enforcing the standards through the courts. If local authorities failed to meet their recycling rates, the first course of action would be to offer advice on potential service improvements. If they still failed, then councils may be 'required' to enlist the help of consultants or adopt the practice of one of the beacon councils. The ultimate sanction would be to remove the service from the council and give it to a private sector body!

In my eyes this seems a little harsh on the higher achievers, as those that have done little to date will not be required to achieve a great deal of change in the next 3 years?

But at least the mandatory nature of these targets should provide the necessary drive for change towards more 'sustainable' approaches to our management of society's waste.

To ensure that local authorities contribute to achieving these targets the Government will set statutory performance standards for local authority recycling in England through the Best Value system. Where there are 2 tiers of local government, authorities will need to work closely together, and with industry and others, to achieve the required standard. In addition Waste Disposal Authorities will be given the power to 'require' certain wastes to be delivered to them separate from other wastes so that they can be recycled, whilst municipal waste management strategies (linking collection and disposal authorities where appropriate) will become mandatory. Both of these drivers should help to push waste management in a direction towards greater co-operation, and towards a scenario where increased recycling and composting are encouraged.

More importantly the Strategy sets out requirements for local authorities to form 'groups' to give them an improved position when negotiating market process for recycle. The Community Sector was also acknowledged as providing kerbside recycling collections for 2 million homes in England and Wales. They are considered a crucial partner in increasing recycling, and the Government clearly wants improved partnerships between the voluntary and community sectors. Clearly the 'open' support from the Government in the Strategy for increased recycling, composting and reduction should be welcomed, and has been by many working in and around the industry

The underlying driver behind this Strategy, and much of the UK policy and legislative documentation relating to waste, has been the EU Landfill Directive and its statutory targets for the reduction of municipal biodegradable waste going to landfill.

The Landfill Directive targets relating to municipal waste are;

- *By 2010 to reduce biodegradable municipal waste landfilled to 75% of that produced in 1995*
- *By 2013 to reduce biodegradable municipal waste landfilled to 50% of that produced in 1995*
- *By 2020 to reduce biodegradable municipal waste landfilled to 37.5% of that produced in 1995*

The Government in the supporting documentation to the Strategy detailed 4 proposed models for achieving these targets;

- *Option 1; maintain existing recycling rates & meet the targets through energy recovery (perhaps an additional 166 incinerators)*
- *Option 2; maintain existing recycling rates for non-organic waste, and increase kerbside recycling of paper and compostable waste, the rest of the target being met through energy recovery (up to 196 more composting sites and 128 incinerators)*
- *Option 3; increases kerbside collections of all recyclables, and energy recovery is used to meet the rest of the target (up to 223 more MRFs, 116 more composting sites and 112 incinerators)*
- *Option 4; same as option 3 but assumes a greater provision of kerbside recycling (up to 316 more MRFs, 164 more composting sites, and 89 incinerators)*

Either way it's a lot of new facilities (there are only 12 municipal waste incinerators operational at present), with all the inherent problems of financing, suitable sites, NIMBY and timescales! Both national and local planning authorities will need to bite the 'bullet' and push waste management facilities through the planning system otherwise by the end of the decade we will be in an increasingly difficult position. Landfill void will be decreasing and costs increasing, the landfill tax will have increased, and waste levels will have risen too, not to mention we will be in line for a heavy fine from Europe for having failed to meet the Landfill Directive Targets.

I think that this Strategy provides the initial steps in the process of change and it is definitely time to act!

Statutory recycling targets will only be achieved if there are long-term sustainable markets for the materials recovered. This is the rationale behind the creation of the 'Waste and Resources Action Programme' (WRAP), which will aim to help overcome the market barriers that currently exist to recycling. WRAP is a newly created body with scope to look at commercial, municipal and industrial wastes.

It will be a limited company and is expected to have some private sector involvement. This body will initially be funded by the DETR, DTI, the Environment Agency, contributions from the waste industry and landfill tax credits.

WRAP will have a range of functions which include; market facilitation, promotion of investment opportunities in the expansion of reprocessing, research project management, information management (a one-stop-shop; and the provision of advice, guidance and technical support on waste and resource related matters for businesses. WRAP may have a pivotal role to play in directing future research and development in sustainable waste management and in developing the necessary markets to allow recycling and composting to thrive. This is a step in the right direction.

4. RECYCLING INCENTIVES

However, developing a sustainable approach to waste management will require a huge commitment from everyone involved, and thus other initiatives were also outlined in the Strategy. One interesting development for the 'general public' has been the acceptance by the government of the need to pilot a range of 'incentives' for households to reduce and recycle their waste, centred upon 4 approaches;

- *Supermarket reward schemes (vouchers or loyalty points for materials recycled at the store)*
- *Performance rewards (local authority vouchers for households determined by the amount of waste they divert)*
- *Prizes for recycling (local authority competitions to boost public awareness and participation)*
- *Intensive education campaigns (through one-to-one advice, local waste reduction clubs, and community brainstorming activities)*

These incentive systems will be piloted over the next couple of years to provide evidence of whether any of them can successfully raise awareness and promote recycling by consumers. If they (or any one of them) do, then the pressure will be there for the industry to lobby for their widespread introduction as a means of enhancing widespread involvement in recycling activities. This may prove to be an essential element in the waste management system given the Government's noted reluctance to direct charging for household waste services through 'pay as you throw' schemes!

5. LANDFILL TAX CREDITS

The Landfill Tax Credit Scheme (LTCS) is given a high profile within the Strategy. The Government makes it clear that it is keen to use the LTCS to help boost recycling, and extends the activities eligible for support to include 'recycling and re-use projects carried out by non-public bodies (community schemes)'. The Government have sent a clear message to the landfill operators that recycling is a high priority and that they should be looking to invest larger sums of money in this part of the waste management system. Whether this is realistic or not remains to be seen, but it does relate back to my comments last month, and to conversations that have been raging over the last 6 months about the role of the Landfill Tax Credit System in contributing to [1] sustainable waste management; and [2] to the achievement of the targets laid out in the National Strategy and the EU Landfill Directive.

6. CONCERNS

The Strategy remains an advisory document, and legislation will be introduced over the coming 12 months to introduce the mandatory recycling targets and other elements of the Strategy requiring a legislative basis. Without this legislative framework the Strategy may fail to deliver its worthy goals in the shadow of market inertia, lack of local authority funding, and the lack of participation by the general public in waste management schemes!

The initial 'backlash' against the Strategy has come from the Environmentalists who have claimed that 'too much emphasis is being placed on incineration with energy

recovery.’ In reality this is not the case! The role of EfW has been downplayed from the position it was afforded in the draft Strategy with only a little over 2 pages of text dedicated to this approach. The Strategy notes that ‘where it does not make sense to recycle waste, consideration should be given to using it as a fuel.’

The Strategy also says that ‘EfW has an important role to play alongside recycling and composting in a system of sustainable waste management, but that EfW plants should be appropriately sized and care must be taken to ensure that contracts are sensitively designed so as not to crowd-out recycling.’

This Strategy if implemented fully will cost significant sums of money, but the Strategy is rather vague on how much money will be allocated to recycling over the coming years or where it is to come from! However, the Strategy does commit itself to considering the ‘financial implications of the Strategy for local authorities’. The Environment Minister has adamantly stated that he does not expect to see an increase in Council Tax Bills to pay for this Strategy, but whether the Treasury will provide the necessary funding is yet to be seen.

I feel that the failure to provide any additional funds is a much more worrying concern for the success of this Strategy. The Government has received a stinging attack from many leading organisations including the Environmental Services Association, the Council for the Protection of Rural England and the IWM because of the lack of financial guidance and guarantee within the Strategy.

One source [7] has suggested that ‘the Government’s goals of recovering, recycling and composting more domestic waste could impose ‘additional costs’ of between £1.6 to £2.8 billion over the next 20 years (equivalent to perhaps £150 per household in England and Wales per year). Will this level of additional tax be acceptable to the general public? If not, then who will pay?

The other common response to the Strategy has been; will the planning regime be able to accommodate the number of new waste management facilities required to make this Strategy a reality? According to the Institute of Wastes Management

'unless radical changes are made to the planning process we doubt whether sufficient headway will be made in implementing this Strategy.'

7. POLITICAL RESPONSES

Within a few days either side of the National Waste Strategy's launch came the response from the other 2 major political parties.

The Liberal Democrats have published a 'waste charter' calling for a presumption against landfill or incineration and in favour of recycling and composting. The party were also keen to see *increased revenue from the landfill tax credit scheme going back to local authorities as direct investment in waste reduction, recycling and composting.*

The Conservative Party launched their 'Cleaner, Greener Britain – A Blue Green Agenda' supports the notion of a moratorium on incinerators until independent British scientific evidence proves they are safe, whilst encouraging local 'tangible' community benefits through hot water provision and cheaper energy. According to John Redwood MP (Conservative) 'John Prescott is the dirty man of Europe! He doesn't care about the air we breath! He has earmarked up to 70 towns and cities across England as sites for new municipal waste incinerators!' The second part of their agenda involves a more pro-active approach to the promotion of recycling stating that 'every home in the country should have recyclables collected separately from other wastes', and they are looking at ways of reforming the landfill tax credit system to allow the level of investment required.

Clearly, waste and its appropriate management is a political 'hot-cake' at present and long may this continue. For too long waste has been ignored and not given the political credibility that it requires if we are to achieve the Landfill Directive targets and if we are to achieve our goal of 'sustainable waste management'.

8. THE CHALLENGE

To summarise, there are a number of imminent targets and deadlines which will remain at the forefront of the minds of local waste management officers and elected local and central government politicians (see Figure 7.3).

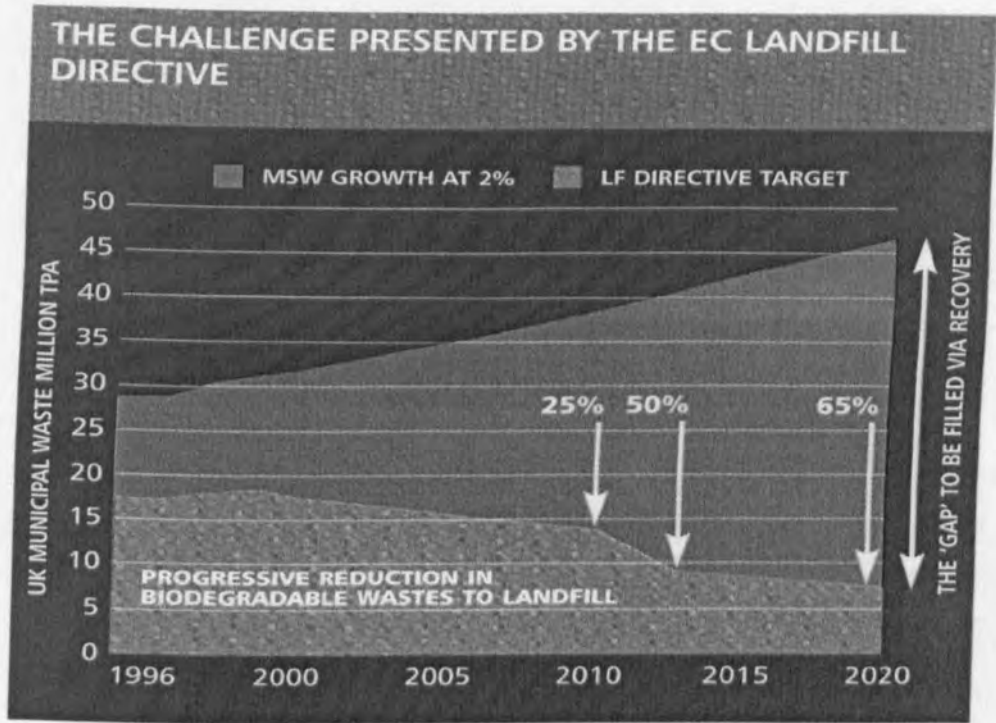
The most imminent targets include;

- *2003 increase to 10% recycling (if <5%) double the recycling and composting level (if 5-15%) or increase to 33% recycled (if > 15%)*
- *2005 recycle and compost 25% of household waste and recover 40% of MSW*
- *2008 reduce biodegradable MSW going to landfill to 75% of 1995 level*
- *2010 recycle or compost 30% of household waste and recover 45% of MSW*
- *2015 recycle or compost 33% of household waste and recover 67% of MSW*
- *2016 reduce biodegradable MSW going to landfill to 50% of 1995 levels*
- *2020 reduce biodegradable MSW going to landfill to 50% of 1995 levels*

These targets are not only statutory and thus enforceable, they are also European driven and not simply aspirational UK Government standards. This means a great deal will need to change in the next 5 years, if the levels of service, infrastructure, funding and public support required to achieve these targets are to be available and working effectively.

Let us take a hypothetical example for County 'Waste', which produces 400,000 tonnes per annum of MSW, of which 300,000 tpa is household waste. In 1998 –1999 the recycling level in the county was 5% and the composting level 2% with the remainder (93%) being landfilled. Let us take national averages and assume that municipal waste is growing at a rate of 5% per annum, and that biodegradable waste accounts for approximately 60% of MSW what will this mean in terms of target attainment?

Figure 7.3. The EU Challenge (source: author)



Hypothetical Example;

- County will need to increase its household recycling and composting rate from 7% in 1998-99 to >14% by 2003 (Recycled 15,000 tonnes and Composted 6,000)
- 2003-04 levels (assuming no waste growth); Recycle 30,000 tonnes and Composted 12,000 tonnes
- 2003-04 levels (assuming 5% waste growth); Recycle 31,500 and Compost 12,600

If we assume no growth in the waste stream which remains at 300,000 tpa of household and 400,000 tpa of MSW per annum to meet the Waste 2000 Targets we will need to;

- Recycle and Compost 25% of household waste by 2005 (75,000 tonnes)
- Recycle and Compost 30% of household waste by 2010 (90,000 tonnes)
- Recycle and Compost 33% of household waste by 2015 (100,000 tonnes)
- Recover 40% of MSW by 2005 (160,000 of which 75,000 comes from recycling)
- Recover 45% of MSW by 2010 (180,000 of which 90,000 comes from recycling)
- Recover 67% of MSW by 2015 (268,000, of which 100,000 comes from recycling)

However, if we assume a 5% growth per annum in the waste stream (more realistic as waste minimisation is having little impact as yet) then by 2020 there will be 600,000 tonnes of household waste or 800,000 tpa of MSW requiring management, of which we will need to;

- *Recycle and Compost 25% of household waste by 2005 (93,750)*
- *Recycle and Compost 30% of household waste by 2010 (135,000)*
- *Recycle and Compost 33% of household waste by 2015 (173,250)*

- *Recover 40% of MSW by 2005 (200,000 of which 93,750 comes from recycling)*
- *Recover 45% of MSW by 2010 (270,000 of which 135,000 comes from recycling)*
- *Recover 67% of MSW (469,000 of which 173,000 comes from recycling)*

If the County is to meeting the Landfill Directive, and we assume that 60% of the 400,000 tpa of MSW is biodegradable, and that there is no growth in MSW produced (240,000) then we must reduce the level of organic waste going to landfill;

- *To 75% of the amount produced in 1995 by the year 2008 (180,000 tonnes) = 60,000 diverted*
- *To 50% of the amount produced in 1995 by the year 2016 (120,000 tonnes) = 120,000 diverted*
- *To 35% of the amount produced in 1995 by the year 2020 (84,000 tonnes) = 165,000 diverted*

However, if there is a 5% growth in MSW per annum then the total amount of waste requiring management will be 800,000 tonnes (480,000 of which is biodegradable) of which disposal must be reduced to the same levels as before. Thus the need for alternative processing options becomes evident;

- *by the year 2008 - 300,000 tonnes of organic MSW must be diverted from landfill*
- *by the year 2008 - 360,000 tonnes of organic MSW must be diverted from landfill*
- *by the year 2008 - 400,000 tonnes of organic MSW must be diverted from landfill*

9. RESEARCH OUTPUT

Findings from the author's own research suggest that Government waste management policy in the past has failed to achieve the degree of progress required when non-statutory targets have been used.

The research involved a survey of all English waste management authorities with a series of detailed follow-up interviews to investigate achievement of the targets set in *Making Waste Work* (1995).

The general findings were that only 22% of authorities would achieve the Recovery Target by 2000 (of 40%), whilst 38% would attain the Recycling Target (25% by 2000). One source said *“one of the biggest issues that you have identified is that Government policies have had no legislation to back it up!”* This theme was supported by other local authority officers who claimed that *“there needs to be more focus on the implementation side of it all!”* Clearly the setting of national policy and targets is not the end of the matter, it is simply the playing field upon which local authorities and the waste industry will be judged (see Chapter 3).

The local authority officers involved in the survey generally acknowledged the existence of a ‘policy implementation gap’ between what was desired through policy and what was achievable through local service delivery. Sixty-four percent of English authorities that responded claimed to be experiencing this ‘gap’. The main reasons given for this ‘barrier’ were costs (33%), staffing issues (17%) and the inflexible nature of CCT (13%). Only if these issues are adequately addressed can we expect the new wave of Government waste management policy to be adequately implemented.

According to one local authority *“nationally we are failing to achieve the Government’s targets! That is quite evident from talking with other officers and from the figures produced in your research.”* The question that this raises is will the necessary legislation be in place to make these new targets and the new Strategy a working reality? However, we should not be too cynical about the likely success of this new Strategy for England and Wales. This current Strategy has built upon the failures of ‘Making Waste Work’ (1995) and has taken on-board many of the consultation comments from ‘A Way With Waste’ and ‘Less Waste More Value’.

We will have statutory local authority recycling targets (a major barrier according to my research), we will have market development (another of the barriers noted by all players in the waste sector), and we also have statutory working arrangements between WDAs and WCAs which will direct materials collection and treatment and enforce joint municipal waste strategies (this lack of co-ordination was also a major barrier identified in my research).

Finally we will have new innovative developments in recycled newsprint, public procurement and household recycling initiatives (all of which have previously hindered the development of sustainable waste management from one location to another!)

10. CONCLUSIONS

However, developing a sustainable approach to waste management will require a huge commitment from everyone involved, and thus other initiatives were also outlined in the Strategy. One interesting development for the 'general public' has been the acceptance by the government of the need to pilot a range of 'incentives' for households to reduce and recycle their waste. These incentive systems will be piloted over the next couple of years to provide evidence of whether any of them can successfully raise awareness and promote recycling by consumers. The need to motivate residents (householders) to change their patterns of consumption and recycling are essential for enhancing widespread involvement in recycling activities. This may prove to be an essential element in the waste management system given the Government's noted reluctance to direct charging for household waste services through 'pay as you throw' schemes [7].

If the Government is to deliver sustainable development it must begin to tackle the growing mountain of waste. This can be achieved through; designing products which use fewer materials; using processes that produce less waste; putting waste to good use; and choosing products made from recycled materials. There are 3 elements, which need to be in place if 'cyclical systems' of materials recovery are to be effective; greater provision of single material waste streams; greater reprocessing capacity; and more use of recycled (secondary) materials in production processes.

Until all three are guaranteed (which is by no means certain) the Government's aims as set out in the Strategy will remain 'on the shelf' and not have the scale of impact on local service provision that was intended [8].

Clearly the success of the Strategy will depend upon its ability to influence 3 key areas; economics, public awareness and education, and industry action.

Following the publication in May this year of the Government's Waste Strategy the Environment Sub-committee of the House of Commons Select Committee on the Environment, Transport and Regional Affairs has resolved to inquire into the progress, which has been made since publication in June 1998 of its Report on Sustainable Waste Management [4].

The Sub-committee will examine whether the policies set out in the Waste Strategy are sufficient to deliver sustainable waste management, and whether the necessary measures, including provision of financial resources, are in place for those policies to be implemented. Clearly, we are all watching developments closely.

We are at the beginning of an interesting new era in the development of sustainable waste management in the UK, even if it is being driven more in response to EU legislation (Landfill Directive and Producer Responsibility) than by our own national policy agenda in light of sustainable development. However, if the Strategy is to prove a success, the necessary funding must be forthcoming (the biggest barrier identified in my research), all stakeholders must play a part (not always the case in the past) and the real costs of waste management must be borne by the producers – both industry and consumers (something that has never been the case).

I, like the rest of the industry, will wait to see what the Treasury has to say on the funding issue, and what legislation is actually enforced. I will look forward to the development of WRAP and its market development programme, and will follow closely the development of the Recycling Incentive schemes. No doubt we will all be monitoring the Recycling and Composting rates of our authorities and our neighbouring areas, looking for trends in the new league tables.

We should perhaps not forget that some of the Beacon Councils and leading waste management authorities have exceeded many of the targets listed in the Strategy through joint initiatives, partnerships and innovative approaches. Perhaps those authorities struggling to come to terms with the new Strategy should look to its neighbours for guidance. I look forward to seeing the developing impact of this Strategy and will follow the movement of waste management practices towards greater sustainability with close scrutiny.

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CHAPTER 7 [III]

THE INTRODUCTION OF LOCAL AUTHORITY BEST VALUE LEGISLATION

THE INTRODUCTION OF LOCAL AUTHORITY BEST VALUE LEGISLATION

1. INTRODUCTION

A new UK strategy for Sustainable Development was produced in May 1999 by the present Labour Government [1]. It supersedes the previous strategy for Sustainable Development, which was published, in 1994, by the then Conservative Government [2]. The present strategy has four central themes:

1. *Social progress which recognises the needs of everyone;*
2. *Effective protection of the environment;*
3. *Prudent use of natural resources;*
4. *Maintenance of high and stable levels of economic growth and employment.*

The strategy has been published following an earlier 'Opportunities for Change' consultation paper produced during 1998, on the Government's approach to implementing Sustainable Development strategies [3]. Responses to this paper, resulted in widespread support for setting challenging, measurable targets for each key policy area. The strategy stresses that sustainable waste management is a key priority by encouraging the prudent use of natural resources, which is essential for future prosperity and the protection of the environment. The strategy introduces the intention to set long term goals for business through sectoral benchmarking, identifying and disseminating best practice and encouraging responsible care and producer responsibility initiatives which ensure that Sustainable Development is considered from the outset.

Performance indicators are an integral part of the strategy as they help to identify and prioritise areas for future action. Much has previously been written on the valuable lessons that can be learnt and the pitfalls to be avoided when devising and using sustainability indicators, particularly when addressing those indicators on a national scale, which are not always readily applicable at the local level [4].

The Government has revised the performance indicators produced in 1996 [5] after a series of consultations [6]. The new set features 150 indicators, including a set of headline indicators, which will give a broad overview of Sustainable Development. It is the Government's intention to publish annually the latest information against each headline indicator and the progress towards them. Waste arising and its management is one of the 14 headline indicators (Table 7.1).

2. UK WASTE STRATEGY

The Conservative's Government White Paper 'Making Waste Work', published in December 1995, set the strategy for the sustainable management of waste in England and Wales [7]. It built upon the Sustainable Development strategy published in January 1994 [2], concentrating on the reduction of waste at source rather than the end disposal of waste.

It sets out management options within a hierarchical framework, with the aim of moving waste management further up the hierarchy with increasing reliance on waste minimisation and decreasing reliance on landfill (Figure 7.4). It is based, essentially on demonstrating the Best Practicable Environmental Option (BPEO) for any particular type of waste, taking into account the environmental and economic costs and benefits of the different waste management options. Primary and secondary targets were set in 'Making Waste Work' (Table 7.2), but widespread criticism was voiced for not recognising the scale of change required to meet these targets for recycling and recovery. It was recognised that an attempt should be made to assess the environmental and social costs and benefits of each waste management option, regardless of their assumed place in the hierarchy [8].

Table 7.1. The headline indicators and waste indicators proposed in the UK strategy for Sustainable Development [1]

Type of Indicator	Description
Headline Indicators	<ul style="list-style-type: none"> · Total outcome of the economy (GDP) · Investment in public, business and private assets · Proportion of people of working age who are in work · Qualifications at age 19 · Expected years of healthy life · Homes judged unfit to live in · Level of crime · Emissions of greenhouse gases · Days where air pollution is moderate or high · Road traffic · Rivers of good or fair quality · Populations of wild birds · New homes built on previously developed land
Indicators for waste	<ul style="list-style-type: none"> · Waste arisings and management · UK resource use (to be developed) · Waste by sector (to be developed) · Household waste and recycling · Materials recycling · Energy efficiency of economy · Energy use per household · Hazardous waste

Figure 7.4. The Waste Hierarchy [7]

Widespread dissatisfaction with 'Making Waste Work' [7] resulted in a consultation paper on a possible new waste strategy for England and Wales; 'Less Waste More Value' was published in 1998 by the present Labour Government [9]. It supports the hierarchy but believes it should be used as a guide, not a prescriptive set of rules and that the targets have to be challenging but achievable. The key drivers to divert waste from landfill to waste reduction are the Government's initiatives for local authorities, businesses and households. For example, the Waste Minimisation Act 1998 enables certain local authorities to make arrangements to minimise the generation of waste in their area, which saves resources and eliminates the environmental and financial costs of waste collection and disposal [10].

In June 1999, the Labour Government published a new draft waste strategy for England and Wales, 'A Way with Waste' [11] which sets new goals (Table 7.2) and suggestions for achieving them. These include an increasing reliance on energy from waste and for the Government to work with local authorities to develop innovative approaches to minimise the growth of household waste. This draft strategy is clearly linked with the new UK Strategy for Sustainable Development [1], emphasising the vital role waste reduction will play in achieving its objectives. In conjunction with the draft strategy, a report of the UK Market Development Group has been published, concentrating on the development and expansion of markets for recyclates, a key development for sustainable waste management [12].

In April 1999, the EC Council of Ministers adopted the Landfill Directive. Key features include the drastic reduction of biodegradable waste going to landfill, waste specific landfills, and that the gases produced from landfill are collected, treated and utilised. It also ensures that the price charged for disposing of waste reflects the real costs involved. This will force the UK waste management industry to invest in recycling and recovery infrastructures and engage in sustainable waste management practices.

Table 7.2. Existing targets and proposed goals for waste management in England and Wales

<i>Strategy</i>	<i>Existing Targets</i>
Making Waste Work [7]	To reduce controlled waste going to landfill from 70% to 60% by 2005 to recover 40% of municipal waste by 2005 to recycle or compost 25% of household waste by the year 2000.
Way With Waste [11]	<i>Proposed Goals</i> to recycle or compost 25% of household waste by the year 2005 to achieve 45% recovery of municipal waste including 30% recycling and composting by 2010 to recover two-thirds of waste, 50% through materials recovery, by 2015 to recycle a third of household waste by 2015.
Fifth Programme of the European Commission	<i>Existing Targets</i> to recycle and reuse at least 50% of plastic, glass and paper by 2000.

3. UK WASTE ARISING AND MANAGEMENT

The UK has, at present, little reliable data about the nature and volume of waste arising [13]. Because of this it is problematic to set accurate performance indicators, which are central to the new strategy for Sustainable Development. The Environment Agency is currently working on the production of the first validated set of national estimates of controlled waste arisings, from industry and commerce.

Household waste is composed of waste arising directly from households, civic amenity sites, public buildings and that collected as litter. Commercial waste emanates from premises used for the purposes of trade and business and industrial waste originates from factories in various sectors. All of these wastes are 'controlled' wastes which are strictly regulated and defined in section 75 of the Environmental Protection Act 1990 as amended by the Environment Act 1995 [14].

Reasonably accurate annual figures for UK household waste are available from 1995-96 onwards. Each household, on average produces over one tonne of waste per year and this comprises 7% of total waste arisings [7].

Landfill remains the dominant disposal option for MSW in England with 85% of household waste in the United Kingdom currently landfilled (Table 7.3) [15]. Recycling and waste-to energy schemes have suffered due to the low cost and extensive availability of landfill sites. The best MSW recycling schemes are achieving diversion rates from landfill of about 15%. The Government's requirement for an additional 3.8 million homes by 2016 will further increase the tonnage of waste by around 15% [16].

Table 7.3. Approximate disposal routes for UK wastes (1996) [15]

<i>Sector</i>	<i>Household %</i>	<i>Commercial%</i>	<i>Construction%</i>	<i>Industrial %</i>	<i>All %</i>
Landfill	90.0	85.0	30.0	75.0	70.0
Incineration	5.0	7.5	0.0	1.0	2.0
Recycling	5.0	7.5	63.0	18.0	21.0
Other	0.0	0.0	7.0	6.0	7.0

In the UK, County Councils are the Waste Disposal Authorities (WDAs) and have a statutory duty to prepare disposal plans and to dispose of MSW. Within a county, Borough or District Councils are the Waste Collection Authorities (WCAs) and have a statutory duty to collect and transport MSW, to prepare recycling plans and encourage waste minimisation. Where Unitary Authorities exist in metropolitan areas, the functions of both the disposal and collection authorities are combined in the one tier of local government. The Environment Agency undertakes waste regulation, which acts as the Waste Regulation Authority.

There are estimated 3,500 waste management companies in the UK, with approximately 30 major and middle-sized companies' [15]. For the municipal waste collection sector, two companies hold approximately 40% by value of the contracts held by the private sector.

The remaining smaller firms have niches within their own locality and subcontract from the larger operators. The waste industry traditionally concentrated on waste collection, treatment and disposal. It is now increasingly becoming involved in waste separation, recycling, composting and energy recovery, because of the desire to drive waste up the hierarchy.

There is strong competition in the waste management industry in the UK especially for waste collection, which has led to very low margins within contracts; however the competition for MSW collection and disposal is mainly on a regional basis due to the relatively high costs of transporting waste.

This paper focuses on the impact of new '*Best Value*' legislation for local authorities in the UK on the management of MSW and for the waste management industry. The next section describes Compulsory Competitive Tendering (CCT), the legislation framework that has been in existence since the 1980s and controls the letting of contracts for MSW disposal and collection. These contracts have essentially grown out of the requirement to dispose of MSW as cheaply and efficiently as possible. In the third section, the new '*Best Value*' legislation and policy framework for local authorities in the United Kingdom is analysed. Competition, effectiveness and quality will play important roles in the future letting of MSW contracts.

The analysis of the impacts of Best Value legislation is based on the ranking of eight issues by differing stakeholders in the waste management industry, including local authorities (60% response rate) after an initial pilot survey identified 8 key issues arising from Best Value legislation. These findings are important for current and future policy considerations for the management of MSW and sustainable waste management practices.

4. COMPULSORY COMPETITIVE TENDERING

The previous Conservative Government (in power from 1979 to 1997) had three main policy strands towards the public sector. First was to improve efficiency by introducing competition into the provision of public services, second was to reduce public expenditure and third to implement privatisation. The Local Government (Planning & Land) Act 1980 introduced the concept of Compulsory Competitive Tendering (CCT) to local authorities for the maintenance and construction of buildings, highways and civil engineering works. The 1988 Local Government Act introduced CCT to many more services including the collection of waste and street cleaning. The extension of CCT to professional services occurred in both 1994 and 1995.

Legislation implemented CCT for all tiers of local government for their 'defined activities', where the gross cost of undertaking them 'in-house' is more than £100,000 in the previous year. The legislation is prescriptive about what must be subject to competition, how the competition process will be organised and what happens after the contract has been awarded. Effectively, CCT requires that local authorities only work within the defined activity if they have 'won' in competition with external contractors. Local authorities set up in-house units known as Direct Services Organisations (DSOs) to bid for MSW contracts. They have no independent legal existence separate from their parent authority and are therefore constrained by the limitations imposed on local government.

Local authorities relied on the then Department of Environment's (DoE) Circular 10/93 which repeated earlier guidance and made it clear that a decision not to award to the lowest tender, in favour of the DSO, could only happen in 'very limited circumstances' [17]. The DoE added that authorities would need, 'specific and well-founded reasons for such a decision'. The clear implication was that, in most cases the tenders had to be awarded on the basis of the lowest price.

Research has shown that during the second round of tendering 85% of contracts have been awarded to the lowest bidder, compared to 91% awarded to the lowest bidder for the first round of tendering. This is thought to be due to an increased focus on quality and a greater amount of competition [18].

Compulsory Competitive Tendering has proved to be an unpopular strategy in local government [19]. It reduces the degree to which services can be organised and delivered flexibly and responsively and it possesses a rigid framework sometimes at odds with best practice and value for money issues. It encourages the use of a price mechanism and market forces to improve the efficiency of local authority services yet market failure is considered a major obstacle for Sustainable Development. The nature of CCT has held sustainable waste management practice back significantly as MSW collection without any segregation and recycling is usually the least costly option.

It is possible that there was some reduction in the quality of service in the early years of CCT [20]. Research findings claim that CCT has only resulted in significant cost savings when private contractors won the contract [21].

There are over 400 WCAs and 100 WDAs in the UK. Waste collection contracts tend to be held for an average of 6 years (matching the capital investment required) and waste disposal contracts can be longer still (up to 25 years). Many street cleansing contracts are combined with waste collection contracts. Due to the high costs of entry, the limited number and size of contracts and low margins, only a relatively small number of companies are involved in MSW collection. However, the competition for waste collection contracts between these companies is intense, with an average of 13 firms applying to tender and 4 being asked to tender for a given contract. Compulsory Competitive Tendering and waste collection services have been researched extensively in the UK by the Audit Commission [22], Domberger, Meadowcroft and Thompson [23] and Szymanski and Wilkins [24].

At present, waste disposal is governed by the Environmental Protection Act 1990, which requires local authorities to divest themselves of their involvement in waste disposal to private contractors, or to separately organise Local Authority Waste Disposal Companies (LAWDCs). They are required to administer their responsibilities through competitively tendered contracts in England and Wales. These requirements have not yet been repealed. In Scotland and Northern Ireland, waste disposal is still an 'in-house' operation. The authority is empowered to include in the contracts environmental and public health factors as well as value for money. This regime is criticised for requiring over prescriptive procedural requirements for the letting of contracts. Waste disposal is therefore currently undertaken either by the LAWDC, a joint venture company with the local authority, the private sector, or through the privatisation of the local authority waste disposal section.

5. BEST VALUE

In July 1997, the Labour Government confirmed that it intended to replace CCT with a duty for local authorities to obtain Best Value in providing services to local taxpayers.

In March 1998, a consultation paper was issued on the subject of Best Value [25] and this was followed in July 1998 by a White Paper describing the new Modern Local Government, which establishes the key elements of the Best Value framework [26].

Best Value is described in the White Paper as:

'...a duty to deliver services to clear standards – covering both cost and quality – by the most effective, economic and efficient means available. In carrying out this duty local authorities will be accountable to local people and have a responsibility to central government in its role as representative of the broader national interest' [26].

Best Value links closely with other government policies concerning Sustainable Development, democratic renewal and social exclusion and is part of the 'Modernising Local Government' programme.

The Best Value approach to service delivery, is where a balance between cost and quality considerations must be struck, thus the cheapest supplier of a service may not satisfy Best Value criteria if the quality of service provided suffers excessively. The implementation of Best Value involves a commitment to an ethos of continuous improvement; even where local authorities provide a good service, the pressure to deliver Best Value remains. There is no one definition of Best Value, or one way of obtaining it, local authorities are encouraged to find a way that suits them, and to promote new and innovative ways of working.

The Local Government (Best Value and Capping) Act received Royal Assent in July 1999 and will come into effect on the 1st of April 2000. This Act imposes a new duty of Best Value on local authorities and repeals previous legislation governing CCT. The Government is currently consulting on aspects of Best Value, prior to issuing orders and guidance in the autumn. In Wales, CCT has been suspended since April 1994 when local government was reorganised. The main elements of Best Value are a corporate strategy, fundamental performance reviews, a local performance plan and audit, inspection and intervention.

6. PILOT AUTHORITIES

Invitations for local authorities to become pilot authorities for Best Value were announced in June 1997. In England, 37 local authorities were chosen as pilots and in Wales all 22 authorities are piloting Best Value. Sixteen pilot authorities in England are involved in reviewing either their waste services or related issues. The work of the pilots in England is being evaluated by a team led by the Local Government Centre at Warwick University Business School, and by the Cardiff Business School in Wales, both commissioned by the Department of Environment, Transport and the Regions (DETR). The Government has made it clear that the experience of the authorities will be taken into account in shaping the way in which Best Value will apply in practice.

7. FUNDAMENTAL PERFORMANCE REVIEWS

Experience of the pilot authorities has indicated that performance reviews must be properly planned and implemented, a key component being to set the approach within a coherent, corporate and co-ordinated strategy. This will allow for the integration of waste services and policy considerations and encourage working across boundaries with other agencies.

Nearly three-quarters (73%) of English local authorities have a Best Value review programme in place as at January 1999, of these 27% are reviewing their refuse and waste management services and 23% are reviewing their street cleansing services [27]. Local authorities will have to undertake a review of the performance of all services over a 5-year period. Best Value will put the onus on the authorities themselves to lead the review process. Local authorities will be required to:

- *Challenge why and how a service is being provided*
- *Invite comparison with other local authorities' performance and the private sector across a range of indicators*
- *Consult with the local taxpayers, service-users and the wider business community on the service*
- *Embrace fair competition as a means of securing efficient and effective services.*

There are several approaches to reviewing services: service-based, which has proved to be most popular as yet, area-based, customer focused and a crosscutting method. For waste collection, a service-based approach would fit into the existing service structure of most local authorities and data on performance is readily available, although it reinforces the existing method of provision and neglects the challenge aspect. An area-based approach may be suitable for reviewing street cleansing services and waste collection as it encourages consideration of a co-ordinated service through a locality but limited performance data could be a hindrance and variations in service standards across localities could occur.

An interesting technique is the 'street scene' approach that aims to identify and draw together all the elements, players and relationships that could influence the visual quality of the public realm [28]. The WCAs services are linked to the provision of other waste management services particularly waste minimisation, recycling, treatment and disposal. Consequently this service cannot be reviewed independently and it will be necessary for the WCAs and WDAs to co-ordinate their approaches to reviews. Local authorities are expected to review poorer services first (as highlighted by the national indicators) but reviewing stronger service areas could spread best practice.

Challenge

The challenge element is the key to significant and continuous improvements for service delivery. It challenges the local authority to ask why the service is provided at the outset and whether the service can be altered in any way to be better. Challenge must be based against internal standards and should result in improved waste services, and particular the diversion of waste from landfill to minimisation and recycling.

Comparison

To compare services, it is essential to collate comprehensive baseline data for each service and to use performance indicators that facilitate the making of appropriate comparisons between the standard of performance achieved by different authorities and the standards of performance achieved in different years. In the UK, the development and use of performance measurement has been extensive [29]. Several sets of performance indicators will be used for Best Value: a small number of general health indicators, a national set of Best Value service indicators proposed by the Government, and local performance indicators provided by local authorities.

These should complement the suite of indicators for Sustainable Development in the UK. Since 1992, the Audit Commission has been responsible for setting a suite of national performance indicators for local authorities, including waste services indicators, which form a base of national comparative data. Local authorities will have to develop performance indicators to measure inputs, outputs and outcomes for a service. The measurement of inputs and outputs for the waste management industry has been commonplace in the form of monitoring activity but the outcome measurement is a new concept to much of the waste management industry and not always easily defined and measured.

The Draft Waste Strategy [11] recommends that the performance indicators must be compiled in a way that ensures waste management is no longer seen as separate functions between the WDAs and WCAs. Performance indicators alone cannot be used to make judgements about whether or not Best Value or sustainability is being achieved; the views of the public and professional evaluation are equally important.

Within the White Paper there are requirements to set targets for specific services against national and local indicators which will be published annually in the local performance plans. Quality targets should raise the performance of local authority services over the 5-year Best Value cycle to match that of the upper quartile of the local authorities at the time the target was set. Targets generated by the performance reviews need to reflect the principles of Sustainable Development set out in the recent UK strategy [1].

A Way with Waste states that the local targets for waste should take account of local assessments of BPEO, and will not therefore necessarily be at the same level as the national targets already proposed [11].

Indicators and achievable targets are essential for waste reduction, and the new Best Value indicators will have a significant impact on this with requirements for contractors to meet waste reduction targets within contracts.

Benchmarking

Benchmarking is the search for best practice, and the subsequent translation of this best practice into use in the organisation; it entails measuring financial and operational performance against that of a competitor. Individual authorities are expected to use a form of benchmarking to promote Best Value in their own service delivery.

It has been reported that around 150 authorities claim to undertake some sort of benchmarking exercise [30]. In Wales, 12 local authorities have undertaken a joint benchmarking exercise concentrating on waste collection, waste disposal, street cleansing and public conveniences.

Consultation

To meet the minimum requirements on consultation, a local authority will need to consult the community about all of its services over a 5-year cycle. Consultation should originate from a strategic and co-ordinated approach across the whole local authority. The most common methods of consultation are the traditional approaches such as service satisfaction surveys, public meetings and consultation documents but more innovative methods are increasing in popularity, such as referenda, citizen's panel and interactive websites. Local authorities will have to consult widely with all interested parties (service users, suppliers and staff) and to engage consultation successfully with groups, which are under-represented.

However, such widespread consultation could have implications for setting plans for future service delivery, particularly since there may be differences in the opinions of sustainable waste management. Consultation to be meaningful must feed directly into decisions about policy, financial choices, service provision and strategy. The role of consultation, public information and education is critical for Best Value and indeed for waste reduction.

Competitiveness

The White Paper states:

'Retaining work in-house without subjecting it to real competitive pressure can rarely be justified. Should an authority exercise that choice and the service fail to provide Best Value continuing, in-house provision would not be sustainable' [26].

The White Paper sets out a number of ways how an authority might address the 'compete' element. These include commissioning an independent benchmarking report, providing a core service in-house and buying top-up support from the private sector so that comparison can be made between the two and contracting a service out to the private sector following competition restricted to external bidders. A key aspect of the competition criteria will be the examination of each service's procurement strategy.

8. AUDIT, INSPECTION AND INTERVENTION

The Audit Commission will be responsible for the audit and inspection of the Best Value process. Two consultation papers have recently been issued by the Audit Commission regarding principles for public inspection and inspection methodology [31, 32]. The inspection methodology will allow inspectors to make an assessment of whether local authority expenditure on waste management offers the public and stakeholders Best Value (Figures 7.5). This will be achieved by reviewing the economy, efficiency and effectiveness of the local authorities waste reduction, collection, recovery and disposal strategies and services, and make an assessment of performance against the requirements of the Best Value framework (Figure 7.6). An evidence-based assessment of local performance towards national standards will also be inspected.

An evidence-based assessment of local performance towards national standards will also be inspected.

Figure 7.5. Reviewing the Service [32]

Figure 7.6. Comparing Reviews, Services and Authorities [32]

There will be power for the Government to intervene when there is a failure to meet any single national performance standard, persistently high costs not warranted by service excellence or need; a failure to improve standards and a failure to act on a critical inspection report.

9. METHODOLOGY

An initial pilot survey was undertaken by telephone in June 1999 to identify the implications of the forthcoming Best Value legislation for waste management in the UK. The top ten waste management companies identified, by turnover in 1996/1997, who held over 40% of the market share [15] were interviewed. To signify the publicly owned waste management companies, five local authority owned LAWDCs and five DSOs were also interviewed, who were considered to be representative.

To acquire a viewpoint from the local authority perspective, five WDAs and five WCAs were also consulted and five 'other parties' were identified and asked to name the main issues arising from Best Value legislation. The pilot survey identified a consensus of eight main waste management issues arising from Best Value, these were:

- *working arrangements;*
- *investment and resources;*
- *performance based contracts and benchmarking;*
- *the role of consultation within the contract specification;*
- *innovation within the waste management industry;*
- *contractual terms (length);*
- *consolidation of waste management companies;*
- *diversification within waste management companies.*

A questionnaire was designed, asking the respondents to rank these eight issues in order of importance, with reasons. They were also asked if there were any other issues, which they considered important.

To obtain a realistic view from the MSW collection sector, questionnaires were sent to twenty private firms that are involved in MSW collection and cleaning contracts, representing 35% of the UK contracts in value terms [15].

The remaining 65% of contracts in value terms (237 contracts) are held by DSOs and questionnaires were sent to 40 representative DSO units. For the MSW disposal sector, 59 LAWDCs (42%) have been contracted out to the private sector; 50 LAWDCs (36%) are still wholly owned by the local authority with a further 26 LAWDCs (19%) set up as joint venture companies. Of these, 20 local authority LAWDCs were sent questionnaires and 10 jointly-owned LAWDCs. For the private sector, the top twelve UK landfill operators, as of September 1996, were sent questionnaires, representing a 44% share in the landfill market, as well as 8 smaller MSW disposal companies.

For a representative view for local authorities, 20 WDAs and 20 WCAs were sent questionnaires representing all of the pilot authorities and a selection of other authorities that were working towards Best Value within their waste management section. All of these authorities have first-hand knowledge of the impacts of Best Value.

Ten 'other' interested parties received questionnaires, including the Department of Environment, the Department of Trade and Industry, Local Government bodies, regional bodies, trade associations and consultants, these have all been involved with the development of Best Value legislation. Several interviews were also held with key stakeholders in the MSW market to gain a more in-depth view on Best Value. All of the participants in the pilot survey were sent questionnaires.

The response rate for the questionnaires was 60%, with 96 questionnaires returned from a total of 160. The responses obtained are considered to be representative of both the MSW collection and disposal sectors of the waste management industry, with a variety of company size and types replying.

10. RESULTS OF SURVEY

The results are grouped into the ranking of issues for local authorities, waste management companies, others and overall (Table 7.4). Generally, local authorities, waste management companies and the 'others' show consensus in the ranking of the eight issues.

These results are then divided further for in-depth examination. All of the private waste companies have been grouped together for analysis, as have the LAWDCs and DSOs as their responses were similar. Table 7.5 shows the ranking of issues for private waste management companies and LAWDCs/DSOs. The WDAs and WCAs ranking of issues are shown in Table 7.6. There was a general consensus that the most important impact of Best Value legislation would be new working arrangements, followed by investment and resources.

Variation within ranking occurred the most between private waste companies and LAWDCs/DSOs with private waste companies being more concerned with the actual processes of Best Value such as benchmarking and consultation whilst DSOs/LAWDCs were more concerned with investment and resources and contractual terms. The rankings of the issues signify the difference between publicly owned companies and private companies and how they operate in the MSW market. The ranking of issues for WDAs and WCAs does not show that much variation, with the eight issues having similar rankings. The next section discusses in detail each issue from each stakeholders viewpoint.

Table 7.4. Rank order of the issues facing organisations involved in waste management in the UK, due to Best Value

<i>Issues</i>	<i>Overall</i>	<i>Waste Management Companies</i>	<i>Local Authorities</i>	<i>Others</i>
Working Arrangements	1	1	1	2
Investment & Resources	2	5	4	1
Performance & Benchmarking	3	2		3
Consultation	4	3	2	4
Innovation	5	4	3	5
Contractual Terms (length)	6	6	5	6
Consolidation	7	5	6	7
Diversification	8	7	7	8

Table 7.5. Subdivision of waste management companies into private waste companies and DSOs/LAWDCs: (rank order of Best Value issues)

<i>Issues</i>	<i>Private Waste Companies</i>	<i>DSOs / LAWDCs</i>
Working Arrangements	1	1
Investment & Resources	6	3
Performance & Benchmarking	3	4
Consultation	4	6
Innovation	2	5
Contractual Terms (length)	4	2
Consolidation	7	8
Diversification	5	7

(Key: 1 = most important, 8 = least important)

Table 6. Subdivision of local authorities into waste disposal authorities and waste collection authorities: rank order of Best Value issues

<i>Issues</i>	<i>Waste Collection Authorities</i>	<i>Waste Disposal Authorities</i>
Working Arrangements	1	2
Investment & Resources	2	1
Performance & Benchmarking	3	1
Consultation	3	3
Innovation	5	4
Contractual Terms (length)	4	5
Consolidation	6	7
Diversification	7	6

(Key: 1 = most important, 8 = least important)

Working Arrangements

From the survey, working arrangements is perceived to be the most important issue arising from the implementation of Best Value by both waste management companies and local authorities, and second for the 'others' category (Table 7.4). WCAs ranked this issue most important and WDAs second (Table 7.6). Both types of authorities agreed that the idea of 'consortia' is a key issue reflecting the scale of investment required for new waste collection, treatment and disposal techniques to ensure sustainable waste management practices and that Best Value will enable this to occur.

Due to the compulsory nature of CCT, partnerships between the public and private sector have largely been set back, therefore research will be vital to show the most effective working arrangements between the waste management industry and local authorities. A relationship built on the basis of partnership between local authorities and contractors is much more likely to succeed and offer greater opportunity to deal with the pressures of change and continuous improvement within a contract framework.

The Government expects that local authorities will develop partnerships between the service provider, communities, agencies and other authorities as a result of Best Value, and to this cause the Government is intending to provide councils with discretionary powers to engage in partnership arrangements with other bodies.

Waste reduction will not occur unless innovative partnerships are created between authorities, producers and consumers.

Working arrangements are only considered a major issue, if the local authority during the challenge aspect of the review of a service decides that the externalisation of services is the 'Best Value' option. If it fits in with the Best Value plans of the authority, then early termination of such an in-house award should be considered. DSOs and LAWDCs also rank working arrangements first (Table 7.5), citing the fact that much more flexibility exists if the WDAs and WCAs retained more work in-house under CCT.

The Government and respondents to the survey recognise that Best Value allows for the opportunity of integrated waste management to become widely adopted, providing the integration of waste services brings increases in efficiency, cost savings and quality.

The 'Best Value' option will depend on the drivers within the locality, such as local landfill availability, the relative cost of waste options in the area and local recycling markets. Long-term integrated waste contracts provide the opportunity for different forms of working arrangements and these opportunities will increase under the Best Value regime. For example, a joint venture company between Kirklees Metropolitan Council and United Waste Services Ltd was set up in 1998, covering a 25 year integrated waste management contract.

To achieve Best Value for waste services, joint working between WCAs and WDAs is vital. Around half of the counties in England are understood to be working with their WCAs to prepare joint waste strategies, and most plan to have them in place before the end of 2000. The UK Government has warned that if the two types of authorities cannot work together then it will consider a move to a single-tier waste management authority. Where joint waste strategies do exist, authorities should set joint service delivery and performance targets and may let Best Value contracts together.

The European Union's procurement rules could make these 'Best Value' working arrangements more difficult as the negotiated procedure is usually necessary which can be costly, time-consuming and prescriptive. Nevertheless the negotiated procedure does provide flexibility to achieve waste contracts with a 'best fit for the authority'. The Contracts (Rights of Third Parties) Bill currently before parliament could also have an effect on working arrangements and contractual agreements. It requires that a contract governed by English law can only bind, and can only be enforced by, someone who is a party to that contract.

Investment, Resources and Process of Tendering

The survey shows that investment, resources and the process of tendering is the second most important issue. When looking closely at the responses, private waste companies rank this issue sixth and DSOs/LAWDCs third (Table 7.5). Local authorities believe the issue is more important, with WDAs ranking it the most important and WCAs ranking it second (Table 7.6). The 'others' category also thought it was the most important issue.

This variation could be due to the fact that local authorities and the 'others' are acutely aware of the investment required to divert waste away from landfill and up the hierarchy; indeed WCAs did identify the need for income flows to secure investment for waste recycling and minimisation. Most private waste companies did not see investment as a major issue in relation to Best Value but uncertainty is apparent in the waste management industry concerning the extra cost, if any, of the contractor embracing Best Value. Industry is willing to put up the finance required for 'Best Value' waste collection, treatment and disposal.

Waste contracts usually require significant capital and assets but economies of scale could be achieved by integrating service contracts (for disposal, collection, recycling and recovery) or for neighbouring local authorities to share facilities. LAWDCs/DSOs rank this issue as third (Table 7.5), citing they are constrained where investment is concerned, due to local authority governance.

It is recognised that power over capital spending must be devolved to local authorities where more beneficial partnerships will develop. The lack of public finances made available for projects are a considerable constraint on the development of the MSW, although new private financing models are being increasingly used such as the Private Finance Initiative (PFI).

Project deliverability is a key factor in the evaluation of any bid for a waste disposal or collection contract. Contractors will need to convince financiers of the 'bankability' of the project.

Lenders will look to eliminate as much risk as possible within the contract documentation and seek as many guarantees built into the contract as are feasible on waste quantities, composition, delivery patterns and contingency arrangements. Access to finance is cited as one of the barriers to entry in to the waste management industry [15].

Many private waste management companies believe that the tendering process is a major obstacle in terms of cost and length. Many emphasise that the process of tendering should show Best Value as well as the outcome. Local authorities, waste companies and their industry representatives have voiced concern over the planning system for waste facilities, believing it to be a significant hurdle. Even when planning permission is eventually granted, it takes anywhere between two to ten years from plant conception to operation.

Contracts - Performance and Benchmarking

The survey shows that this issue is ranked third overall. Waste management companies and local authorities ranked this issue second (Table 7.4). WDAs believe it is the most important issue whilst WCAs rank it third (Table 7.6). This variation could be because WCAs have been using types of performance based contracts for MSW collection and street cleaning contracts under CCT by using frequency based indicators which are simple to record and factual.

For Best Value, the performance of contractors will be based on outcomes, as well as frequency and efficiency indicators. Performance measures will also be built into MSW disposal contracts to ensure continuous improvement and the movement of waste up the hierarchy. The extent and standard of the MSW service over the contract length should be detailed and agreed so that the targets set and high standards can be achieved. Benchmarking is voiced as a key concern by the private waste management companies.

They emphasize that when undertaking any benchmarking exercise it is essential to compare 'like for like' and to look behind the 'cost' factor to explain any differences. Private waste companies and DSOs/LAWDCs will have to share their performance information with one another to aid the benchmarking processes undertaken by the WCAs or WDAs.

Role of Consultation within the Contract Specification

This issue is ranked fourth overall with waste management companies ranking it third, local authorities ranking it second and 'others' fourth (Table 7.4). WCAs and WDAs both rank this issue as third most important for themselves (Table 7.6). All of the respondents in the survey recognised that consultation with local communities and stakeholders is a key element of Best Value but there was uncertainty from both waste management companies and local authorities of whether it should be part of the contract specification. Private waste companies rank it fourth and DSOs/LAWDCs sixth (Table 7.5).

The difference in the perceived importance of consultation could be because the DSOs/LAWDCs originated from local authorities which to some extent, have consulted with the local community in the past.

Private waste management companies have carried out little consultation with the public and the general public image of the waste management industry is poor in the UK.

Consultation is a difficult issue and it will be necessary not to raise the expectations of the public too high, especially where recycling is concerned, as the WCA might be unable to deliver due to budgetary and market constraints. Emphasis will be placed upon negotiating contracts, which clearly recognise that local services must benefit local people. Legal mechanisms must be found within contracts for listening and responding to communities and enabling local authorities to deliver what the public wants.

Quality, company reputation and customer services have always been important features in the waste market for leading suppliers, and this will require greater significance in light of Best Value. A survey by Barony in a mainstream service suggests that while 80% of local authorities rated customer satisfaction as important, only 35% undertook satisfaction surveys [33]. To ensure the contractor delivers on customer satisfaction it has to be built into the prospective agreement.

Innovation

Innovation is ranked third most important for local authorities and fourth most for waste management companies (Table 7.4). Private waste companies perceive it to be second most important overall compared to DSOs/LAWDCs who rank it fifth (Table 7.5). The private waste management companies believe that innovation is vital for the company's ability to deliver a Best Value contract successfully whereas DSOs/LAWDCs do not always have the resources to concentrate on innovation. For continuous improvement within waste contracts, it is essential that innovation and flexibility occur within the lifespan of the contract.

From a private waste management company's point of view, innovation will be essential to maximise profits and to gain commercial advantage by embracing new technologies. The new draft waste strategy emphasises the fact that companies must work to develop new markets and products for recycled materials; otherwise they run the risk of falling behind more resourceful competitors [11].

WDAs and WCAs rank innovation fifth and fourth respectively recognising that to reach MSW targets, innovation is a necessity (Table 7.6). Several WDAs are leaving their waste management service reviews to the fourth or fifth year in the review cycle, hoping that new technology will be more efficient and less costly by then. The trade associations recognise that the lack of training and skills within the industry and the need to reorganise current high standards are obstacles to innovation.

Contractual Terms - Length

The survey shows that the length of contracts is considered sixth overall, with waste management companies ranking it sixth, local authorities fifth and 'others' sixth (Table 7.4). DSOs/LAWDCs rank this issue second and private waste companies rank the importance of the length of contract fourth (Table 7.5). The respondents believe that the impact of financing should be matched to the reasonable life of the asset and therefore reflected in the length of the contract; without long-term contracts it will be impossible to make large capital investments.

WDAs rank the issue fifth (Table 7.6); they already tender out long term contracts for MSW disposal and therefore do not believe Best Value is a major issue for contract lengths; however WCAs at present have shorter contracts and therefore rank contract length as fourth, slightly higher than the WDAs. The local authority can give the contractor a long-term contract in return for a commitment from the supplier to meet specified cost, quality and other performance targets. However, tension is apparent in the private sector over the issue of the 5-year cycles of reviewing services in relation to long-term contracts.

Flexibility must be built into any long-term contract to build any changes that might occur during the contract's lifespan. Many authorities are locked into long-term waste contracts that prevent movement up the waste hierarchy and also continuous improvement or review of performance; there is also the added problem of a lack of co-ordination between the timescales of waste collection and waste disposal contracts.

If these contracts do exist and cannot be escaped, it would be sensible for the local authority to put waste services to the end of the review process. It is recognised in *A Way with Waste* [11], that longer term contracts will provide stability for both the client and the contractor, enabling longer term planning that will lead to more stable process and a better correlation of supply and demand for the recyclate market.

Consolidation

Consolidation is viewed seventh overall (Table 7.4), with private waste management companies ranking it seventh and DSOs/LAWDCs eighth (Table 7.5). WCAs and WDAs ranked the issue sixth and seventh respectively (Table 7.6). Replies to the questionnaire suggest that it is considered an important issue, especially for smaller companies but Best Value is not seen as a driver for it, however consolidation may occur at a faster rate than the present. Companies with fewer integrated waste management services will find it increasingly difficult to win or maintain MSW management service contracts.

As a result, many companies will look to take-overs and consolidation as a means of broadening service offerings. By consolidating, companies will encompass a greater proportion of the value chain and move into new geographical markets. Often, entry into the waste management industry is easiest through acquisition and take-overs.

Diversification

Overall, diversification is ranked as the least important issue, although private waste companies rank it fifth. Diversification is essential for the movement of waste away from landfill. Best Value is considered a driver for diversification interlinked with the requirements of the Landfill Directive and the UK's waste strategy. The questionnaire raises the point that as well as diversification, specialisation could also occur within the waste management industry. Waste management companies will obviously want to spread the risk to their business. More companies are branching out into sorting, separation, recycling and facilities management.

Many DSOs are now offering integrated services including ground and building maintenance, cleaning, waste collection and recycling.

Legislation, public awareness and initiatives such as the landfill tax are diverting waste from landfill into a higher cost and added value segment of the market, thus contributing significantly to market growth and company profitability.

Other issues

Replies to the survey suggest that in general the UK waste management industry is wary of Best Value and there is a particular concern that Best Value will develop into a different version of CCT.

There is a lack of information available to the industry that explains Best Value. One waste management company voiced the opinion that someone needs to decide what Best Value means and then tell everyone else. Questions are raised on how contractors participate in Best Value reviews, who is the arbiter in the event of any dispute and what weighting, if any, are given to quality standards in the selection of tenders.

11. CASE STUDY REVIEW OF NORTHAMPTONSHIRE

Northamptonshire County Council's (NCC) recycling rate was 11% for MSW in 1999-2000, equivalent to 37,500 tonnes collected and reprocessed. However, their target recycling rate for 2003/04 is 18% or 65,000 tonnes (assuming no increase per annum in waste generation). But, MSW arisings in Northamptonshire are increasing at double the national average (6%), and thus by 2003-2004 nearer 80,000 tonnes per annum will need to be recycled. At present the majority of MSW produced in the County is currently landfilled, in excess of 85%. Approximately 68% of households in Northamptonshire have access to kerbside collections for their recycling, and Household Waste Recycling Centres (HWRCs) handle nearly a third of the MSW stream in Northamptonshire.

NCC was a Best Value pilot authority. Their pilot review identified the strategic issues facing NCC and provided a platform for the development of a long term waste strategy NCC are now reviewing their waste management services in Year 1 and also in Year 4 of the cycle with the District and Borough Councils throughout Northamptonshire

The Year 1 Best Value review is focusing on the management and cost of waste, waste reduction and recycling/composting. Year 4 will look at service delivery issues and the progress on the County's strategy.

NCC through their Best Value Pilot status formed the Midlands Comparator Group consisting of 7 WDA's: Staffordshire, Leicestershire, Northamptonshire, Nottinghamshire, Warwickshire, Lincolnshire and Derbyshire.

This group through dialogue and discussion amongst officers devised 10 key performance indicators for waste services and a further 26 supplementary indicators for operational comparison. To date this group has successfully compared costs of service provision across the group, thus satisfying the compare element of Best Value.

The Midlands Comparator group is ongoing and is reviewing more operational issues at present. Comparison with the Audit Commission Performance Indicators (PIs) for waste disposal per tonne showed the County to have a value of £20.35, within the top quartile for County Councils and the top quartile for all WDA's in England. The Group have carried out a survey of waste disposal costs of 24 WDAs, with a 50% return rate. Broadly compared, the costs and breakdown costs of activities by these WDAs shows NCC in a favourable light.

Five out of the 12 surveyed WDAs obtain external funding, 3 of them from landfill tax credit schemes, whilst 5 out of the 12 WDAs are conducting Best Value reviews in Year 1. However, the profile of staff costs for each waste service (e.g. WDA operations, abandoned vehicles, policy/strategy development) showed large variation between authorities with staff budgets varying from £78,000 to £604,000. In NCC £8.3 million is spent on waste services every year (98% for contracts), leaving £17,000 for pro-active initiatives.

NCC and the Midlands Comparator Group have also been busy putting forward service improvement suggestions.

- *Household Waste Recycling Centres a financial bonus scheme to exceed current 35% recycling target / re-sale services*
- *Expansion of trade waste services*
- *Expanding kerbside collections*
- *Increase processing capacity for green waste and dry recyclables*
- *Market development*
- *Community education*
- *Industry issues (including waste minimisation projects/resource efficiency)*
- *Improved customer focus*
- *Enforcement (trade waste restrictions)*
- *Development issues (new households requiring new infrastructure)*
- *Research and information (data and knowledge)*

However, it must be noted that there are problem with comparisons. NCC is already in the top quartile of costs for waste disposal, and the interpretation of the Audit Commission PI's is a common problem, with a lack of consistency or clarity applied to the indicators. Greater guidance for calculating PI's (especially recycling rates) appears to change annually, but it is not so easy to change contract specifications, making it a heavy risk to contractors to base contracts on PI's. Nonetheless there is a role for basic comparison, if for nothing more than a swift 'health check'.

Greater emphasis is required on what lies beneath the figures. Even though NCC have been involved in benchmarking for over 2 years there is still confusion over comparisons, because different departments and authorities have similar but never identical accounting systems and thus costs are worked out in different ways. It can also be hard for WDA's to judge their costs as they are not sure of the amount of waste generated or how much WCA's will recycle for recycling credits.

The Best Value Review process can also be troublesome, as noted in the experiences of NCC. There is difficulty in reviewing a service that is subject to rapid and significant change, and costs are incredibly unstable at present due to the landfill tax, diminishing void and the Landfill Directive.

12. CONCLUSIONS

Best Value is a major challenge for local authorities to develop new ways of delivering services. It places all of the issues relating to waste management on one agenda and removes the partial analysis and provision that previously occurred. As yet, no waste contracts have been issued under the 'Best Value' tag but the majority of local authorities are already preparing for Best Value.

The eight key issues for waste management from the implementation of Best Value, identified by this research are in decreasing importance: working arrangements, investment and resources, performance and benchmarking, consultation, innovation, contractual terms, consolidation and diversification. The waste management industry is uncertain what Best Value will mean to them but most of these issues will play key roles in their future contracts.

Best Value will be a key driver for movement up the waste hierarchy, together with other legislation such as the Landfill Directive. Much greater emphasis will be placed on minimisation than disposal. Best Value is an opportunity for local authorities and the waste management industry to work closely together, finance new initiatives such as municipal recycling facilities and achieve continuous improvement in the collection, treatment and disposal of MSW.

The legislation will also lead to a marked change within the waste management industry with take-overs and mergers increasing and more companies diversifying to offer a greater range of sustainable services.

Waste prevention, reduction and minimisation would appear synonymous with Best Value. The Best Value methodology, once embedded into working practices will rapidly drive the management of MSW up the hierarchy, away from disposal towards minimisation.

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CHAPTER 8

CONCLUSIONS

CHAPTER 8 - CONCLUSIONS

'THE SUSTAINABLE WASTE MANAGEMENT AGENDA'

The thesis has covered both a great depth and breadth of subject material over a time period of only 5 years, but a period of great change and dynamism in terms of policy and local authority activity. In light of this the findings of the work are perhaps a little disjointed, but nonetheless valuable. This section will attempt to tie together the important messages and underlying strands in a simple resume.

1. LANDFILL AVAILABILITY

The use of both primary and secondary data has provided the basis for an increased understanding of the waste disposal industry in the UK, and has allowed an assessment of the role and influence of National Government in shaping the industry's future, particularly the role which landfill will fulfil. Research into current waste management issues is an essential part of the evolving waste management sector, with the intention of identifying important trends which could prove useful for future waste policy decision-making. This research charts the general confusion that has existed during the last few years and shows that even after Government attempts to focus the industry, there still remains some disorder and a general lack of direction, which will need to be further addressed in the coming decade.

There is little doubt that the industry is changing in response to diminishing void, public opinion and Government action, and this paper has discussed a number of the avenues of change presently in use, and indicated the potential routes which the industry could follow. It would appear that the landfill tax is a necessary development given the inadequacies of the recycling targets, recycling credits and non-fossil fuel subsidies, which were tried previously, but proved unsuccessful. Perhaps now the waste industry will be given the high political and media profile that it requires, which will enable more positive pro-active, rather than reactive, steps to be taken towards the goal of sustainable waste management practice in the UK.

Current trends and renewed Government commitment must continue if the nation is to be prepared to cope with the landfill crisis which will arise over the next 15 years, through the increasing use of environmentally friendly alternatives to landfill.

Landfill will no longer be the cheapest or simplest waste disposal option, and the new targets will encourage local authorities and waste management companies to embrace the ideals of *minimisation, recycling, re-use, composting and waste to energy*, in an attempt to minimise their costs, achieve their targets and maximise their environmental performance.

2. AEROBIC LANDFILL

Globally, landfill remains the most commonly used (and often the cheapest) method for the disposal of MSW. However, the condition of many of these sites particularly the older ones, and those in developing nations are of a poor standard, and are thus a significant environmental risk due to the anaerobic degradation of the organic fraction of the waste stream. Without eliminating organic waste from landfills (as is being attempted in the European Union through the Landfill Directive) an alternative to anaerobic landfills must be considered. For landfills worldwide, the aerobic landfill promotes a change in the overall management of solid waste disposal. In many cases, the aerobic landfill serves as a means to operate landfills more efficiently. Additionally, the aerobic landfill serves as a cost-effective, aerobic remediation solution for landfills that are adversely impacting the environment. In all, this technology could evolve itself into a cost-effective approach to sustainable solid waste management.

3. POLICY IMPLEMENTATION

Traditionally, a number of important issues have been overlooked when discussing environmental policies and MSW, particularly policy development and the implementation of MSW strategy, and this is the rationale behind the research.

There remains an obvious need for local government to test proposed planning strategies and management systems against their suitability within the local context (environmental, social and political) and their effectiveness once implemented, as many policies have negligible impact once they are documented. This requires some form of evaluation of the planning process.

The justification for this research is the obvious failure of national MSW policy to alter local government practice in line with sustainable development and the targets laid down in Making Waste Work (DoE 1995).

What this research shows is that no matter how radical, rapid or innovative policy change and direction are from both the EU and UK policy dictators and legislators, they will fail to alter practices at the local scale in the short term. Policy that is driven by the centre often fails to adequately take account of local circumstances, funding problems, staffing issues and organisational barriers to change. These are the issues that must be faced by policy makers in the coming Millennium if MSW management practices are to move towards their ultimate goal of sustainability.

4. WASTE MINIMISATION

Waste Minimisation Clubs have demonstrated that the application of minimisation methodology results in improved resource utilisation and that the financial savings lead to enhanced company profitability that should result in enhanced employment security. There is little doubt that *'local demonstrator projects'* (minimisation projects and clubs) provide the necessary focus for companies' waste minimisation activities and potentially accelerate progress. However, cost savings rather than environmental improvement remain the key motivating influence but companies still find it difficult to allocate sufficient human resources, and this theme must be used more in promotional work in support of waste minimisation. Minimisation Clubs have also demonstrated that the hierarchy is a functional concept and that significant savings can be made by reducing waste at source.

8.5. PUBLIC AWARENESS

As a result of the research, a series of issues were identified as being fundamental to the development of a local authorities' waste awareness campaign. There is often a need to target publicity information especially for the lower-recycling groups in society. Education, publicity and promotion are essential for the success of any recycling scheme. Quality promotion and publicity on a regular basis, will produce better recycling performance figures, whilst poor quality promotion, or none at all, will result in low recycling rates. Thus, when planning the provision of a recycling service it should include full education and publicity elements. More importantly, regular leaflets help to maintain public awareness, and knowledge will decline if frequent reminders are not utilised.

The Recycling Roadshow campaign indicates the clear need for continual and sustained efforts to improve participation rates in recycling services, which is perhaps the main barrier to totally costs effective and efficient recycling services for many local authorities. It was found that the main advantage of the face to face approach for the promotion of recycling services is that this type of contact is responsible for changing of personal habits, because the Roadshow team are all well versed in the benefits and issues of recycling within the Borough and can thus provide the necessary supportive evidence and arguments often required by unsure residents. Residents appeared more likely to change their behaviour after having spoken to an officer personally about the topic who can answer all their questions. This type of contact also provides the local authority with important feedback from the residents relating to collection problems that they experience, and the recycling team can then act immediately to remedy these problems and improve the efficiency of the service provided.

Public surveys are essential if we are to offer the type of service that the public wants and would positively respond to. The landfill tax credit system has enabled this public education campaign to occur, and the funders should be acknowledged for their foresight in funding such an important element of sustainable waste management – the social aspect of participation.

6. LANDFILL TAX CREDIT SCHEME

Irrespective of the different approaches used for landfill tax fund management, all aim to fulfil the aims and objectives of the individual landfill operators and associated environmental bodies, whilst hoping to promote sustainable waste management and improve local community public relations. This undoubtedly can make gaining funding under the LTCS a complicated affair. However, the LTCS is a valuable innovation, which allows a proportion of a national tax to be redirected by landfill operators and Environmental Bodies to projects which can assist in driving sustainable waste management and improve the quality of living for those communities who live close to landfill sites. It is in effect a 'polluter pays' fund, which can channel monies into local community projects and research and education programmes, centred on improving waste management practices.

The success of the first "green tax" scheme has shown itself to be markedly productive in the direct recycling of landfill tax credits into beneficial social and environmental projects nationally. Large sums of money have been spent on sustainable waste management research and development and education, community amenities and building restoration and maintenance.

7. THE NEW POLICY AGENDA

Best Value is a major challenge for local authorities to develop new ways of delivering services. It places all of the issues relating to waste management on one agenda and removes the partial analysis and provision that previously occurred. As yet, no waste contracts have been issued under the 'Best Value' tag but the majority of local authorities are already preparing for Best Value. The eight key issues for waste management from the implementation of Best Value, identified by this research, are in decreasing importance: working arrangements, investment and resources, performance and benchmarking, consultation, innovation, contractual terms, consolidation and diversification. The waste management industry is uncertain what Best Value will mean to them but most of these issues will play key roles in their future contracts.

Best Value will be a key driver for movement up the waste hierarchy, together with other legislation such as the Landfill Directive. Much greater emphasis will be placed on minimisation than disposal.

Best Value is an opportunity for local authorities and the waste management industry to work closely together, finance new initiatives such as municipal recycling facilities and achieve continuous improvement in the collection, treatment and disposal of MSW. The legislation will also lead to a marked change within the waste management industry with take-overs and mergers increasing and more companies diversifying to offer a greater range of sustainable services. Waste prevention, reduction and minimisation would appear synonymous with Best Value. The Best Value methodology, once embedded into working practices will rapidly drive the management of MSW up the hierarchy, away from disposal towards minimisation.

The Landfill Directive seeks to reduce the amount of biodegradable municipal waste going to landfill. Of particular relevance to the composting industry is the kitchen and garden waste fraction of municipal waste because that is the fraction where BPEO is most likely to be composting. The first Landfill Directive target in 2010 requires the UK to have diverted between 4.9 – 7.7 million tonnes per annum of organic material in MSW from landfill. In 1999, the UK composting industry processed around 619,000 tonnes of municipal waste and the composting capacity was estimated to be growing at around 22% per year. In order to implement the Landfill Directive all parts of the UK will need to develop intensive national recycling schemes and expand their incineration capacity. Depending on the definition of MSW used, the recycling rates achieved and the growth rate in MSW between 35 and 170 new energy from waste incinerators will be required in the UK. Large scale composting of MSW followed by landfill could provide one relatively cheap way of complying with the Landfill Directive.

We have moved from a waste management system which was centred on collection and out of sight disposal to one where recycling has now been integrated through joint collections and integrated contracts to be part of the total system, but we need to go further.

There is a need for structural integration where recycling is but one part of an integrated service suited to the local waste streams and conditions, and then for the ultimate in integration when we no longer focus on waste and its management but think in terms of resource management and the optimisation of waste streams as a potential resource, only then will we become sustainable.

To conclude, IWM will (and must) consist of an overall approach to the waste problem, managing waste in an environmentally and economically sustainable fashion, and involving the use of an 'optimum' combination of treatment methods (best determined through LCA). The onus is on local authorities to achieve sustainable waste management (or as best as they can under their local economic, social and environmental conditions), and simply 'bolting-on' waste management options such as composting is unlikely to achieve this goal, as different components of an integrated system are strategically interconnected and must work unison. Simply adding a piece of technology to it will not strengthen it and could act on the contrary (see Figure 8.1).

Figure 8.1 Competing options for the management of municipal solid waste (source: Materials Recycling Weekly)

An integrated system is only as strong as its weakest component and to avoid a compromise of achievement the system may need to be recalibrated to incorporate any changes. We must aim for continuous improvement (as with best practice), and achieve in the long term our final goal of sustainable resource use or Integrated Resource Management (part of the bigger picture – where waste is but one element of the system). The emphasis is now about ‘management’ and not disposal, and ISWM – integrated solid waste management – implies an optimisation of the system (both materials and energy), and one of the principles of integrated waste management is to recognise waste as a resource rather than a problem!

8. SUMMARY

This thesis represents a collection of research reports, academic papers and short communications considering developments in sustainable solid waste management in the UK.

The focus centres on driving sustainable waste management through a range of measures and stakeholder action, with a series of case studies discussed from different regions and scales.

It can be concluded that policy implementation is a major problem in facilitating sustainable waste management in UK and that the barriers that exist today will not be magically removed tomorrow. Issues of funding, public participation and resource efficiency, along with clear Government strategic thinking and guidance are all essential requirements that are missing from the solid waste management cauldron at present. Perhaps the new legislative and facilitating issues discussed in this thesis (landfill tax credits, waste minimisation clubs, public education campaigns, Waste Strategy 2000, EU Landfill Directive and Best Value) have helped to alleviate them, because if not we will not shift practices nor achieve greater sustainability. However, it is a little too early to make any definitive conclusions for many of these issues, although suffice to say things are moving in the right direction.

The UK still has a long way to go to achieve the levels of recycling and recovery optimised throughout Continental Europe. Perhaps integrated waste management (contracts and systems) offers an indication of the direction in which we must travel to catch-up.

What can be concluded from all of these inter-woven research strands is that without effective policy implementation voluntary legislation and strategy goals will fail, and unless we can promote change through facilitative measures (landfill tax credits, best value and public education) then a future of direct charging, enforced market development, statutory targets, increased budgets, and greater challenges will loom on the horizon for some time to come.

9. CONCLUDING THOUGHTS

For every tonne of useful products made in the UK, we consume about ten tonnes of other resources - raw materials and energy. Those ten tonnes become a burden on the environment. They go to landfill, or are emitted to the atmosphere or into water. And the way we live means that a high proportion of the useful goods we produce join the waste stream quite quickly too (often in under 6 months). The problems this raises are serious, and they are about the impact our economy, and our behaviour as individuals, has on the environment. Every year, at least 120m tonnes of industrial, commercial, and household waste have to be dealt with. Clearly the objective is to improve the ratio of resource efficiency and thus produce less waste per tonne of raw materials consumed.

All modern activities in society will lead to waste creation at some point. As the waste often is a source of possible pollution, contamination, and depletion of resources, it is important to collect and treat it properly. Waste management is a service providing better health and environment for society's citizens by removing the waste they produce, but in a modern society with large quantities of waste and depletion of land, waste management takes on a more advanced role. It needs to promote less waste accumulation and increased recovery, i.e. material recycling and energy recovery, to sustain resources and the environment.

While at the same time offer treatment and disposal methods that are clean and sustainable in the long run. As waste management becomes more advanced and the internal and external demands for continuous improvements are increasing, it is realised that an integrated waste management approach is needed.

Sustainable waste management needs to be environmentally beneficial, economically optimised and socially acceptable. The Sustainable Development strategy underlies the Waste Strategy 2000 for England and Wales which was produced in May 2000 and acts as an advisory document. This Strategy sets out a vision of sustainable waste management in England and Wales for the next 20 years. For the sustainable management of MSW, the Strategy advises local authorities to base their decisions on the Best Practicable Environment Option (BPEO) within an integrated approach to waste management. The concept of the BPEO means that local environmental, social and economic preferences will be important in any decision, which may result in different BPEOs for the same waste in different areas.

But if we are to deliver sustainable development it is crucial that we begin to tackle our growing mountain of waste. To engineer this step change in the way we think about waste we must all work in partnership (businesses, local authorities, community groups, the government and the public). Persuading people to change their own approach to waste on a person-by-person, business by business, basis is probably the biggest challenge we face.

Around the world, the natural environment is becoming a primary driver of political action and behavioural change, and it is now impossible to deny the power of 'Green-Logic'. The Environment is a classic example of a policy field that infuses all others, where the targets and language are easy to adopt but achieving them is much harder. Radical environmental progress can be achieved by changing one of the universal and most mundane activities; the way we empty our bins!

'Without determined action from everyone', Michael Meacher (Environment Minister) has stated that, 'councils could otherwise be handling a massive 50 million tonnes of household waste a year by 2020. Acting now to cut waste will avoid the need for hundreds of extra new waste facilities in the coming decades. We are simply throwing money away; even at today's recycling rates, for example, recycling aluminium cans saves £21million a year, producing 95% less greenhouse gas emissions than using raw aluminium'.

It is through legislation that the concepts of sustainable waste management are translated into policies and guidance with intended consequences. However, we must be careful not to over-regulate for fear of stifling opportunities and flexibility. What we must do is 'implement and ground the theories surrounding sustainability, so that they can be applied to waste management services.' In terms of legislation and how it is implemented we need to consider the Government's requirements.

Sustainable waste management according to Waste Strategy 2000 is 'using material resources efficiently to cut down on the amount of waste we produce..... where waste is produced dealing with it in a way that actively contributes to the economic social and environmental goals of sustainable development.'

However, the context behind sustainable waste management and the more general environmental field is controlled by issues which unfortunately beyond the scope of any one Government department or solid waste management company including; a dynamic social system, an often unpredictable policy context, and the fact that law is a social construct.

In terms of the policy context there are a number of distinctive stages leading to the final delivery of a policy;

1. system is dynamically conservative
2. disruptive event demands new ideas
3. ideas on margins move to become mainstream
4. media and champions diffuse the ideas
5. ideas become the centre of policy debate
6. ideas are taken up by the 'already powerful'
7. ideas gain legitimacy and have power to change public policy
8. ideas become an integral part of the concept framework
9. ideas appear obvious in retrospect

In terms of sustainable waste management, the origins may lay as far back as the 1970's Oil Crisis. This was the first time that the global community had to face the realisation that economic growth and environmental protection could not co-exist, and that we needed to think more closely about the types of growth required - hence sustainability was spawned. Through increased lobbying, research and action the concept has moved from the margins to the centre (mostly during the 1980s) and by the 1990s sustainability was a foundation stone of every policy theme and law in the country.

Is greater legislation the answer? No, but more effective legislation is an essential part of the tool box. Early policy analysis and tracking would enable the right types of policies to be set and the appropriate support tools to be put in place, whilst more framework legislation (less is more) would enable greater freedom in decision-making and operation. We do work in a 'messy' environment both physically with waste and politically in terms of drivers, and the largest problem we face and one that muddies the water more than most is culture and our inability to change behaviour.

Perhaps of greater significance for the future delivery of sustainable waste management and the attainment of national recycling targets is local community participation in whatever services are on offer, especially kerbside collection programmes.

However, the experiences of the beacon councils has shown that public education and awareness programmes alone are not enough to deliver the necessary changes. Motivating the public, and thus understanding what concerns them is the first stage, whilst feedback to the residents on how their activities are making a difference is the necessary second stage. This undoubtedly shows the importance of accepting social issues as central to the planning and delivery of sustainable waste management services, moving solid waste management away from its traditional home of engineering and public health, towards more applied and integrated disciplines including geography.

There are two important issues in achieving sustainable waste management beyond the operational and technical concerns and they are; [a] getting the agreement of the public to the solutions to the waste management problem and [b] engaging the public in the delivery of the solutions.

Academic calls (including from geographers) for greater public involvement in key waste management decisions came in the early 1990s, but only a few local authorities have heeded this cry. However, there is now a new driver for greater social inclusion - Best Value.

Clearly, in the UK we have failed to adequately involve the public in gaining agreement on the waste management solutions to be employed. This has been either an engineering solution suggested from within or a consultant's grand view delivered from outside. However, in the last decade with the growing emphasis on sustainability and BPEO, there is a greater need to consider the issue of 'society's needs' and all available options in determining the BPEO, and thus effectively linking waste strategy (policy) with site selection (implementation). However, there is also a need to effectively engage the public in the delivery and use of the solutions; an area where historically more attention has been given by the waste management industry and especially local authorities.

However, we have a great deal more to achieve in this field, particularly the question of whether 'we can engage people in recycling (for example) if the same people weren't involved in selecting the specific recycling solution proposed, or if they haven't agreed on the need for recycling as a solution?'

Waste management in the UK remains overly fragmented and this is perhaps the greatest barrier to effective public involvement - the system is just too complicated to understand! Waste management remains compartmentalized with waste Collection Authorities, Waste Disposal Authorities, Waste Planning Authorities and the Environment agency all having fundamental roles to play in strategy development, service provision and facility siting. When you build on top of this overlapping timescales of waste planning the system remain overly conservative and resists change and innovation. Add the technical issues of plant design, waste composition and different approaches and the picture becomes particularly 'muddy' for the general public. This is an issue that must be addressed in this decade as we try to build consensus and gain greater understanding of the need to achieve sustainable waste management with the undoubted increased costs that will come from trying to achieve this.

However, public consultation and consensus building and awareness raising programmes are only part of the solution. The industry needs to be more proactive in educating children about resources, consumption and waste from an early age, and link into the National Curriculum to help deliver these messages.

It would appear that there is a need to move beyond the 'green rhetoric' which has been part of the education arena for the last decade and start to educate children more directly about the implications of resource consumption. At the same time we must move away from the historical over-emphasis on recycling 'at all costs' because under certain conditions recycling may not be the BPEO. There is also an urgent need for better data and understanding on resource consumption and the 'cradle to grave' impacts of materials; and thus make waste more of a social issue!

Health and safety have historically been the major concerns in waste management. However today society demands more than this; waste management must be sustainable linking economic development, social equity and the environment. One direction which can be followed is Integrated Waste Management which links waste collection, sorting, recovery, treatment and ultimate disposal. These schemes need to be flexible in design to accommodate changes in conditions and must adapt to changing circumstances. Integrated Waste Management is all about delivering a balance between the needs of the Environment, the Economy and Society.

- ***Environmentally effective*** - this requires that the overall environmental burdens of managing waste be reduced, both in terms of consumption of resources (including energy) and the production of emissions to air, water and land.
- ***Economically affordable*** - this requires that the costs of waste management systems are acceptable to all sectors of the community served, including householders, commerce, industry, institutions and government.
- ***Socially acceptable*** - this requires that the waste management system meets the needs of the local community, and reflects the values and priorities of that society.

Integrated Waste Management (IWM) takes an overall approach and manages waste in an environmentally effective and economically affordable way, involving the use of a range of different treatment options at a local level, whilst dealing with the entire solid waste stream. To assess the sustainability of IWM we need to identify [a] overall environmental burdens and [b] overall economic cost.

It is time to re-examine the factors and standards involved in solid waste management in the UK. However, there are some conceptual foundation stones upon which we must base our future strategy and service developments.

The first is 'integrated systems' using all appropriate waste treatment options at the required scale to meet both local, regional, national and EU targets. The second requires more in terms of waste prevention and solutions at source. Waste continues to grow throughout the OECD; 10% increase in production from 1990 to 1995 with an annual growth in most major countries of in excess of 2%, whilst in the UK the Environment Agency suggest a figure of 3% per annum.

This suggests that even if we meet the waste 2000 targets for recycling and recovery we as a country will be sending as much waste to landfill as we currently do!

As an indication of where we need to be headed we can look at two of our European counterparts, Sweden and Denmark (note Tables 8.1, 8.2 and 8.3), both of whom are recovering greater volumes of waste materials as a potential raw material for industry;

Tables 8.1 Sweden (source: Institute of Wastes Management)

	1997	1998
waste production	3.2 million tonnes	3.8 million tonnes
recycled	26%	25%
EfW	36%	38%
landfill	30%	27%
biologically treated	8%	9%

Table 8.2 Denmark (source: Institute of Wastes Management)

	1996	2000
waste production	2.8 million tonnes	3.2 million tonnes
recycled / composted	31%	60%
EfW	58%	36%
Landfill	11%	4% (residues only)

Table 8.3 UK (source: Institute of Wastes Management)

	1995	2000
waste production	24 million tonnes	28 million tonnes
recycled / composted	4%	9%
EfW	5%	8%
landfill	91%	83% (residues only)

Achieving sustainability in solid waste management will only occur through, achieving the BPEO, the development of appropriate integrated strategies involving all the stakeholders and educating and informing the public whilst addressing their local needs and wants is not a simple task!

10. IN REVIEW

In an age where sustainable waste management is a fundamental goal, there is a real need for geography. Without maps, scale and regions we will be unable to effectively plan or locate the new facilities (recycling and recovery) required to enable authorities to meet Government targets and the EU landfill directive. Perhaps planning should return to the concept of 'city regions' first mooted by geographers in the early 1960's rather than progressing with the overly complicated system of collection, disposal and unitary authorities we have today?

Without better quality, coverage and availability, the role of waste planners becomes increasingly difficult. How will we know if we have met our targets if we don't know how much waste there is and how many facilities are needed to measure the growing waste stream? More importantly without better data the role of LCA remains under question, and without LCA the determination of BPEO is almost impossible. A well used phrase in information system and most apt for waste management is 'garbage in - garbage out!' If we feed data models poor information then we cannot expect reasonable recommendations at the other end, and so the job of the local politicians and decision-makers remains an impossible one in trying to satisfy the needs of the environment, the economy and society.

As for the targets we have to respond to. Should they not be material specific or on a per capita basis? Would this not drive industry's response more actively? Percentage targets become difficult to manage when the baseline of waste generation continues to change.

There is a clear need for public education, awareness raising and engagement at all stages in waste management decision-making.

However, the future is bright and the future is green. Society is moving towards greater sustainability and the involvement of the public in problem solving will deliver their increased involvement in those solutions, whilst the use of *LCA* will improve the decision-making process and provide comfort to politicians who have to bite the bullet on where to locate an EfW plant and how many new recycling facilities will need to be built. Resource efficiency and sustainable waste management may still be a long way off, but integrated waste management, waste prevention and materials re-use and recycling are the first stages on the path to heightened social responsibility and sustainability. But this will only be delivered when we find a way of 'de-coupling' waste production (consumption) from economic growth!

CHAPTER 9

THE RESEARCH AGENDA

CHAPTER 9 - THE RESEARCH AGENDA

'SUSTAINABLE WASTE MANAGEMENT POLICY AND PRACTICE'

This brief section builds upon the work that has been completed (by the author and colleagues that he has worked with) to date and suggests a number of avenues that would be appropriate for further investigation. At all stages throughout this research the emphasis has been on real world examples and research of value to the waste management sector and these provisos remain the same for the proposed research programmes detailed below. If the research is not of inherent value to the industry then there is little value in securing the funding and progressing the work.

The work presented in this thesis is the culmination of a 4 or 5-year process, and as such a number of diverse and related topics have been covered, some in more depth than others. The research proposed below attempts to build upon the thesis work, address some of the limitations in the work completed to date, and looks to integrate the findings into a more coherent understanding of the sustainable waste management sector in the UK.

Waste management as we speak today is focussed on a number of themes, all of which have been discussed or hinted at in the previous chapters. These include; [1] diversion from landfill; [2] public acceptance and participation of services; [3] barriers to policy implementation; [4] economic barriers and incentives to change; and [5] waste prevention as the ideal prior to management.

To build upon these we need to consider the main foci of activity in the UK today as detailed largely in Chapter 7. These should include; [1] Best Value as a framework for local waste service delivery; [2] business and household waste minimisation programmes; [3] local government decision-making protocols and budgets; [4] international examples of high landfill diversion (Sweden, Germany etc.); and [5] public wants and needs in terms of waste management services. Chapter 7 also highlighted the new policy framework that exists in terms of Best Value and the Government's 'Waste 2000' Recycling Targets. These two issues raise a number of questions that could fuel future research programmes.

In terms of driving sustainable waste management in the UK we need to consider the work in Chapter 7, relating to the degree of diversion required to meet the Landfill Directive. New research into alternative techniques, cost benefit analyses for combinations of alternative and scenario reviews would all prove of immediate value to the waste management sector. Of equal importance would be research into the economics associated with meeting these targets (additional costs) and ways of recovering these costs through direct charging or taxation. For these targets to be met within the specified time frames a great deal of funding will be required, greater co-operation amongst waste management authorities will be essential, and major infrastructure development programmes will need to get underway in the very near future. All of these would prove interesting topics for future research projects, and all of which will require careful monitoring and independent evaluation. Another related issue is that of the landfill tax credit system. Could this prove to be the economic driver required to implement the major shift from disposal economics to material economics? Perhaps the landfill tax credit system could be utilised not only to drive recycling infrastructure, but may also become one of the key funding sources for the development of organic waste management technologies and systems.

This research has provided a range of snap-shots relating to the development of sustainable waste management in the UK since 1995. The work has shown that waste management policy implementation fails across the UK because of inadequate funding, poor public understanding and commitment, and a lack of strategic guidance from Central Government. New policy developments including Best Value, Waste Strategy 2000 and the Landfill Tax credit Scheme are just the beginning of measures intended to overcome these barriers. The Beacon Councils are already proving what can be achieved if the political will, funding and public support for recycling is available and harnessed.

This research has already proved its worth through contributing to a number of Government reviews on sustainable waste management policy and practice.

The work has also been presented in academic journals and at international conferences helping to disseminate some of the 'best and worst' of municipal solid waste management in the UK to a wide international audience.

The work has also sparked a number of spin-off research programmes with collaborating institutes and organisations including; studies on recycling behaviour and motivations for participation; analyses of the success of green angels (business advisors) in encouraging waste prevention in companies; a review of best value implications for waste management authorities; detailed public education campaigns and reviews of promotional literature and authority waste education programmes; and an array of smaller scale projects looking at home composting barriers; household waste prevention techniques; waste compositional studies (see Figure 9.1) and international research on public education (see Figure 9.2) and strategy development.

**Figure 9.1 There is a need for more research into waste composition
(source: Materials Recycling Weekly)**

Figure 9.2 There is also a need to investigate the way people think and act (source: Materials Recycling Weekly)

The future agenda for successful policy implementation in terms of sustainable waste management in the UK will fall on the following;

- *Central government in providing the necessary strategic framework and funding*
- *The 'Are you doing your bit' public education campaign to change people's habits and beliefs*
- *Market development through WRAP to drive recycling programmes*
- *and the continuing shift in emphasis towards sustainability and the acceptance of the environmental agenda by all involved in the decision-making process which will come through the Best Value regime*

Geography as a discipline is in a strong position to develop these research topics. Historically the work of Gandy, Coggins and Petts has helped to shape the current crop of waste academics and researchers, whilst the new crop of researchers including Read, Leach, Tebbat-Adams and Perrin continue to promote the link (see Bibliography).

This is especially evident from the recent conference hosted jointly by the Institute of wastes management and the Royal Geographical Society. I was the convenor for this event and noted the obvious value of the geographical approach to waste management research, offering an inter-disciplinary and applied focus to the often-technical area of work. The theme of the conference was the delivery of sustainable waste management in the UK; the changing legislative framework and the implications for society at large in relation to waste and its generation, treatment and disposal. The principal findings from this conference were noted in the previous Chapter.

The above issues have particular resonance for the UK as we enter the new century, and more importantly as the current Government increases its public commitment to sustainable waste management. We all need to focus more clearly on how the substantial changes implied by the EU Landfill Directive, the New Waste Strategy (2000), the Packaging Directive, the Landfill Tax, greater public concerns and sustainable development will be implemented – and more importantly by whom?

The timing of the meeting was ideal, one year after the publication of the Government's waste strategy for England and Wales 'Waste Strategy 2000' and anticipating the launch of the Government's Guidance Document on Municipal Waste Management Strategies, which was expected to indicate how to deliver sustainability in waste management at the local and regional scales. The guidance note was released in early March, but even timelier was the publication of the House of Commons Environment, Transport and Regions Committee Report on Sustainable Waste Management the week prior to the conference.

This report noted what ‘a depressing inquiry it had been’, with the same old excuses being used for limited progress in delivering sustainable waste management as were evident in 1998 (at the last inquiry).

The inquiry were concerned that ‘*waste and its management remains a low priority for the Government*’ and even though Waste Strategy 2000 sets in train some improvements it remains woefully inadequate of what is required.

One final point of great significance noted in the executive summary of the report was the recommendation that ‘waste prevention should be at the heart of any sustainable waste management strategy, but that it had been largely ignored in Waste 2000.’

The conference suggested a number of ways forward for sustainable waste management in the UK, reflecting the themes of this thesis and the broader research programme;

- *waste must be viewed as a resource - but this will inevitably require some changes in legislation*
- *targets will drive change (especially where they are statutory) but this will cost inevitably it will be the consumer who pays in the long run*
- *public involvement and understanding is essentially delivering ultimately sustainable solutions to the waste management problem - we need to engage them from the earliest stage if we expect them to participate fully in what is proposed*
- *we must avoid over regulating and legislating and should enable freedom of choice to spur innovation and development*
- *we have the tools to improve decision-making through LCA but we must ensure we have enough quality data to feed these models*

I not only support these ideas, but I look forward to designing new research programmes and directing joint research teams with colleagues from consultancy and academia in the coming years.

The discipline of 'waste management' is a fledgling one, but one that has grown beyond recognition in the last 5 years, and one that will undoubtedly continue to grow. The research in this thesis has helped to inform the debate, has answered some questions and has raised many more, some of which have inspired new research projects and studies. The future for academic studies into waste management, whether it be from a psychological, engineering or geographical perspective looks fruitful, and that can only be of benefit for the ever increasing professionalism of the UK waste management sector.

CHAPTER 10

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