



Review

Towards a Zero Waste Strategy for an English Local Authority



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ABSTRACT

Many developed countries are using a challenging Zero Waste concept to change current waste management practices to more sustainable methods of managing waste, including household waste. The concept includes waste prevention; high levels of recycling and recovery of all resources from waste; and behavioural change. This research provides a case study on the development of a Zero Waste Strategy (ZWS) for Charnwood Borough Council (CBC), an English Local Authority (LA), which has an established household waste management system.

This paper describes the steps taken by the authors, together with CBC to devise and implement a ZWS. A series of focus groups were held involving elected members of the LA and members of the community. The aim was to identify the core aspects of environmental, operational and social demands in order to prioritise actions to be included in a draft ZWS. The draft underwent wider public consultation, which highlighted areas for revision, and following revision has been adopted by the LA. The ZWS takes into account local issues, local policies, alongside national strategies and legislation.

Many of the options identified during this research complement each other and if used in combination may see large steps taken towards Zero Waste. This is difficult to achieve without a holistic approach to waste generation, collection, treatment and disposal. Key findings from this research are to switch the focus from recycling to reuse and waste prevention, alongside increasing education and behaviour change programmes for householders. Additionally, the potential value of separately collecting food waste, with a recognised high potential yield, must be explored to ensure meeting targets set in the ZWS and the requirements of the Landfill Directive.

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Contents

1. Introduction.....	65
2. Research context – household waste management in the UK.....	65
3. Defining Zero Waste.....	65
3.1. Zero Waste – the international context.....	66
3.2. Zero Waste – the UK context.....	66
3.2.1. England.....	66
3.2.2. Northern Ireland.....	67
3.2.3. Scotland.....	67
3.2.4. Wales.....	67
3.3. Monitoring household waste and recycling performance.....	67
4. A Zero Waste Strategy for Charnwood Borough Council.....	67
4.1. Context – Household waste management in Charnwood Borough Council, UK.....	69
5. Research methodology.....	69
5.1. Charnwood Borough Council Zero Waste Strategy development process.....	69
5.2. Initial scoping exercise.....	69

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5.3.	Facilitated focus groups	69
5.3.1.	Focus group tasks	69
5.3.2.	Assessing focus group outputs	70
5.4.	Public consultation on draft ZWS	71
6.	Results and analysis	71
6.1.	Focus groups	71
6.1.1.	Questionnaire results	71
6.1.2.	Identified policy instruments for inclusion in Zero Waste Strategy	71
6.1.3.	Rating the level of ambition	72
6.1.4.	Completing structured form – prioritisation of policy options for Zero Waste Strategy	72
7.	Results from public consultation	72
7.1.	Targets set within the Zero Waste Strategy	72
7.2.	Public consultation responses to Zero Waste Strategy questions	72
7.3.	Amendments to the draft Zero Waste Strategy	73
8.	Discussion	73
9.	Conclusion	74
	Acknowledgements	74
	References	74

1. Introduction

The Brundtland Report “Our Common Future” (WCED, 1987) brought the concept of sustainable development into the mainstream of business and political thought. Since then, legislation has been introduced at European and National levels with the aim of improving environmental performance. This includes better waste management practices. On a local level, this has led to strategies and operational practices including the introduction of separate household collections for organic (compostable) waste and recyclable materials. Local Authorities (LAs) have a key role in supporting sustainable development through many of their activities, planning, education and waste management (Wilson and Williams, 2007).

Resource depletion, climate change and rising consumer awareness are providing challenges for more sustainable solutions to waste management and treatment. For many years, the focus in the UK has been on increasing the amount of household waste (HW) that is collected for recycling and reducing landfill disposal (Defra, 2007). Recycling targets, source separated kerbside collections have been implemented and education programmes for householders to encourage recycling have been undertaken (WRAP, 2009). As such, annual amounts of recycled HW increased from 3.2 to 10.7 million tonnes between 2001/2002 and 2011/2012 (Defra, 2012).

Zero Waste is one of the most visionary concepts for addressing waste problems and encompasses many different strategies developed for sustainable management of waste; these include waste reduction, repair, reuse and recycling (Welsh Assembly Govt., 2010).

The aim of this paper is to describe the process undertaken by the authors with CBC to develop a draft Zero Waste Strategy (ZWS) that will integrate alongside an established household waste management system.

2. Research context – household waste management in the UK

Household waste makes up approximately 9% of all waste collected and treated in the UK each year (Defra, 2007). Environmental, social, governmental and fiscal pressures have led to a range of measures being introduced that have impacted on the way HW is collected and treated. These include the introduction of separate kerbside collections for recyclable materials, and organic waste for composting alongside collections of residual waste for treatment

or landfill disposal (LGA, 2013). A well operated HW collection system can have a considerable impact on increasing recycling levels (Barr and Gilg, 2005).

In the best performing areas, approximately 20% of households do not make use of their recycling collection service (Harder and Woodard, 2007). Changing behaviour to more sustainable patterns remains one of the biggest waste management challenges (Price, 2001). This requires raising awareness in waste prevention and reuse and providing information on a wider range of sustainable actions rather than concentrating on recycling. However, funding for such schemes is now under significant threat due to the continued reductions in Local Government spending and impact of these activities is very difficult to monitor (Read et al., 2009). Holistic approaches to material flow, resource use and long term sustainability are required for a truly sustainable Zero Waste City (Zaman and Lehmann, 2011).

3. Defining Zero Waste

A variety of definitions exist for Zero Waste depending on the primary focus. These include ‘Zero Waste to Landfill’ and ‘Zero Waste emissions to land, sea and air’. However, all focus on sustainable waste management and comprehensive use of resources. This, together with sustainable design and management of products and processes brings a move towards a Circular Economy (Ellen MacArthur Foundation, 2010) with a holistic approach to preventing and managing waste. Definitions of Zero Waste taken from a variety of sources, including strategy documents, are outlined in Table 1.

Recent research also recognises that Zero Waste utilises a range of measures aimed at eliminating waste and challenging conventional ways of thinking, to view waste as a resource with value rather than a problem to be dealt with (Curran and Williams, 2012). The concept of Zero Waste goes beyond maximising recycling and focusing on the Waste Hierarchy (Fig. 1) by targeting recovery of all resources, and aiming to reduce the amount of waste collected, whilst reusing and recycling progressively higher proportions and designing and managing production processes to eliminate waste and encourage recovery of all resources to mitigate the impact of waste (Scottish Government, 2010).

In this research ZW is defined as an aspirational end process where all waste that is produced is reused or recycled as a resource without the need for any landfill or energy recovery.

Table 1
Selection of definitions of “Zero Waste”.

Location	Definition	Source
England (Defra)	<p>“Going further than maximising recycling, to stopping things being discarded and moving on to waste prevention”</p> <p>“A simple way of encapsulating the aim to go as far as possible in reducing the environmental impact of waste.</p> <p>“Material resources are reused, recycled or recovered wherever possible and only disposed of as the option of last resort”.</p>	<p>Waste Strategy for England, 2007 (Defra, 2007)</p> <p>Defra’s guidance for Zero Waste Places (Defra, 2008)</p> <p>Waste Management Plan for England (Defra, 2013)</p>
Scotland – The Scottish Government	<p>“A means of eliminating the unnecessary use of raw materials; sustainable design; resource efficiency and waste prevention; re-using products where possible; and recovering value from products when they reach the end of their lives either through recycling, composting or energy recovery, in accordance with the waste hierarchy”</p>	<p>Scotland’s Zero Waste Plan (Scottish Government, 2009)</p>
Wales – Welsh Assembly Government	<p>“An aspirational end point where all waste that is produced is reused or recycled as a resource without the need for any landfill or energy recovery”</p>	<p>The Welsh Government’s waste strategy document “Towards Zero Waste defines Zero Waste as: (Welsh Assembly Govt., 2010)</p>
Charnwood Borough Council	<p>“Zero Waste means treating waste in a way that has least impact on the environment, challenging the long held practice of disposal of materials. This is far more than increasing the amount of recycling we do; the focus lies on waste prevention, thus reducing the amount of waste requiring treatment and treating the waste we do manage as a resource”</p>	<p>Zero Waste Strategy for Charnwood Borough (2012–2024) (Charnwood Borough Council, 2012a)</p>

3.1. Zero Waste – the international context

Zero waste has developed from a concept started by the Lean Movement in the automotive industry, where there was a refusal to accept the inevitability of waste (Womack and Jones, 2003). Many of the world’s major cities such as Adelaide, San Francisco and Stockholm are now working towards Zero Waste and “Zero Waste commitments” have been introduced in many countries. These include USA (California), Canada (Nova Scotia), Australia, New Zealand, Lebanon, Taiwan and China (Greyson, 2007).

In 2005 Victoria, Australia approved a strategy to move towards Zero Waste, with the aim of annual reductions in waste generation and an overall recycling target to recycle 75% of waste collected by 2010. However, the draft Victorian Waste and Resource Recovery Policy, 2012 (Victoria Government, 2012) recognised that these targets had not been met through a variety of factors including increasing population, additional waste generation and a plateau in recycling recovery rates. A Zero Waste approach is challenging because it requires a holistic method encouraging designers, manufacturers, retailers and householders to take a variety of actions, from sustainable design and production methods to reuse and recycling of discarded items (Clay et al., 2007).

Matete and Trois (2008) researched the impact of Zero Waste strategies and behaviour change campaigns on HW generation, concluding the success of such schemes is dependent on the

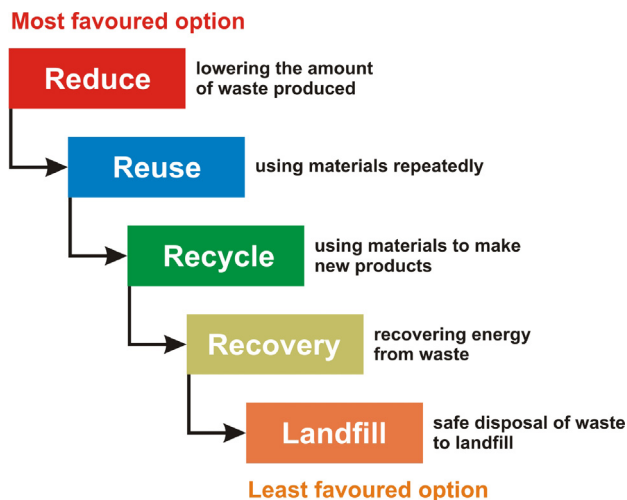


Fig. 1. The Waste Hierarchy (EU Waste Framework Directive, 2008).

participation rate of households, with “the drive towards Zero Waste requiring a positive attitude towards waste minimisation and recycling among residents”. Behavioural change can be improved by designing educational campaigns to reinforce positive attitudes among householders, taking into account demographic information, for example income levels, educational background and the nature of the waste stream.

Numerous waste legislative and fiscal measures around the world, such as charges for waste collection and kerbside recycling collection services, have been introduced to successfully support HW recycling (Cole et al., 2011). The Landfill Allowance Trading Scheme (LATS) resulted in waste reduction and an increase in recycling performance among UK LAs (Calaf-Forn et al., 2014) and the introduction of Landfill Tax in the UK encouraged an improvement in environmental performance (Mirata, 2004). Although, this may be as a driver for reducing costs rather than serving society (Lin et al., 2009). Greyson (2007) concluded it is ironic that the world’s efforts to reduce its problems may block a preventive approach. He concluded that Zero Waste, sustainability and continued economic growth may not be achievable as they are currently practiced. However, policy is a dynamic process rather than a static object (Wenteng and Boons, 2014) and development over time will address this issue.

3.2. Zero Waste – the UK context

The devolved Governments of Wales, Scotland and Northern Ireland have taken far more ambitious strategic views on HW management and treatment than England. The devolved Governments have set higher progressively increasing targets for recycling than those for England, or for the UK as a whole. Table 2 summarises the targets currently set out by the various UK Governments from 2010 to 2025. England is aiming for a target of recycling 50% of household waste collected by 2020 and Scotland and Wales are aiming for a target of 70% by 2025.

Movements towards a comprehensive ZWS including thorough plans for improving resource efficiency are likewise being led by the devolved Governments. Each of which, have published strategies that target Zero Waste and improved resource management. These differing approaches are discussed in the section below and summarised in Table 3.

3.2.1. England

Following the review of waste policy in England in 2011 (Defra, 2011), the UK set commitments to move towards a Zero Waste

Table 2

Recycling targets set by the individual UK governments (Waste Strategy for England (2007); Scotland, Zero Waste Plan (2010); Wales, Towards Zero Waste (2010); Northern Ireland, Towards Resource Management: The Northern Ireland Waste Management Strategy 2006–2020 (2006).

	Initial recycling target (as a % of household waste collected)	Further targets			
England	40% by 2010 achieved 41%	45% by 2015	50% by 2020	Later targets not specified.	
Scotland	40% by 2010 achieved 38%	50% by 2013	60% by 2020	70% by 2025	Later targets not specified
Wales	40% by 2010 achieved 44%	52% by 2013	58% by 2016	64% by 2020	70% by 2025
Northern Ireland	35% by 2010 achieved 37%	40% by 2015	45% by 2020	Exploring increasing 2020 target to 60%	Later targets not specified

Economy, by prioritising the management of waste in line with the Waste Hierarchy and reducing the carbon impact of waste (Defra, 2013). However, no statutory obligation was placed on LAs to develop a ZWS. Therefore, any actions towards reaching this ambitious goal are open to LAs to interpret and perform within a local context. Additionally, a Zero Waste Places (Defra, 2008) initiative to encourage sustainable waste management launched in the Waste Strategy for England, 2007 (Defra, 2007), was withdrawn in 2010 due to the economic downturn. This has led to the 2011 Waste Review, being seen as “unambitious” and “a lost opportunity to mirror the delivery of Zero Waste by the devolved Governments” (Hassall, 2013).

3.2.2. Northern Ireland

The Northern Ireland Waste Strategy uses many of the concepts of Zero Waste, resource management, waste prevention, recycling and sustainable treatment methods. There are also progressively increasing targets for the lifetime of the strategy which runs from 2006 to 2020 (DoENI, 2006). In 2013 a consultation process was launched to seek opinion on a Recycling Bill that would include targets of 60% recycling by 2020, and whether this should be one target or a “stepped approach” (DoENI, 2013)

3.2.3. Scotland

The Scottish Government has implemented a far more ambitious programme for sustainability in waste and resource management. The Scotland, Zero Waste Plan (Scottish Government, 2010) is backed with the provision of funding of £154 million between 2008 and 2011 at both National and Local levels. Zero Waste Scotland is the delivery body for and is supporting LAs in Scotland (Gulland, 2011). The introduction of *The Waste (Scotland) Regulations, 2012* demonstrate a wide range of strategies for resource management rather than waste treatment.

3.2.4. Wales

The Welsh Government outlines plans for a sustainable future with waste treated as a resource. The Welsh Strategy “Towards Zero Waste” is a long term plan, which includes targets to recycle high levels of household waste (70% by 2025). Welsh environmental legislation, waste strategy, and comprehensive series of sector plans recognise actions that need to be taken for Wales to work towards becoming a sustainable nation. This challenges the way waste is handled, transported and treated in Wales with the overall aim to reach Zero Waste by 2050.

3.3. Monitoring household waste and recycling performance

A reporting tool (WasteDataFlow) exists for UK LAs to report to Central Government quantities of HW and recycling collected and the treatment and disposal methods used. This can be used

for benchmarking and tracking progress. However, using solely the recycling rate (a measure of the proportion of waste that is recycled) does not take into account waste prevention and avoidance activities (Read et al., 2009). Successful performance from an LA perspective would include a continuing decline in the overall weight of waste collected, with recycling rates increasing year on year. In addition, there is the challenge of resource management that encompasses design, repair, reuse and disposal of manufactured goods and educating towards good purchasing decisions.

Gentil et al. (2011) found waste prevention is more beneficial when landfilling is the dominant waste management technology. The prevention of food waste (in particular meat waste) showed the highest benefits, whilst noting the importance of recycling and energy recovery. They concluded, despite the difficulties in implementation and monitoring, waste prevention has a significant role to play and should be promoted as a very strong policy driver. Wilson et al. (2012) recommended an approach building on existing recycling rates, whilst also using measures to control waste growth. Emphasising that every tonne of waste reduced, reused or recycled is a tonne of waste that the LA does not have to pay collection and disposal costs on.

The key to moving towards achieving a Zero Waste society could be represented by a shift of public opinion. With households, this will include: rejecting junk mail; reusing food leftovers; home composting; donating electrical goods to charities, buying second hand clothes; avoiding single-use bags; and extending the service life of products (by not replacing a product unnecessarily) or purchasing products that generate less packaging (Bartl, 2011). The diversity of these actions makes the development of a social norm and monitoring more challenging. Zaman and Lehmann (2013) suggest a Zero Waste Index (ZWI) to measure holistically a city’s performance and move towards Zero Waste. ZWI provides a measure of “virgin material offset by recovery of resources” using data showing commonly recycled materials from household waste and would give an indication of waste avoidance.

New approaches to campaigns promoting pro-environmental behaviour are needed, as is an understanding that campaigns need to have a wider focus than just covering waste management issues (Phillips et al., 2011). It is, however, recognised that the shift towards Zero Waste is difficult without a clearly defined action plan and implementation schedule that fully explores the value of food waste, e-waste and other waste streams (Curran and Williams, 2012).

4. A Zero Waste Strategy for Charnwood Borough Council

The case study was CBC, an English Waste Collection Authority undertaking the development of a ZWS. The ZWS is seen by CBC as a long term plan to improve the environmental performance of the LAs waste management activities, setting specific objectives and

Table 3
Comparing UK waste strategies.

	England	Wales	Scotland	Northern Ireland
Waste strategy	Waste policy review in 2011	Towards Zero Waste – Overarching long term plan for resource efficiency and sustainable waste management – implementation via 6 sector plans (Welsh Assembly Govt., 2010).	Scotland's Zero waste Plan (Scottish Govt, 2010) delivering a long term overarching plan for resource efficiency and sustainable waste management – implementation via requirements of Waste (Scotland) Regulations, 2011	Waste Strategy is under review but there is appears to be a move from “resource management” to “resource efficiency” (DoENI, 2013)
Key targets	50% by 2020 – as per EU Waste Framework Directive	Recycling, preparation for reuse or composting of LA municipal waste – 52% by 2012–2013 (achieved) 58% by 2014–2015, 64% by 2019–2020, 70% by 2024–2025 90% reuse/recycling of C&D waste by 2025. Maximum 30% residual waste by 2025.	Recycling, preparation for reuse or composting of LA household waste 50% by 2013 60% by 2020 70% by 2025	Currently as Waste Framework Directive requirements, but new Recycling Bill set to be introduced 2014 with mandatory 60% target for LA municipal waste by 2020. Draft bill appears to follow Welsh model with staggered targets and possible penalties for failure to achieve targets
Waste Prevention Programme	Consultation completed – results due autumn 2013	In consultation – Proposed targets – Waste reduction by 1.2% per year to 2050 (based on 2006/7 levels) Aim to achieve 27% reduction in waste by 2025 “Zero Waste” by 2050) either prevented, reused, recycled/composted. Action focused on food, paper, clothing, consumer goods, plastic (packaging). Key objective to break link between economic growth and waste generation i.e. making best use of resources from efficient processes and product design (designed for disassembly, and reuse or recycling). Recycling processes to be closed loop or “up-cycling”. Where possible recyclates to be used in Wales.	Scottish Government consulted on “Safeguarding Scotland's Resources – a programme for the efficient use of resources” in Oct 2012. Key aspect was development of a dedicated Business Resource Efficiency Service 0 Resource Efficient Scotland was launched in April 2013 www.resourceefficientscotland.com/	Consultation in progress
How?	Market driven by Landfill Tax escalator – Government will only intervene where there are clear market failures	Mandatory recycling and recovery targets and potential fines of £200/tonne if target not achieved. Proposed 4Es model of behaviour change for Waste Prevention campaigns: engaging, enabling, encouraging, exemplifying	The Waste Scotland Regulations 2012. Phased approach adopted to rolling out key measures in the regulations including: Businesses to present metal, glass, plastic, paper/card for separate collection from January 2014 Food businesses producing over 50 kg of food waste/week to present food waste for separate collection from January 2014 (producing over 5 kg/week from January 2016) Ban on key separately collected recyclables being incinerated or landfilled from January 2014 (plastic, card/paper, glass, metal, food waste) Ban on BMW to landfill from January 2021	Recycling Bill may follow Welsh model
Economic benefits	Benefits recognised, but leaving market to develop	Key aim of Zero Waste plan is to design out waste, develop technologies to deal with the waste that is produced as sustainably as possible and to manage waste within Wales where possible, in doing so, waste will be reduced (saving money, jobs and markets will be created within Wales. New technologies being tested – e.g. nappy recycling trial.	Key aim of the Zero Waste strategy plan is to talk about resources rather than waste. To reduce resource use via smart product and packaging design, deal with waste that is produced as sustainably as possible and get as much economic value from waste as possible New technologies being tested – nappy recycling trials with 4 Scottish councils	The proposed move towards “resource Efficiency” will have similar aims to Scotland and Wales: saving money through waste prevention, trying to maximise value of waste and to deal with waste as locally as possible. Consultations on Recyclate quality, MRF Code of Practice due soon

targets for improvement. There is no statutory obligation on the LA to produce a ZWS. This research offers commentary on the innovative approach that the English LA has taken, given the freedom of less prescriptive legislation than the devolved UK Governments of Scotland and Wales. It is recognised that the success of the Zero Waste management scheme relies upon the local context, with extent of community motivation for involvement in waste management, waste reduction and recycling activities being major factors (Colon and Fawcett, 2006).

4.1. Context – Household waste management in Charnwood Borough Council, UK

CBC collects household waste and recycling from 67,000 properties in Charnwood Borough. A fortnightly kerbside commingled recycling collection operates in the borough. This service collects glass, plastic, metal, paper, cardboard and textiles for recycling, alongside fortnightly collections of garden waste and residual waste (Cole et al., 2012). Currently 49% of household waste collected in the Borough is recycled. The household waste and recycling service is operated under contract by an external waste management contractor. The contract allows changes to be made to operational procedures of the household waste collection service to align with CBC policies which seek to minimise the need for landfill disposal for any of the household waste collected (Cole et al., 2013).

5. Research methodology

CBC views the development of the ZWS as a “significant undertaking” (Charnwood Borough Council, 2012b). This vision may influence the work of the Borough for a period up to 12 years. For this reason a thorough and robust methodological process, outlined in Fig. 2, was devised and adopted for this research. The research was carried out by the authors working with the LA to procedures set out in CBC’s Constitution which outlines the process for decision making, consultation, overview and scrutiny (Charnwood Borough Council, 2008),

5.1. Charnwood Borough Council Zero Waste Strategy development process

The development process for the ZWS consisted of an initial “brainstorming” session with five CBC waste management officers and the authors. During which two facilitated focus groups were planned, one with 16 members of the community, and the second with a group of eight LA elected members.

The intention was to explore with the focus groups a range of actions; operational practices; policy and charging procedures; and performance targets to include in the ZWS.

Using the output of these discussions, a draft ZWS was written to provide a framework for CBC to follow and implement. Subsequently, the draft CBC ZWS underwent a wider public consultation exercise. This was to identify areas requiring amendment, and capture feedback from a larger sample group than the initial focus groups. Responses from this consultation were reported to CBC and amendments made to the ZWS prior to its adoption.

5.2. Initial scoping exercise

The initial stage of the Strategy development involved a group of five Waste Managers from CBC carrying out a scoping exercise to identify themes and structure to be covered by the ZWS and identify any barriers to the process. This was to establish the aims of the ZWS and the timescale for the development process with the

authors, whilst also ensuring it was in line with the LA’s established procedures.

The initial scoping exercise identified themes for the research and development of the ZWS, these include:

- Climate change mitigation.
- Customer satisfaction.
- Impact on LA targets.
- Economic factors.
- Resource efficiency.

Barriers to the development and implementation of a ZWS, were acknowledged, these are:

- Varying commitment of senior management and politicians.
- Absence of training programmes to explain the concept of Zero Waste.
- Embedding Zero Waste in all CBC activities rather than just referring to household waste collections.

Identifying these barriers early in the process enabled these to be challenged during the Strategy development stages. In addition to this, some areas of concern that a ZWS could have an impact upon were identified.

5.3. Facilitated focus groups

Following established LA procedure, which requires the use of focus groups following set rules on membership and terms of reference, two facilitated focus groups were formed. This was to ensure the ZWS received input from both members of the community and political support from elected members within CBC. The focus groups were to assist in the development of a ZWS, to identify and prioritise environmental, operational and social demands available to CBC. The focus groups used a mix of quantitative and qualitative research.

A specialist market research company was used to recruit local residents for the first focus group to ensure a demographic selection reflecting the diversity of the Borough. This included getting a wide selection of age ranges, participants with different gender, ethnic backgrounds and from varying locations within the CBC area. The first focus group was attended by 16 members of the community. The participants of the second focus group comprised eight elected members. This was structured in such a way to include representation from each party in the same proportions that reflected the political makeup of CBC.

Many of the participants in both focus groups had an interest in sustainability, not necessarily waste management and the degree of awareness about the issues involved varied widely. The focus group findings were used to inform actions and targets included in the ZWS and supporting policies.

5.3.1. Focus group tasks

The focus group participants were set a series of four tasks, these were as follows:

1. Completion of a questionnaire comprising the following questions:
 - What is CBC’s current recycling target?
 - What is the recycling target for the UK (as a whole)?
 - What are the individual recycling targets for England, Scotland, Wales and Northern Ireland?
 - What percentage of household waste does CBC recycle and compost?

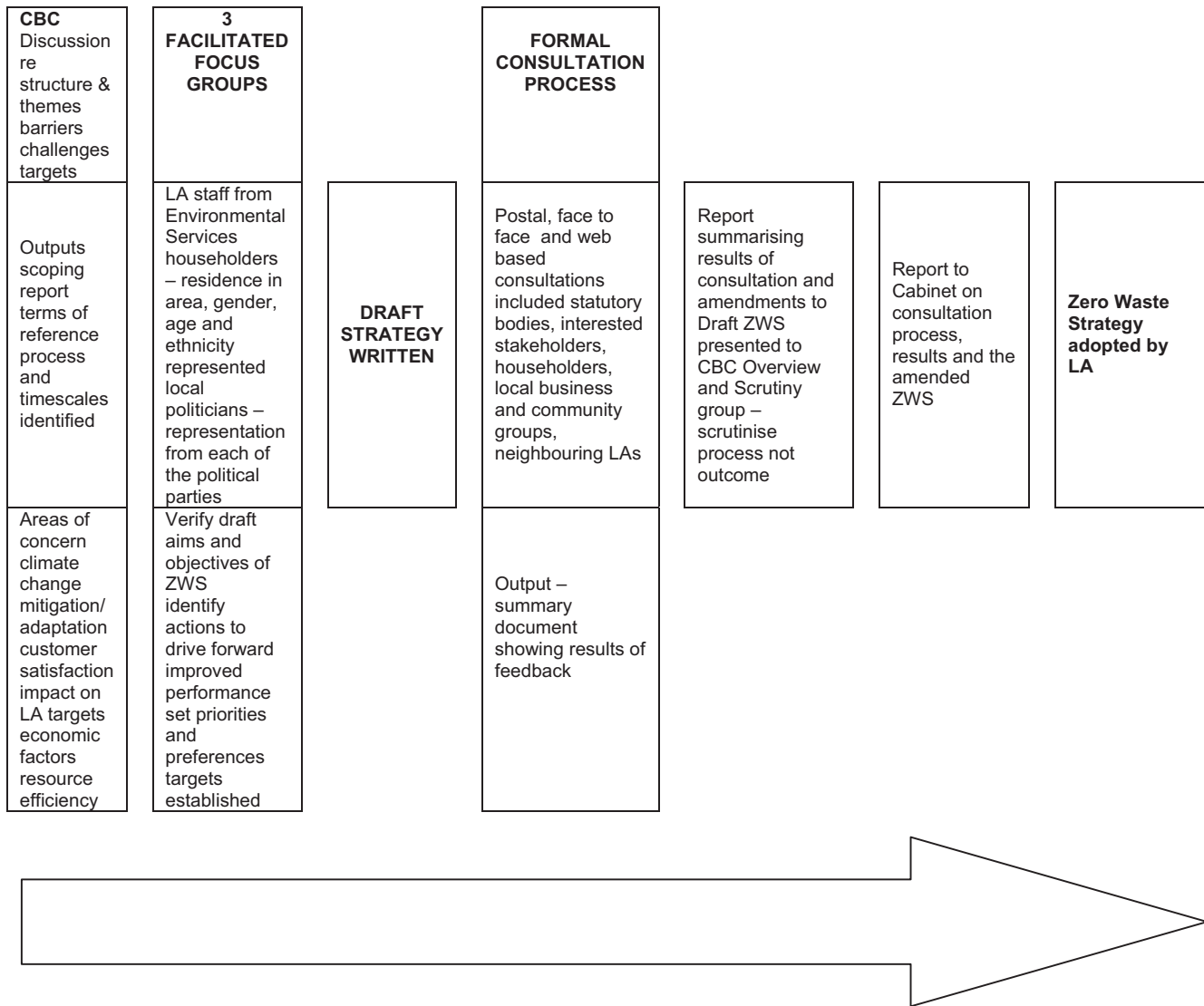


Fig. 2. Process for development of Zero Waste Strategy for Charnwood Borough Council.

2. Discussion to identify possible policy options to include in the ZWS.
3. Participants were asked to rate the level of ambition CBC as ambitious, moderate or to remain at today's levels in the following three areas:
 - The recycling rate (as a percentage of household waste collected).
 - The amount of waste sent for landfill disposal.
 - The cost of the waste and recycling collection service.
4. Completion of a structured form by scoring the identified options available to the CBC against a series of issues that they may influence to varying degrees. A scoring matrix, Fig. 3, was developed to allow focus group participants to score each of the identified options available to CBC against the issues listed above. Participants were asked to complete this task individually, giving each of the options a score between 1 (low impact) and 5 (high impact) depending on the perceived scale of impact of each option on the issues listed. For instance, if they thought that removing the charge currently in operation for the garden waste collection service would have a high impact on customer satisfaction then they would score this 5, if this would have a low impact on CBC's recycling rate they would score it 1.

5.3.2. Assessing focus group outputs

Each individual focus group member completed one of the scoring sheets (Fig. 3), marking each option for its potential to impact on the listed areas of concern/"benefits". With each column receiving equal weighting a total score was calculated for each option on each participants scoring sheet. The scores from each individual were then combined to produce an overall score for each option and from this a ranked order produced showing a measure of importance placed on each option by the focus group.

An overall average ranking across both groups, those of elected members and members of the community, can be produced by using the following equation:

$$\text{Overall ranking score} = W_e S_e + W_c S_c \quad (1)$$

where S_e is the score given by elected members; S_c is the score given by members of the community; W_e is the weighting factor for elected members and W_c is the weighting factor for members of the community.

In which

$$W_e + W_c = 1.0.$$

Appraisal of Waste Management Options Consultation workshop		Benefits				
		Total (Rank)	Climate mitigation	Customer satisfaction	Impact on targets	Economic factors
Options	Garden waste charging policy (remove charge)					
	Bulky waste charging policy (introduce charge)					
	Residual waste (additional capacity) charging policy (introduction of charge)					
	Behavioural change					
	Food waste					
	Rearrange of recycle					
	Influencing treatment options					
	Street cleansing waste					
	Home composting/ food digestion					
	Restrict landfill bin capacity					

Fig. 3. Focus group appraisal scoring sheet.

A subsequent overall ranking score was produced for each policy option, with the lowest score becoming the highest priority action. These were then placed into order of priority in an overall listing.

5.4. Public consultation on draft ZWS

The findings from the focus groups were used to shape the structure and content of the ZWS and build on areas identified at the earlier scoping exercise. A draft ZWS for CBC was compiled; this was subject of further public consultation to establish opinions on its content, targets and actions. A six week public consultation on the draft CBC ZWS took place during October and November 2012.

The consultation took the form of a questionnaire. The authors used a questionnaire following the standard format used by CBC for public consultation. This contained 10 questions. Two questions were related to the age and location of the respondent, seven questions were multiple choice directly related to the content of the ZWS and associated targets, and a further question offered the opportunity to provide free-text comments giving opinions on the current waste and recycling operations of CBC, or related subjects.

The consultation was promoted through a series of public meetings, leaflets, posters, text alerts and the LAs Twitter account and a dedicated webpage on CBC website, which contained the draft strategy, information and a link to the questions. A paper copy was posted to a variety of stakeholders, Government organisations, other LAs, local businesses, professional partners and community groups.

6. Results and analysis

6.1. Focus groups

The results from the activities undertaken in the focus group are presented in this section. These have been combined for analysis to provide a guideline for the structure and content for the draft ZWS.

Results from both focus groups were combined to produce a draft strategy whose structure and content reflected opinions of both groups.

6.1.1. Questionnaire results

The questions set aimed to test the level of understanding on the recycling performance of CBC, the UK as a whole and the

individual nations within the UK and to judge their perceptions of CBC's current performance relative to other regions.

Results showed 85% of participants demonstrated some accuracy about local and UK recycling performance, with 80% of participants also accurately stating CBC's current recycling target. There was wide range of answers about the recycling performance in Scotland, Wales and Northern Ireland, with 30% of participants correctly stating these. However, views were subjective, based on each participant's prior level of knowledge.

6.1.2. Identified policy instruments for inclusion in Zero Waste Strategy

The focus group discussions to suggest possible policy options for inclusion in the ZWS agreed two ways for CBC to move towards Zero Waste: "recycle and reuse" and "reduce waste produced in households". Within these two categories, a list of policy instruments available to the CBC have been identified, these are:

1. Increase the range of recycle by collecting materials present in residual waste stream that are not currently recycled. This involves evaluating the cost of segregation, collection and transport. Possibilities exist for increasing recycling of textiles, bulky waste, food waste and WEEE (electrical and electronic items), which have recycling potential high enough to justify the additional resources involved in segregating them from residual waste.
2. Encourage behavioural change by identifying and encouraging non-recycling householders to participate in kerbside recycling schemes that collect common household waste materials.
3. Educate householders on the benefits of using home composting equipment or other treatment methods suitable for home processing of garden and food waste.
4. Restrict HW landfill bin capacity, by decreasing the size of containers provided to households.
5. Seek more sustainable treatment methods for a range of materials present in HW. Working with partners, such as neighbouring LAs and Leicestershire County Council, to make use of alternate treatment processes that have environmental benefits.
6. Introduce a separate food waste collection for anaerobic digestion or composting, and therefore divert this waste from landfill disposal.
7. Remove the current garden waste charge as it is perceived to be a barrier to the use of this service. Removing the charge and

providing a free collection service may encourage more householders to use the service, which will in turn result in removing some organic garden waste from landfill disposal.

8. Introduce a charge for excess of residual waste. Provide householders with the ability to have any amount of residual waste removed from their premises by CBC, provided they pay for the service beyond an agreed reasonable amount.
9. Charge for the removal of bulky waste stream to discourage the use of the current CBC free bulky waste collection service, to encourage householders to find alternative ways for reuse and recycling (e.g. second hand sales, charity shops, furniture recyclers, etc.) (Cole et al., 2013).

6.1.3. Rating the level of ambition

The level of ambition that CBC should aim for in the three key areas is shown in Fig. 4. This is shown as a percentage of total attendants at both of the focus group sessions.

These results show a clear level of ambition amongst participants for the LA to strive for higher recycling rates and reduce the level of waste sent for landfill disposal. Whilst continuing to reduce the costs of the services should remain a priority, it does show some willingness to invest in a service that delivers an improved recycling performance and reduction in waste to landfill.

6.1.4. Completing structured form – prioritisation of policy options for Zero Waste Strategy

Participants looked at the various policy options available to CBC (listed in Section 6.1.2) and then considered how adopting any of these would impact on waste management across a series of factors identified in the project scoping.

Rankings for each option from both the member's and the local residents' focus group are presented in Table 4, together with an aggregated score from both groups (by assuming $W_e = W_c = 0.5$). The table shows the policies ranked order of priority, with highest priority in position 1.

The results show the two focus groups had different priorities. Increasing the range of recyclates was top priority for the elected members and second priority for the members of the community, making it the highest priority for the aggregated rankings. The members of the community saw behavioural change as their top priority; this was sixth in the priorities listed by elected members, but became second priority in the aggregated rankings.

Policies that involved introducing a charge for services were not popular with either focus group. Introducing a charge for bulky waste collections ranked tenth by the elected members and ninth by the members of the community. Implementing a charge for the collection of residual waste above a predetermined quantity was also unpopular. Elected members placed this in eighth position and members of the community gave this the lowest priority of all options.

The introduction of a separate collection service for food waste received mixed support, this was not seen as a priority by either focus group. It was ranked fifth by members of the community, but deemed as a very low priority (ranked ninth) by elected members.

In the overall rankings (Table 4) the low cost options (increase the number of recyclable materials collected, behavioural change, encourage home composting and restrict the size of landfill bins supplied to households) occupied the highest ranked placings. The policies regarding the collection of organic waste, garden waste, food waste and street sweepings were seen as neither high nor low priority and occupied the mid ranking places. Finally, and as mentioned previously, the policies that addressed charging for services were unpopular.

Table 4
Policy instruments prioritised by focus group participants.

Policy instruments	Ranking		
	Elected members ^a	Members of the community ^a	Aggregated score (Eq. (1))
Increase the range of recyclates collected separately	1	2	1.5
Encourage/subsidise home composting	2	6	4
Restrict the size of the landfill bin issued to households	3	4	3.5
Sustainable treatment/disposal of street cleansing waste	4	8	6
Garden waste charging policy	5	7	6
Behavioural change	6	1	3.5
Influencing treatment options	7	3	5
Residual waste (additional capacity) charging policy (introduction of charge)	8	10	9
Introduce a separate food waste collection	9	5	7
Bulky waste charging policy (introduce a charge)	10	9	9.5

^a 1: highest priority. 10: lowest priority.

7. Results from public consultation

The consultation received 411 responses. It is difficult to quantify a response rate because the questionnaire was available online through CBC's website with open access in addition to the questionnaires that were posted and completed by respondents visiting roadshows and other events. The number of replies was in line with other consultation exercises carried out by CBC, such as the public consultation on the Core Strategy Consultation in 2012 (Charnwood Borough Council, 2012c).

7.1. Targets set within the Zero Waste Strategy

Looking specifically at the targets included in the draft ZWS there was a broad agreement with the targets set, as reported below:

- Over 88% agree with a recycling target (62% of waste collected within the Borough by 2024).
- Over 81% agree that households should aim to dispose of less than 335 kg of waste per household per year by 2024.
- Over 72% agree that the cost of the waste collection service should be in the lowest 25% of CBC, with some support for increased service costs if required to meet the other two targets.

7.2. Public consultation responses to Zero Waste Strategy questions

Results of the consultation exercise included comments on ZWS and CBC actions to implement it, of which 151 responses

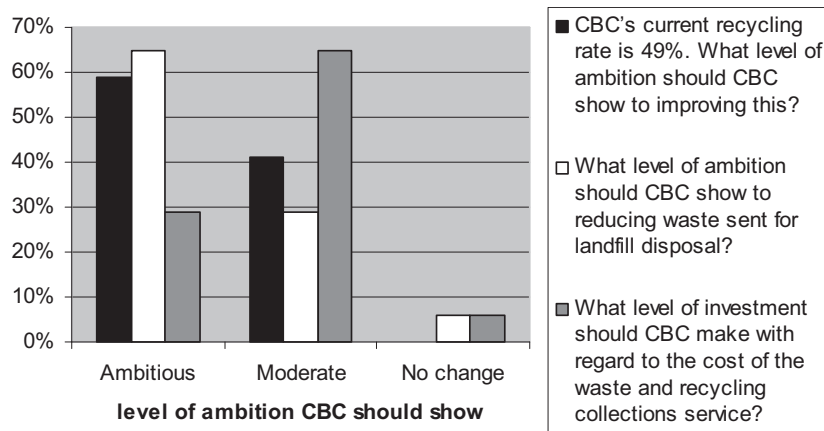


Fig. 4. Focus group participants views on the level of ambition CBC should target.

included qualitative comments. The most frequently recurring topics were associated with addressing the levels of packaging on consumer items (18%); and increasing education and communication regarding recycling (12%), with 8% stating that “other people (e.g. neighbours, other householders, etc.) were to blame for low levels of recycling”. Support for the introduction of a dedicated food waste collection service was received from 11% of respondents, with only 1% not supporting this action. The comments have been grouped into topics and are shown in Fig. 5.

- There is widespread support for continuing educational programmes and communication with the public to raise awareness about waste prevention, reuse and recycling.
- CBC should continue to work in partnership with other agencies and stakeholders to influence the parts of the “sustainable waste management cycle” that they do not have control over.
- CBC should explore ways of improving the waste services it offers. However, there is a need to take account of the financial impact of any changes when assessing their viability.

7.3. Amendments to the draft Zero Waste Strategy

The public consultation process showed broad support for the draft ZWS and based on the findings the following recommendations were made:

- The focus on waste prevention and reuse requires strengthening. As such, respective sections in ZWS were amended.
- Targets in the draft ZWS, whilst set above Government baseline levels, were accepted as achievable for CBC.

8. Discussion

This paper has outlined the development of a ZWS for CBC, providing a narrative of the process undertaken. Findings from two focus groups were used to build on the initial results of a scoping group to form a base for the ZWS. Taking into account the limited sample size of the focus groups, a wider public consultation was used to refine the contents of the CBC ZWS. The refinements include increasing the focus on reuse and waste prevention and exploring improvements that can be made to household waste

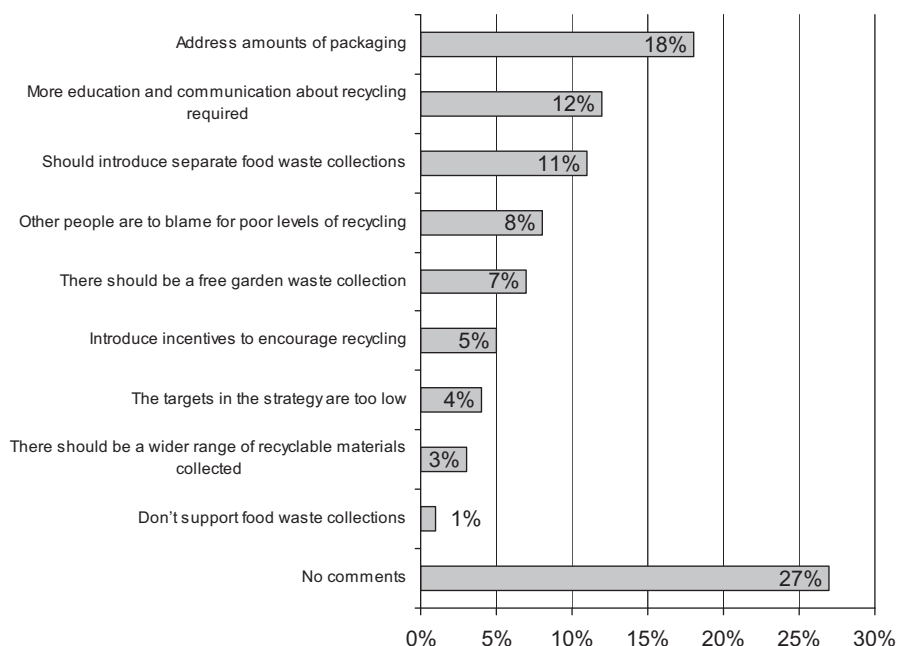


Fig. 5. Respondents' qualitative comments received during public consultation.

collection services within the Borough to recycle, reuse or treat more sustainably various sections of the residual waste stream.

The order of priority of options from the focus groups showed a preference for the lower cost options (increase the number of recyclable materials collected, encourage home composting and restrict the size of landfill bins supplied to households) these policies will be among the first to be implemented. These actions have been found to have some success in reducing quantities of household waste, with the limit on the amount of residual waste forcing householders to reduce and recycle (Uzzel and Rätzzel, 2009).

The policies regarding the collection of organic waste, garden waste, food waste and street sweepings were neither high nor low priority options in the focus groups. However, food waste makes up as much as 30% of residual household waste (Defra, 2008a; Zero Waste Scotland, 2010). Therefore, the treatment of organic waste, particularly food waste, is an important issue that must be included in the ZWS if CBC is to reach set targets and also meet the Landfill Directive requirements of reducing landfill disposal of biodegradable waste. In addition to this, increasing the range of recyclates collected separately was highest ranked priority for the focus groups and the introduction of a separate food waste collection was popular in the wider public consultation. This would suggest the value of investigating all options for recycling waste that is not currently separated for recycling or organic treatment. The value of collecting food waste should be explored particularly as this has a recognised high potential yield, which is not the case with all items contained within the household waste stream. Other areas to explore are separating other items for recycling such as e waste, and making improvements to the existing bulky waste and textile collections (Cole et al., 2013).

Educating householders to change behaviour patterns by providing information and encouraging compliance of those poor or non-recyclers was an area that was important to the community member's focus group and also in the later consultation. It is generally easy to obtain the involvement of the environmentally aware, but the interest of other sections of the public is more challenging (Harder and Woodard, 2007). Public education, or structured and frequently repeated social marketing of desired behaviour to the users of systems is essential (Scheinberg, 2010); whilst changing behaviour remains one of the biggest challenges when making changes to waste collection services (Price, 2001).

Options that involved introducing or increasing a charge, such as for additional waste to be collected or for the collection of bulky waste items, were unpopular; this may serve as an incentive to reduce waste production to avoid the cost of collection (CIWM, 2007).

This research focuses on the actions of an English LA taking an innovative approach to adopt a ZWS. Comparing waste management approaches taken in England with those in Scotland and Wales raises the issue of increased targets, national policy and legislation in the devolved countries against the freedom LAs have in England. With less legislation and lower targets in England, LAs are free to take innovative approaches or alternatively to do the bare minimum at times of financial pressure.

9. Conclusion

The results from this research give a clear indication of actions that can be taken by CBC to devise and implement a ZWS. The continued use of policies, which influence the development of sustainable waste management systems, provide education and raise awareness of environmental issues, and promote positive behavioural changes, will move towards achieving the key principles of Zero Waste. Examining the Lean Movement, possibly the foundation for Zero Waste, Pool et al. (2011) found

improvements are conditional on adequate organisational arrangements with respect to change management, particularly communications and involvement. This is an area for further research, in particular examining LA strategic successes by monitoring improvements and examining inter-organisational actions.

Many of the options identified during this research complement each other and if used in combination may see large steps taken towards achieving Zero Waste. Zero Waste is difficult to achieve without clear management policies in place and requires long term initiatives. A ZWS should include social and environmental aims alongside WM performance targets and the ability to monitor progress.

To achieve targets set within a ZWS, there is a need to establish a link between all stakeholders to produce a holistic approach to waste management. This would encompass treatment processes chosen to consider the best possible method of resource recovery for different elements of HW streams and deliberate efforts made to reduce waste production. This will require additional efforts, innovation, creative and effective policies, partnership working and support from National Government for LAs to move in the direction of zero waste.

This study illustrates the benefits of LAs and universities working together in partnership based on the principles outlined by Williams (2009). The commentary provided on the development of this ZWS by an English LA could be utilised to aid other Local Authorities, or other world regions to address the issue of Zero Waste. Subject to legislative differences, the findings could be utilised to structure waste management strategies in a variety of international contexts.

Further study is suggested to establish whether the implementation of ZWS is successful and whether ZWS made a difference to the performance of the LA when compared to similar LAs without a ZWS. Additionally, if any innovative practices were introduced as a result of adopting ZWS, the structure and processes of these could be investigated to show any examples of Best Practice.

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