East Sussex County Council and Brighton and Hove City Council

Waste Minimisation Research

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1 Background, Aim and Scope

As part of the development of the Waste and Minerals Development Framework for East Sussex and Brighton and Hove, the Councils have commissioned research to identify waste management capacity requirements to 2026/7 (ERM, 2009). The research has identified shortfalls and Scott Wilson was requested by East Sussex County Council (ESCC) and BHCC to identify waste reduction/minimisation initiatives that have the potential to reduce the need for additional future non-hazardous non-inert landfill capacity.

The scope of this report is limited to consideration of Municipal Solid Waste (MSW) and Commercial and Industrial (C&I) waste streams only, as these are considered likely to be the main contributors to non-hazardous landfill input.

The research is focussed upon the identification of initiatives that could be directly implemented or supported by the authorities, however wider initiatives (such as national level initiatives) that the Councils could potentially support or influence are also considered.

One of the key aims of the Government's Waste Strategy 2007 is to 'decouple waste growth (in all sectors) from economic growth and to put more emphasis on waste prevention and re-use'. Targets have been set to divert both biodegradable municipal waste and non-municipal waste from landfill. Key proposals for action include: incentives, regulatory reform, targeting specific materials, products and sectors, stimulating investment and 'improvement in national, regional and local governance…to deliver better coordinated action and services on the ground'.

The scope of work summarised in this report is limited to desk based review of existing information as described in Section 2. The report is not intended to be a definitive identification and quantification of all potential waste reduction initiatives, but a time limited review of those identified from the indicated sources with an initial assessment of their potential to reduce waste to landfill in order to inform and support development of the Waste and Minerals Development Framework for East Sussex and Brighton and Hove.

2 Research Methodology

The work involved desk-based research and review of information from a number of published sources, these are described below.

The Councils' Draft Information Paper 1 was reviewed in order to understand current local MSW and C&I waste arisings, management, anticipated growth and predicted capacity shortfall.

The following online sources were reviewed in order to identify existing research and data:

- DEFRA Waste Implementation Programme and Waste and Resources Evidence Programme and DEFRA Municipal Waste Management Statistics;
- The Waste and Resources Action Programme (WRAP);
- Envirowise;
- Business Link;

- The Local Government Association (LGA) including the BREW Centre for Local Authorities;
- The Regional Improvement and Efficiency Partnership (RIEP) Network's Waste Improvement Network (WIN);
- LARAC;
- The Environment Agency (EA);
- The Scottish Environmental Protection Agency (SEPA); and,
- The Chartered Institution of Wastes Management (CIWM).

This research was supplemented by a review of the East Sussex and Brighton and Hove Waste and Minerals Core Strategy and Minerals Sites DPD Consultation document (February 2008) and consultation responses, and finally, consultation and discussions with representatives from:

- East Sussex and Brighton and Hove Councils;
- Business Link;
- Envirowise; and,
- The National Industrial Symbiosis Programme (NISP).

3 Summary of Waste Growth Assumptions and Capacity Shortfall Estimates

Estimated MSW and C&I waste arisings and growth forecasts are summarised in Table 1, with the percentage difference between the maximum and minimum estimated waste arisings also given.

Table 1: Estimated MSW and C&I Waste Arising Estimates (Draft Information Paper 1)

Waste Stream	Year	Waste Arisings (Min) / tonnes	Waste Arisings (Max) / tonnes	% difference between min and max
MSW	2011/12	393,000	438,000	10.3%
	2016/17	396,000	473,000	16.3%
	2021/22	398,000	490,000	18.8%
	2026/27	400,000	502,000	20.3%
C&I	2011/12	393,000	415,000	5.3%
	2016/17	409,000	448,000	8.7%
	2021/22	421,000	458,000	8.1%
	2026/27	432,000	458,000	5.7%

Note:
i) The percentage difference indicated is the % of the maximum estimated waste arisings.

The contribution to waste management made by recycling, recovery and landfill will change over the period 2006/7 – 20026-27. The focus of this work however, is landfill capacity and Table 2 summarises forecast non-hazardous landfill requirements. These are taken from Draft Information Paper 1.

Table 2: MSW and C&I Non-hazardous Landfill Capacity Requirements 2009/10 – 2026/27 (tonnes)(Draft Information Paper 1)

Waste Stream	Year	Minimum projected annual landfill capacity requirement / tonnes	Maximum projected annual landfill capacity requirement / tonnes	RPG9 annual landfill capacity requirement / tonnes	Difference between minimum and maximum requirement / tonnes
MSW	2011/12	171,321	190,935	185,736	19,614
	2016/17	109,182	130,440	127,288	21,258
	2021/22	69,248	85,182	86,826	15,934
	2026/27	60,020	75,287	74,850	15,267
C&I	2011/12	127,186	134,025	156,814	6,839
	2016/17	96,233	105,363	123,890	9,130
	2021/22	72,787	79,257	96,833	6,470
	2026/27	67,532	71,724	87,629	4,192

Note:
i) Projected annual waste arisings as set out in Draft Information Paper 1.
ii) Capacity requirements from 2009/10 onwards are effectively the MSW and C&I waste capacity shortfall as zero non-hazardous landfill capacity from 2009/10 onwards.
iii) The figures stated in this table exclude consideration of waste arisings from other sources e.g. exports of MSW and C&I waste from London,.

The minimum MSW waste model accounts for 'household growth, declining MSW/household' and decoupling of economic growth from waste arisings. ERM note that to achieve the waste arisings observed under this scenario, 'East Sussex and Brighton and Hove would need to deliver significant gains in waste minimisation, consistent with the spirit of the WS2007 target'.
This work seeks to identify waste reduction/minimisation initiatives with the potential to reduce the need for additional future non-hazardous landfill capacity. This essentially means the reduction initiatives required to deliver waste growth/capacity requirements closer to minimum rather than maximum growth estimates.

The East Sussex and Brighton & Hove Waste and Minerals Core Strategy and Minerals Sites DPD - February to April 2008 invited consultation on the following three 'options' for waste minimisation:

- 'Option W1a: Set targets for the reduction in waste growth and seek to implement cross-cutting programmes for awareness-raising and encouraging individuals, organisations, and local businesses to take responsibility for reducing the amount of waste they produce';

- 'Option W1b: Base waste growth assumptions on previous trends, taking account an increasing contribution from potential minimisation measures'; and,

- 'Option W1c: Assume that the link between economic growth and waste growth will quickly be broken and waste growth will cease within the life of the Framework'.

The majority of responses to the consultation favoured option W1a with some support for option W1b. A number of respondents commented that option W1c was a dangerous/flawed assumption supported by little evidence (responses provided by East Sussex County Council and BHCC).

Some respondents supporting option W1A commented that targets needed to be measured and potentially enforced.

East Sussex County Council provided comments (Personal Communication, 17.3.09) made by a number of local authorities, regulatory and support bodies as well as local businesses – including those involved in the management of waste through the Options Testing Dialogue (OTD). The dialogue includes comments relating to a number of initiatives that have been implemented locally which were also identified as part of this research, other relevant comments include:

- Noting the limited influence of the planning policy to affect behaviour (especially in dealing with waste arising from existing properties and businesses), however, the issue is complex and subject to a high number of influences beyond planning policy;
- Noting that spatial plans can harness other trends or support the delivery of other strategies/initiatives outside of planning e.g. sustainable community strategy or MWMS;
- Difficulties associated with a lack of sound C&I waste data and the consequent need for further research;
- A need for District/Borough Councils to provide information, or, estimates on the impact of their own waste minimisation policies (Lewes District Council);
- The need to focus on waste minimisation from both construction and demolition and operation of new developments;
- A (possibly temporary) fall in waste arisings in the current economic climate; and,
- An expectation of a slowing in arisings growth rather than a fall – as estimated by ERM (2009).

4 Initiatives Identified

4.1 Municipal Solid Waste (MSW)

Table 3 summarises MSW waste reduction initiatives identified by this research.

It is assumed that most assessments of the potential impact of a specific initiative are based on the assumption that there is little or no pre-existing activity or effort in the identified area. This may not in reality be the case and current initiatives within the East Sussex and Brighton and Hove area have been identified and summarised (Table 4) in order to support consideration of the likely local impact of potential initiatives (Table 5).

Appendix 1 summarises research undertaken by the Waste Improvement Network (WIN) on MSW services provided by the 20 waste collection authorities with the lowest waste arisings per capita 2006/7.

4.2 Commercial and Industrial Waste (C&I)

Table 4 summarises published C&I waste reduction initiatives and relevant existing local initiatives.

Table 5 identifies other waste reduction initiatives and potentially relevant research. These findings are listed separately as either these initiatives have not yet been implemented or their national rather than local nature.

Table 3: Municipal Solid Waste (MSW) Reduction Initiatives Identified (Mainly Household Waste Initiatives)

Initiative	Identified Investment/ Return	Estimated reduction of MSW waste stream feasible	Key Assumptions/Notes	Has such an initiative been implemented locally?	References
Direct weight/volume/bin (tag) based charging	Danish data indicates lower total fees (net benefit)	32% total 55% residual	Danish surveys indicate unchanged consumer behaviour, however, data indicates otherwise	No	European EA (2002)
	No data	16% total 20% residual		No	(Irish) Environmental Protection Agency (2008)
	No data	>50% residual	Espace Environment, Belgium (Note that this figure is stated as resulting from variable charging as well as from home composting and packaging reduction initiatives). Elsewhere in the report a 69% reduction figure is quoted using variable charging and bin size limiting	No	Enviros report for DEFRA (2004)
	No data	5-7% reduction	Figure quoted from US studies	No	Enviros report for DEFRA (2004)
	DEFRA Estimate that schemes would offer a net benefit	13-39% residual	Some studies indicate increased waste to CA/HWRC sites and in the short term, increased fly tipping/other illegal disposal	No	DEFRA (2007, 2008)
	No data	19-28% residual	Based on modelling undertaken	No	Mackie Associates for the CIWM (2007)

Initiative	Identified Investment/ Return	Estimated reduction of MSW waste stream feasible	Key Assumptions/Notes	Has such an initiative been implemented locally?	References
Alternate weekly collections (AWC)	15% cost saving	Not stated, however 14% higher recycling/ composting rate indicated	Based on modelling for Surrey County Council	3 of 6 District/Borough Councils (Wealden, Rother and Hastings). Hastings BC introduced AWC in 2007 and observed fall in arisings from 227kg per household to 219kg	Eunomia (2005) Waste Improvement Network (Jan 09)
Reduced size of bins for residual waste collection	No data identified	3% in first year	140 litres is standard bin, these are emptied weekly. Larger bins are available at an additional cost to households (WIN).	Yes – Brighton and Hove (140 litre), Eastbourne (180 litre), Lewes wheelie bins must be purchased, larger volume bins are more expensive	East Midlands Centre of Excellence (undated) (Published via WIN) Enviros report for DEFRA (2004)
Household food waste reduction campaign	No data identified	1.7%	WRAP Estimate 70kg avoidable food waste/person/year. Potential reduction calculated on basis of: 2007/8 DEFRA data for East Sussex collected HH waste of 501kg/person, ONS 2005 population of 497,900 and an assumed 25% of households influenced to reduce food waste by 50%.	County Council: Rethink rubbish programme have spoken to over 72,000 people at events since 2003, community waste action grants.	WRAP (2008) East Sussex County Council (2008)

Initiative	Identified Investment/ Return	Estimated reduction of MSW waste stream feasible	Key Assumptions/Notes	Has such an initiative been implemented locally?	References
Home composting/digestion (e.g. green cone household food waste digester)	No data identified	1-3%	Home and community composting, assumes 25% of households influenced	Discounted composters available county wide – B&H take-up, c. 8,500 over last 2 years (approx. 7% of households) County Council – 22,126 Composters sold since 2003 – 9% of housing stock (DEFRA 2008) – estimated diversion of 4,657 tonnes per annum.	National Resource and Waste Forum (NRWF, 2004, updated 2006) East Sussex County Council (2008) DEFRA (2008)
	No data identified	4-5%	Home composting, assumes 25% of households influenced		Enviros report for DEFRA (2004)
	No data identified	6% (Digestion)	Trial achieved a 33% participation rate		Charnwood Borough Council (2008)
Reusable nappy campaign	No data identified	0.5-1%	10-20% of households influenced (NRWF, 2004)	County Council – estimate 235 babies using washable nappies due to their campaign. B&H Initiative planned	National Resource and Waste Forum (NRWF, 2004, updated 2006) Enviros report for DEFRA (2004)

Initiative	Identified Investment/ Return	Estimated reduction of MSW waste stream feasible	Key Assumptions/Notes	Has such an initiative been implemented locally?	References
Unwanted mail/newspaper initiatives	No data identified	0.2-0.4% (assumes 10-20% of households influenced) (NRWF)	Data suggests up to 26% of households have (at some point) been registered (Based on DEFRA figure of housing stock of 237,374, 2007/8).	County Council run a 'preventing unwanted mail campaign'. There were 4,196 registrations in East Sussex (exc. B&H) during period Oct 07-Mar 08). There have been 61,790 registrations since 1983, however registration lasts only 5 years, so many are likely to have expired. No campaign by B&H has been identified.	National Resource and Waste Forum (NRWF, 2004, updated 2006) Enviros report for DEFRA (2004) East Sussex County Council (2008)
Community based initiatives i.e. re-use and refurbishment	No data identified	1-2%	An estimated 5% of waste stream may be suitable and 1-2% total residual waste stream reduction might be possible if 20-40% of this could be captured (NRWF)	Community Recycling Network (CRN) member: 'Furniture Now'	National Resource and Waste Forum (NRWF, 2004, updated 2006) European EA (2002) Enviros report for DEFRA (2004)
Replacing goods with services (e.g. increased hiring/leasing)	No data identified	0.5-1%	No data identified	None identified	National Resource and Waste Forum (NRWF, 2004, updated 2006)

Initiative	Identified Investment/ Return	Estimated reduction of MSW waste stream feasible	Key Assumptions/Notes	Has such an initiative been implemented locally?	References
Grass cycling (fine cutting and leaving cuttings on lawn)	No data identified	No data identified	No data identified	None identified	Enviros report for DEFRA (2004)
Schools Projects	No data identified	No data identified	None identified	Rethink rubbish programme, community challenge project and the youth waste summit	Enviros report for DEFRA (2004) East Sussex County Council (2008)

Table 4: Commercial and Industrial (C&I) Waste Initiatives Identified

Initiative	Identified Investment/ Return	Estimated reduction of C&I waste stream feasible	Key Assumptions/Notes	Has such an initiative been implemented locally?	References
Cleaner production and eco-design initiatives	Varied company by company – typical min. paybacks of 4 months cited	Varied by company/case study	Pilot support programme was partially financed by European Regional Development Fund	None identified	European EA (2002) Enviros report for DEFRA (2004)
Business waste minimisation support Initiatives	Estimates £1 invested = £2 saved (betre)	No data identified	The betre project review acknowledges that the project cost/benefit resulted in approximately a break even benefit, but that SMEs do not always measure the effects of actions, so savings are likely to be underestimated.	Business excellence through resource efficiency Programme April 2006 – March 2008: Resource Efficiency awareness raising, included waste minimisation club Envirowise	Business excellence through resource efficiency (betre) (May 2008) South East Sustainable Business Partnerships (SESBP)(2007/8) Envirowise publication ET221 (Waste Minimisation Clubs)
Exchange Networks: e.g. The National Industrial Symbiosis Programme (NISP)	Estimate 72p invested per tonne diverted	No data identified	Report undated but states savings since April 2005 (based on investment figure stated, estimate data of report to be during 2007/8)	NISP	‘NISP Means Business’ (undated) Value for money report

Table 5: Further reduction initiatives/potentially relevant areas of research identified

Formation of Joint Waste Authorities
Container re-use and deposit/refund schemes (Canada, Germany, Spain, USA)
Non-container re-use and deposit/refund schemes (Austria, USA)
Industry sector voluntary agreements/initiatives
Packaging waste producer liability/responsibility
Waste taxes
Product/Eco labelling (Europe, Denmark, Canada)
Material bans (to landfill)
Used product take-back schemes (UK, Germany, USA, New Zealand, Australia)
Product Taxes (e.g. Irish plastic bag levy)
Equipment leasing (USA, Holland, Sweden, Italy, Germany, Spain)
Typical waste minimisation budget estimation

Note:
No data was identified for these initiatives in terms of their waste reduction potential.
As most of the initiatives/issues identified are national rather than local in nature, quantification of potential impact is outside the scope of this work.

5 Alternative Cost of Local Landfill Capacity Development

Limited data has been identified on the implementation costs of many waste reduction initiatives, however for context, the financial cost of establishing regional land-raise capacity has been estimated.

Details of the estimation, including the range of assumptions used are shown in Appendix 2.

The cost to develop and operate a nominal, theoretical 50 hectare site with 35 hectares (70%) for landfilling/raising and a nominal 5 million cubic metre capacity for use over a minimum 15 year period has been estimated.

The total cost estimate generated is £55.4 – £94.6 Million.

Based on the capacity of 5 million cubic metres, this equates to a figure of approximately £11 - £19 per cubic metre, or per tonne (assuming a landfill density of one). This would be in addition to collection costs.

It should be noted that this cost per tonne relates to landfill development and operation only and excludes landfill tax which will be £40/tonne from 1st April 2009 and £48/tonne from 1st April 2010 (DEFRA, 2009). There is at present no decision from central Government on whether this figure will be held beyond 2010 or rise further. Furthermore, it is anticipated that a commercial operator may only consider it commercially viable to develop a site if costs were closer to the lower range estimate. This is due to the upper figure resulting in a cost per cubic metre that almost equates to a 'typical' ex-landfill tax gate-fee for non-hazardous MSW or C&I waste. A nominal cut off for development is estimated to be 75% of the likely gate fee (£14.25/cubic metre).

6 Summary of Potential Reduction

Table 6 shows the estimated potential impact of initiatives based on the published impact of trial schemes and consideration of local conditions applicable to this study. NB assessment of potential impact involves some subjective assessments – see notes/assumptions column.

Table 6: Estimated potential of identified initiatives in a local context

Waste Stream	Initiative	Notes / Assumptions	Potential Impact on East Sussex and Brighton and Hove Waste arisings
MSW	Direct weight/volume/bin (tag) based charging	Unproven in the UK, but successfully implemented abroad. Potential impact on UK waste arisings are based on Irish EPA estimates Controversial – may be unpopular with residents.	16% reduction? (EPA) 5-7% reduction quoted in US studies. Estimated to help increase recycling to around 55% Potential saving of up to £18/household/ year
	Alternate weekly collections/limited size residual bins	Implemented by all ESCC and B&HCC authorities	May be some further potential
	Household food waste reduction campaign	Impact of 'Rethink rubbish' campaign unknown, therefore reported potential benefit assumed to represent the maximum impact - 25% of households influenced to reduce food waste by 50%.	Up to a 1.7% reduction NB potential impact may be influenced by co-adoption of home composting / digestion.
	Home composting/ digestion	Based on savings estimated by influencing 25-33% of households and sale of discounted composters to 7% of B&H households and 9% of ESCC households. Note that saving scaled back to lower estimate as number of independent composters not influenced by initiatives unknown.	2% NB potential impact may be influenced by co-adoption of household food waste reduction campaign
	Reusable nappy campaign	Based on influencing 10-20% of households and because a local campaign has been operated, the lower estimated potential figure identified has been used.	0.5%

	Initiative	Notes/Assumptions	Potential Impact on East Sussex and Brighton and Hove Waste arisings
MSW	Unwanted mail/ newspaper initiatives	Possibly, limited local potential to increase impact as 26% of local households have at some point since 1983 been registered.	Low potential
	Community based initiatives i.e. re-use and refurbishment	Based on the identification of a local operational scheme covering much of the County, the lower estimated potential reduction figure identified has been used. A greater range of waste e.g. – WEEE could offer further potential.	1%
	Replacing goods with services (e.g. increased hiring/leasing)	It should be noted that limited case study information/evidence has been identified to support quoted reduction potential, therefore the lower potential reduction figure identified has been used.	0.5%
C&I		Further research is required to assess the local commercial and industrial activity and relevant interventions in order to allow assessment of potential impact.	Unknown

MSW reduction estimates achieved by direct variable charging varied from 5-7% based on studies in the USA (Enviros, 2004) through 16% indicated by the Irish Environmental Protection Agency (2008) up to 32% indicated by the European Environment Agency (2002) for systems run in Denmark. A number of the studies also suggest that introduction of such schemes would be potentially cost neutral or provide a cost benefit.

It is estimated that there is the potential to further reduce the MSW waste stream by an estimated 5-6%, through implementation of the other initiatives summarised in Table 6. Information on the implementation costs is, however, currently insufficient to support estimation of implementation costs in East Sussex/Brighton and Hove.

Overall the range of reduction initiatives summarised in Table 6 are estimated to have the potential to reduce MSW arisings by an estimated 10-13% (using the most conservative variable charging impact estimate) to 21-22% (using data from Irish variable charging schemes) and potentially beyond.

Insufficient data has been identified by the research to allow estimation of the contribution C&I waste reduction initiatives might make to landfill disposal requirements. This lack of information is reflected in the general lack of accurate C&I waste data, as highlighted by AEA's report to DEFRA Delivering Data for Monitoring Waste Strategy 2007 (June 2008).

7 Data Limitations

For the majority of initiatives identified, only limited published information detailing implementation costs has been identified. Furthermore, many of the support initiatives offer a range of resource efficiency support services. It is therefore not straightforward to report on the programmes effectiveness at reducing waste in isolation. In other cases, data is reported for the country as a whole and provides no indication of the minimum spend required to achieve any level of success – either nationally or at a local scale.

In terms of Council decision making, this is considered to leave two possible approaches:

1) Conduct further research to quantify the cost of various initiatives into a cost per tonne reduced/diverted measure and minimum level of investment required to achieve results (which could then be compared in a cost/benefit manner with the alternative estimated cost of landfill capacity development); or,
2) Consider comparison with avoided landfill costs to, in simple terms, be an indicative ‘budget’ ceiling for Council spend/tonne on waste reduction initiatives.

The adoption of the second of these approaches requires a degree of caution, as there is significant uncertainty in both ERM’s future capacity requirement estimates, split of management methods as well as the estimated cost of landfill/raising development. This will subsequently result in a high level of uncertainty as to whether any spend will result in the net landfill reduction and associated cost savings anticipated. Further research into the effectiveness of preferred options is recommended.

8 Analysis

The range of reduction initiatives summarised in Table 6 are estimated to have the potential to reduce MSW arisings by a further estimated 10-13% (using the most conservative variable charging impact estimate) to 21-22% (using data from Irish variable charging schemes) and potentially beyond.

If the assumption is made that without further reduction initiatives, arisings would tend towards the upper arisings estimates shown in Table 1, the reduction initiatives appear to have the potential to enable achievement of waste arisings comparable with the minimum forecast estimates.

The review suggests that if ERM’s MSW waste management estimates are assumed to be correct (in terms of the future split between recycling, recovery and landfill), the difference between the lowest and highest estimated landfill capacity requirement might therefore be avoided. In cost terms, these avoided costs might be considered an indicative ‘budget’ for reduction initiatives as indicated in Table 7. It should be noted that these estimates are subject to considerable uncertainty as outlined in the previous section.

Table 7: Avoided Landfill Tonnages and associated cost avoidance if reduction initiatives allow achievement of minimum rather than maximum MSW waste arisings

Waste Stream	Year	Difference between minimum and maximum landfill requirement / tonnes	Potentially avoided landfill costs (per annum)
MSW	2011/12	19,614	£215,754 – £279,500
	2016/17	21,258	£233,838 – £302,927
	2021/22	15,934	£175,274 – £227,060
	2026/27	15,267	£167,937 – £217,555

Note:
i) Cost of landfill as discussed in Section 5 (£11-£14.25/tonne).
ii) Intermediate years not shown.
iii) Avoided costs do not account for inflation.

It is recognised that such an analysis fails to account for other tangible benefits of improving the sustainability of waste management.

9 Conclusions

The research suggests that minimum estimated future MSW arisings might be achievable by successful implementation of the waste reduction initiatives identified. Household waste variable charging is the single initiative that appears to have the greatest potential. It should however be noted that there is a high level of uncertainty as to whether any spend will result in the achievement of arisings reductions in East Sussex/Brighton and Hove similar to those that have been achieved elsewhere (as identified by the research). Further research into the local effectiveness of preferred options is recommended.

Insufficient information regarding the potential of C&I waste reduction initiatives to reduce waste arisings was identified to support assessment. Given that the demands of C&I waste on landfill capacity are forecast to be similar to MSW, this is a significant gap in the data. Information regarding the impact of national initiatives is also lacking and their potential is therefore impossible to define.

The House of Lords Science and Technology Committee (2008) report comments on the high number of business support programmes and the Business Support Simplification Programme indicates Business Link as the primary access point for businesses in order to partly rectify this. A logical step would appear to be to work with, and promote Business Link as the first port of call for businesses seeking resource efficiency support. Business Link could then assist or signpost to appropriate service providers. The Lords' report also highlights potential benefits in terms of economies of scale that might be achieved through Joint Waste Authorities.

10 Potential Further Research

Further research is required to estimate Local Authority reduction initiative costs. This might be achieved by collating details of staff employed and promotional budgets for initiatives operated in East Sussex and Brighton and Hove. A number of the initiatives have measured and reported their impact and such research could potentially be used to support further cost/benefit analysis.

Further research is required to identify and assess the potential of local and national C&I waste reduction and initiatives to reduce waste to landfill.

An investigation of the potential of Joint Waste Authorities may also be beneficial.

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South East Sustainable Business Partnerships (SESBP)(2007/8) BREW Project – Summary of Achievements 2007/08

The Waste and Resources Action Programme (2008) The food we waste

Waste Improvement Network (Jan 09) Case study Jan 09: Barnsley MBC introduce ABC & decrease collected household waste/head by >11% in one year!

The Waste Improvement Network (2006/7) Briefing Note: Summary of services provided by the 20 Waste Collection Authorities with the lowest waste arisings per capita in 2006/7 (Produced for WIN by Waste and Energy Research Group, University of Brighton.

Appendix 1:

Summary of research by WIN on services provided by the 20 waste collection authorities in England with the lowest waste arisings per capita 2006/7

Research by the Waste Improvement Network (2006/7) identified a number of features common to the waste management services being delivered by the 20 Waste Collection Authorities in England with the lowest waste arisings per capita.

Common features identified are as follows:

- 15 authorities provide wheeled bins to the majority of households (either 240 (12 LAs) or 180 litre (3 LAs);
- 13 authorities operate Alternate Weekly Collections;
- All but two of the 15 authorities operating wheeled bin collections operate strict policies on side waste and do not collect material outside the bin;
- All the Councils provide kerbside collections of dry recyclables;
- 13 authorities offer a mixed dry recyclables collection service, the others requiring segregation into either 2, 3 or 5 containers;
- 11 authorities operate alternate weekly collections of recyclables with 2 also collecting glass each month, the other 7 offer weekly collections;
- All 20 authorities collect; newspapers, mixed papers and cans, 16 collect cardboard, plastic bottles and glass. On average Authorities collect 7 materials;
- 17 Councils offer a green waste collection service – 6 for free and 11 charging between £15 and £50 (with two charging by the sack);
- Three Authorities operate a separate weekly food waste collection service;
- All Authorities collect bulky waste, 4 offering a free service.

Appendix 2:

Indicative estimated cost of establishing and operating a land-raising facility

‘Typical’ landfill costs, based on land-raise as compared to ‘normal’ mineral working reclamation

Item	Description	Low Cost	High Cost	Comment
Development (capital expenditure) costs:				
1 *	Land Acquisition – assume 50Ha	1,000,000	10,000,000	Low cost based on £20k/Ha with no uplift to reflect actual use High cost based on full uplift value
				NOTE – could be split over number of years’ operations, although will always be front-end loaded, as could be based around initial cost plus royalty, as fixed proportion of income, typically 20%
2	Fixed infrastructure – required prior to commencement of operations			
2.1 **	Fencing – assume full 50Ha, as rectilinear form, so assume 3,000 linear metres	90,000	180,000	Low cost based on predominantly agricultural fencing High cost based on predominantly on industrial fencing, more likely to be required by EA at permitting stage
2.2 **	Access road – assume nominal 500m required	300,000	500,000	Low cost based on predominantly single-track with passing places High cost based on full-length two-lane road Both costs assume NO costs associated with utilities relocations, which could double these
2.3 **	Accommodation, offices, etc	150,000	300,000	Low cost based on ‘portable’ buildings High cost based on ‘permanent’ structures
2.4 **	Yard, parking, wheel-wash, weighbridge, etc	250,000	350,000	Low cost based on ‘minimal’ approach for short-term development High cost based on ‘optimal’ approach for longer-term development
2.5 **	Utilities	100,000	250,000	Low cost assumes supplies nearby High cost assumes distant ‘delivery’
2.6 ***	Screening/void creation – minimum likely costs	500,000	1,500,000	Low cost based on minimal screening and limited void-space enhancement High cost based on more demanding screening and improved void-space enhancement NOTE – could be split over number of years’ operations, although will always be front-end loaded
2.7 ****	Archaeology/ecology	250,000	500,000	Low costs reflect minimal activities High costs reflect substantial activities

Item	Description	Low Cost	High Cost	Comment
3	Engineering costs – directly associated with placement of waste			
3.1 ***	Lining – assume 35Ha treated	3,500,000	5,000,000	Low cost assumes presence of natural materials on site High cost assumes more engineering materials imported NOTE - split over number of years' operations, although will always be front-end loaded
3.2 ***	Leachate/landfill gas management – based on 35Ha treated	1,750,000	2,250,000	Low cost based on deeper site with few potential receptors High cost base on shallow site with many potential receptors NOTE - could be split over number of years' operations, although will always be front-end loaded
3.3 **	Leachate and landfill gas treatment systems – single plant for each	500,000	1,000,000	Low costs assume readily accessible site with nearby off-site facilities High costs assume more remote site with no nearby off-site facilities
3.4 ***	Capping/restoration	1,750,000	2,500,000	Low cost assumes presence of natural materials on site High cost assumes more engineering materials imported NOTE - split over number of years' operations, although will always be back-end loaded
4	EA Approvals	250,000	250,000	Estimate c. £250,000
Operational expenditure costs:				
5	Operational Costs	20,000,000	20,000,000	Estimate based on operational costs of £4/cubic metre.
6	Post closure costs	25,000,000	50,000,000	Estimate based on post closure costs of £0.50 to £1.00/cubic metre
	Total	55,390,000	94,580,000	Total cost estimate
		£11.078	£18.916	Estimated cost per cubic metre, based on 5 million cubic metre capacity. Cost relates to landfill development and operation only and excludes landfill tax which will be £40/tonne from 1st April 2009 and £48/tonne from 1st April 2010

* likely to be less than 'mineral' workings, to reflect increased development costs
** likely to be more than for 'mineral' workings, reflecting that fact that these opportunity costs have usually at least partially been met by previous user
*** likely to be substantially more than 'mineral' workings as function of area vs. depth
**** could be same as 'mineral' working reflecting balance between past activities' impact on surroundings and pervious 'loss' of resource

Assumptions:
50 Ha site, fully fenced and provided with dedicated new access
35Ha used for landfilling – 70% proportion – rest used for screening/buffer zones
Average 14m depth of placed waste, as pre-settlement depth – typically more than 20m in 'mineral' workings, therefore 50% penalty for all area-based costs
Nominal 5 million cubic metre site
Developed for use over minimum 15-year period, possibly more with increased waste diversion