



JMWMS Supplementary Report Three: Data and Projections

Supplementary Report 3: Data & Projections

This report includes supporting data and projections that inform the Headline Strategy update. It considers the fundamental aspects of the strategy from the latest waste composition data and projections, through to the strategy of the individual partners for recovering materials and value from the wastes.

The document pulls together data from sources which were important in the development of the Strategy update document in particular, including:-

1. Outline Business Case (OBC) for Merseyside, Enviros Consulting, 2006
2. Original Joint Municipal Waste Management Strategy (JMWMS) and data, 2005
3. Waste Composition Study, SWAP (now Resource Futures), 2006
4. District Council Action Plans (DCAPs), 2006
5. Best Value Performance Indicator & Defra Statistics, 2006 & 2007
6. Merseyside Waste Disposal Authority (MWDA) compiled waste stats 2003/4 – 2006/7

The Report is structured under the following headings:-

- 3.1 Waste Composition
- 3.2 Waste Growth
- 3.3 Waste Prevention & Re-use
- 3.4 Recycling & Composting
- 3.5 Waste Treatment & Disposal

3.1 Waste Composition

The following waste composition study was undertaken over the winter of 2005 and summer of 2006. It informs the modelling undertaken for the strategy to provide a strong basis for developing sustainable waste management in Merseyside. For any management system it is important to understand what it is you are managing. Waste composition analysis provides estimates of the proportions of different materials within the waste stream. This can be used to determine, for example what is practicable to recycle, or compost, or what elements of the waste could be reduced by successful waste prevention initiatives. Municipal waste does however vary in its composition throughout the year, not least in terms of the amount of garden derived wastes present, and so it is important to understand the annual variation in composition. This variation needs to be considered in the planning of treatment capacity and operational / logistical arrangements for outputs from waste processing.

Table 3.1 shows the estimated composition of the residual household waste collection (i.e. as collected from the kerbside). A broad comparison¹ against a national composition dataset highlighted that Merseyside has generally higher levels of plastics and disposable nappies, and significantly lower levels of garden waste and wood. It should be noted that where local authorities have achieved over 40% recycling / composting, a substantial amount of the contribution comes from garden waste collection and composting.

¹ SWAP, 2006

Table 3.1 Estimated Composition of Residual Domestic Waste (excl Household Waste Recycling Centres) (HWRCs)

Material	Percentage	kg/hh/wk
Kitchen waste	27.10	3.98
Paper	16.70	2.45
Plastics	13.29	1.95
Glass	7.59	1.11
Miscellaneous Items	7.05	1.03
Card	6.96	1.02
Textiles	4.68	0.69
Metals	4.21	0.62
Disposable Nappies	4.00	0.59
Garden Waste	3.48	0.51
Fines	2.23	0.33
Electrical Items	1.28	0.19
Hazardous Items (non WEEE)	0.90	0.13
Wood (not garden waste)	0.53	0.08
Total	100	14.69

Table 3.2 aggregates the composition of the refuse and recycling collections of the Districts to produce a combined estimate of composition.

Table 3.2 Estimated Combined Refuse and Recyclate Composition Data Collected by Districts

Material	Percentage	kg/hh/wk
Paper and card	26.10	4.51
Kitchen waste	23.02	3.98
Plastics	11.30	1.95
Glass	9.28	1.60
Garden Waste	8.10	1.40
Other material	7.88	1.36
Textiles	4.47	0.77
Metals and white goods	4.07	0.70
Disposable Nappies	3.40	0.59
Other electrical Items	1.09	0.19
Hazardous Items	0.76	0.13
Wood	0.52	0.09
Potentially reusable items	0.01	0.00
Total	100	17.29

The analysis also considered waste deposited at the HWRCs. Table 3.3 is an estimate of the composition of waste deposited into the residual (refuse) skips. The authors of the study considered that of this waste ~40% had the potential to be recycled / reused

(although not necessarily under the BVPI definitions), and a further ~5% was compostable.

Table 3.3 Composition of Residual HWRC waste

Material	Percentage
'Black Bin' Waste	14.77
Flooring	11.85
Inert material	11.50
Miscellaneous	10.53
Wood & Wood Related	9.62
Furniture	8.60
Garden Waste	4.92
Paper and Card	4.92
Electrical	4.76
Scrap Metal	3.60
Plastics	3.27
Books & Bric-a-brac	2.81
Textiles	2.62
Toys, Leisure & Sports Equipt	1.72
Glass	1.59
Household Hazardous Waste	1.49
Ceramics	1.25
Bicycles	0.09
Other Liquid Waste	0.09
Total	100

Table 3.4 combines the composition analysis for all the household waste, whether deposited at HWRC or collected by the Districts.

Table 3.4 Estimated Combined HWRC and District Refuse and Recycling Composition Data

Material	Percentage	kg/hh/wk
Paper and card	20.17	4.80
Other material	17.71	4.21
Kitchen waste	16.73	3.98
Garden Waste	9.73	2.31
Plastics	8.71	2.07
Glass	7.10	1.69
Metals and white goods	4.64	1.10
Wood (not garden waste)	4.50	1.07
Textiles	3.68	0.88
Disposable Nappies	2.47	0.59
Potentially reusable items (non-electrical)	2.18	0.52
Other electrical Items	1.51	0.36

Hazardous Items (non-electrical)	0.87	0.21
Total	100	23.79

3.2 Waste Growth

The levels of municipal solid waste (MSW) have fluctuated over recent times, but have remained largely stable over the last four years. A reduction in arisings generally experienced by Partners in 2005/6 was noted, however the factors controlling waste arisings are many and complex and it is unlikely that this is the result of a single factor. The complex issue of waste growth is addressed in detail in Supplementary Report Six 'Waste Arisings Study'.

One measure of household waste arisings is collected through the Government Best Value Performance Indicator (BVPI) 84a. This indicator records the kg of household waste generated per person in a local authority area (including recyclables). Table 3.5 shows the BVPI 84a for each District in the Merseyside Waste Partnership (MWP) from 04/05 and 05/06, with targets for improving performance in 06/07² and 07/08 derived from the JMWMS Action Plans. The national average BVPI 84a is also shown in the table, it illustrates that household waste arisings per head are significantly lower than average in Merseyside, which is consistent with a large urban environment.

Table 3.5 BVPI 84a Performance

	04/05 actual	05/06 actual	05/06 National	06/07 target	07/08 target
Knowsley	408.4	451.7	505	413	413
Liverpool	437	433.1		470	480
Sefton	406.5	412.4		423	430
St Helens	444	450		459	473
Wirral	440	437.6		458	468

The levels of municipal waste generated in Merseyside are summarised in Table 3.6 and include the percentage increase / decrease year on year over the last four years. The national (England) municipal waste growth factor is also included in the table for comparative purposes.

Table 3.6 MWP & National MSW Growth

Year	Tonnes per annum	Annual % Growth	Data Source	National MSW growth	Data Source
2003/4	842856	No data	MWDA	- 1%	Defra
2004/5	863511	+2.4%	MWDA	+ 1.7%	Defra
2005/6	835425	-3.3%	MWDA	- 3%	Defra
2006/7	840107	+0.6%	MWDA	No data	

² Whilst provisional 06/07 municipal waste data is available, no audited BVPIs are available at the time of writing

Comparison of the Merseyside MSW growth rates with national figures reveals that the growth has generally followed the national trend where data is available, however the magnitude of growth / reduction has been in excess of the national picture. The growth data combined with a relatively low level of household waste generation to date (Table 3.5) show no evidence that Merseyside will converge, in terms of waste arisings, with the national average in the future.

The national assumptions of waste growth have been revised in recent Government documentation, from a ~3% per annum working assumption for the national Waste Strategy 2000, down to ~1.5% per annum in the consultation of the revised Waste Strategy (2006). Over the last five years however national MSW growth has averaged 0.5% per year (2007³). Merseyside experience also reflects this trend, however the unpredictability of waste arisings and the influence of external factors outside the control of the local authorities means that projections forward should be carefully considered.

In the OBC document, a working assumption of a 3% annual growth, declining to a 2% growth by 2010, to a 1% growth by 2014 and a zero growth by 2020 has been modelled. It is often prudent, when procuring waste services over a long period of time, to allow for excess capacity to ensure that there is always sufficient capacity to effectively maintain the service, should waste arisings grow at a substantial rate. This may also be a contingency capacity to help tackle any emergency waste management service required. Where surplus capacity has been procured then it may be possible to utilise any excess capacity to treat wastes from the non municipal sector.

A supporting study to this Strategy (Supplementary Report Six 'Waste Arisings Study') considers the historical development of arisings in Merseyside in greater detail. The report also uses available data, including socio-demographic and service related data to make estimates of future projections of arisings, noting areas where more detail are needed. Table 3.7 shows the growth profile derived from this study. This is considered to be strategically more robust than the previous growth scenario included within the original JMWMS.

Table 3.7 Estimated MSW Growth Projections

Year range	MSW annual growth rate
2007/8 – 2009/10	+0.6%
2010/11 – 2014/15	+0.4%
2015/16 – 2019/20	+0.2%

3.3 Waste Prevention and Re-use

A separate report (Supplementary Report One 'Waste Prevention Strategy') considers the relevant data and business case for waste prevention activity. It also explains the anticipated impact of different measures on the municipal waste arisings.

³ Waste Strategy for England 2007, Department for Environment, Food & Rural Affairs (DEFRA), 2007

3.4 Waste Recycling and Composting

The data on recycling and composting was primarily reported via Best Value Performance Indicators (BVPIs) up to April 2008. There were two statutory BVPIs, for which Government has set targets, these are for the sum of BVPI 82a and 82b (recycling and composting, respectively). Urban authorities tend to be lower performing in the area of recycling and composting for reasons discussed below. There is also convincing evidence of a relationship between population density and ability to achieve high recycling / composting rates. A report⁴ commissioned by the Resource Recovery Forum (RRF) investigated international performance in terms of high recycling and composting rates. The findings of the report showed a strong correlation between population density and the achievable levels of recycling. This is of particular relevance to Merseyside as a centre of high population density. Table 3.8 summarises some key findings in this regard:-

Table 3.8 Recycling Performance of International Leaders in Recycling

Density of Population, Persons/km ²	Comment on 'achievable' recycling performance
<250	Highest performance in rural areas 55-65%
<1000	For small towns the best performers may achieve 45 – 55%
1000 - 2500	Best performing urban / provincial areas achieve ~45%, although not always sustained
>3000	Larger metropolitan areas and cities, best performers in the range of 30 – 36%

The population density of Merseyside is 2119 persons⁵ / km² indicating international best practice of less than 45%. The MWP strategy is based upon reaching 44% recycling and composting by 2019/20. The RRF research considered a wide variety of the best performers in the world including case studies. The reasons for the relationship between performance and population density are varied, but include the quantity of available organic waste (garden waste in particular), which is readily separable and recyclable and comprises a large proportion of the recovered materials in the more rural high achieving areas (with large gardens), variations in household prosperity and income, the level of social mobility / stability in the population etc. Furthermore, there are often limitations on the types of collection systems that can be utilised in urban areas. A study of New York (10,200 persons/km²) showed that even with mandatory recycling and 100% coverage of a multi material kerbside collection service, the maximum rate that had been achieved was 21%, and the view of the waste authority was that the maximum possible was 25%.

Consideration of more recent data from England, through BVPI 82a and 82b also supports this link between authority types and high or low performance. Figures 3.1 and 3.2 use 05/06 data and the Defra classification of local authorities to illustrate the current relationship in England.

⁴ High Diversion of Municipal Waste: Is it achievable? Resource Recovery Forum 2004

⁵ Merseyside Area Profile Fact File (excl. Halton), March 2007, Regional Intelligence Unit, NW RDA

It can be seen from Figure 3.1 that there is a strong correlation between the more 'urban' an authority is, the lower the percentage of those authorities achieving the national level of 25% recycling and composting. There are a wide variety of reasons for this trend. Conversely, the more 'rural' an authority is, the larger proportion of them were achieving the national recycling & composting targets, although the trend is not as distinct, with some lower performance shown in the rural >50 category (over 50% of the population in rural dwellings), although still higher than the urban authorities.

Figure 3.1 Local Authorities Meeting the National (25%) Recycling Targets in 05/06

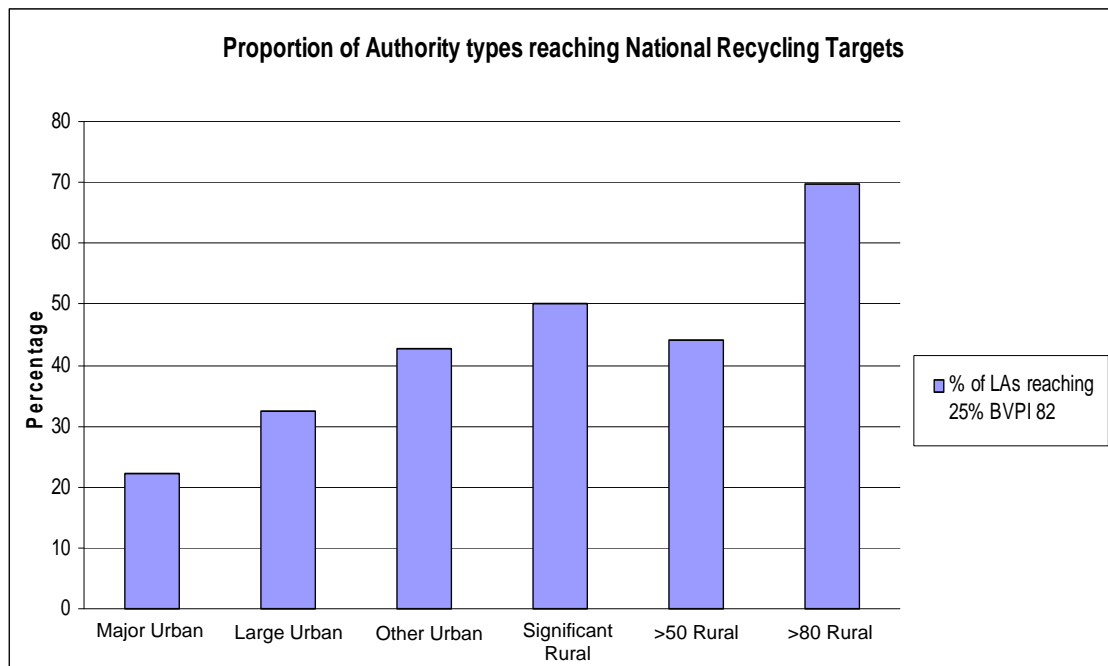
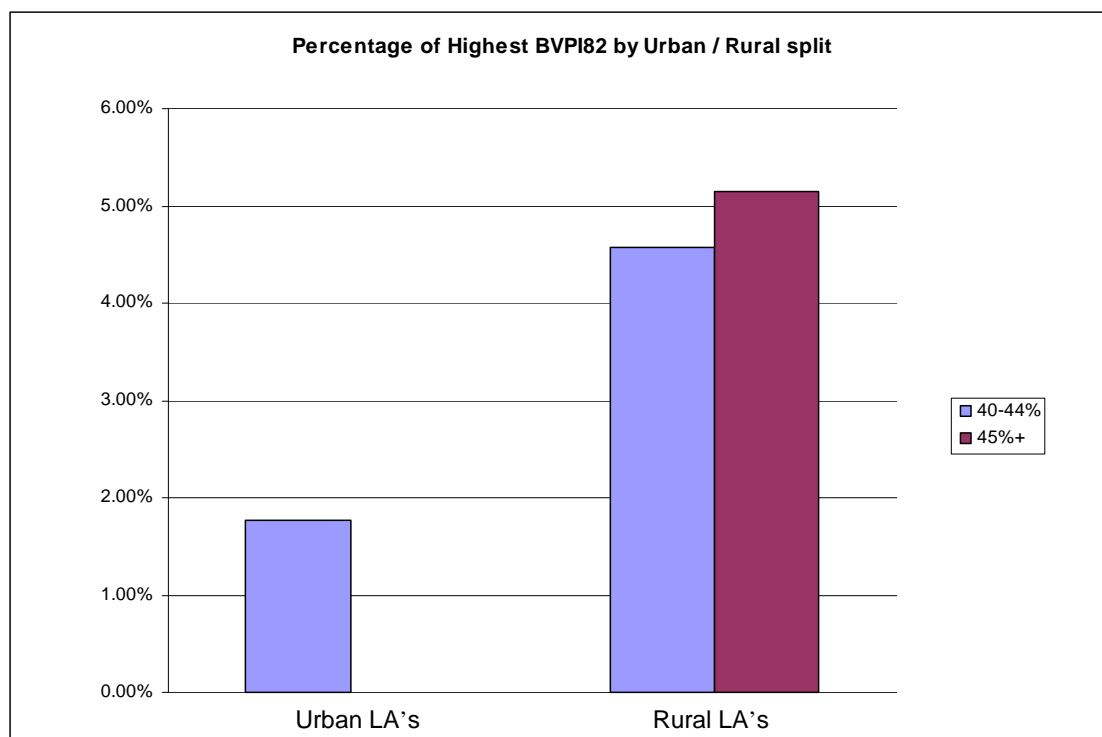


Figure 3.2 considers the proportion of authorities reaching the highest recycling/composting rates (>40%). It again confirms the position that greater proportions of the more rural authorities are meeting the highest levels of recycling/composting performance, with no urban authorities achieving over 45% in 05/06.

Figure 3.2 Proportion of Urban Rural 'High Achievers' in BVPI 82 in 05/06



Projected and Actual Performance of the Districts

Merseyside authorities have yielded relatively low recycling and composting rates and missed statutory performance targets in 2003/4 and 2005/6. The Partnership have pooled their targets on successive occasions, and the 2007/8 targets in Table 3.9 & 3.10 are pooled among the MWP in agreement with Defra.

Table 3.9 BVPI 82a Recycling Performance & Projected Targets

	04/05 actual	05/06 target	05/06 actual	06/07 target	07/08 target	source
Knowsley	6.49%	11%	7.40%	12%	13%	DCAP
Liverpool	7.60%	10%	8.60%	12%	15%	DCAP
Sefton	12.90%	16%	13.80%	18%	18%	DCAP
St Helens	9%	10%	9%	10.50%	12%	DCAP
Wirral	8%	15%	7.90%	20%	25%	DCAP

Table 3.10 BVPI 82b Composting Performance & Projected Targets

	04/05 actual	05/06 target	05/06 actual	06/07 target	07/08 target	source
Knowsley	3.90%	4%	5.40%	5%	6%	DCAP
Liverpool	0%	5%	2.10%	8%	10%	DCAP

Sefton	2.10%	5%	6%	7%	7%	DCAP
St Helens	6.50%	10.50%	10.60%	11%	11%	DCAP
Wirral	2%	3%	4.50%	6%	8%	DCAP

The individual performance of each District has been modelled based on the targets and agreed policies within this Strategy, (for example separate collection of kitchen waste, alternate weekly collections).

The collection authorities (Districts) in Merseyside all provide separate collection services for at least two recyclable materials to the majority or all properties in their area. The proportion of properties served is measured by BVPI 91, and Table 3.11 summarises performance against this indicator.

Table 3.11 BVPI 91 Actual Data and Data Projections for MWP Districts

	04/05 actual	05/06 target	05/06 actual	06/07 target	07/08 target	source
Knowsley	97%	95%	95.80%	97%	97%	DCAP
Liverpool	84%	85.50%	91.80%	86%	86.50%	DCAP
Sefton	97.45%	95%	97%	97%	97%	DCAP
St Helens	100%	100%	100%	100%	100%	DCAP
Wirral	100%	100%	100%	100%	100%	DCAP

The Districts also provide 'bring', or 'drop-off' sites for householders to deposit recyclables. These facilities are well established in Merseyside and the Table 3.12 summarises the number of sites in each of the Districts, and the materials collected.

Table 3.12 Bring Banks in Merseyside

Material Type	Knowsley	Liverpool	Sefton	St Helens	Wirral
Glass (Colour separated)	18	23	17	104	22
Cans	13	132	21	42	22
Paper	46	226	25	69	22
Books			1	2	5
Textiles & Shoes	14	41	14	10	16
Mixed Glass	6			2	45

Projected and Actual Performance of MWDA

The recycling and composting performance of MWDA is a factor of the effectiveness of the Household Waste Recycling Centres (HWRCs). The HWRCs have performed relatively poorly in the past, averaging less than 25% separation for recycling / composting up until 2005/6 (excluding rubble, which is not included in the BVPI definitions). Good practice HWRCs have achieved over 60%, and MWDA has set challenging targets for improvement of the operations of the Merseyside HWRCs. The performance to date and the targets are included in Table 3.13.

Table 3.13 HWRC Recycling and Composting Performance

Total tonnage of waste deposited at HWRCs	District	2002/03	2003/04	2004/05	2005/06	2006/07
		Actual	Actual	Actual	Actual	Target
Formby	Sefton	21.90%	25.52%	35.62%	45.63%	
Sefton Meadows	Sefton	13.93%	20.43%	20.79%	29.85%	
South Sefton	Sefton			48.67%	50.34%	
Southport	Sefton	18.57%	20.20%	25.61%	34.54%	
Otterspool	Liverpool	15.98%	22.83%	20.79%	27.92%	
Kirkby	Knowsley	4.16%	9.84%	14.26%	36.36%	
Huyton	Knowsley	8.19%	10.51%	10.66%	20.19%	
Rainford	St.Helens	19.76%	22.08%	31.37%	41.35%	
Rainhill	St.Helens	50.29%	31.41%	33.03%	40.35%	
Ravenhead	St.Helens	28.89%	16.98%	19.04%	33.12%	
Newton-le-Willows	St.Helens	17.95%	18.69%	27.23%	45.39%	
Bidston Moss	Wirral	9.29%	18.51%	19.90%	31.83%	
West Kirby	Wirral	14.86%	26.93%	33.42%	45.19%	
Clatterbridge	Wirral	10.30%	18.45%	24.04%	30.55%	
All Sites		16.50%	19.20%	22.18%	33.30%	41.00%
All Sites (including rubble)		26.42%	31.31%	36.18%	44.48%	50.00%

3.5 Waste Treatment and Disposal

There has been no significant municipal waste treatment operations taking place in Merseyside, and all residual waste has been sent for disposal in landfill to date. Table 3.14 contains the levels of household waste sent to landfill from the MWP. The initial reductions have been achieved through increases in recycling and composting with an additional significant diversion from landfill planned to come into effect when the residual waste treatment capacity is in place (around 2013).

Table 3.14 Landfill of Household Waste

	2002/3 (actual)	2003/4 (actual)	2004/5 (actual)	2005/6 (actual)	2006/7 (target)
% of household waste landfilled	91.3%	89.88%	86.54%	81.38%	76.08%

There are two waste treatment initiatives currently under development in Merseyside.

The first is the Private Finance Initiative (PFI) procurement, for which the reference case is to procure two Mechanical Biological Treatment (MBT) facilities, processing residual municipal waste from Merseyside, and designed to generate a refuse derived fuel and capture some recyclables. The refuse derived fuel could then be thermally treated at a co-located facility. Both these processes are considered treatment technologies and whilst the procurement is not necessarily constrained to exactly duplicate the reference case, it is likely that similar capacities of treatment will be required in order to meet the objectives of this strategy and the contract output specification even if the reference case approach is not adopted. It is intended that all the residual MSW will be processed

by these treatment facilities once available. There will be a proportion of rejects and outputs from the processes which is likely to be sent to landfill.

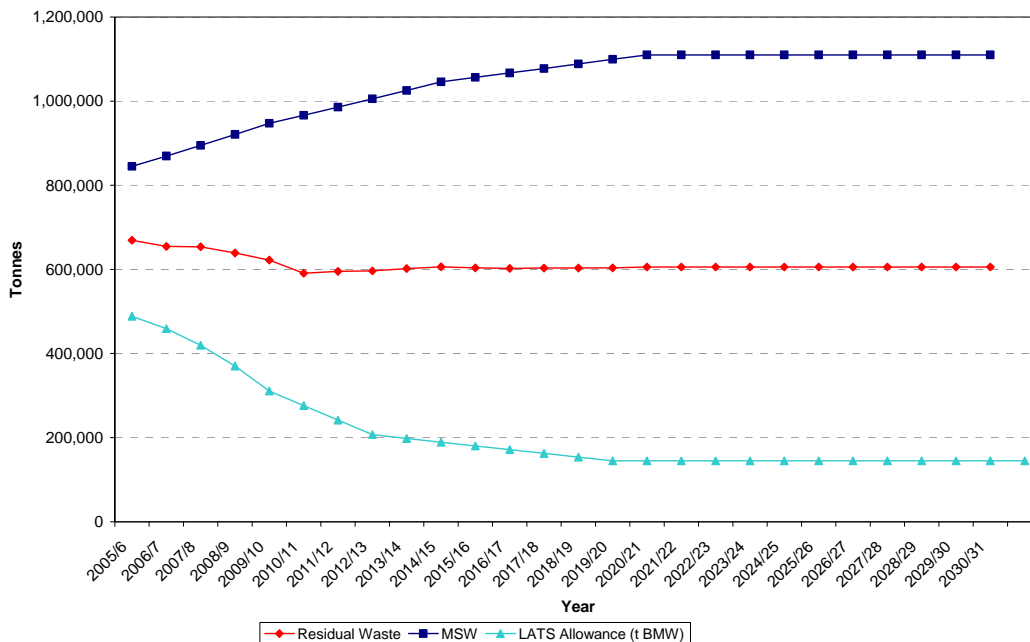
The second municipal waste treatment activity is the (part Government funded) New Technology Demonstrator plant built in Knowsley. The technology is known as a Mechanical Heat Treatment process, designed by Fairport Engineering, where residual MSW is heated in a rotating kiln prior to mechanical separation into different fractions. The process may be configured to generate a fuel and it is claimed that this may be refined to a high biomass content and to various user specifications. The capacity of the Demonstrator is 50,000 tonnes per annum.

Landfill Allowance Trading Scheme (LATS) Profiling

The requirement to manage the Landfill Diversion obligations derived from the Landfill Directive is a key driver for developing alternative waste management options. The levels of increase in recycling and composting, combined with the procurement of residual waste treatment capacity will bring about sufficient diversion to exceed the landfill diversion requirements in the long term. In the short to medium term however there will be a shortfall in landfill diversion for which excess Landfill Allowances may be purchased from other waste disposal authorities (where available) to enable the MWP to meet its obligations under the Landfill Allowance Trading Scheme.

Figure 3.3 illustrates the modelled MSW arisings, residual waste (after projected recycling / composting) and BMW landfill allowances for the period to 2031. This profile will change as a result of the new growth projections (see Supplementary Report Six).

Figure 3.3 LATS profile



Source: Outline Business Case, Enviro 2006

Table 3.15 details the LATS allowances and the anticipated BMW diversion across the period 2008/9 – 2014/15. The particular importance for the Partnership of the statutory national target years (2009/10, 2012/13; 2019/20) is that there are limitations placed on the options for managing landfill diversion obligations across national target years. In terms of LATS this means no banking or borrowing of allowances can occur across (into or out of) these years.

Table 3.15: Household and municipal waste management projections

Year	LATS allowance	BMW Diverted	Recycling & Composting BVPI ⁶
2008/9	370,089	327,489	
2010/11	276,248	262,174	
2011/12	241,647	191,819	
2013/14	198,166	353,715	
2014/15	189,284	335,723	38%

The MWP have set challenging targets for landfill diversion, however the length of time for treatment capacity to be procured/ permitted/achieve planning/commissioned and become available for processing waste, means that there is a period in which the diversion is insufficient to meet the obligation. This is illustrated by Table 3.15, which demonstrates that the Partnership will not be diverting sufficient BMW relative to its allowance until 2013/14. From this point onwards the Partnership will be diverting significantly more than its allowance and so be in a position to sell allowances to other WDAs.

⁶ Targets agreed by the Merseyside Waste Partnership