



National Assembly for **Wales**
Cynulliad Cenedlaethol **Cymru**

Waste Management in Wales

Abstract

This research paper examines Wales' current performance in waste management. Progress in reaching the national Waste Strategy targets is considered, and the waste hierarchy is reviewed.

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Waste Management in Wales

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Executive Summary

Waste management is a topic of considerable interest and importance in Wales. Space for landfill – the preferred waste disposal method until recent years – is running out, and European Directives require substantial reductions in the amount of waste landfilled. National targets for recycling have been set in order to help Welsh local authorities meet their landfill targets.

Many of the targets set out in the National Waste Strategy for Wales have either already been met, or are likely to be met by the target date.

The most challenging issue is the impending targets set by the Landfill Directive for 2009/10 and 2012/13. If landfill diversion continues at current rates then Welsh local authorities will be subject to Welsh Assembly Government fines of nearly £10 million in 2010, and nearly £32 million in 2013 (more than £12 million of which would be paid by two authorities). Only three authorities would avoid fines in these circumstances. These fines would be in addition to any share of infraction penalties imposed by the EU if waste management activities in Wales contribute to the UK exceeding its landfill allowances.

At current rates of increase of recycling and composting, 11 local authorities will meet the 40 per cent target in 2009/10, whilst the remaining 11 will fail to meet the target. The overall recycling and composting rate will be 38 per cent by 2009/10.

In order to meet the 2020 target of 300kg of waste production per person, household waste needs to decrease by 3.5 per cent annually from 2005/06.

The European Parliament has adopted a five-step waste hierarchy, which is a useful way of framing the environmental favourability of different waste management options. The waste hierarchy is examined in detail in this paper.

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Waste Management in Wales

1 The Waste Strategy

"Waste is Wales' biggest environmental problem; a problem to which we all contribute as individuals on a daily basis. However we can also as individuals be part of the solution"¹.

Wise About Waste: The National Waste Strategy for Wales, June 2002

The Welsh Assembly Government's strategy for dealing with waste is set out in *Wise About Waste: The National Waste Strategy for Wales*¹ (the Strategy). Its objective is to implement "a sustainable, integrated approach to waste production, management and regulation (including litter and flytipping) that minimises the production of waste and its impact on the environment"¹, and one of its primary aims is to make Wales a "model for sustainable waste management"².

The Strategy sets out a series of targets. Some of these targets are set at a Member State level by European Commission (EC) Directives, a proportionate share of which Wales is required to achieve. The Strategy also lays out some Wales-specific targets: primary targets, over which the Welsh Assembly Government and its key partners have a direct influence, and secondary targets where the Welsh Assembly Government's influence is less.

The Strategy is set out in 12 chapters, with one appendix summarising the targets, instruments and actions proposed to deliver the policies.

- The first three chapters provide an introduction to the subject, including an overview of the situation in 2002, the legislative framework driving waste management, key principles of waste management, and the chosen policies to deliver the targets.
- Chapters four to nine are entitled 'Action'. They cover regulation and enforcement, resource management, infrastructure and market development, education, research, and the overarching strategic framework.
- The final three chapters include the actions required by different stakeholders to achieve the targets, an analysis of opportunities and challenges, and the need for a "complete review not later than five years after the publication of this strategy".

The last statement is particularly noteworthy. Although the Strategy was designed to operate from 2002 to 2012, there have been substantial changes in the field of waste management over the past four years. In addition, the new powers gained by the National Assembly for Wales in May 2007 open a wider range of policy options than have been available previously. The Welsh Assembly Government has started the review of the Waste Strategy.

¹ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, pp. v-vii
http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

² *ibid*, p. 2

2 Waste Targets

There are three sets of targets:

- UK targets, where Wales must meet its share of targets set for the UK by EC Directives
- Primary Wales-specific targets, where the Welsh Assembly Government and its key partners have a direct influence over their outcome
- Secondary Wales-specific targets, where the Welsh Assembly Government's influence is less

2.1 UK targets

Target A: *The Landfill Directive³ requires the UK to limit the amount of biodegradable municipal waste (BMW) landfilled:*

- *By 2010 to no more than 75% of the BMW produced in 1995*
- *By 2013 to no more than 50% of the BMW produced in 1995*
- *By 2020 to no more than 35% of the BMW produced in 1995*

These target dates are the result of a maximum four-year derogation, permissible for those Member States that landfilled more than 80 per cent of all municipal waste in 1995⁴.

In Wales, the proportion of total municipal waste deemed to be biodegradable is 61 per cent⁵. In Scotland the proportion is 60 per cent⁶, in England, the proportion is 68 per cent⁷, and in Northern Ireland the proportion is 71 per cent⁸. Since the defined proportion is now fixed in each country, regardless of the actual biodegradable portion of municipal waste, Wales' target should be easier to achieve than those for England and Northern Ireland.

The lack of accurate records means that there is no definitive figure for the amount of municipal waste landfilled in any country in the UK in 1995. However, by agreement with the European Commission, the amount of waste landfillable in Wales in the 'target years' of the Landfill Directive is shown in Table 1.

Table 1 Landfilling allowances for Wales in Landfill Directive target years

| Target date | Maximum amount of BMW landfillable in Wales (tonnes) ⁹ | Total municipal waste landfillable in Wales (tonnes) ¹⁰ |
|--------------|---|--|
| 17 July 2010 | 710,000 | 1,164,000 |
| 17 July 2013 | 470,000 | 770,000 |
| 17 July 2020 | 330,000 | 541,000 |

³ European Commission, *Council Directive 1999/31/EC of 26 April 1999 on the Landfill of Waste*, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31999L0031:EN:HTML>

⁴ *ibid*

⁵ OPSI, *The Landfill Allowances Scheme (Wales) Regulations 2004*, SI 2004/1490 (W.155), <http://www.opsi.gov.uk/legislation/wales/wsi2004/20041490e.htm>

⁶ Scottish Executive, *Indicators of Sustainable Development for Scotland: Progress Report 2004*, <http://www.scotland.gov.uk/Publications/2004/02/18983/33610>

⁷ OPSI, *The Landfill Allowances and Trading Scheme (England) Regulations 2004*, <http://www.opsi.gov.uk/SI/si2004/20043212.htm>

⁸ OPSI, *The Landfill Allowances Scheme (Northern Ireland) Regulations 2004*, <http://www.opsi.gov.uk/sr/sr2004/20040416.htm>

⁹ OPSI, *The Landfill (Scheme Year and Maximum Landfill Amount) Regulations 2004*, SI 2004/1936, <http://www.opsi.gov.uk/si/si2004/20041936.htm>

¹⁰ Calculation based on the agreed proportion of BMW in municipal waste (61 per cent)

The landfill allowance for biodegradable municipal waste allocated to each Welsh local authority for each year until 2009/10 is shown in a letter from the Minister for Environment, Planning and Countryside to local authority Chief Executives¹¹, available at:

http://www.environment-agency.gov.uk/commondata/105385/landfillallowltr_e_868975.pdf

The initial landfill allowance in 2005/06 of 1,021,999 tonnes of BMW is equivalent to 1,675,408 tonnes of total municipal waste, which is 128,000 tonnes more than the total amount landfilled in 2002/03.

If a Member State fails in its obligations to meet the landfill targets, it could be fined by the European Court of Justice. The penalty depends on "the seriousness of the infringement, its duration, and the need to ensure that the penalty itself is a deterrent to further infringements"¹². If the United Kingdom fails to meet the Landfill Directive targets, DEFRA has suggested that it could face a fine of up to £0.5 million a day¹³. The Welsh Assembly Government has indicated that any fines levied on it will be passed on to failing authorities¹⁴.

In order to encourage local authorities to meet their targets, *The Landfill Allowances Scheme (Wales) Regulations 2004*¹⁵ stipulate that a penalty of £200 per tonne will be imposed for any amount of BMW landfilled above each authority's allowance in a scheme year¹⁶. The Welsh Assembly Government has thus far exercised its right to waive fines on underperforming authorities, although the Minister for Environment, Planning and Countryside has stated that fines will not be waived in future¹⁷.

This £200 per tonne fine will be in addition to any infraction penalty imposed if Wales' waste management activities cause it to contribute to a UK failure to meet the Landfill Directive's requirements. Thus, failing authorities will face a fine of £200 per tonne from the Welsh Assembly Government, plus a proportion of the infraction penalty if Wales' waste management activities cause the UK to exceed its landfill allowance. The WLGA considers that these costs are likely to be far in excess of the £200 per tonne penalty¹⁸.

A projection has been made of the amount of waste that would be landfilled by local authorities in Wales if future waste management activities reduce the amount of waste being sent to landfill at the same rate as activity over the years 2002/03 to 2005/06 has done (see [Annex A](#)). This projection has been compared with a proportionate share¹⁹ of the amount allowable by *The Landfill (Scheme Year and Maximum Landfill Amount) Regulations 2004*²⁰.

The calculation does not take account of factors such as changing public attitudes to waste, or new recycling and composting facilities coming into operation. For this reason,

¹¹ Minister for Environment, Planning and Countryside, *The Landfill Allowance Scheme: Allocation of Allowances*, 14 August 2004.

¹² European Commission, 2005, *Commission Communication: Application of Article 228 of the EC Treaty*, http://ec.europa.eu/community_law/eulaw/pdf/sec_2005_1658_en.pdf

¹³ DEFRA, *Final Regulatory Impact Assessment on Implementing the Landfill (Scheme Year and Maximum Landfill Amount) Regulations 2004*,

<http://www.defra.gov.uk/corporate/regulation/2004/lats.pdf>

¹⁴ Welsh Local Government Association, *WLGA Co-ordinating Committee: Item 7 Waste Management*, 31 March 2006, <http://www.wlga.gov.uk/uploads/publications/1174.pdf>

¹⁵ OPSI, *The Landfill Allowances Scheme (Wales) Regulations 2004*, SI 2004/1490 (W.155), <http://www.opsi.gov.uk/legislation/wales/wsi2004/20041490e.htm>

¹⁶ A scheme year is any year from present to 2019, excluding 2010 and 2013, which are 'target years'

¹⁷ Carwyn Jones, Oral Evidence [201], *The Environment, Planning and Countryside Committee*, 7 February 2007,

<http://www.wales.gov.uk/cms/2/CommitteeMeeting/N000000000000000000000000047/67f87b10b45aa366078388e484d5932e.htm>

¹⁸ Welsh Local Government Association, *WLGA Co-ordinating Committee: Item 7 Waste Management*, 31 March 2006, <http://www.wlga.gov.uk/uploads/publications/1174.pdf>

¹⁹ A calculation was made of each local authority's share of the 2009/10 allowances, and these values were used as the basis to calculate the distribution of allowances for authorities in 2012/13

²⁰ OPSI, *The Landfill (Scheme Year and Maximum Landfill Amount) Regulations 2004*,

<http://www.opsi.gov.uk/si/si2004/20041936.htm>



and because the calculation is sensitive to the years chosen for the analysis of rate of reduction in landfill (in this case, 2002/03 and 2005/06), it should be noted that the values used in Table 2 are not predictions, but are an illustration of what could happen if recent landfilling trends were to continue until 2009/10 and 2012/13. All amounts of waste have been rounded to the nearest 500 tonnes.

On this basis, the authorities that would miss their 2009/10 and 2012/13 targets, and the possible fines levied, are shown in Table 2. The fines listed in the Table do not include any share of possible EU infringement penalties. The three authorities that would meet their targets are Monmouthshire, Bridgend, and Neath Port Talbot.

Table 2 Local authorities that would miss the 2009/10 or 2012/13 landfill targets based on the assumptions detailed in the text (authorities ranked in order of the biggest fine in 2012/13)

| Local authority | Amount by which 2009/10 target would be missed (tonnes) | Amount of BMW in excess of limit (61 per cent of total municipal waste) (tonnes) | Possible fine in 2009/10 (£) ²¹ | Amount by which 2012/13 target would be missed (tonnes) | Amount of BMW in excess of limit (61 per cent of total municipal waste) (tonnes) | Possible fine in 2012/13 (£) ²² |
|-------------------|---|--|--|---|--|--|
| Cardiff | 28,000 | 17,000 | 3,400,000 | 58,500 | 35,500 | 7,100,000 |
| Rhondda Cynon Taf | 20,500 | 12,500 | 2,500,000 | 42,000 | 25,500 | 5,100,000 |
| Powys | 7,000 | 4,500 | 900,000 | 19,500 | 12,000 | 2,400,000 |
| Conwy | 3,500 | 2,000 | 400,000 | 19,500 | 12,000 | 2,400,000 |
| Carmarthenshire | 4,500 | 2,500 | 500,000 | 19,000 | 11,500 | 2,300,000 |
| Gwynedd | 5,000 | 3,000 | 600,000 | 16,000 | 10,000 | 2,000,000 |
| Vale of Glamorgan | 3,000 | 2,000 | 400,000 | 13,000 | 8,000 | 1,600,000 |
| Pembrokeshire | 1,000 | 500 | 100,000 | 13,000 | 8,000 | 1,600,000 |
| Ynys Môn | 5,500 | 3,500 | 700,000 | 12,000 | 7,500 | 1,500,000 |
| Wrexham | | | | 11,000 | 6,500 | 1,300,000 |
| Blaenau Gwent | 2,500 | 1,500 | 300,000 | 10,500 | 6,500 | 1,300,000 |
| Torfaen | 500 | 500 | 100,000 | 7,500 | 4,500 | 900,000 |
| Swansea | | | | 4,500 | 2,500 | 500,000 |
| Newport | | | | 4,500 | 2,500 | 500,000 |
| Flintshire | | | | 3,500 | 2,000 | 400,000 |
| Caerphilly | | | | 2,500 | 1,500 | 300,000 |
| Merthyr Tydfil | | | | 2,500 | 1,500 | 300,000 |
| Denbighshire | | | | 1,000 | 500 | 100,000 |
| Ceredigion | | | | 1,000 | 500 | 100,000 |

Risk assessments undertaken as part of the Wales Programme for Improvement in 2003 identified that the management of waste services was a 'key risk' for 70 per cent of Welsh local authorities²³.

Target B: Companies operating under the Packaging Regulations were required to recover 59 per cent of packaging waste, and to recycle at least 19 per cent of each

²¹ Based on the £200 per tonne penalty outlined in OPSI, *The Landfill Allowances Scheme (Wales) Regulations 2004*, SI 2004/1490 (W.155),

<http://www.opsi.gov.uk/legislation/wales/wsi2004/20041490e.htm>

²² *ibid*

²³ Wales Audit Office, February 2005, *Waste Management: A Challenging Agenda for the Welsh Public Sector*, p. 14, http://www.wao.gov.uk/assets/englishdocuments/Waste_Management_Themed_Paper_9.pdf



specified material by 2002. However, a revised Packaging Directive²⁴ (implemented by two Regulations in the UK²⁵) set new recovery and recycling targets. By 31 December 2008, a minimum of 60 per cent of all packaging waste will need to be recovered, with recycling rates of between 55 and 80 percent. To compensate for the packaging waste that smaller businesses produce (they are exempt from the Regulations), those that must comply with the Regulations are required to recover 68 per cent of their packaging waste by the end of 2008, and this is likely to rise to 70 per cent by the end of 2010²⁶.

Disaggregated figures for Wales are not available for packaging. The UK data for packaging recovery and recycling for 2003 to 2005 are shown in Table 3.

Table 3 Packaging recycling and recovery rates, 2003 to 2005

| Year | Recycling rate (per cent) | Overall recovery rate (per cent) |
|--------------------|---------------------------|----------------------------------|
| 2003 ²⁷ | 47.4 | 53.4 |
| 2004 ²⁸ | 49.7 | 55.6 |
| 2005 ²⁹ | 54.4 | 59.9 |

The recovery rate has increased from 53.4 per cent to 59.9 per cent over two years. At this absolute rate of increase (3.25 per cent per year), the recovery rate at the end of 2008 would approach 70 per cent, achieving the Directive requirement of 68 per cent.

Target C: The End of Life Vehicles Directive³⁰ required that by 1 January 2006, 85 per cent of the average weight of all End of Life Vehicles should be re-used and recovered, with re-use and recycling accounting for 80 per cent. These targets are likely to be increased to 95 per cent and 85 per cent by 1 January 2015³¹.

In 2002, an average of 74 per cent of each of the vehicles scrapped in Wales and England was recovered (10 per cent for re-use of parts, and 64 per cent materials recycling)³². More recent figures are not available; the Directive requires data to be submitted from 2006 onwards, and these are expected to be published in July 2007.

²⁴ European Commission, Directive 2004/12/EC of the European Parliament and of the Council of 11 February 2004 Amending Directive 94/62/EC on Packaging and Packaging Waste,

http://europa.eu.int/eur-lex/pri/en/oj/dat/2004/l_047/l_04720040218en00260031.pdf

²⁵ OPSI, The Producer Responsibility Obligations (Packaging Waste) Regulations 2005,

<http://www.opsi.gov.uk/SI/si2005/20053468.htm>

OPSI, The Packaging (Essential Requirements) Regulations 2003,

<http://www.opsi.gov.uk/si/si2003/20031941.htm>

²⁶ DEFRA, The Producer Responsibility Obligations (Packaging Waste) Regulations 2005: Is Your Business Complying?, pp. 10 and 14

<http://www.defra.gov.uk/Environment/waste/topics/packaging/pdf/packagewaste06.pdf>

²⁷ DEFRA, Packaging and Packaging Waste: Data Relating to 2003,

<http://www.defra.gov.uk/Environment/waste/topics/packaging/pdf/package-waste2003.pdf>

²⁸ DEFRA, UK Packaging and Packaging Waste Data Relating to 2004,

<http://www.defra.gov.uk/Environment/waste/topics/packaging/pdf/package-waste2004.pdf>

²⁹ DEFRA, Packaging and Packaging Waste: Data Relating to 2005,

<http://www.defra.gov.uk/Environment/waste/topics/packaging/pdf/package-waste2005.pdf>

³⁰ European Commission, Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on End-of-Life Vehicles,

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32000L0053:EN:HTML>

³¹ ENDS Europe Daily, Commission Firm on 2015 Car Recycling Goal, Issue 2241, 16 January 2007,

<http://www.ends.europedaily.com/articles/index.cfm?action=article&ref=22411&searchtext=Commission%2Bfirm%2Bgoal%2B2015%2Bcar%2Brecycling%2Bgoal&searchtype=all>

³² Welsh Assembly Government, June 2002, Wise About Waste: The National Waste Strategy for Wales, Part 2, p. 126,

http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

2.2 Primary Wales-specific targets

Target A: *Public bodies in Wales should achieve:*

- *By 2005, a reduction in waste equivalent to 5 per cent of the 1998 arisings*
- *By 2010, a reduction in waste equivalent to 10 per cent of the 1998 arisings*

Two surveys of commercial and industrial waste have been conducted, in 1998/99 and 2002/03, from which results for Wales as a whole are extrapolated³³. The waste arisings from the public sector were approximately 249,000 tonnes in 1998/99. Although the 2002/03 survey showed a reduction in arisings, the sample size from the public sector was inadequate for firm conclusions to be drawn.

Target B: *Each local authority in Wales should achieve the following recycling and composting targets:*

- *By 2003/04, at least 15 per cent recycling and composting of municipal waste, with a minimum of 5 per cent composting and 5 per cent recycling*
- *By 2006/07, at least 25 per cent recycling and composting of municipal waste, with a minimum of 10 per cent composting and 10 per cent recycling*
- *By 2009/10 and beyond, at least 40 per cent recycling and composting of municipal waste, with a minimum of 15 per cent composting and 15 per cent recycling*

The progress on recycling and composting in Wales is shown in Figure 1.

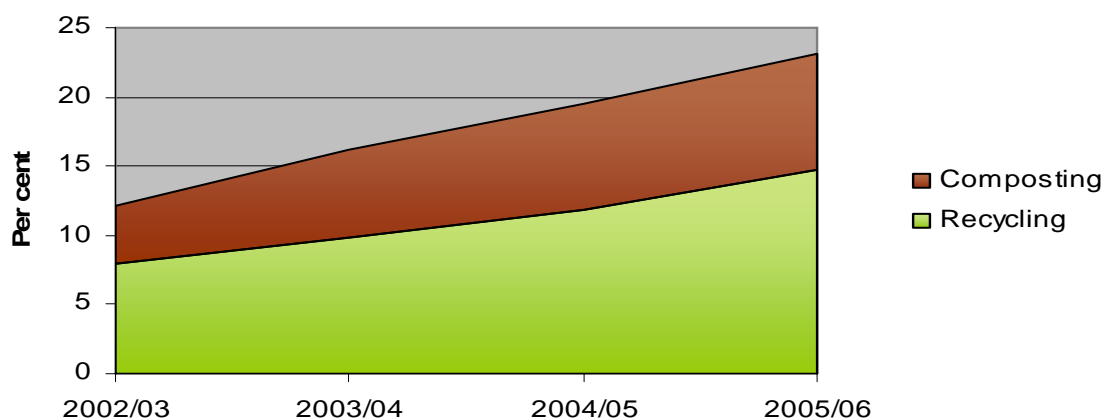


Figure 1 Recycling and composting rates in Wales, 2002/03 to 2005/06

In 2003/04, the target of 15 per cent recycling and composting, with a minimum contribution of 5 per cent of each, was reached overall in Wales (see Table 4), although nine local authorities in Wales failed to meet the target³⁴.

³³ Environment Agency Wales, *About the Commercial and Industrial Waste Survey*, <http://www.environment-agency.gov.uk/regions/wales/816243/1220048/1223323/1234874/?version=1&lang=e>

³⁴ Wales Audit Office, February 2005, *Waste Management: A Challenging Agenda for the Welsh Public Sector*, p. 10, http://www.wao.gov.uk/assets/englishdocuments/Waste_Management_Themed_Paper_9.pdf
Failing authorities were Ynys Môn, Denbighshire, Wrexham, Carmarthenshire, Neath Port Talbot, Cardiff, Rhondda Cynon Taf, Merthyr Tydfil, and Blaenau Gwent.



Table 4 Composting and recycling rates, 2002/03 to 2005/06

| Year | Composting rate (per cent) | Recycling rate (per cent) | Overall composting and recycling rate (per cent) |
|-----------------------|----------------------------|---------------------------|--|
| 2002/03 ³⁵ | 4.15 | 7.92 | 12.07 |
| 2003/04 ³⁶ | 6.41 | 9.84 | 16.25 |
| 2004/05 ³⁷ | 7.63 | 11.81 | 19.44 |
| 2005/06 ³⁸ | 8.45 | 14.67 | 23.12 |

In the financial year 2005/06, the recycling rate was 27 per cent in England³⁹, 24 per cent in Scotland⁴⁰, and 23 per cent in Northern Ireland⁴¹. During the calendar year 2005, the recycling rate in the Republic of Ireland was 35 per cent⁴².

If the composting rate in Wales continues to increase at its three-year average of 1.43 percentage points, the composting target for 2006/07 will be missed by 0.1 per cent. The 2009/10 target of 15 per cent would likewise be missed, by 0.8 per cent. The Wales Audit Office notes that there is a risk of reaching a plateau for composting rates in the short and medium term because of the time lag in developing large composting infrastructure. The decision of the Welsh Assembly Government that home composting can be counted towards local authority targets from April 2007⁴³ should lead to a greater increase in 2007/08 than in recent years, although the classification has not satisfied the European Commission's requirements to count towards diversion of BMW from landfill.

The minimum recycling rate for 2006/07 (10 per cent) was reached in 2004/05. If the three-year average increase in the recycling rate of 2.25 percentage points is maintained in 2006/07, the minimum recycling rate for 2009/10 (15 per cent) will be reached by 2006/07. It is generally easier to divert recycle from landfill at lower levels of recycling.

If the recycling and composting levels increase at their three-year average rates until 2009/10, the overall recycling and composting rate of 40 per cent will not be reached, with 24 per cent recycling, and 14 per cent composting (total 38 per cent).

The levels of composting and recycling from 2002/03 to 2005/06 are known for each local authority in Wales. By calculating the rate of increase in composting and recycling, it is possible to project what these levels would be in 2009/10 if the increase is maintained at the three-year average. This calculation does not take account of factors such as changing public attitudes to composting and recycling, new composting and recycling facilities coming into operation, or the greater difficulty likely to be faced in increasing

³⁵ WLGA Data Unit, *2002/03 National Assembly for Wales Performance Indicators: Version 1.3*, http://www.dataunitwales.gov.uk/Documents/Data_Set/PIs/ADS06000_SpreadsheetForPublishing200203_eng.xls

³⁶ WLGA Data Unit, *2003/04 National Assembly for Wales Performance Indicators*, http://www.dataunitwales.gov.uk/Documents/Project/PIs/ADS06000_Spreadsheet_for_publishing200304_eng.xls

³⁷ WLGA Data Unit, *2004/05 National Assembly for Wales Performance Indicators: Version 1.0*, http://www.dataunitwales.gov.uk/Documents/Project/PIs/ADS06000_Spreadsheet_for_publishing200405_eng.xls

³⁸ WLGA Data Unit, *2005/06 National Strategic Indicators for Wales*, http://www.dataunitwales.gov.uk/Documents/Data_Set/PIs/lqd10000_2005_06_pi_data_v1_bi.xls

³⁹ DEFRA, *The Waste 'Tide' Turns*, <http://www.defra.gov.uk/news/2006/061116b.htm>

⁴⁰ Scottish Executive, *Figures Show Increase in Recycling*, <http://www.scotland.gov.uk/News/Releases/2006/10/03101410>

⁴¹ Environment and Heritage Service, December 2006, *Municipal Waste Management Northern Ireland: 2005/06 Summary Report*, http://www.ehsni.gov.uk/municipal_waste_management_for_northern_ireland_2005-06_summary_report.pdf

⁴² Irish Environmental Protection Agency, *National Waste Report 2005*, <http://www.epa.ie/NewsCentre/ReportsPublications/Waste/National%20Waste%20Report%202005.pdf>

⁴³ Welsh Assembly Government, *Progress on Implementing Recommendations from the EPC Committee's Inquiry into Meeting Landfill and Recycling Targets*, Evidence to the Environment Planning and Countryside Committee, 7 February 2007, <http://www.wales.gov.uk/cms/2/EnvironmentPlanningAndCountrysideCommittee/N00000000000000000000000000000009/8089c6dcec8c90fb99ffa80dcfdca99.htm>



composting and recycling rates where high proportions of recoverable materials are already being collected. The projections are shown in Table 5.

Table 5 Projected composting and recycling rate for each local authority in 2009/10 if recent increases are maintained (authorities ranked in order of the least amount recycled in 2009/10)

| Local authority | Composting and recycling rate (per cent) | | Rate of increase, 2002/03-2005/06 (percentage points) | Composting and recycling rate in 2009/10 if increase stays constant (per cent) |
|-------------------|--|-----------------------|---|--|
| | 2002/03 ⁴⁴ | 2005/06 ⁴⁵ | | |
| Cardiff | 9.37 | 12.12 | 0.92 | 15.8 |
| Wrexham | 13.93 | 18.41 | 1.49 | 24.4 |
| Torfaen | 10.13 | 16.84 | 2.24 | 25.2 |
| Pembrokeshire | 15.45 | 21.14 | 1.90 | 28.8 |
| Rhondda Cynon Taf | 10.32 | 19.05 | 2.91 | 30.7 |
| Ynys Môn | 10.80 | 19.80 | 3.00 | 31.8 |
| Conwy | 16.43 | 23.88 | 2.48 | 33.8 |
| Carmarthenshire | 13.55 | 22.68 | 3.04 | 34.8 |
| WALES | 12.07 | 23.12 | 3.68 | 37.8 |
| Blaenau Gwent | 6.00 | 19.79 | 4.60 | 38.2 |
| Denbighshire | 9.19 | 21.84 | 4.22 | 38.7 |
| Bridgend | 15.16 | 25.73 | 3.52 | 39.8 |
| Merthyr Tydfil | 9.50 | 22.62 | 4.37 | 40.1 |
| Gwynedd | 11.49 | 24.00 | 4.17 | 40.7 |
| Newport | 16.65 | 27.12 | 3.49 | 41.1 |
| Vale of Glamorgan | 12.36 | 25.54 | 4.39 | 43.1 |
| Neath Port Talbot | 3.09 | 21.12 | 6.01 | 45.2 |
| Flintshire | 12.47 | 26.66 | 4.73 | 45.6 |
| Swansea | 12.60 | 27.74 | 5.05 | 48.0 |
| Monmouthshire | 11.28 | 27.98 | 5.57 | 50.3 |
| Caerphilly | 10.10 | 28.08 | 6.00 | 52.1 |
| Ceredigion | 20.35 | 35.58 | 5.08 | 55.9 |
| Powys | 19.60 | 35.30 | 5.23 | 56.2 |

⁴⁴ WLGA Data Unit, 2002/03 National Assembly for Wales Performance Indicators: Version 1.3, http://www.dataunitwales.gov.uk/Documents/Data_Set/PIs/ADS06000_SpreadsheetForPublishing200203_eng.xls

⁴⁵ WLGA Data Unit, 2005/06 National Strategic Indicators for Wales, http://www.dataunitwales.gov.uk/Documents/Data_Set/PIs/lqd10000_2005_06_pi_data_v1_bi.xls



Target C: *By 2003/04, all civic amenity sites in Wales should have installed facilities to receive and store bonded asbestos sheets, oils, paints, solvents, and fluorescent light bulbs.*

By 2005/06, seven of the 22 Welsh local authorities had met the 2003/04 target. Ten authorities had no facilities for one or more of the stipulated materials. Overall, each material is able to be stored at more than half of all civic amenity sites in Wales (Table 6)⁴⁶.

Table 6 Proportion of civic amenity sites with suitable provision for hazardous waste

| Material | Proportion of all civic amenity sites with suitable storage facilities (per cent) |
|-------------------|---|
| Asbestos | 53.0 |
| Oil | 95.2 |
| Paint | 67.5 |
| Solvent | 65.1 |
| Fluorescent tubes | 72.3 |

⁴⁶ Welsh Assembly Government, *CA Site Survey of HHW Provision 2005-06*, personal communication, 17 January 2007

2.3 Secondary Wales-specific targets

Target A: *By 2009/10 and beyond, waste arisings per household should be no greater than those in 1997/98, and waste arisings per person should be less than 300kg per annum by 2020.*

The waste generated per household in Wales is shown in Table 7.

Table 7 Household waste arisings, 1997/98 and 2004/05

| Year | Total household waste (tonnes) | Number of households in Wales | Waste per household (kg) |
|-----------------------|--------------------------------|-------------------------------|--------------------------|
| 1997/98 | 1,292,000 ⁴⁷ | 1,185,800 ⁴⁸ | 1,090 |
| 2004/05 ⁴⁹ | 1,580,000 ⁵⁰ | 1,247,300 ⁵¹ | 1,267 |

The rate of growth of waste has therefore been 2.2 per cent per household per year between 1997/98 and 2004/05. In order to reach the 2009/10 target (waste arisings per household no greater than in 1997/98), waste per household needs to decrease by 3.7 per cent every year from 2005/06.

With regard to the target to reduce personal waste arisings in Wales below 300kg per year by 2020, the waste per person in 2004/05, and the target for 2020 are shown in Table 8.

Table 8 Household waste arisings in 2004/05, and the 2020 target

| Year | Total household waste (tonnes) | Population of Wales | Waste per person (kg) |
|---------|--------------------------------|-------------------------|-----------------------|
| 2004/05 | 1,580,000 ⁵² | 2,958,600 ⁵³ | 534 |
| 2020/21 | 914,160 | 3,047,200 ⁵⁴ | 300 |

In order to reach this 2020 target, household waste needs to decrease by 3.5 per cent per year from 2005/06.

Target B: *Businesses in Wales should achieve:*

- *By 2005, a reduction in waste equivalent to 5 per cent of the 1998 arisings*
- *By 2010, a reduction in waste equivalent to 10 per cent of the 1998 arisings*

This target is measured using the total quantity of industrial and commercial waste produced⁵⁵. Two surveys of commercial and industrial waste have been conducted, in 1998/99 and 2002/03, from which results for Wales as a whole are extrapolated⁵⁶.

⁴⁷ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 33, http://new.wales.gov.uk/topics/environmentcountryside/epg/waste_recycling/wise_about_waste_strategy?lang=en

⁴⁸ National Assembly for Wales Statistical Directorate, *1998-Based Population and Household Projections for Wales*, <http://new.wales.gov.uk/docrepos/40382/40382313/403824/population/825798/sb32-2001.pdf?lang=en>

⁴⁹ The latest year for which figures are available

⁵⁰ National Statistics, *Municipal Waste Management Report for Wales 2004-2005*, http://new.wales.gov.uk/docrepos/40371/403823112/4038216/4038215/0405_MSW_FINAL_REPORT_pt1.doc?lang=en

⁵¹ National Statistics, *Mid-Year Household Estimates for Wales, 2001-2004*, <http://new.wales.gov.uk/docrepos/40382/40382313/403824/housing/housing-2006/sdr139-2006.pdf?lang=en>

⁵² National Statistics, *Municipal Waste Management Report for Wales 2004-2005*, http://new.wales.gov.uk/docrepos/40371/403823112/4038216/4038215/0405_MSW_FINAL_REPORT_pt1.doc?lang=en

⁵³ Welsh Assembly Government, *2005 Mid Year Estimates of Population*, <http://new.wales.gov.uk/topics/statistics/headlines/pop-2006/hdw20060831/?lang=en>

⁵⁴ There is no population prediction for 2020; we have used 2021 as a surrogate. National Assembly for Wales Statistical Directorate, *1998-Based Population and Household Projections for Wales*, <http://new.wales.gov.uk/docrepos/40382/40382313/403824/population/825798/sb32-2001.pdf?lang=en>

⁵⁵ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 2, p. 142, http://new.wales.gov.uk/topics/environmentcountryside/epg/waste_recycling/wise_about_waste_strategy?lang=en

⁵⁶ Environment Agency Wales, *About the Commercial and Industrial Waste Survey*, <http://www.environment-agency.gov.uk/regions/wales/816243/1220048/1223323/1234874/?version=1&lang=e>



Industrial and commercial arisings were 6,130,000 tonnes in 1998/99⁵⁷, and 5,272,000 tonnes in 2002/03⁵⁸, a reduction of 14 per cent. The 2010 target (a reduction of 10 per cent on 1998 arisings) had already been met in 2002/03.

Target C: *Less than 85 per cent of the amount of industrial and commercial waste landfilled in 1998 should be landfilled by 2005, and less than 80 per cent by 2010.*

A total of 2,431,000 tonnes of industrial and commercial waste was landfilled in 1998/99⁵⁹. A total of 1,474,000 tonnes of this waste was landfilled in 2002/03⁶⁰, a 39 per cent reduction, which achieved both the 2005 and 2010 targets.

Target D: *The amount of hazardous waste generated should be reduced by at least 20 percent between 2000 and 2010.*

Welsh Assembly Government data indicate that hazardous waste arisings in Wales were 365,000 tonnes in 2000. In 2003 (the most recent year for which data are available), 303,000 tonnes of hazardous waste were generated. This is 83 per cent of the arisings in 2000; at this rate of reduction, the 2010 target may already have been reached⁶¹.

Target E: *Less than 85 per cent of the amount of biodegradable industrial and commercial waste landfilled in 1998 should be landfilled by 2005, and less than 80 per cent by 2010.*

The total amount of biodegradable industrial and commercial waste landfilled in 1998/99 was approximately 985,000 tonnes⁶². There are no subsequent data for landfilling biodegradable industrial and commercial waste.

Target F: *At least 75 per cent of construction and demolition waste should be re-used or recycled by 2005, and at least 85 per cent by 2010.*

In 1998/99, 76 per cent of construction and demolition waste was reused or recycled, with the remainder landfilled⁶³. In 2003, 91 per cent of construction and demolition waste was reused or recycled⁶⁴, a figure which attained the 2010 target.

⁵⁷ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 55, http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

⁵⁸ Environment Agency Wales, *Wales Commercial and Industrial Waste Data Used for Graphics/Charts 2002/03*, http://www.environment-agency.gov.uk/commonddata/103601/walescitablenessummary_1236864.xls

⁵⁹ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 55, http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

⁶⁰ Environment Agency Wales, *Wales Commercial and Industrial Waste Data Used for Graphics/Charts 2002/03*, http://www.environment-agency.gov.uk/commonddata/103601/walescitablenessummary_1236864.xls

⁶¹ Arisings are expected to have increased during 2004 as a result of rapid landfilling activity prior to the ban, in July 2004, on landfilling hazardous waste in municipal landfill sites.

⁶² Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 82, http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

⁶³ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 2, p. 118, http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

⁶⁴ Smiths Gore, 2005, *Survey of the Arisings and Use of Construction, Demolition and Excavation Waste, Quarry Waste and Dredging Waste in Wales in 2003*

3 The Waste Hierarchy

The waste hierarchy⁶⁵ places different waste management practices in order of environmental favourability. It progresses through the following stages:

- Prevent waste production
- Reduce/minimise waste production and hazardousness
- Re-use
- Recover materials (composting and recycling)
- Recover energy
- Dispose

The Welsh Assembly Government notes that waste management techniques further up the waste hierarchy generate more direct jobs, with the possible exception of waste minimisation⁶⁶. Waste minimisation does however have an indirect impact on safeguarding jobs through making business more efficient and competitive, and it also provides employment for those providing advice on waste minimisation⁶⁷.

The Welsh Assembly Government has a stated preference to move waste management as far up the waste hierarchy as practicable⁶⁸. Waste management has started to move up the hierarchy, from an overwhelming dependence on landfill in Wales (93 per cent in 1999/2001-02⁶⁹), to recycling and energy recovery. The Wales Audit Office notes that Wales' waste targets cannot be met through recycling and reuse initiatives alone. Limiting the amount of waste produced in the first place is 'essential', and legislative measures will be needed to achieve these reductions⁷⁰. There is some evidence that household waste minimisation activity is correlated with recycling activity⁷¹.

A diagram of different waste management options (Figure 2) illustrates pathways under which smaller loops represent less wastage of both material and energy. Material exiting the loops altogether is the biggest wastage route, since it represents a permanent loss of energy and matter⁷².

⁶⁵ Welsh Assembly Government, *Waste Disposal Hierarchy*,

http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/waste_disposal_hierarchy?lang=en

⁶⁶ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 2, p. 165,

http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

⁶⁷ *ibid*

⁶⁸ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 18,

http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

⁶⁹ *ibid*, p. 33

⁷⁰ Wales Audit Office, February 2005, *Waste Management: A Challenging Agenda for the Welsh Public Sector*, p. 23,

http://www.wao.gov.uk/assets/englishdocuments/Waste_Management_Themed_Paper_9.pdf

⁷¹ Obara L, 2005. *Is Waste Minimisation a Challenge Too Far?: The Experience of Household Waste Management and Purchasing in the UK*. Cardiff University: The Centre for Business Relationships, Accountability, Sustainability and Society. <http://www.brass.cf.ac.uk/uploads/wpwasteminchallengeLO1005.pdf>

⁷² Notwithstanding the production of landfill gas, and the future possibility of 'landfill mining'

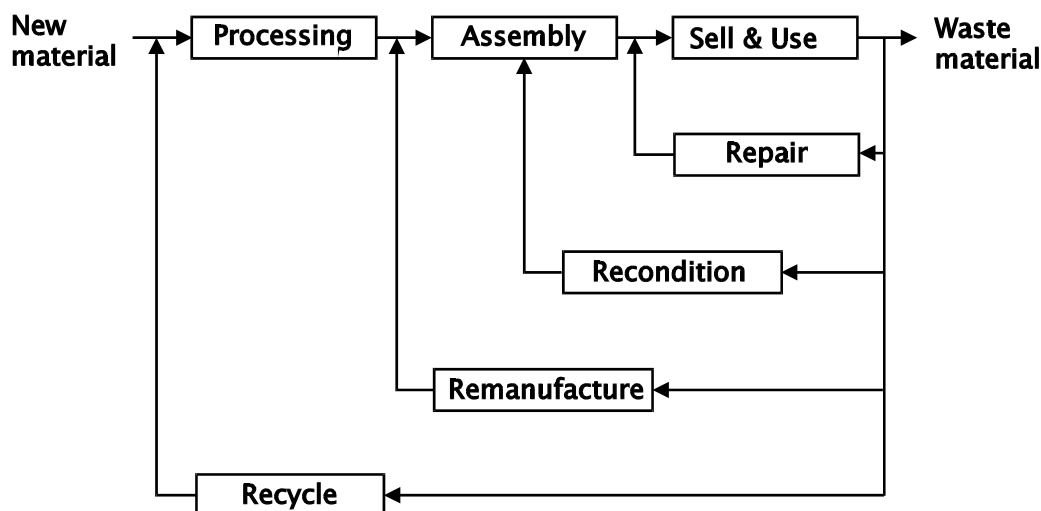


Figure 2 Reducing waste through closed loop design - repair, remanufacturing or recycling (King et al, 2005⁷³)

The following sections describe the waste hierarchy in descending order of favourability.

3.1 Reducing consumption of unnecessary goods

Many of our most commonly used goods are not strictly speaking necessary. All products require raw materials and energy for their production, and resources to deal with their disposal, with associated environmental impacts. Unnecessary or single-use goods are particularly wasteful where a good alternative exists.

- 4 per cent of all plastic flowing into the UK household packaging sector is comprised of carrier bags, which could be replaced with reusable cotton or robust plastic bags, saving 2,100 tonnes of waste annually in Wales⁷⁴. A 2003 survey indicated that 90 per cent of shoppers in the Republic of Ireland, which has a 15c levy⁷⁵ on carrier bags, now use long life bags⁷⁶.
- Junk mail can be reduced by contacting the Mailing Preference Service⁷⁷, while mail arriving for a previous owner or tenant of a dwelling can be reduced by making the source of the mail aware of the changed circumstances.
- Much packaging may be unnecessary, such as the shrink-wrapping on a swede highlighted in the waste campaign of *The Independent* newspaper⁷⁸.
- Some single-use goods could be discouraged, with the use of financial instruments, where an analogous multiple-use alternative is available. Examples include single-use

⁷³ King AM et al, 2005. Reducing Waste: Repair, Recondition, Remanufacture or Recycle? *Sustainable Development* 14(4), 257-267.

http://www.remanufacturing.org.uk/pdf/Salt_Lake_City_v6_AK.doc

⁷⁴ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 2, p. 70, http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

⁷⁵ Levy to be increased to 22c from 1 July 2007.

Irish Department of the Environment, Heritage and Local Government, *Plastic Bags Levy to be Increased to 22c From 1 July Next*,

<http://www.environ.ie/DOEI/DOEIPub.nsf/6fb57b90102ce64c80256d12003a7a0d/825d1e7cf9c621528025728900409e92?OpenDocument>

⁷⁶ Irish Department of the Environment, Heritage and Local Government, 2005. *Submission from the Department of the Environment, Heritage and Local Government*. Edinburgh: Scottish Parliament Environment and Rural Development Committee.

<http://www.scottish.parliament.uk/business/committees/environment/inquiries/pb/ERD.S2.05.27.1d%20-%20DEHLG.pdf>

⁷⁷ Mailing Preference Service, <http://www.mpsonline.org.uk/mpsr/>

⁷⁸ McCarthy M, Hickman M and Roberts G, "Campaign Aims to Reduce the Mountains of Waste", *Independent*, 22 January 2007, <http://news.independent.co.uk/environment/article2175016.ece>

nappies, single-use drinks containers, single-use batteries, plastic cups and cutlery, plastic pots for single portions of milk, and paper towels. In many instances longer life products can be substituted, such as rechargeable batteries, or reusable drinks containers. In other instances, organisational change may enable long-life products to be used, such as mugs instead of disposable cups.

In 2005, the opinion of the Wales Audit Office was that 'very few' local authorities had considered ways of minimising the amount of waste produced⁷⁹.

3.2 Reducing packaging

Some goods require a minimum amount of packaging to retain their integrity. However, many commonly-purchased goods may be over-packaged – packaging has increased by 12 per cent between 1999 and 2005, and now accounts for one third of an average household's total waste⁸⁰. Examples include cardboard packaging for toothpaste tubes or bags of cereal, and small packets of fruit packaged on polystyrene trays and wrapped in clingfilm. Environment Agency Wales has stated its desire for a drive on waste minimisation at source⁸¹.

Under UK law, packaging volume and weight must be limited "to the minimum adequate amount to maintain the necessary level of safety, hygiene and acceptance for the packed product and for the consumer"⁸². Ben Bradshaw, UK Minister for Local Environment, suggested in November 2006 that consumers could remove "excessive and unnecessary" packaging in shops and leave it at the till in order to encourage retailers to reduce waste⁸³. He also suggested that people can "complain to the supermarket manager... if that doesn't work, report the shop to the trading standards authority"⁸⁴.

In Germany, consumers have had the right, since 1991, to leave packaging that is surplus to requirements at the retail outlet that sold it⁸⁵. In addition, retail outlets are obliged to accept, free of charge, used and emptied sales packaging returned by the consumer to any outlet stocking that particular product⁸⁶.

3.3 Discouraging the use of certain types of single-use packaging

There are many examples of substitutions of materials that could provide better environmental performance, such as replacing polystyrene take-away cartons with paper wrapping, selling some types of drinks in polythene sacs (as in Sweden), selling yoghurt in Tetra-Paks, or using refillable bottles. Legislation in Germany has resulted in 90 per cent of beer bottles being reused⁸⁷. Financial incentives could be used in the UK to phase out packaging with poor environmental performance.

⁷⁹ Wales Audit Office, February 2005, *Waste Management: A Challenging Agenda for the Welsh Public Sector*, p. 14, http://www.wao.gov.uk/assets/englishdocuments/Waste_Management_Themed_Paper_9.pdf

⁸⁰ "Too Much Packaging? Dump it at Checkout, Urges Minister", *Guardian*, 14 November 2006, <http://environment.guardian.co.uk/waste/story/0,,1947184,00.html>

⁸¹ Ceri Davies, Oral Evidence [247], *Environment, Planning and Countryside Committee*, 25 January 2007, <http://www.wales.gov.uk/cms/2/CommitteeMeeting/N00000000000000000000000000000047/d7b7d3fc3d2fab4e6e1ee0549897a4a4.htm>

⁸² OPSI, *The Packaging (Essential Requirements) Regulations 2003*, <http://www.opsi.gov.uk/si/si2003/20031941.htm>

⁸³ "Too Much Packaging? Dump it at Checkout, Urges Minister", *Guardian*, 14 November 2006, <http://environment.guardian.co.uk/waste/story/0,,1947184,00.html>

⁸⁴ "Waste Basket: Minister Backs Campaign to Cut Packaging", *Independent*, 23 January 2007, <http://news.independent.co.uk/environment/article2177993.ece>

⁸⁵ Der Grüne Punkt, *Waste Separation*, <http://www.gruener-punkt.de/en/environmental-info/waste-separation.html>

⁸⁶ German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, *Ordinance on the Avoidance and Recovery of Packaging Wastes*, Article 6 http://www.bmu.bund.de/files/pdfs/allgemein/application/pdf/verpackv_4aenderung_en.pdf

⁸⁷ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 2, p. 71,



3.4 Repairing and reusing goods

Reuse is a valuable means of keeping useful items out of landfill. By donating a product to a charity shop or to the community sector, rather than disposing of it when it is no longer needed, people are both supporting the charity or community organisation, and reducing the landfill of waste. Community-based organisations which reuse goods frequently have a social function in providing jobs and training for disadvantaged people⁸⁸. Online communities are becoming increasingly popular means of exchanging and donating useful but unwanted products⁸⁹. In both these cases, reuse often takes place in close proximity to the original location of the item⁹⁰.

Products tend to have shorter life spans now than they did in the past⁹¹. Planned obsolescence is one way in which markets generate a demand for new sales⁹². Improving the lifespan of products is "one of the most obvious strategies for reducing waste and increasing material productivity"⁹³. On average, for one tonne of waste at the consumer end of a manufactured article, there are 5 tonnes at the manufacturing stage and 20 tonnes at the site of initial resource extraction⁹⁴.

Designing products for a longer life, and extending that life span through repair and reconditioning, would benefit the environment through a reduction in resource use, reduced pollution and less waste. There could also be economic benefits, since service and repair work could be carried out locally even if the item was originally imported. There are also possible disadvantages. A product designed to last longer may require more materials and different types of materials, some of which may be less easy to recycle once the product has to be discarded. Another concern is that keeping products in service longer will mean foregoing the benefits of improved environmental performance, for example in energy efficiency, until a later date. However, this has to be set against the energy used in producing the product in the first place, which can be greater than the energy used during its lifespan.

The aim is to achieve the optimal life span rather than the maximum life span for a product. A life cycle analysis is a means to help ensure that the best balance is achieved between longevity, design for recycling, and product use.

3.5 Composting kitchen and garden waste

The proximity principle indicates that waste should be treated at source, where possible, in order to reduce the environmental impact of transporting it, and to encourage producer responsibility⁹⁵. Composting is a means of reducing the 18.3 per cent of municipal waste that is comprised of garden and compostable kitchen waste⁹⁶, along with some cardboard

http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

⁸⁸ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 37,

http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

⁸⁹ The first Welsh Freecycle group started in Newport in May 2004; by 12 January 2007 there were 19,658 members of 28 groups throughout Wales.

⁹⁰ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 37,

http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

⁹¹ Reisch L, 2001. Time and wealth: The role of time and temporalities for sustainable patterns of consumption. *Time and Society* 10(2/3): 367-385.

⁹² Strausz R, 2006. *Planned Obsolescence and the Provision of Unobservable Quality*, Departmental Working Paper, Free University of Berlin,

<http://sites.wiwiw.fu-berlin.de/bester/roland/papers/obsolescence/obsolescence.pdf>

⁹³ Von Weizsäcker E et al., 1997. *Factor Four*, p. 70. London: Earthscan.

⁹⁴ Waste Online, *Waste Reduction – the First Option*,

http://www.wasteonline.org.uk/resources/WasteWatch/WASTEWORk1_files/page4.html

⁹⁵ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 13,

http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

⁹⁶ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 2, p. 81,



and paper; 23 per cent of households in the UK compost kitchen and garden waste⁹⁷. 16 of 22 local authorities in Wales promote home composting⁹⁸. According to the Wales Audit Office, home composting of kitchen and garden waste is "far more cost-effective and environmentally beneficial" than its collection by local authorities⁹⁹. Wales is the first country in the UK to have committed to count home composting towards local authority targets¹⁰⁰, although this will not count towards European targets for diversion of BMW from landfill.

There are many blocks of flats in Wales, as well as other dwellings that either have no garden or have a garden inadequate in size to house a compost bin. For these dwellings, a wormery may be an indoors alternative to composting.

3.6 Recycling

Resources or goods that cannot be repaired or reused should be recycled. The necessity to recycle is in part a failure to keep resource use to a minimum, because recycling generally incurs societal costs and environmental impacts greater than those associated with reuse or reduction of waste at source.

Ideally, recycling should be source-segregated, that is, it should be sorted by whoever generated the waste, or as close to the source as possible. Segregated recycling almost invariably leads to a higher quality product than co-mingled recycling¹⁰¹; the Wales Audit Office comments that materials are not always collected in a way that avoids contamination, limiting marketability and reducing economic value¹⁰². Although there can be increased costs associated with the superior product, these increased costs are largely associated with more employment¹⁰³, because discrimination in waste sorting can best be achieved by people. Cylch notes that costs with segregated systems may actually decrease over time, as the value of collected materials increases¹⁰⁴.

The Welsh Assembly Government considers that higher quality recyclate will be required in order for recycling systems to be economically self-sustaining¹⁰⁵, and recommends Cylch's Cleanstream approach¹⁰⁶ as a means that "maximises the collection of clean recyclable and compostable materials from the household stream"¹⁰⁷. The Welsh Assembly Government also encourages local authorities to partner the community sector

http://new.wales.gov.uk/topics/environmentcountryside/epg/waste_recycling/wise_about_waste_strategy?lang=en

⁹⁷ Recycle Now, *Welcome to the Compost at Home Website*,

http://www.recyclenow.com/home_composting/welcome.html

⁹⁸ WLGA, *Recycling and Composting Services Provided by Local Authorities in Wales, Percentage of Households Covered and Participation Rates*, Paper Tabled at Environment, Planning and Countryside Committee, 25 January 2007.

⁹⁹ Wales Audit Office, February 2005, *Waste Management: A Challenging Agenda for the Welsh Public Sector*, p. 26,

http://www.wao.gov.uk/assets/englishdocuments/Waste_Management_Themed_Paper_9.pdf

¹⁰⁰ Welsh Assembly Government, *Progress on Implementing Recommendations from the EPC Committee's Inquiry into Meeting Landfill and Recycling Targets*, Evidence to the Environment Planning and Countryside Committee, 7 February 2007,

<http://www.wales.gov.uk/cms/2/EnvironmentPlanningAndCountrysideCommittee/N00000000000000000000000000000009/8089c6dcec8c90fb99ffa80dcfd0a99.htm>

¹⁰¹ Cylch, *Cleanstream 2006*, pp. 22-24,

http://www.cylch.org/content/files/Cleanstream_2006.pdf

¹⁰² Wales Audit Office, February 2005, *Waste Management: A Challenging Agenda for the Welsh Public Sector*, p. 5,

http://www.wao.gov.uk/assets/englishdocuments/Waste_Management_Themed_Paper_9.pdf

¹⁰³ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 2, pp. 165-166 and 178,

http://new.wales.gov.uk/topics/environmentcountryside/epg/waste_recycling/wise_about_waste_strategy?lang=en

¹⁰⁴ Cylch, *Cleanstream 2006*, p. 6,

http://www.cylch.org/content/files/Cleanstream_2006.pdf

¹⁰⁵ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 38,

http://new.wales.gov.uk/topics/environmentcountryside/epg/waste_recycling/wise_about_waste_strategy?lang=en

¹⁰⁶ See Cylch, *Cleanstream 2006*,

http://www.cylch.org/content/files/Cleanstream_2006.pdf

¹⁰⁷ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 13,

http://new.wales.gov.uk/topics/environmentcountryside/epg/waste_recycling/wise_about_waste_strategy?lang=en

in recycling partnerships, because they have a good track record of working with communities and encouraging good diversion rates, and because some of them provide support for disadvantaged people¹⁰⁸.

Civic amenity sites are approximately four times cheaper per tonne of recyclate collected than kerbside recycling¹⁰⁹; bring sites are also likely to be cheaper because of economies of scale.

Evidence from other countries in Europe indicates that charging for the collection of household waste significantly increases the effectiveness of recycling schemes¹¹⁰, and reduces residual waste¹¹¹. International experience suggests that variable charging for household waste can lead to increased flytipping, although such increases tend to be short-lived where schemes are well managed and enforcement is effective¹¹². The European Commission concurs that most communities introducing variable charges have not experienced large and sustained increases in flytipping¹¹³.

3.7 Deriving all possible benefits from materials that cannot be reused or recycled

Although one of the primary objectives of the Waste Strategy is to minimise the use of energy from waste¹¹⁴, it also indicates that a "limited number" of energy recovery facilities will be required in Wales in order to meet the requirements of European legislation¹¹⁵. The Welsh Assembly Government has set a number of criteria that need to be met for an energy from waste plant to be acceptable¹¹⁶, including a requirement that "as much recyclable and compostable material as practically possible has been removed" from the residual waste.

Energy from waste technologies include gasification, incineration, and pyrolysis¹¹⁷. All methods involve the combustion of waste to directly or indirectly generate electricity, or the substitution of other fuel by waste in manufacturing¹¹⁸. Friends of the Earth suggests that anaerobic digestion has better environmental performance than other energy from waste technologies¹¹⁹. The EC Waste Incineration Directive¹²⁰, which applies to all energy from waste technologies, applies stringent standards on emissions¹²¹. According to the Environment Agency, studies into the health of communities living near to

¹⁰⁸ *ibid*, p. 41

¹⁰⁹ Wales Audit Office, personal communication, 26 January 2007

¹¹⁰ National Assembly for Wales, *Decision Report: Request for Local Authority Powers for Charging for Residual Waste to be Included in a Forthcoming DCLG Bill*,

<http://www.information.wales.gov.uk/content/decisionreports/agriculture/waste-management/request%20for%20powers%20for%20charging%20for%20residual%20waste.rtf>

¹¹¹ OECD, February 2007, *Instrument Mixes Addressing Household Waste*,
[http://www.oilis.oecd.org/olis/2005doc.nsf/43bb6130e5e86e5fc12569fa005d004c/f8ee018fcd7f55b1c1257279004feb96/\\$FILE/JT03221143.PDF](http://www.oilis.oecd.org/olis/2005doc.nsf/43bb6130e5e86e5fc12569fa005d004c/f8ee018fcd7f55b1c1257279004feb96/$FILE/JT03221143.PDF)

¹¹² HC Deb 28 June 2006 C394W,

<http://www.publications.parliament.uk/pa/cm200506/cmhansrd/cm060628/text/60628w1277.htm>

¹¹³ European Commission, May 2003, *Towards a Thematic Strategy on the Prevention and Recycling of Waste*,

http://europa.eu.int/eur-lex/en/com/cnc/2003/com2003_0301en01.pdf

¹¹⁴ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 2,

http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

¹¹⁵ *ibid*, p. 79

¹¹⁶ *ibid*, p. 18

¹¹⁷ The Environment Agency has a website dedicated to waste technology:

<http://www.environment-agency.gov.uk/wtd/679004/?lang=w>

¹¹⁸ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 85,

http://new.wales.gov.uk/topics/environmentcountryside/epq/waste_recycling/wise_about_waste_strategy?lang=en

¹¹⁹ Friends of the Earth, *Dirty Truths: Incineration and Climate Change*,

http://www.foe.co.uk/resource/briefings/dirty_truths.pdf

¹²⁰ European Commission, *Directive 2000/76/EC of the European Parliament and of the Council on the Incineration of Waste*,

<http://eur-lex.europa.eu/LexUriServ/site/en/consleg/2000/L/02000L0076-20001228-en.pdf>

¹²¹ The regulated emissions are nitrogen oxides (NOx), sulphur dioxide (SO₂), hydrogen chloride (HCl), heavy metals, particles, and dioxins and furans. For further details, see the Directive text.

incinerators have not found any convincing links between incinerator emissions and adverse effects on public health¹²².

The Welsh Assembly Government has indicated its desire for an Incineration Tax, in order to encourage more beneficial forms of waste management¹²³. In Norway, a tax is levied on incinerators based on measured or estimated emissions¹²⁴, which is aimed at driving emissions down.

Other countries in Europe have made greater use of incineration for waste disposal. In 1996, Austria incinerated 16 per cent of its waste, and Sweden incinerated 39 per cent¹²⁵. Finland's proposed national waste plan envisages an increase in incineration of municipal waste, from 9 per cent in 2003, to 31 per cent in 2016¹²⁶.

3.8 Landfill

Landfilling is generally the least favourable option for dealing with waste. It creates environmental pressure because it results in the permanent loss of material and energy resources. For example, the potential loss of resource from electrical and electronic waste in Europe has been estimated to include 2.4 million tonnes of ferrous metals, 1.2 million tonnes of plastics and 0.65 million tonnes of copper¹²⁷. The Wales Audit Office notes that landfill can also be unsightly, cause noxious smells and wind-blown litter, and may cause leachates to enter groundwater¹²⁸. The relative cheapness of landfill as a waste management option has been one of the main reasons for Wales' reliance on it in the past.

Landfilling should only occur for residual waste, when all other waste management options have been exhausted. The Netherlands¹²⁹ and Denmark¹³⁰ have prohibited the landfilling of waste that is suitable for incineration: in 2004, 66 per cent of Danish waste was recycled, 24 per cent was incinerated, and 8 per cent was landfilled¹³¹. The European Parliament adopted a resolution on 13 February 2007 calling for a ban on landfilling of recyclable waste by 2020, extending to "all residual waste" except where unavoidable, by 2025¹³².

The amount of landfill space in Wales is decreasing faster than it is being created. At current rates, Environment Agency Wales estimates that landfill capacity will expire in 2012¹³³. However, there is an unequal distribution of landfill capacity across Wales; on a

¹²² Environment Agency, *Waste Incineration*,

http://www.environment-agency.gov.uk/yourenv/eff/1190084/resources_waste/213982/203410/

¹²³ Welsh Assembly Government, June 2002, *Wise About Waste: The National Waste Strategy for Wales*, Part 1, p. 114,

http://new.wales.gov.uk/topics/environmentcountryside/epg/waste_recycling/wise_about_waste_strategy?lang=en

¹²⁴ OECD, February 2007, *Instrument Mixes Addressing Household Waste*,

[http://www.oilis.oecd.org/olis/2005doc.nsf/43bb6130e5e86e5fc12569fa005d004c/f8ee018fcd7f55b1c1257279004feb96/\\$FILE/JT03221143.PDF](http://www.oilis.oecd.org/olis/2005doc.nsf/43bb6130e5e86e5fc12569fa005d004c/f8ee018fcd7f55b1c1257279004feb96/$FILE/JT03221143.PDF)

¹²⁵ Institute for Prospective Technological Studies, March 1999, *The Incineration of Waste in Europe: Issues and Perspectives*,

<http://www.einet.org/dioxin/eur18717en.pdf>

¹²⁶ Finnish Environment Administration, *Valtakunnallisen jättesuunnitelman tavoitteena ehkäistä jätteen syntyä*,

<http://www.ymparisto.fi/default.asp?contentid=219252&lan=fi>

¹²⁷ AEA Technology, 1997. *Recovery of WEEE: Economic and Environmental Impacts*. Abingdon: AEA Technology.

¹²⁸ Wales Audit Office, *Waste Management: A Challenging Agenda for the Welsh Public Sector*, p. 4,

http://www.wao.gov.uk/assets/englishdocuments/Waste_Management_Themed_Paper_9.pdf

¹²⁹ OECD, February 2007, *Instrument Mixes Addressing Household Waste*,

[http://www.oilis.oecd.org/olis/2005doc.nsf/43bb6130e5e86e5fc12569fa005d004c/f8ee018fcd7f55b1c1257279004feb96/\\$FILE/JT03221143.PDF](http://www.oilis.oecd.org/olis/2005doc.nsf/43bb6130e5e86e5fc12569fa005d004c/f8ee018fcd7f55b1c1257279004feb96/$FILE/JT03221143.PDF)

¹³⁰ Danish Environmental Protection Agency, *Waste 21 Appendix C: Capacity*,

http://glwww.mst.dk/udgiv/Publications/1999/87-7909-571-2/html/bilag03_eng.htm

¹³¹ Danish Environmental Protection Agency, *More Waste is Being Recycled in Denmark*,

<http://www.mst.dk/homepage/>

¹³² European Parliament, *European Parliament Resolution on a Thematic Strategy on the Recycling of Waste*,

<http://www.europarl.europa.eu/sides/getDoc.do?Type=TA&Reference=P6-TA-2007-0030&language=EN>

¹³³ Environment Agency Wales, *Evidence to EPC Committee on Waste*, 25 January 2007,



- authorities clean up illegal waste, council taxpayers pay for the increased cost of dealing with this waste. Expenditure on street cleansing activities by Welsh local authorities was approximately £50 million in 2005/06¹⁴⁶.
- The illegal deposition of waste by private companies undermines legitimate waste companies, because it is cheaper for a private individual to flytip material than to dispose of it in landfill. In this way, the market becomes distorted by unfair competition.
 - They pose a greater environmental threat than waste that is dealt with in a controlled manner. Incidents of flytipping frequently include the disposal of waste that is hazardous, and because they tend to be in isolated locations that may not be cleansed regularly, they are more likely to contaminate the surrounding soil and watercourses. Littering that is not cleared up becomes a contaminant of either the soil or water. Although some litter will eventually break down (organic litter over a period of a decade, some metals over the course of a century), most plastic waste takes thousands of years to degrade. Plastic waste that ends up in waterways contaminates both the waterways and, ultimately, the sea.
 - Local environmental quality is often worse in the most deprived communities, and these communities are least able to tackle the problem because of its scale¹⁴⁷.

Keep Wales Tidy has estimated drinks containers to comprise approximately 16 per cent of litter by weight in Wales¹⁴⁸. In order to reduce the litter effect of drinks containers, Keep Wales Tidy recommends implementing a deposit system for cans and bottles. Such a system could reduce street cleansing costs, and Keep Wales Tidy also notes that such a system could have resulted in savings of £4.5 million in local authority landfill costs in 2005/06, by removing these containers from the municipal waste stream. Updating these figures¹⁴⁹ suggests that savings in 2007/08 could be £6.2 million. The costs of such a system would be borne by manufacturers and consumers. The packaging industry association in the UK is opposed to deposits¹⁵⁰.

Keep Wales Tidy has estimated plastic bag litter to comprise approximately 2.7 per cent by weight of litter in Wales, with associated cleansing costs to local authorities¹⁵¹. Keep Wales Tidy recommends a levy as a means to tackle the problem, although such powers are not available to the Welsh Assembly Government. In an interview with the *Western Mail*, a ban on the use of plastic bags in Wales was suggested by the Minister for the Environment, Planning and Countryside as an alternative to a levy¹⁵². UK retailers have agreed to reduce the environmental impact of plastic bags by 25 per cent by the end of 2008¹⁵³.

¹⁴⁶ The actual figure is £34 million for 15 authorities (Wales Audit Office, personal communication, 26 January 2007), which has been extrapolated to 22 authorities.

¹⁴⁷ Hastings et al, 2005. *Cleaning up Neighbourhoods: Environmental Problems and Service Provision in Deprived Areas*, <http://www.irf.org.uk/bookshop/eBooks/1861348169.pdf>

¹⁴⁸ Keep Wales Tidy, June 2006, *Papur Datgan Sbwriel Caniau a Photelli/Can and Bottle Litter Position Paper*, <http://www.keepwalestidy.org/english/images/cansandbottles.pdf>

¹⁴⁹ An increase in landfill tax and gate fees to £68 per tonne, and municipal waste landfilled of 1,363,000 tonnes. We use the assumption that the proportion of potentially deposit-bearing materials in landfilled waste has decreased by 6.7 per cent (the increase in recycling rate between 2002-03 and 2005-06) to 6.4 per cent since 2003 (current total therefore calculated as 91,321 tonnes).

¹⁵⁰ Industry Council for Packaging and the Environment, *Container Deposit Laws: The Facts*, <http://www.incpen.org/pages/userdata/incp/containerFS.pdf>

¹⁵¹ Keep Wales Tidy, July 2006, *Papur Datgan Sbwriel Bagiau Plastig/Plastic Bag Litter Position Paper*, <http://www.keepwalestidy.org/english/images/plasticbags.pdf>

¹⁵² Martin Sipton, "Caring for the Planet: I Want to be Able to Look my Children in the Eye", *Western Mail*, 9 November 2006, p. 7

¹⁵³ DEFRA, *UK Retailers Sign Up to Cut the Environmental Impact of Carrier Bags*, <http://www.defra.gov.uk/news/2007/070228a.htm>

Annex A

Tables 9 and 10 show a projection of the amount of waste that would be landfilled by local authorities in Wales if future waste management activities reduce the amount of waste being sent to landfill at the same rate as activity over the years 2002/03 to 2005/06 has done.

A calculation was made of the proportionate share of the 2009/10 allowances shown in the letter from the Minister for Environment, Planning and Countryside to local authority Chief Executives¹⁵⁴, available at:

http://www.environment-agency.gov.uk/commondata/105385/landfillallowtr_e_868975.pdf

This share was used as the basis to calculate the distribution of allowances for authorities in 2012/13.

Each authority's rate of reduction in landfill between 2002/03 and 2005/06 was calculated. The analysis is sensitive to the years chosen: 2005/06 is the most recent year for which landfill data are available; information is also publicly available for the amount of waste landfilled by each local authority in 2002/03, and this year was considered to be one that allowed for improved performance in landfill diversion in recent years to be better reflected in the projections.

The rate of reduction in landfill between 2002/03 and 2005/06 was extended to both the 2009/10 and the 2012/13 targets. The values for the two authorities that recorded increases in landfilling between 2002/03 and 2005/06 (Rhondda Cynon Taf and Powys) were reduced by the value recorded by the next-worst performing authority (Conwy).

The calculation was made on a compound basis. This method was chosen because the amount of waste landfilled more closely follows a curve of exponential decay than a linear decrease (for example, using a linear decrease to project the amount of waste landfilled would indicate a result of Neath Port-Talbot landfilling no waste by 2012/13).

This calculation does not take account of factors such as changing public attitudes to waste, or new recycling and composting facilities coming into operation.

¹⁵⁴ Minister for Environment, Planning and Countryside, *The Landfill Allowance Scheme: Allocation of Allowances*, 14 August 2004.



Table 9 Landfill target for 2009/10 and projected landfill for each local authority in Wales

| Local authority | Landfill (tonnes) | | Annual rate of decrease, 2002/03-2005/06 (per cent) ¹⁵⁵ | 2009/10 target (total municipal waste ¹⁵⁶) (tonnes) | 2009/10 projection ¹⁵⁷ (tonnes) | Approximate difference (tonnes) |
|-------------------|------------------------|------------------------|--|---|--|---------------------------------|
| | 2002/03 ¹⁵⁸ | 2005/06 ¹⁵⁹ | | | | |
| Cardiff | 169,416 | 158,731 | 2.148 | 117,446 | 145,525 | 28,000 |
| Rhondda Cynon Taf | 98,022 | 105,233 | increase | 77,805 | 98,324 | 20,500 |
| Powys | 53,800 | 54,416 | increase | 43,826 | 50,843 | 7,000 |
| Ynys Môn | 42,380 | 38,461 | 3.183 | 28,392 | 33,794 | 5,500 |
| Gwynedd | 66,673 | 60,180 | 3.358 | 47,451 | 52,495 | 5,000 |
| Carmarthenshire | 81,927 | 74,214 | 3.242 | 60,400 | 65,048 | 4,500 |
| Conwy | 67,434 | 64,085 | 1.684 | 56,230 | 59,877 | 3,500 |
| Vale of Glamorgan | 53,670 | 49,312 | 2.783 | 41,292 | 44,047 | 3,000 |
| Blaenau Gwent | 44,764 | 40,577 | 3.220 | 33,194 | 35,597 | 2,500 |
| Pembrokeshire | 62,334 | 56,478 | 3.235 | 48,330 | 49,517 | 1,000 |
| Wrexham | 74,522 | 64,831 | 4.538 | 53,831 | 53,841 | 0 |
| Torfaen | 51,054 | 44,679 | 4.349 | 37,852 | 37,400 | -500 |
| Merthyr Tydfil | 36,536 | 29,827 | 6.539 | 24,185 | 22,758 | -1,500 |
| Ceredigion | 32,233 | 26,281 | 6.578 | 22,930 | 20,018 | -3,000 |
| Denbighshire | 48,702 | 38,542 | 7.503 | 31,895 | 28,213 | -3,500 |
| Newport | 61,480 | 53,153 | 4.735 | 50,339 | 43,778 | -6,500 |
| Monmouthshire | 45,757 | 36,364 | 7.373 | 33,510 | 26,768 | -6,500 |
| Caerphilly | 92,480 | 77,682 | 5.647 | 74,140 | 61,567 | -12,500 |
| Flintshire | 78,344 | 62,202 | 7.402 | 59,807 | 45,730 | -14,000 |
| Bridgend | 56,403 | 42,709 | 8.854 | 44,716 | 29,476 | -15,000 |
| Swansea | 132,727 | 112,906 | 5.249 | 109,870 | 91,004 | -19,000 |
| Neath Port Talbot | 96,485 | 59,239 | 15.007 | 66,533 | 30,913 | -35,500 |
| WALES | 1,547,141 | 1,350,102 | 4.4394 | 1,164,000 ¹⁶⁰ | 1,126,550 ¹⁶¹ | -37,000 |

¹⁵⁵ Rate of increase has been rounded to three significant figures. Calculations of the projected amounts of waste landfilled use the original (unrounded) values.

¹⁵⁶ Targets from http://www.environment-agency.gov.uk/commondata/105385/landfillallowltr_e_868975.pdf have been increased by 63.935 per cent to account for the difference between BMW landfilled and total municipal waste landfilled

¹⁵⁷ Tonnages for Powys and Rhondda Cynon Taf were deflated using 1.68 per cent - the reduction for the next-worst performing county

¹⁵⁸ Environment Agency Wales, *Waste Management Options used by Unitary Authority 2002/03*, http://www.environment-agency.gov.uk/commondata/103601/walesmw1a_1236824.xls

¹⁵⁹ WLGA Data Unit, *2005/06 National Strategic Indicators for Wales*, http://www.dataunitwales.gov.uk/Documents/Data_Set/PIs/lgd10000_2005_06_pi_data_v1_bi.xls

¹⁶⁰ Rounding errors give a total target of approximately 1,163,974 tonnes

¹⁶¹ Based on the total of local authority figures, rather than a deflation of the all-Wales total



Table 10 Landfill target for 2012/13 and projected landfill for each local authority in Wales

| Local authority | Landfill (tonnes) | | Annual rate of decrease, 2002/03-2005/06 (per cent) ¹⁶² | 2012/13 target ¹⁶³ (total municipal waste) (tonnes) | 2012/13 projection ¹⁶⁴ (tonnes) | Approximate difference (tonnes) |
|-------------------|------------------------|------------------------|--|--|--|---------------------------------|
| | 2002/03 ¹⁶⁵ | 2005/06 ¹⁶⁶ | | | | |
| Cardiff | 169,416 | 158,731 | 2.148 | 77,746 | 136,347 | 58,500 |
| Rhondda Cynon Taf | 98,022 | 105,233 | increase | 51,505 | 93,441 | 42,000 |
| Conwy | 67,434 | 64,085 | 1.684 | 37,222 | 56,903 | 19,500 |
| Powys | 53,800 | 54,416 | increase | 29,012 | 48,318 | 19,500 |
| Carmarthenshire | 81,927 | 74,214 | 3.242 | 39,983 | 58,924 | 19,000 |
| Gwynedd | 66,673 | 60,180 | 3.358 | 31,411 | 47,383 | 16,000 |
| Vale of Glamorgan | 53,670 | 49,312 | 2.783 | 27,334 | 40,470 | 13,000 |
| Pembrokeshire | 62,334 | 56,478 | 3.235 | 31,993 | 44,865 | 13,000 |
| Ynys Môn | 42,380 | 38,461 | 3.183 | 18,795 | 30,669 | 12,000 |
| Wrexham | 74,522 | 64,831 | 4.538 | 35,635 | 46,839 | 11,000 |
| Blaenau Gwent | 44,764 | 40,577 | 3.220 | 21,947 | 32,268 | 10,500 |
| Torfaen | 51,054 | 44,679 | 4.349 | 25,057 | 32,730 | 7,500 |
| Swansea | 132,727 | 112,906 | 5.249 | 72,731 | 77,414 | 4,500 |
| Newport | 61,480 | 53,153 | 4.735 | 33,323 | 37,848 | 4,500 |
| Flintshire | 78,344 | 62,202 | 7.402 | 39,590 | 36,308 | 3,500 |
| Caerphilly | 92,480 | 77,682 | 5.647 | 49,079 | 51,716 | 2,500 |
| Merthyr Tydfil | 36,536 | 29,827 | 6.539 | 16,010 | 18,579 | 2,500 |
| Denbighshire | 48,702 | 38,542 | 7.503 | 21,114 | 22,327 | 1,000 |
| Ceredigion | 32,233 | 26,281 | 6.578 | 15,179 | 16,322 | 1,000 |
| Monmouthshire | 45,757 | 36,364 | 7.373 | 22,183 | 21,273 | -1,000 |
| Bridgend | 56,403 | 42,709 | 8.854 | 29,601 | 22,320 | -7,500 |
| Neath Port Talbot | 96,485 | 59,239 | 15.007 | 44,043 | 18,980 | -25,000 |
| WALES | 1,547,141 | 1,350,102 | 4.4394 | 770,000 ¹⁶⁷ | 992,266 ¹⁶⁸ | 227,500 |

¹⁶² Rate of increase has been rounded to three significant figures. Calculations of the projected amounts of waste landfilled use the original (unrounded) values.

¹⁶³ Assumes the same proportion of the total waste landfillable in Wales in 2012/13 as was allocated to each local authority for 2009/10.

¹⁶⁴ Tonnages for Powys and Rhondda Cynon Taf were deflated using 1.68 per cent - the reduction for the next-worst performing county (Conwy)

¹⁶⁵ Environment Agency Wales, *Waste Management Options used by Unitary Authority 2002/03*,

http://www.environment-agency.gov.uk/commondata/103601/walesmw1a_1236824.xls

¹⁶⁶ WLGA Data Unit, *2005/06 National Strategic Indicators for Wales*,

http://www.dataunitwales.gov.uk/Documents/Data_Set/PIs/lqd10000_2005_06_pi_data_v1_bi.xls

¹⁶⁷ Rounding errors give a total target of approximately 770,493 tonnes

¹⁶⁸ Based on the total of local authority figures, rather than a deflation of the all-Wales total