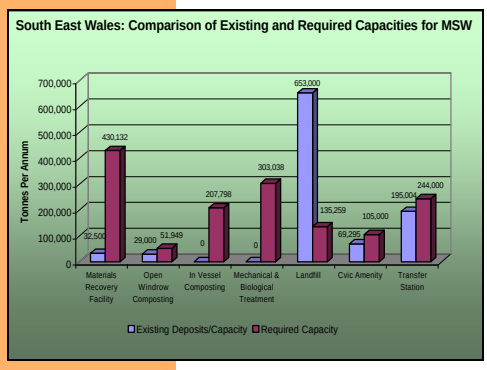
South East Wales Regional Waste Plan

March 2004



Llywodraeth Cynulliad Cymru
Welsh Assembly Government

www.sewaleswasteplan.org

This is the Regional Waste Plan for South East Wales. The plan has been approved by the Members Steering Group and endorsed by all of the local planning authorities in the region:

Blaenau Gwent County Borough Council

Brecon Beacons National Park Authority

Caerphilly County Borough Council

Cardiff County Council

Merthyr Tydfil County Borough Council

Monmouthshire County Council

Newport County Council

Powys County Council

Rhondda Cynon Taf County Borough Council

Torfaen County Borough Council

Vale of Glamorgan County Borough Council

Contents

Foreword

More than 5 million tonnes of waste are produced in South East Wales each year. The way that we deal with waste in the region, as in Britain as a whole, does not meet modern environmental standards and we are lagging behind other European countries. We have to meet the challenge of improving how we manage our waste.

I am therefore pleased to welcome and recommend this Regional Waste Plan as a pioneering strategy for dealing with waste in an integrated and comprehensive way across South East Wales for the next 10 years. It is the first step in the direction of providing the new facilities which are needed.

I am particularly pleased that the strategy which is recommended is supported by a detailed environmental assessment, a sustainability assessment and by both public and stakeholder preferences as well as by a health impact assessment. The last of these is a recognition of the very real concerns about potential effects on health which waste management facilities can have. All of these assessments point very clearly in one direction and give confidence that the Regional Waste Strategy is not only the best for South East Wales but also has general support.

It has been prepared by the South East Wales Regional Waste Technical Group which is made up of a wide range of interests including planning and waste management officers from local government, the Welsh Assembly Government, Environment Agency Wales and other government bodies, and representatives from the waste industry and environmental groups. The process has therefore been 'inclusive' and the Plan has benefited from a very wide range of views.

The Regional Waste Plan has been endorsed by each of the local planning authorities in South East Wales. It will be monitored and reviewed on a three-year cycle to take account of changing circumstances. The local planning authorities will now use it in preparation of their Development Plans and in the planning process.

Cllr John Taylor
Chair, South East Wales Regional Waste Plan Group

South East Wales Regional Waste Plan

In a Nutshell

Plan Preparation

1 The Regional Waste Plan is a land use framework to facilitate planning and controlling the development of an integrated network of facilities to treat and dispose of waste in South East Wales in a way which will satisfy modern environmental standards and meet targets set by European and national legislation.

2 This is the final part of a series of documents prepared over a two-year period including a Regional Waste Assessment agreed in November 2002 which contains 'baseline' information.

3 Altogether in South East Wales just under 5 million tonnes of waste are produced each year and that amount is forecast to rise over the next ten years before it begins to reduce.

4 A range of 6 Options was identified which between them allow assessment of the advantages and disadvantages of the broad choices of combinations of available waste treatment and disposal methods.

5 A 'Life Cycle Assessment' was carried out to compare the environmental costs and benefits of each Option in relation to environmental indicators. A wider 'Sustainability Assessment' was then carried out to include economics, social consequences, practicability and consistency with policy, in addition to environmental factors.

6 Following this a Draft Plan was drawn up and extensive consultation was undertaken to find out the views and preferences of individuals, communities, public bodies and organisations, business and industry, voluntary organisations, environmental groups, other interest groups, and the waste management industry.

Regional Waste Strategy

7 From this process it is clear that there is strong support from both the technical assessment and public and stakeholder preferences for the following Regional Strategy:

Regional Waste Strategy

- aim to achieve the 2020 Landfill Directive targets by 2013
- achieve this principally through maximising recycling and composting
- deal with residual waste by Mechanical Biological Treatment
- choose between **either** sending the residual waste from MBT to landfill **or** using it as Refuse Derived Fuel
- limit the amount of waste going to landfill to that which can not be dealt with acceptably in any other way.

8 To implement this Strategy for all the waste streams will require a wide range of waste management facilities. Bt 2013 the total capacity requirement for all facilities will be 5.9 million tonnes. The capacity requirement for each type of facility for each waste stream by 2013 is identified for the region as a whole and for each local authority.

9 The diversity of South East Wales, ranging from large coastal cities to remote rural communities, means that within this framework it is appropriate that decisions on the way in which capacity requirements are met in terms of the location and size of facilities should be left to each local authority to determine in relation to its own area either unilaterally or in collaboration with others.

10 If the Preferred Strategy is successfully implemented, then the required landfill capacity for Municipal Waste across the region by 2013 will be 290,000 tonnes compared with 653,000 tonnes in 2001. It is calculated that the existing landfill capacity of 16.5 million tonnes is likely to be sufficient until that time and beyond for both Municipal Waste and Non-Inert Industrial and Commercial Waste.

11 To assist with site allocation and the preparation of Unitary Development Plans, a guide to the locational requirements of each facility type is shown in an Appendix.

12 Consideration of what additional, specialist facilities are required to deal with specific wastes is not clear. Nevertheless, it is concluded that it is probable that facilities for dealing with these specific wastes will serve either the region as a whole or in some cases an even larger area. They will locate in response to the area from which the waste is drawn and the potential markets for products. In many cases this effectively makes them 'footloose' within the region, and even beyond, with broad location within the region determined by market forces and development proposals subject to locally determined criteria.

13 To assess the potential effects of implementing the Regional Waste Strategy a Health Impact Assessment (HIA) was carried out taking account of both public perceptions of the potential health impacts of different waste management operations and scientific knowledge of these impacts. The HIA confirmed the Regional Strategy to be the option that is most consistent with the objective to protect human health against potentially harmful effects associated with waste management in South East Wales.

Next Steps

14 The process of developing and assessing the Preferred Regional Waste Strategy must be followed through in 3 ways:

- provision must be made in Unitary Development Plans for meeting the capacity requirements for each facility type
- the proposals must be implemented on the ground
- the Plan must be monitored and reviewed

South East Wales Regional Waste Plan

Summary

Background

1 The Regional Waste Plan for South East Wales is one of three being prepared in Wales to provide regional coordination and a strategic, integrated approach to management of all waste streams. The Plan is primarily a land use planning document and sets the regional framework for planning and controlling the development of waste management facilities.

2 This is the final part of a series of documents prepared over a two year period. These are:
- a Regional Waste Assessment agreed in November 2002, published in January 2003
- a Draft Options Development Report identifying 7 options for ranges of facilities
- a Life Cycle Analysis of the environmental impacts of options identified
- a Sustainability Analysis, adding economic, social and operational impacts of options
- a Draft Plan for Consultation, and
- two Reports of Consultation

3 This final Regional Waste Plan brings together the technical assessments and the results of the consultation in putting forward an integrated waste management strategy for South East Wales for the next 10 years.

4 The Regional Waste Plan is prepared as required by Planning Technical Advice Note 21 on Waste and within the framework set by national and European legislation and policies. The Plan in turn provides the framework for the policies and proposals on waste in the Unitary Development Plans of the 11 local planning authorities in the region.

5 The Plan does not repeat what is in the documents noted above but summarises some of the key points in its various sections.

The Region

6 South East Wales has just under half the population of Wales. The $1^{1}/_{3}$ million people form 549,000 households and these are forecast to increase to 637,000 by the year 2020 as the size of households continues to get smaller. There is a strong correlation between the number of households and the amount of Municipal Solid Waste likely to be produced.

Vision, Aims and Objectives

7 The Regional Waste Plan has the following Vision and Aims:

To provide an agreed strategy for the region setting out a land use planning framework for the efficient and effective management of wastes in South East Wales with the following aims:

A to meet the needs of communities and businesses in a sustainable way

B to minimise adverse impacts on the environment and health

C to accord with the principles, policies and targets set by national and European legislation

8 To help achieve these Aims the Plan has 14 objectives divided into 3 Groups concerned with:
- service delivery
- environmental standards
- policy framework

Underlying Principles

9 Because the Regional Waste Plan will provide the land-use framework for bringing about change it is essential that it should be guided by sound principles. 5 key principles are considered to be fundamental:

- **Sustainability** – ensuring *"development which meets the needs of the present without compromising the ability of future generations to meet their own needs"* and seeking to 'de-couple' waste production from economic growth to ensure that the increase in production of waste is slower than the increase in the economy;
- **The Waste Hierarchy** – establishing that waste should be managed by, in descending order of desirability, reduction, re-use, recovery of materials, recovery of energy and, least desirable, disposal;
- **Proximity -** the principle that waste should be managed as near as possible to where it is produced;
- **Regional Self Sufficiency** – the principle that as far as practicable waste should be managed within the region where it is produced;
- **Flexibility** – the principle of leaving options open for as long as possible to monitor change and allow new opportunities to emerge.

10 Other considerations identified are: producer responsibility; the precautionary principle; consultation and equal opportunity; and integration and partnership.

The Waste Problem

11 The Regional Waste Plan provides the framework for dealing with wastes arising from all sources in South East Wales and needing treatment and disposal. These are:

- construction and demolition waste
- industrial waste
- municipal waste
- commercial waste
- potentially controlled agricultural waste

12 Altogether in South East Wales just under 5 million tonnes of waste are produced each year and that amount is forecast to rise over the next ten years before it begins to reduce.

13 The problem is created not simply by the amount of waste produced but by the fact that the way it is managed at present does not meet modern environmental standards

14 Among the problems identified are:

- The amount of waste produced in South East Wales is high and increasing
- The amount of waste going into landfill is high and the proportion recycled or treated is very low
- The amount of municipal waste recycled and composted in 2001/2 is well below set targets
- The capacity of facilities capable of managing special waste is set to reduce significantly below amounts produced
- Changes in controls over construction and demolition waste are likely to increase the requirement for recycling

Dealing with Waste: methods available

15 A number of types of facilities can be used to manage waste. These vary in their environmental impact and some are more suited to particular wastes and waste streams than others. All waste facilities and options will involve some environmental risk.

16 The aim of **Recycling** and **Composting** is to recover value from waste as much as possible via separation and reprocessing. However, even if recycling and composting are maximised there will be residual waste for further treatment and disposal. **Thermal Treatment** and **Landfill** are methods of disposal of this residual waste. **Mechanical Biological Treatment** is an intermediate method for further reducing the amount and environmental impacts of residual waste and increasing the recycled fraction.

17 **Recycling** reprocesses materials into the same or a different product. Materials can be separated either at source or at Materials Recovery Facilities which can vary in scale from 5,000 tonnes a year upwards. Different scales of facilities may be considered appropriate in different types of locations, ranging between the 'urban-efficiency' of large facilities and the 'community ownership' of local partnership facilities. It is appropriate that the decision on scale of facility should be left to each local authority to determine in relation to its own area.

18 **Composting** is a way of recycling biodegradable waste. 'Windrow' composting is suitable for all 'green' wastes, is an extremely flexible way of dealing with such waste, can be economical and efficient at small or large scale, and is generally regarded as 'sustainable' as it requires no energy inputs and is relatively inexpensive. 'In-vessel' systems are a way of composting kitchen and catering waste safely. They are likely to be considered economical and efficient only at a medium or large scale, with implications for the number which will be required in the region. Composting of kitchen and catering waste will be required by 2010 to meet targets.

19 **Mechanical Biological Treatment** is a relatively new process to further reduce environmental impacts before disposal of residual waste left after recycling and composting, potentially gaining additional value from the recovery of metal, plastics and possibly energy. Recyclable materials are separated mechanically before biological treatment to reduce the biodegradable waste to a stable material. The residual waste after Mechanical Biological Treatment can either go to landfill or be further processed as Refuse Derived Fuel with a much higher calorific value than untreated waste. This allows energy to be recovered from the material produced, thereby greatly increasing the value recovered from the waste.

20 **Thermal Treatment** can be divided into two broad categories, Incineration and Advanced Thermal Treatment. Though arousing much interest and the subject of 'pilot-plant' testing, Advanced Thermal Treatment technologies, pyrolysis and gasification, are as yet unproven in the UK and so are not considered in this Plan. All forms of incineration recover energy from the waste and so can be regarded as 'Energy from Waste' technologies. They therefore have the considerable environmental benefits of avoiding the use of fossil fuels and considerably reducing the amount of waste buried in landfill, and, by rendering it biologically inert, prevents methane production. Thermal treatment is generally in large-capacity facilities which require large volume throughput leading to concerns that waste streams will be committed to the facility with consequent reduction in recycling and composting. Furthermore, though the combustion process is now very strictly regulated and health risks are assessed as minimal, public perception is that health risks are unacceptable.

21 **Landfill** is the most familiar of the waste management methods. Growing concerns about environmental problems have meant that sites have become engineered to increasingly stringent standards. However, concerns have remained about environmental and health impacts and a growing awareness that landfill is wasteful of resources, have led to the current position that landfill is nolonger regarded as the preferred option for waste disposal. Nevertheless, landfill has a continuing role both during the period of transition when alternative waste management methods are being introduced and on an ongoing

basis because all other waste management methods reduce the amount of waste but leave residual amounts which will continue to require final disposal. From July 2004 there will be no 'open-gate' landfill sites accepting hazardous waste in Wales.

Dealing with Waste: the range of options

22 A range of options has been identified which between them allow assessment of the advantages and disadvantages of the broad choices of combinations of available waste treatment and disposal methods.

23 The Options are developed on the basis of choices at three levels. (see box on right)

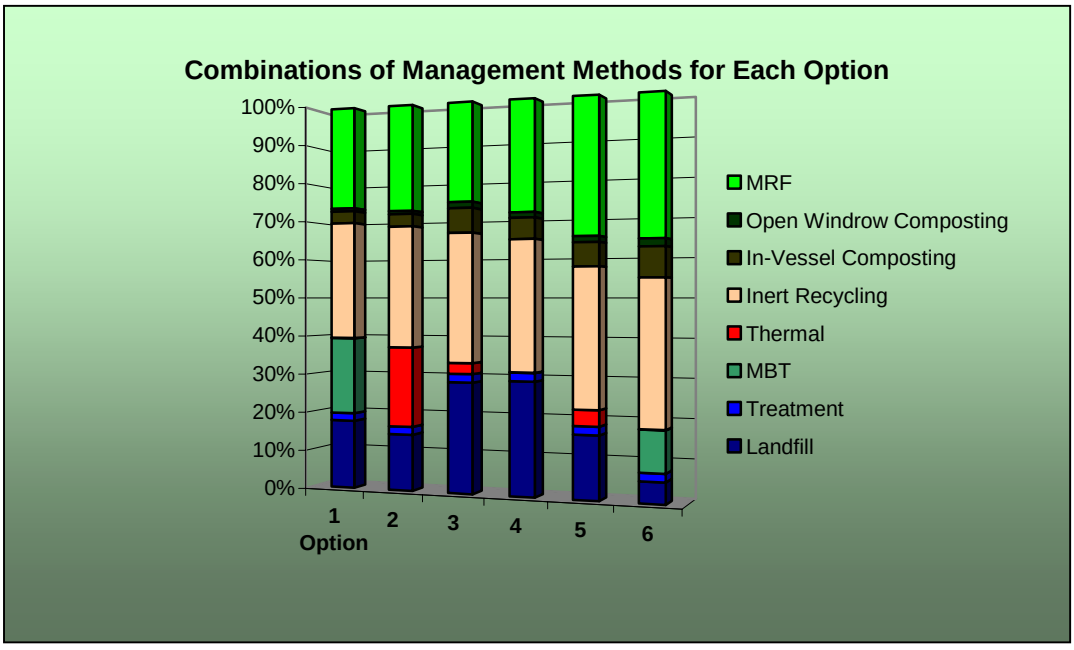
24 From these choices 7 Options were identified which between them represent a sufficient range of choices for dealing with waste in the region and allow a comparison of combinations of technologies either directly or indirectly.

CHOICES
Tier 1
Should targets be met or exceeded?
Tier 2
What amount of recycling and composting should be aimed for?
Tier 3
What methods should be used for dealing with residual waste?

25 These Options are:

Option 0 *'Do Nothing' strategy*
Option 1 *Meet 2013 Targets / MBT-led strategy for residual waste*
Option 2 *Meet 2013 Targets / Thermal-led strategy for residual waste.*
Option 3 *Meet 2013 Targets / Landfill-led strategy for residual waste.*
Option 4 *Meet 2013 Targets / Landfill-led strategy for residual waste.*
Option 5 *A 'Do More' strategy / Landfill-led strategy for residual waste.*
Option 6 *A 'Do More' strategy / MBT-led strategy for residual waste*

26 The options are looked at in turn in terms of the capacity of treatment and disposal facilities which will be needed across the region as a whole in respect of each waste stream. These are summarised in the Figure below.



27 A number of specific wastes need separate consideration because of their nature and the special provisions needed for dealing with them. These are:

- End of Life Vehicles;
- Hazardous Wastes;
- Packaging Waste;

- Tyres;
- Waste Electrical and Electronic Equipment.

Dealing with Waste: assessment of the options

28 Technical assessment of the Options identified was carried out using an assessment process which combined factors relating to economics, social consequences, practicability and consistency with policy, in addition to environmental factors.

29 The 12 Objectives and 21 Indicators adopted for the assessment were based on a methodology developed by the Office of the Deputy Prime Minister.

30 Using these a 'Life Cycle Assessment' was carried out to compare the environmental costs and benefits of each Option in relation to the environmental indicators. From this it became clear that the 'Do Nothing' option (Option 0), as expected, compared very badly with the other options and was not a practical way forward. It was therefore excluded from further assessment.

31 A wider 'Sustainability Assessment' was then carried out of the remaining 6 Options, broadened out to include the other indicators, weighted according to importance attached to them by the organisations represented on the Regional Waste Technical Group. 'Sensitivity tests' were carried out to test the robustness of the analysis.

32 The final scores from the assessments are shown in the Figure (right), on a scale of 0 (worst performing) to 1 (best).

Final Scores for Comparative Analysis

Option	overall score
1	0.43
2	0.50
3	0.27
4	0.32
5	0.65
6	0.87

33 From the assessments clear conclusions are drawn:

- Option 6 consistently performed best followed by Option 5
- Option 2 consistently scores best of the options not seeking to exceed targets for 2013
- Options 3 and 4, which are both "meet 2013 target" strategies relying on landfill for residue disposal, consistently perform at similar relatively poor levels
- These two options are outperformed by Option 1, which is recycling-led with residues going to MBT, in nearly all the analyses**.**

Dealing with Waste: your views

34 Membership of the Regional Waste Technical Group was drawn from a wide range of bodies and interests groups as well as local councils. The intention in doing this was to involve as wide a range of 'stakeholder' viewpoints as possible throughout the process of preparing the Consultation Draft of the Plan.

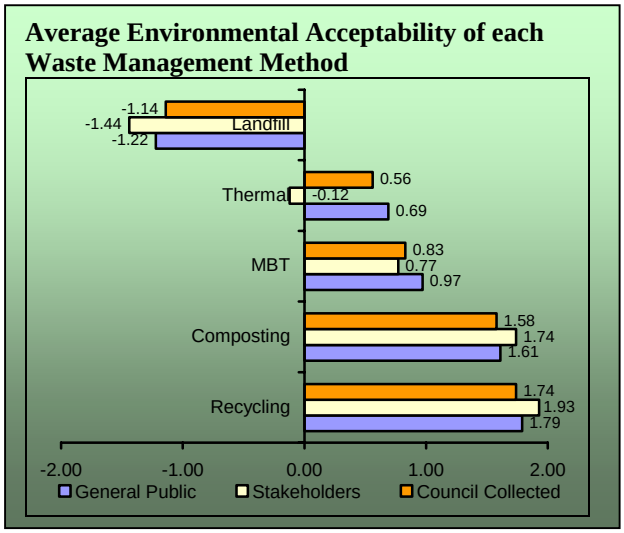
35 Extensive consultation was undertaken on the Draft Plan to find out the views and preferences of individuals, communities, public bodies and organisations, business and industry, voluntary organisations, environmental groups, other interest groups, and the waste management industry. This was to allow local considerations to be taken in to account and to allow consideration of viewpoints not put forward previously.

36 There were 3 main strands to the consultation:

- a statistically structured survey of households and 'stakeholder' interests
- a broader consultation aimed at the whole population
- a broader consultation aimed at stakeholder interests

37 The consultation showed a clear preference for aiming to exceed rather than simply 'meet' targets.

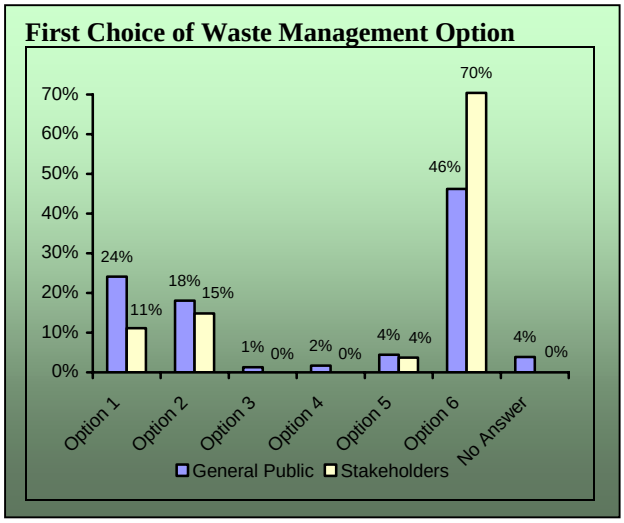
38 Both the public and stakeholders were asked to indicate preference for waste management methods. From the responses it is clear that recycling and composting are considered to be the most environmentally acceptable ways of dealing with waste, with recycling emerging as more acceptable than composting.



39 There was a clear preference for MBT as the most environmentally acceptable of the alternatives for dealing with the waste left after recycling and composting, with 67% of the public considering it to be either 'Good' or 'Very Good'. However, there was also a significant view among the public that thermal treatment is either a 'Good' or 'Very Good' way of dealing with residual waste though that was not reflected by the views of stakeholders.

40 The consultation also showed that landfill is now widely regarded as environmentally unacceptable and it attracted very little support.

41 Rating the 6 Options from 'Very Good' to 'Very Poor' showed clearly that the favoured approach is Option 6, which seeks to exceed targets with high levels of recycling and composting and to deal with residual waste by an MBT-led strategy. Unexpectedly, given the support for exceeding targets, the Option with the second highest level of support was Option 1, which seeks to meet rather than exceed targets. The simplest explanation for this apparent conflict is that respondents feel that an MBT-led strategy is a good one whether it aims to exceed or merely meet targets.



42 The views of the general public and stakeholders are different in regard to the third highest placed option with the public choosing Option 2, the '*Meet Targets / Thermal-led strategy*' and stakeholders choosing Option 5, the '*Exceed Targets / Landfill-led strategy*'

43 Other issues which were raised during the consultation included:

- the need to ensure flexibility in strategies for dealing with waste;
- the need for implementation and investment to bring about change on the ground;
- alternatives for dealing with residual waste from Mechanical Biological Treatment;
- and the role of emerging technologies.

The Regional Waste Strategy

44 The process followed in preparing this Regional Waste Plan has been to develop a range of options for dealing with waste in South East Wales and then to evaluate those options to see which performs best against a standard set of environmental and sustainability criteria and which has public and stakeholder support.

45 Clear conclusions can be drawn from this process:

- Option 6 emerges very clearly as the Preferred Option both on the basis of the Life Cycle and Sustainability assessments and on the basis of public and stakeholder preferences;
- there is clear public and stakeholder preference for maximising recycling and composting;
- there is clear public and stakeholder preference for using Mechanical Biological Treatment for residual waste

46 There is therefore strong support both from the technical assessment and public and stakeholder preferences for the following Regional Waste Strategy:

Regional Waste Strategy

- aim to achieve the 2020 Landfill Directive targets by 2013
- achieve this principally through maximising recycling and composting
- deal with residual waste by Mechanical Biological Treatment
- choose between **either** sending the residual waste from MBT to landfill **or** using it as Refuse Derived Fuel
- limit the amount of waste going to landfill to that which can not be dealt with acceptably in any other way.

47 To implement this Preferred Strategy for all the waste streams will require a wide range of waste management facilities. The capacity requirement for each type of facility for each waste stream by 2013 is shown in the Figure (right) for the region as a whole and is shown in the Appendixes to the Plan for each local authority.

South East Wales: Facility Capacity Requirements 2013

Facility type	Municipal	C&I non-inert	C&I inert	C&D	Agric	Total
MRF	430,132	241,013	401,701	831,168	3,320	1,907,334
Windrow Composting	51,949	49,762	0	0	0	101,711
In-Vessel Composting	207,798	199,048	0	0	0	406,846
Inert Recycling	0	27,045	443,986	1,508,832	0	1,979,863
MBT	303,038	249,317	0	0	13,114	565,469
Thermal Treatment	0	3,348	0	0	0	3,348
Treatment	0	110,294	0	0	0	110,294
Landfill	135,259	142,068	0	0	13,114	290,441
Civic Amenity	105,000	0	0	0	0	105,000
Transfer Station	244,000	62,000	84,000	84,000	0	474,000
All Types	**1,477,176**	**1,083,895**	**929,687**	**2,424,000**	**29,548**	**5,944,306**

48 The diversity of South East Wales, ranging from large coastal cities to remote rural communities, means that it is appropriate that the decision on scale of facility should be left to each local authority to determine in relation to its own area. Clearly this will affect the number of facilities which are needed both to meet the capacity requirements locally and thus in the region as a whole.

49 The total capacity requirement for all facilities will be 5.9 million tonnes. This is inevitably larger than the total of 5.1 million tonnes of waste which will be produced in the region by 2013 because some waste is 'double counted', one facility type passing it on to another.

50 The largest capacity, and therefore the largest number of facilities, will be required for recycling and composting and for reprocessing inert industrial and construction/ demolition waste. By contrast, although Mechanical Biological Treatment facilities will be the key to dealing with residual waste after recycling and composting, because they are fairly large only 9 or 10 will be required for the region.

51 If the Preferred Strategy is successfully implemented, then the required landfill capacity for Municipal Waste across the region by 2013 will be 290,000 tonnes compared with 653,000 tonnes in 2001. It is calculated that the existing landfill capacity of 16.5 million tonnes is likely to be sufficient until that time and beyond for both Municipal Waste and Non-Inert Industrial and Commercial Waste.

52 Consideration of what additional, specialist facilities are required to deal with specific wastes is not clear. Nevertheless, certain things are clear:

- in many cases the treatment or disposal of these specific wastes will require specialist facilities which may well deal with only limited range of materials
- the amounts of some of these specific wastes and materials is relatively small
- the area which the facility will serve is therefore likely to be large

53 For these reasons it is concluded that it is probable that facilities for dealing with these specific wastes will serve either the region as a whole or in some cases an even larger area. They will locate in response to the area from which the waste is drawn and the potential markets for products. In many cases this effectively makes them 'footloose' within the region, and even beyond, with broad location within the region determined by market forces and development proposals subject to locally determined criteria.

54 Though further analysis of import/export information is needed in order to assess the detailed implications for future changes, the broad implications for capacity requirements are clear. South East Wales is committed to achieving Regional Self Sufficiency and it is anticipated that other regions of Wales and England will be similarly committed. Therefore, because the capacity requirements estimated above are based on the total amount of waste produced in South East Wales, there will be no need to provide for any additional treatment or disposal capacity either to reduce exports or to cater for imports. Indeed, as imports are reduced in compliance with Regional Self Sufficiency, South East Wales can expect to have greater flexibility in capacity.

55 In line with the Principle of Flexibility and respecting the role of local decision-making, the way in which capacity requirements are met and the location of facilities is for each authority to determine either unilaterally or in collaboration with others. To assist with site allocation and the preparation of Unitary Development Plans, a guide to the locational requirements of each facility type is shown in an Appendix.

56 To assess the potential effects of implementing the Regional Waste Strategy a Health Impact Assessment (HIA) has been carried out using a combination of methods and procedures involving both qualitative and quantitative data. The HIA emphasises the importance of the input of people and communities who will be affected by a proposal.

57 The HIA takes into account both public perceptions of the potential health impacts of different waste management operations and scientific knowledge of these impacts. Perceived health issues have been addressed by reviewing the public responses to questionnaires distributed during the consultation process for the Regional Waste Plan, as well as relevant published studies on public perceptions of different waste management options and facilities. The scientific basis for potential health risks has been explored by examining epidemiological literature, responses from Healthcare Trusts, and human toxicity and dioxin scores from the Life Cycle Assessment.

58 Taking and analysing evidence from all these sources, the HIA indicates Option 6 to be the option that is most consistent with the objective to protect human health against potentially harmful effects associated with waste management in South East Wales. This option maximises composting and recycling levels, with all residual waste being sent to MBT rather than to incinerator or landfill. This option, therefore, maximises health benefits and minimises disbenefits.

59 A Strategic Environmental Assessment (SEA) enables choices to be made between a range of options by examining the different environmental consequences of each and allows consideration of the effects of different combinations of types of developments. The Life Cycle Assessment and the Sustainability Assessment carried out to examine the environmental, social and economic impacts of the waste management options and combinations of waste management techniques identified above are together a sophisticated and very detailed Strategic Environmental Assessment.

Next Steps

60 The process of developing and assessing the Preferred Regional Waste Strategy must be followed through in 3 ways:

- provision must be made in Unitary Development Plans for meeting the capacity requirements for each facility type
- the proposals must be implemented on the ground
- the Plan must be monitored and reviewed

61 TAN 21 indicates what is to be included in UDPs including demonstrating that there is adequate provision for waste management facilities to meet the targets in EU Directives.The provisions of the Regional Waste Plan should be incorporated *"at the earliest opportunity or in an early review"*. The extent to which local planning authorities are likely to be given discretion as to how this should be achieved is an emerging issue.

62 Unitary Development Plans will set the land use policy framework for implementing the integrated strategy in the Regional Waste Plan. But that does not achieve the development of the network of facilities on the ground. A range of actions and circumstances and the involvement of a full range of partners will be necessary to achieve that. The range of partners is likely to include both the voluntary/community sector and the commercial waste management industry. The way in which the strategy is implemented is a matter for each local authority to judge in relation to the needs and circumstances of its own area.

63 Preparation of the Plan indicated that there are gaps in information which could not be filled in time to contribute to bringing the Plan forward within the required deadline. More information, and analysis of that information, is needed on three matters in particular to enable more detailed planning:

- amounts and nature of hazardous wastes and available treatment methods for those wastes;
- imports and exports of wastes;
- capacity of current facilities, to more accurately assess what additional facilities need to be provided.

Final Word

64 One of the achievements of the process of preparing the Regional Waste Plan has been the active cooperation of the many partners involved. If continued and developed this collaborative working will contribute significantly to the successful implementation of the Regional Waste Strategy.

65 A disappointment has been the poor level of involvement of industry despite best endeavours. A significant amount of waste arises from the industrial and commercial sectors and it is important that continued efforts are made to secure the active involvement of industry at all levels to ensure that the Strategy is fully implemented.

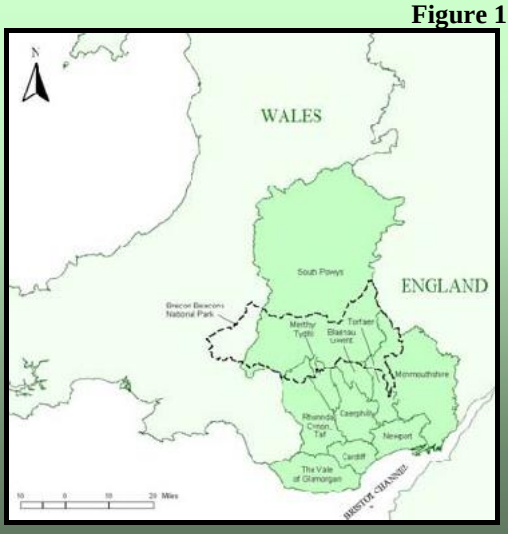
1 Introduction

Background

1 This is the Regional Waste Plan prepared by the South East Wales Waste Group in line with the requirements of Planning Policy Wales Technical Advice Note 21: Waste.[1]

2 The South East Wales Waste Group is one of three such bodies set up in Wales to provide regional coordination and a strategic, integrated approach to management of all waste streams.[2] The area covered by the Group is shown in Figure 1.

Figure 1



3 The Group is led by a steering Group of councillors from the 11 local planning authorities in the region with a Technical Group of officers from local government, the Welsh Assembly Government, Environment Agency Wales and other government bodies, and representatives from the waste industry and environmental groups. Full membership of the Members' Steering Group and the Waste Technical Group is listed in Appendixes 1 and 2.

4 A Regional Waste Assessment was agreed in November 2002 and published in January 2003. It sets out background information on the amounts and types of waste produced in South East Wales, the way that waste is managed now, and the requirements and targets set by European, UK and Welsh legislation.[3]

5 A range of Options for dealing with this waste by different waste management techniques was then identified. These are indicated in a 'Draft Options Development Report' which indicates the tonnages in each waste stream which would be managed by the components of each Option.[4]

6 These Options were then subjected to a 'Life Cycle Analysis'[5] (see paragraphs 195-202) which examined the environmental impacts and a 'Sustainability Analysis'[6] (see paragraphs 203-211) which combined the environmental impacts and the broader socio-economic impacts.

7 A Draft Plan was then prepared and published for consultation so that the final Plan could benefit from the widest possible input from the public and from all those groups organisations and businesses with an environmental, financial or other interest in what happens to our waste. The results of this consultation are summarised in Chapter 8 and two separate Reports of Consultation have been published.

8 This final Regional Waste Plan brings together the technical assessments and the results of the consultation in putting forward a waste management strategy for South East Wales for the next 10 years.

9 The Regional Waste Plan is prepared as required by TAN 21[7] within the framework set by national and European legislation and policies. The Plan in turn provides the framework for the policies and proposals on waste in the Unitary Development Plans of the 11 local planning authorities in the region.

10 All of the documents noted above are available both electronically on the Regional Waste Plan web site and for inspection or purchase as paper copies. CONTACT. They form an integral part of the Plan and should be referred to as appropriate. The Plan therefore does not repeat what is in the documents but summarises some of the key points in the sections below.

Timetable

11 The Plan has been prepared to meet a very exacting timetable. TAN 21 requires that by May 2002 local authorities establish 'joint arrangements' to 'undertake/coordinate data collection and analysis' and to prepare the Regional Waste Plan. In South East Wales the Regional Technical Group was set up in February 2002. The TAN also sets target dates for key stages in the process:

- **November 2002** Prepare and agree a Regional Waste Assessment
- **November 2003** Agree the Regional Waste Plan through the 'joint arrangements'
- **As soon as possible** Incorporate relevant parts of Regional Waste Plan in Unitary Development Plans

12 The South East Wales Waste Technical Group has used these targets as a framework and set a detailed timetable to achieve them. This timetable has been met. However, in meeting the timetable, certain issues could not be dealt with as thoroughly as would have been liked. These will be dealt with in more detail in the 3-yearly Review of the Plan as required by TAN 21 and as considered in chapter 10.

Context

13 The Plan is prepared in the context provided by the National Waste Strategy for Wales[8] which in turn reflects the principles and requirements of both the UK Government and European Union Directives.

14 The Regional Waste Plan is primarily a land use planning document. It sets the regional framework for planning and controlling the development of waste management facilities. It is not a waste management strategy but necessarily draws upon such strategies at both national and local level. It thus provides the land use framework for implementing those strategies.

15 Local authorities have a responsibility to prepare Municipal Waste Management Strategies. The Welsh Assembly Government and the Welsh Local Government Association have jointly issued guidance on the structure and content of these strategies[9] which are to be completed by April 2004. Work on the strategies has therefore been carried out in parallel with the preparation of the Regional Waste Plan and will be published in the context of the Plan. There is considerable overlap in the preparation of the Regional Waste Plan by the joint arrangements of local authorities and preparation of the Municipal Waste Management Strategies by individual local authorities. The consensus approach which has been achieved has therefore been essential to success

16 In terms of the information input to the Regional Waste Assessment and therefore to the Regional Waste Plan, the national context is set by the Strategic Waste Management Assessment for Wales 2000.[10] The information in the SWMA is for the period 1998-1999. An updated SWMA is to be published with more recent information but that is not available to date. However, Environment Agency Wales has made available Site Return deposit data for 2000/01which gives a more up-to-date baseline.

17 Clearly both the Regional Waste Assessment and the Regional Waste Plan are prepared in the context of and to meet the requirements of TAN 21.

18 The Regional Waste Plan will put into effect in South East Wales the key principles which govern the land use planning of waste management. In doing it will seek to avoid unnecessary repetition of what is already dealt with adequately and more appropriately elsewhere. To avoid repetition, extensive reference will be made to relevant source material. This Plan should be read in the context of that broader reference.

The Region

Figure 2

South East Wales	1998	2005	2010	2013	2020
Population ('000)	**1,363.1**	**1,372.7**	**1,378.5**	**1,381.8**	**1.390.9**
Households ('000)	**549**	**576**	**596**	**609**	**637**

19 South East Wales has just under half the population of Wales. The $1^{1}/_{3}$ million people form 549,000 households and these are forecast to increase to 637,000 by the year 2020[11] as the size of households continues to get smaller. There is a strong correlation between the number of households and the amount of Municipal Solid Waste likely to be produced.

20 There are three distinct parts to the region:

- the cities of Cardiff and Newport with a population of some 430,000 in an area of 80 sq miles at high densities and with pressure for development
- the 'Valleys' with about 620,000 people in about 400 sq miles broadly characterised by linear urban communities with a long experience of population loss away from the recent growth points where the valleys meet the M4 Corridor
- the rural areas of south Powys, Monmouthshire and the coastal plain spread over 1,700 sq miles, about 77% of the region, with a population of some 280,000 at low densities and with significant areas of strong pressures for growth

The three areas present different problems for waste management.

21 South East Wales has a concentration of industrial and commercial activity. This is rooted in a history of heavy manufacturing industry and mining which have given rise to very large waste streams. Though the significance of heavy industry in the economy continues to decline it is replaced by other industrial and commercial sectors which give rise to very different waste streams. South East Wales has the most rapidly changing and growing economy in Wales and this presents a significant challenge for waste management if waste production is to be de-coupled from economic growth.

22 The geology, which made South East Wales the cradle of the Industrial Revolution, also gave it an attractive landscape as its essential backcloth. The dereliction left by the wastes of mining and heavy industry has largely been transformed by many years of positive action by local government and other public agencies. Much of the region has been designated as National Park, Area of Outstanding Natural Beauty, or Special Landscape Area in recognition of its attractiveness and to afford it protection. As well as being the root of the wealth of South East Wales and the basis of its attractive landscape, geology and topography continue to form and shape development.

[1] Technical Advice Note 21: Waste, November 2001
[2] The other two are **South West Wales** comprising Bridgend, Carmarthenshire, Ceredigion, Neath Port Talbot, Pembrokeshire, and Swansea and including Brecon Beacons National park (part) and Pembrokeshire Coast National Park; and **North Wales** comprising Conwy, Denbighshire, Flintshire, Gwynedd, Isle of Anglesy, Powys (Montgomeryshire) and Wrexham,and including Snowdonia National Park.
[3] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group View
[4] Developing a Regional Waste Plan for South East Wales Region: Draft Options Development Report February 2003, prepared by SLR Consulting View
[5] Developing a Regional Waste Plan for South East Wales Region: WISARD Assessment, March 2003, prepared by SLR Consulting View
[6] South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, March 2003, prepared by AERC View
[7] Paragraph 2.11 ff
[8] Wise about Waste: The National Waste Strategy for Wales, June 200+2 View
[9] Guidance on Municipal Waste Management Strategies in Wales, August 2002 View
[10] Strategic Waste Management Assessment 2000: Wales
[11] Forecasts are an apportionment for the South East Wales region of data in **Strategic Waste Management Assessment 2000: Wales** Table 1.1. There is good demographic information which indicates that this underestimates the rate of increase in both population and number of households and that the rate of growth could well be double that forecast in SWMA .

2 Vision, Aims and Objectives

Vision and Aims

23 In order to meet the purposes required of it by TAN 21 the Regional Waste Plan has the following Vision and Aims.

Vision and Aims

To provide an agreed strategy for the region setting out a land use planning framework for the efficient and effective management of wastes in South East Wales with the following aims:

A to meet the needs of communities and businesses in a sustainable way

B to minimise adverse impacts on the environment and health

C to accord with the principles, policies and targets set by national and European legislation.

Objectives

24 To meet these Aims the Regional Waste Plan has set a number of Objectives. Each objective is identified to help achieve a specific Aim .

Service delivery objectives(Aim A)

1 To ensure sufficient waste management capacity within the region for 10years.

2 To ensure an integrated and efficient network of waste management facilities.

3 To minimise the costs of waste management.

4 To ensure reliability of delivery of the waste management service.

5 To maximise the use of waste as a resource

Environmental standards objectives (Aim B)

6 To protect the health of local communities and avoid endangering human life

7 To protect local communities from nuisance from odours, noise, dust and vibration.

8 To minimise adverse impacts on landscape, soils, plants and animals

9 To minimise greenhouse gas emissions

10 To minimise adverse impacts on air quality and water quality

11 To minimise transport impacts of waste management

Policy framework objectives (Aim C)

12 To comply with Welsh, UK and European waste management principles and policies in accord with the *Wise about Waste: The National Waste Strategy for Wales*, *Planning Policy Wales*, and *Technical Advice Note 21: Waste.*

13 To provide an integrated regional strategy which meets requirements of EU directives

14 To provide a clear framework for Unitary Development Plan policies

3 Underlying Principles

Background

25 South East Wales, in common with the rest of Wales and Britain, manages its waste in ways which are harmful to the environment and squanders resources.[1] More waste is buried in landfill sites and less is re-used or recycled than in most other European countries.

26 In order to secure improvements to the way that waste is managed the European Union has issued Directives which have been incorporated into Welsh and UK legislation. Four of the key directives are:

- Framework Directive on Waste
- Landfill Directive
- Packaging and Packaging Waste Directive
- Hazardous Waste Directive

These are summarised in TAN 21[2] and in the National Waste Strategy for Wales.[3]

27 The directives set common principles, standards and requirements for all member states and are incorporated in national legislation. The requirements are among those incorporated in the National Waste Strategy, which also sets additional requirements specific to Wales.

28 These requirements are 'driving' change.

29 The Regional Waste Plan will provide the land-use framework for bringing about that change. It is therefore essential that the Regional Waste Plan should be guided by sound principles. 5 key principles are considered to be fundamental:

- Sustainability
- The Waste Hierarchy
- Proximity
- Regional Self Sufficiency
- Flexibility

30 These are not new and indeed have been much discussed elsewhere so they are considered only briefly here. Each is discussed in turn and then mention is made of other principles which have a bearing on waste management.

Sustainability

31 Sustainable development has been much discussed and defined.[4] At it's simplest it means *"development which meets the needs of the present without compromising the ability of future generations to meet their own needs"*. One of the fundamental factors in relation to achieving sustainable waste management is to 'de-couple' waste production from economic growth - to ensure that the increase in production of waste is slower than the increase in the economy[5]. This is identified in the strategy for tackling the waste problem in England as one of 3 Key Goals.[6]

32 TAN 21 requires that the Options considered for dealing with waste should be subject to a Best Practicable Environmental Option (BPEO) assessment[7]. BPEO assessments have tended to focus solely on the environmental consequences but TAN 21 advocates a study of 'Sustainable Waste Management Options', a combined assessment process incorporating in addition factors relating to economics, social consequences, practicability and consistency with policy[8]. This achieves a more balanced assessment of sustainability, the practicalities of which are considered in a report by the Office of the Deputy Prime Minister.[9] This is the approach which has been used in South East Wales.

The Waste Hierarchy

33 The Waste Hierarchy is a useful framework which has become the cornerstone of sustainable waste management. It is identified by the Welsh Assembly Government as one of the key principles for advising decisions on waste management options.[10] It sets out the order in which options for waste management should be considered based on environmental impact (Fig. 3).

34 It is founded on the simple principles that the best option for the environment is to reduce the amount of waste produced. Though beyond the scope of this Plan, measures to secure waste minimisation have a major role to play in the overall waste management strategy. Second best is to re-use products and materials. Next best is to recover materials from waste by recycling, composting, then to recover energy. Finally, least environmentally acceptable is to dispose of the waste, for example by burying it in landfill.[11]

35 The Waste Hierarchy has been debated and re-defined but the basic model shown in Figure 3 has the benefit of simplicity in explaining the concept and is rooted in the provisions of the Landfill Directive.[12]

Proximity

36 Waste should be recovered/recycled or disposed of as near as possible to where it is produced. This reduces the adverse environmental impacts of transporting waste and helps place responsibility for managing waste on those who produce it.[13] (see para 43)

37 How this principle is interpreted in practice will depend on the nature of the waste. The nature, amount and cost of dealing with some wastes will require a single facility at regional or even national scale. Other wastes may most appropriately be dealt with at the community level with the added potential for securing community involvement.

Self-sufficiency

38 As far as practicable, waste should be recovered/recycled or disposed of within the region. The implication of this principle is that as little waste as possible should be exported to other regions.[14]

39 There is potentially a conflict between Self Sufficiency and Proximity in that there may be locations and circumstances where the shortest distance for wastes to travel might mean crossing regional boundaries. In such situations it is likely that Proximity will be the best guide in that environmental impacts are reduced most.

Flexibility

40 Recent data is not always a reliable guide to future trends. Data is not always accurate, up-to-date or complete. Changing economic, social and technological factors will influence future waste growth rates, the composition of future waste streams, and the range of future options for waste management. New waste management technologies are emerging and assessment may show that they offer better environmental and economic options.

41 Therefore the Plan needs to prepare for the future by keeping options open and encouraging new ones to be developed. It is important to avoid prematurely locking into

costly and irreversible options. This applies equally to the reduce/re-use/recycle options at the top of the waste hierarchy as well as to the residual waste options at the bottom.[15] A concern expressed by many is that commitment to large-scale, capital intensive facilities which require a minimum level of throughput to be viable might deter efforts from reduce/re-use/recycle options. Care is needed to ensure that this does not happen.

Other Considerations

42 There are a number of other principles which have implications for the land-use framework of the Regional Waste Plan and for the way in which the Plan is prepared.

43 **Producer responsibility** The producers of goods and materials should take account of the costs of dealing with those goods and materials when they become waste. National legislation and regulation has a major role to play in achieving this but there are also implications at regional/local level.[16]

44 **Precautionary Principle** Where there is preliminary scientific indication that there may be adverse environmental impacts from a particular method of managing waste, caution should be used in making decisions, even in advance of conclusive evidence emerging.[17]

45 **Consultation and equal opportunity** As a matter of principle, consultation on the preparation of the Regional Waste Plan should be as wide as possible. This will ensure that the Plan benefits from the views and contributions of all those with an interest in planning for waste management, including local communities, producers of waste, the waste management industry, environmental interests and those with regulatory responsibilities.[18]

46 **Integration and partnership** The concepts of integration and partnership are at the root of the Regional Waste Plan approach. An integrated approach to developing waste management options for a mix of waste streams can bring the advantages of a number of different technologies and offer greater flexibility. Partnership between local authorities, the voluntary sector, the private sector, and communities can allow a greater range of choices to be implemented and widen 'ownership' of both problems and solutions.[19]

Overview

47 Taken together, these principles form a sound basis for the consideration of options to address problems of waste management. In some cases the principles may seem to be in conflict. However, it is hoped that any potential conflicts can be resolved by reference to the Vision Aims and Objectives of the Plan.

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[1] 'Waste Not, Want Not: a strategy for tackling the waste problem in England', November 2002, page 5 and chapters 2 and 3
[2] Technical Advice Note 21 paragraphs 1.14 – 1.20, pages 6-7
[3] Wise about Waste: The National Waste Strategy for Wales Part One, June 2002, paragraphs 2.4 - 2.6, pp 9-10
[4] For example in Wise about Waste: The National Waste Strategy for Wales Part One, June 2002 , paragraph 2.9, page 11
[5] Wise about Waste: The National Waste Strategy for Wales Part One, June 2002, paragraph 2.9, page 11
[6] Waste Not, Want Not: A strategy for tackling the waste problem in England, November 2002, paragraph 5.4, page 42
[7] The Best Practicable Environmental Option (BPEO) is defined in the Royal Commission on Environmental Pollution 12th Report as *"for a given set of objectives, the option that provides the most benefits or the least*

damage to the environment as a whole, at acceptable cost in the long term as well as in the short term". (Cm 310, ISBN 0 10 103102 5), published in February 1988

[8] Technical Advice Note 21: Waste, November 2001, paragraphs 3.17-3.20, pages 14-15

[9] Strategic Planning for Sustainable Waste Management: Guidance on Option Development and Appraisal, Office of the Deputy Prime Minister October 2002 **View**

[10] Technical Advice Note 21: Waste, November 2001, paragraphs 3.5-3.12, pages 12-13; Wise about Waste: The National Waste Strategy for Wales Part One, June 2002 paragraph 2.12, page 11 and Box 2.2 page 12

[11] In Wales the 'Recovery' is split with preference given to recovering materials over recovering energy as indicated in Technical Advice Note 21: Waste, November 2001, page 14; and Wise about Waste: The National Waste Strategy for Wales Part One, June 2002, page 12

[12] Discussed in Waste Not, Want Not: A strategy for tackling the waste problem in England, November 2002, paragraph 5.6-5.12, page 43-45

[13] Technical Advice Note 21: Waste, November 2001, paragraphs 3.1-3.2, pages 12; Wise about Waste: The National Waste Strategy for Wales Part One, June 2002, paragraph 2.18, page 13

[14] Technical Advice Note 21: Waste, November 2001, paragraphs 3.3, page 12; Wise about Waste: The National Waste Strategy for Wales Part One, June 2002, paragraph 2.19, page 13

[15] 'Residual waste' is that left for disposal after re-use/recycling/recovery. See Waste Not, Want Not: A strategy for tackling the waste problem in England, November 2002, paragraph 5.14, page 47

[16] Wise about Waste: The National Waste Strategy for Wales Part One, June 2002, paragraph 2.16, page 13; Waste Not, Want Not: A strategy for tackling the waste problem in England, November 2002, paragraph 5.4, page 43

[17] Wise about Waste: The National Waste Strategy for Wales Part One, June 2002, paragraph 2.17, page 13

[18] Wise about Waste: The National Waste Strategy for Wales Part One, June 2002, paragraph 2.10, page 11; Waste Not, Want Not: A strategy for tackling the waste problem in England, November 2002, paragraph 5.13 and Box 8, pages 45-46

[19] Wise about Waste: The National Waste Strategy for Wales Part One, June 2002, paragraph 2.20, page 13

4 The Waste Problem

Background

48 This Regional Waste Plan provides the framework for dealing with wastes arising from all sources in South East Wales and needing management, treatment and disposal. The main waste 'streams'[1] which the Plan considers, and the amounts of waste now and forecast in the future, are summarised in Figure 4. In addition the Plan includes a number of specific wastes which are considered to be particularly problematical. These are End of Life Vehicles, Hazardous Wastes, Packaging Waste, Tyres, and Waste Electrical and Electronic Equipment. The Regional Waste Assessment sets out the scale of the problem in detail.[2]

49 Altogether in South East Wales just under 5 million tonnes of waste are produced each year and that amount is forecast to rise over the next ten years before it begins to reduce. (Figure 4)

50 The problem is created not simply by the amount of waste produced but by the fact that the way it is managed does not meet modern environmental standards.

Figure 4 **Controlled Waste 2001/21**

waste stream	2001/02	2011/12	2021/22
Construction and Demolition	2,340,000	2,340,000	2,340,000
Industrial	1,124,706	1,017,164	919,905
Municipal	777,772	974,520	1,000,928
Commercial	571,593	717,186	735,594
Agricultural	18,541	16,768	15,164
all waste	**4,832,612**	**5,064,637**	**5,011,591**
Special (included above)	277,809	227,827	227,827

source: Regional Waste Assessment Table 25 **tonnes**

51 The key facts and 'pointers for action' from the Regional Waste Assessment are set out below.

52 The full Regional Waste Assessment can be viewed on the South East Wales Waste Group's web site or at council offices and libraries throughout the region.

Regional Waste Assessment: key facts and points for action

1 The amount of waste produced in South East Wales is high and increasing

More than 5 million tonnes of controlled waste are produced in South East Wales each year.

While amounts of some types of waste are forecast to remain the same (construction and demolition waste) or to decrease (industrial waste), other types of waste are clearly increasing (Figure 4 above).

Municipal Waste, (the waste produced by households and commercial waste collected by local authorities) and Commercial Waste are increasing by a little less than 3% a year, in line with the rate of increase in the UK as a whole. This means that by 2013 the amount of municipal and commercial waste produced in South East Wales will have increased from 1,349,000 tonnes a year to 1,709,000 tonnes and will make up nearly a third of all the waste produced. [3]T

2 The amount of waste going into landfill is high and the proportion recycled or treated is very low

Information on what happens to waste is incomplete. But what information is available shows that in South East Wales in 2001/02 more than 2 million tonnes of waste went to landfill. This must be regarded as a minimum figure. Less than half a million tonnes, only 18% of all waste going to licensed waste management facilities, went for some kind of treatment.[4]

3 The amount of municipal waste recycled and composted in 2001/2 is well below set targets

Out of a total of 778,000 tonnes of municipal waste produced in South East Wales in 2001/02, only 52,000 tonnes were recycled or composted. This represents 7% across the region. By 2003/04 a minimum of 15% must be recycled and composted to meet National Waste Strategy targets. To achieve this, recycling and composting must increase by 150% to 123,000 tonnes.[5]

4 The amount of municipal waste is forecast to increase

By 2012/13, the end of the Plan period, the amount of municipal waste produced in South East Wales is forecast to have increased from 778,000 tonnes to 985,000. By 2021 it will have increased to over a million tonnes a year. This is by no means a pessimistic forecast. It recognises that in the short term past rates of growth are likely to continue but assumes that by the second half of the 20-year period waste minimisation strategies will have an effect.[6]

5 The amount of commercial waste going to landfill must be reduced

The National Waste Strategy sets targets for the reduction of the amount of industrial and commercial waste allowed in landfill. Taken together these two waste streams already meet those targets. However, this masks important differences in waste management practice between the two.

In 1998 (the base-year for the targets), 76% of commercial waste went to landfill. By 2010 this proportion should reduce to 46%. The amount of commercial waste is forecast to increase from 528,000 tonnes in 1998 to 695,000 tonnes by 2010. Together these two factors mean that the amount of commercial waste not diverted from landfill must increase by just short of 200%, rising from 129,000 tonnes to 376,000 tonnes.[7]

6 The capacity of facilities capable of managing special waste is set to reduce significantly below amounts produced

The Landfill Regulations 2002 require the treatment of all waste before it goes to landfill, including a reduction in its hazardous nature. In 2000/01 43% of special waste went to landfill.

It is anticipated that the amount of special waste produced in South East Wales will reduce from 285,000 to 228,000 tonnes by 2010. The implication is that some 98,000 tonnes of special waste might require both treatment and landfill capacity.

Information provided to Environment Agency Wales under the Landfill Regulations 2002 indicates that by July 2004 no landfill sites in South East Wales will accept hazardous waste.[8]

7 Changes in controls over construction and demolition waste are likely to increase the requirement for recycling

Published data indicates that South East Wales exceeded the 2010 target for re-use/recycling of construction and demolition waste in 2000/01.

However, a significant proportion is classed as going to 'Inert Recovery on Exempt Sites' which is widely regarded as an abuse of the system. Therefore changes in legislation are being considered which would modify this exemption. With this category excluded, in 2001/02 South East Wales fell 7.4% short of the 2005 target – representing a need to extend re-use/recycling to an additional 173,000 tonnes.[9]

8 Some types of agricultural waste are likely to become controlled waste

Agricultural waste is not at present classed as 'Controlled' or subject to waste management Regulations. However, a small proportion, about 1%, has the potential to cause environmental harm and is likely to be classified and subject to regulation. It is forecast that the amounts will be small and will reduce from about 19,000 tonnes in 2000/01 to 15,000 tonnes in 2021. Of this perhaps 75% could be pesticides and sheep-dips, classified as Hazardous waste.[10]

9 Recycling and treatment facilities will be required for Waste Electrical and Electronic Equipment (WEEE)

The proposed WEEE Directive will impose requirements for re-use/recycling of redundant electrical and electronic equipment and to reduce the hazardous content. The details are not yet known but planning for this part of the municipal waste stream should begin. WEEE makes up about 3% of municipal waste and re-use/recycling could therefore make a significant contribution to meeting existing targets. Regulations regarding fridges, which are now classed as hazardous waste, are already in place.[11] Other types of WEEE are also expected to be classed as hazardous in the near future.

10 Additional provision will be required for re-use/recycling of End of Life Vehicles

At present about 74% of vehicles by weight are re-used/recycled. The National Waste Strategy sets targets for this proportion to be increased. By 2006, 80% of vehicles should be re-used/recycled, which, given the estimated growth rate in the number of End of Life Vehicles, implies an increased capacity requirement of some 3,300 tonnes a year.[12]

11 Recycling and treatment facilities will be required for tyres

Though not separately included in the Regional Waste Assessment, there are specific requirements in respect of tyres which must be met. The Landfill Directive bans the landfilling of whole tyres by 2003 and of shredded tyres by 2006. Therefore alternative treatments must be found. It is estimated that the shortfall in waste tyre disposal capacity in Wales will be 12,800 tonnes by 2006.[13] An estimated increase in capacity of 6,000 tonnes will be needed to meet the needs of South East Wales.[14]

12 More needs to be done to reduce, re-use and recycle packaging waste.

Again, though not separately included in the Regional Waste Assessment, packaging waste is considered to be of particular concern and specific arrangements need to be made.

Packaging waste comes from both household and commercial sources included a range of materials, the largest amounts of which are paper and cardboard, glass, and plastics. The amount of packaging waste produced in South East Wales in 2001 is estimated to be 174,000 tonnes.[15]

Measures have been and are being taken to minimise packaging waste at source and challenging targets have been set for the recovery and recycling of the remainder.[16]

[1] In this context the term 'waste stream' is used to refer to wastes from particular sources. Different wastes 'streams' may contain similar wastes types or 'fractions'. For example, both municipal waste and commercial waste streams will contain a paper 'fraction'.
[2] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group
[3] Paragraphs 98-104, Table 25, Graphs 15 and 16
[4] Paragraphs 126-135, Figure 10, and Tables 30-38.
[5] Paragraph 32, Table 7
[6] Paragraphs 26-30, Note 1, Table 2, Graph 4
[7] Paragraphs 56-62, Figure 6, Table 25, Graph 6.
[8] Paragraphs 63-73 and 138, Tables 18 and 19, Note 7 and Graph 11.
[9] Paragraphs 74-86, Tables 20-22, Note 8, Graphs 12 and 13
[10] Paragraphs 87-94, Table 23 and 24, Note 9, Graph 14
[11] Paragraphs 105-113, Tables 26 and 27, Graph 17
[12] Paragraphs 114-123, Tables 28 and 29, Graph 18
[13] Wise about Waste: The National Waste Strategy for Wales Part One, June 2002 paragraphs 5.187-5.189 and Part Two pages 131-132
[14] Based on the proportion of cars in South East Wales taken from Table 28 of the Regional Waste Assessment.
[15] Calculated by apportioning on the basis of population the data for Wales in Table A10.1 of Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002
[16] See Wise about Waste: The National Waste Strategy for Wales Part One, June 2002, paragraphs 5.141 – 5.147, pages 65-67; Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002 Annex 10

5 Dealing with Waste: methods available

Introduction

53 A number of types of facilities can be used to manage waste. These vary in their environmental impact and some are more suited to particular wastes and waste streams than others.[1] All waste facilities and options will involve some environmental risk.

54 A detailed summary of 'Available Technologies' has been prepared for the South East Wales Regional Waste Group. This lists all types of waste management technologies which are known to be currently operational in the UK or in other countries with a similar environmental legislation to the UK. Since then the Government's Strategy Unit has published a report on 'The Role of New and Emerging Technologies' which gives a detailed description and assessment of the main types of waste management facilities.[2] Appendix 5 shows the range of capacities of different facility types.

Figure 5
Ways of managing waste.
Re-use and Recycling
Composting
Mechanical Biological Treatment
Thermal Treatment
Landfill

55 Waste management technologies fall into a number of broad ways of dealing with waste. These are listed in Figure 5 and are considered in turn below. Consideration of strategies to manage the different waste streams has focused on these broad types of waste management.

56 The aim of Recycling and Composting is to recover value from waste as much as possible via separation and reprocessing. However, even if recycling and composting are maximised there will be residual waste for further treatment and disposal. Thermal Treatment and Landfill are methods of disposal of this residual waste. Mechanical Biological Treatment is an intermediate method for further reducing the amount and environmental impacts of residual waste and increasing the recycled fraction.

Re-cycling

57 As much waste as possible should be re-used – used again, without reprocessing, for the same or a different purpose - because that has least impact on the environment (see paragraphs 33-35). Ideally, industry should design products with re-use in mind, and materials and products should be re-used before they enter the waste stream. However, in practice there will be the need for some separation of re-usable materials and products. In reality there is some blurring of the distinction between re-use and recycling.

58 If possible, wastes which cannot be re-used as they are should be reprocessed into the same or a different product - recycling.

59 Recycling can involve 3 stages:
- separation from other wastes and materials
- 'bulking' into viable quantities for onward shipment
- reprocessing into useable products and materials

60 Separation can take place as part of 'doorstep' collection, at civic amenity sites or transfer stations, at specialist 'Materials Recovery Facilities' (MRFs), or by a combination.

61 Materials Recovery Facilities are of two main types. 'Clean MRFs' process clean, dry recyclable materials which are not contaminated with food or garden waste, and are usually separated by the householder or commercial business. 'Dirty MRFs' process mixed, unsorted waste to recover usable materials.[3] Dirty MRFs are increasingly regarded as not providing the quality of recyclable materials needed by industry and the 'at source' sorting of the 'Cleanstream' method is increasingly preferred in the region.

62 The size of the facilities can vary. In relation to municipal waste, civic amenity sites or 'Household Waste Recycling Centres' can be viable with an annual capacity of 3,000 tonnes while MRFs are not considered to be viable below 5,000 tonnes capacity. Commercially, some consider that MRFs are not economical below a capacity of 80,000 tonnes a year. Recycling construction and demolition waste often takes place as a small scale activity in conjunction with inert waste transfer or as temporary activities on demolition sites. However, 'dedicated' facilities for recycling of construction and demolition waste as secondary aggregate are probably not viable below a capacity of about 100,000 tonnes a year.

63 There are advantages and disadvantages to different sizes of facility. The larger a facility is, the more economically viable it is likely to be but the greater its environmental impact. The smaller it is the less impact it is likely to have on the surrounding area and the greater the community involvement and benefit to the local economy, but the more expensive it is to operate and the more facilities will be needed. An important consideration is that for recycling facilities to be successful they must be 'user-friendly' and appropriate for the community they serve. It may therefore be that different scale of facilities may be considered appropriate in different types of locations, ranging between the 'urban–efficiency' of large facilities and the 'community ownership' of local partnership facilities. Because South East Wales has such a diverse range of communities it is appropriate that the decision on scale of facility, within the range of available options, should be left to each local authority to determine in relation to its own area.

64 Some waste materials can be processed locally but many need to be collected and taken to large-scale reprocessing plants which may be some distance from where the waste is produced and collected. Such reprocessing plants are often industrial businesses rather than waste management facilities because the recycled material becomes a raw material for the industrial process.

CHOICE
How big should recycling facilities be?
- small and close to local communities? or
- larger to serve a larger area?

Composting

65 Some wastes are classed as 'biodegradable' because they decompose through the action of plants, animals or micro-organisms. Such wastes can therefore be recycled by composting them. If properly controlled the compost can be used as a growing medium or as a soil improver and therefore positive value is gained from the waste.

66 There are two basic types of composting:

- **'Windrow'** where the waste is heaped up, either in the open-air or in buildings and periodically turned to help the composting process.
- **'In-vessel'** where the waste is placed in sealed containers and hot air blown or sucked through it to speed up the composting process and, because the process reaches higher temperatures, ensure any potentially harmful organisms are killed.

67 Windrow composting is suitable for all 'green' wastes, the waste produced from gardens and green spaces and consisting of grass cuttings, hedge and tree clippings and flowers, etc. It is an extremely flexible way of dealing with such waste, is generally regarded as 'sustainable', requires no energy inputs and is relatively inexpensive. Home composting can be carried out by households with a garden and is perhaps the finest possible example of the Proximity Principle (see paragraphs 36-37). However, at the moment home composting cannot be counted towards the achievement of targets in the National Waste Strategy and ways must be found of measuring this 'diversion' of waste so that it can be counted towards achieving targets.

68 Windrow composting can also be carried out at central facilities which can be economical and efficient at small or large scale. Composting facilities can be particularly suited to a variety of locations including on farms and at landfill sites. However, they are sometimes considered by local communities to be 'bad neighbours'. Because of concerns about the health effects from bio-aerosols, windrow composting should not be done within 250m of premises where people live or work.

69 Although windrow composting is suitable for green waste it is not suitable for 'kitchen' waste. Kitchen and catering waste may contain meat or other animal by-products and recent legislation sets down strict conditions which must be met to kill harmful organisms. If kitchen waste is included in windrow composting the material produced can only be buried in landfill and no recycling value can be gained from it, unless it can be demonstrated that high enough temperatures can be achieved for long enough to kill harmful organisms. These restrictions do not apply to garden composting by households for their own use.

70 Therefore the only way of safely composting kitchen and catering waste is some form of in-vessel system. In-vessel composting is more expensive than windrow composting. Therefore, although it would be easier to collect all biodegradable waste together and deal with it by in-vessel composting, the cost would be higher. Because green waste can be treated effectively by windrow composting it may be most efficient and effective to separate kitchen waste and compost that in-vessel. This has implications for the process and the cost of collection and separation of the wastes. The composting process requires some woody material and therefore it is best to compost a mix of kitchen and green wastes together in in-vessel systems.

71 The operating costs for in-vessel composting systems vary widely depending on the type of system used but are generally higher than windrow systems. Although relatively small in-vessel composting systems are available, it is probable that they will only be economical on a medium or large scale.[4] This has implications for the size and number of such facilities which will be required in the region. If an in-vessel system is restricted to composting kitchen waste, it is probable that a very limited number will be needed.

72 In the short term, the targets which have been set for composting and for reducing the amount of biodegradable waste going to landfill, can be met by separating kitchen waste and burying it in landfill. However, if this choice is made, longer term targets will not be achieved and short term targets cannot be exceeded. By 2010 composting of kitchen waste will be required in order to meet the composting target for 2009/10 in the National Waste Strategy. In any event, separation of green waste and kitchen waste will eventually be necessary.

CHOICES

Should home composting be encouraged?

Should green waste and kitchen waste be separated in the short term?

Should windrow composting be used for green waste as far as possible?

Should kitchen waste be landfilled?

73 In order to meet short term composting targets many authorities in South East Wales are taking steps to increase the amount of windrow composting in their area. By default kitchen waste is currently landfilled. This is pointing in the general direction of separate treatment of green and kitchen wastes.

Mechanical Biological Treatment

74 Mechanical Biological Treatment [5]is a 'hybrid' process which has been developed in recent years in Germany, Austria and Italy as a partial alternative to incineration and

landfill. It is a process which recovers materials and energy from 'residual' waste – the waste left over after recycling by separation at source.

75 The aim of the process is to further reduce environmental impacts before disposal of residual waste and to gain additional value from the recovery of metal, plastics and possibly energy.

76 Though MBT reduces and stabilises waste it still leaves a significant residual waste which must go for final disposal either by landfilling or by some thermal treatment. It is not, therefore, a 'stand-alone' treatment for residual waste but is an intermediate process requiring integration with a waste disposal facility.

77 It is essentially a two part process:
- **mechanical waste preparation** to separate out materials for recycling and 'rejects' which go direct to landfill
- **biological treatment** to reduce the biodegradable waste to a stable material.

78 There is a wide variety of MBT systems but at its simplest it involves no more than these two stages.

79 MBT facilities can have a role as a 'secondary recycling stage'. Even where local authorities have a well-developed kerbside collection in place, MBT enables an increase in recycling rates. It is claimed that some MBT systems can recover 15-20% from the residual waste for recycling.[6] In addition, the quality of recycled metals from an MBT is higher than from incineration and so have a higher value. However, at present many of the industries which use the recovered materials are unwilling to accept materials which have come from mixed waste collections due to the level of contamination, this applies particularly to paper.

80 It is estimated that currently the biodegradable content of residual waste is 65%. It is anticipated that by 2020 home-composting and source-separation for recycling and composting could reduce the biodegradable content to 54%.[7] This is a high figure and, if the material remains biodegradable, makes meeting targets for reducing biodegradable waste going to landfill very difficult. The output from MBT processes is likely to be defined as 'stabilised biowaste' and it may be possible to landfill it as non-biodegradable waste under the terms of the forthcoming Biowaste Directive.

81 One characteristic of the process is that the material which results from the biological treatment is not of sufficient quality to be used as a growing medium or soil improver. It must therefore be sent to landfill or thermal treatment.

82 Putting the MBT-material in landfill has a number of advantages over landfilling untreated waste. There is much reduced biodegradation. Leachate and landfill gas are reduced to about 10% of that produced by untreated waste.[8] It reduces both the cost of managing the landfill site and potentially the long term liability of the site. Furthermore there is less waste to put in the landfill site, it's weight and volume having been reduced by about 25%[9]. **A key consideration is that if Mechanical Biological Treatment stabilises the residual waste so that it is not classed as biodegradable under the provisions of the Landfill Directive, local authorities can rely on MBT after recycling and composting and not need to turn to incineration.**

83 Additionally, some parts of the waste can be further treated to produce Refuse Derived Fuel (RDF) which has a much higher calorific value than the untreated waste. This allows energy to be recovered from the material produced, thereby greatly increasing the value recovered from the waste. One possibility is that an RDF generating plant could serve a number of satellite MBT facilities.

CHOICES
Should Mechanical Biological Treatment be used to reduce the amount of residual waste and its environmental impact?

Should the treated waste go to Landfill ?

…or should it go to Thermal Treatment?

84 Mechanical Biological Treatment is used extensively in Germany and Austria, and increasingly in Italy, though not yet in the UK.

85 The scale of MBT plants varies widely from small plants treating 36,000 tonnes a year to large, integrated systems of 400,000 tonnes capacity.[10, 11] Some of the systems are modular which means that they can be adapted to the needs of a particular region or area and can be adapted over time as requirements change. Current interest in the UK is in modular systems of 60,000 tonne capacity.[7]

86 One possibility is that MBT facilities could replace 'dirty MRFs', thereby taking advantage of already identified and permitted/licensed sites and moving the waste management process up the waste hierarchy.

Thermal Treatment

87 Thermal processing of waste can be divided into two broad categories, **Incineration** and **Advanced Thermal Treatment**. It must be stressed that all forms of thermal processing result in a residual material, at least some of which must be sent to landfill.

88 Advanced Thermal Treatments are of two kinds:

- **Pyrolysis** which involves heating the waste to between 400 – 800^{o}C in the absence of air and oxygen
- **Gasification** which turns carbon-based waste (including wood/paper which cannot be recycled, kitchen and garden waste) into a fuel gas by heating to high temperatures under pressure in the presence of oxygen, sometimes following pyrolysis.

89 Though arousing much interest as alternatives to Incineration, and the subject of 'pilot-plant' testing, neither of the Advanced Thermal Treatment technologies is as yet proven in the UK. Because they are not currently available and cannot therefore make an immediate contribution to a waste management strategy for the region, they are not considered any further in this Plan.[12]

90 However, they may prove to make a valuable contribution to waste management in future years and it is therefore important that, in light of the Flexibility Principle, that decisions are not made at this stage which rule them out.(see paragraphs 40-41 above) The 3-yearly review process provided for by TAN 21 gives additional flexibility.

91 Three forms of incineration can be identified:[13]

- **Mass-Burn Incineration** which burns waste in large moving grates, leaving ash from which metals can be separated and gas emissions which are 'scrubbed' in a chimney-stack
- **Fluidised-bed Technology** which burns waste on a bed of inert particles agitated into a 'fluid' by blowing air through it, giving reduced emissions but requiring some pre-processing of the waste.
- **Refuse Derived Fuel** which burns pellets or crumbs made from the residue of a resource recovery operation (eg Mechanical Biological Treatment, see paragraph 82) which has a higher

and more consistent calorific value than untreated waste and which can be used either in a 'dedicated' boiler or mixed with other fuels for energy generation or industrial processes.

92 All forms of incineration now recover energy from the waste and so can be regarded as 'Energy from Waste' technologies. They therefore have the considerable environmental benefit of avoiding the use of fossil fuels. Furthermore incineration considerably reduces the amount of waste buried in landfill, and, by rendering it biologically inert, prevents methane production.

93 Use of either Mass-Burn Incineration or Fluidised-bed Technology would mean a single-technology waste management solution for residual waste following recycling and composting. This would maximise the energy recovery potential of the waste.

94 Use of Refuse Derived Fuel would mean a two-technology approach twinned with Mechanical Biological Treatment, with the possibility that an RDF generating plant could serve a number of satellite MBT facilities. This approach would maximise recycling. As already noted, the quality of the fuel from an MBT process is higher and more consistent than using untreated waste. It is also probable that, provided plastics are removed, the emissions from the process will be broadly comparable with those from conventional thermal electricity generation.

95 Incineration, in common with all other forms of waste management , does have a number of potential disadvantages which have to be addressed.

96 Mass-Burn Incineration in particular tends to be in large-capacity facilities which require large volume throughput of waste and therefore have long term wastes supply contracts with corresponding loss of flexibility. One concern is that to achieve this will result in the whole of the municipal waste stream being committed to the facility with consequent reduction in recycling and composting. It is therefore important that the scale of the plant and the area which it serves should be geared not to managing the whole of the municipal waste stream but to manage the residual waste after recycling and composting have been optimised. In Europe small/medium sized plants are common and achieve this.

97 Furthermore, because recycling and composting capacity is being increased, and because waste reduction strategies are assumed to have increasing effect[14], care should be taken to ensure that plant capacity can cope with short/medium term amounts of waste while continuing to be economically viable with reduced amounts of waste in the future.

98 Fluidised-bed Technology plants are typically smaller than Mass-Burn Incineration plants. They can therefore be fitted more flexibly into an integrated waste strategy and can be closer to the source of the waste.

99 Though the combustion process is now very strictly regulated and health risks are assessed as minimal, public perception is that health risks are unacceptable. This makes it difficult to secure planning permissions for plants using any incineration technology. Recently 7 planning applications for incineration plants have been refused in Britain.

CHOICES

Should Thermal Treatment be part of an integrated waste management strategy?

Should Mass-Burn Incineration or Fluidised-bed Technology be used to maximise Energy from Waste ?

Should Refuse Derived Fuel be used in conjunction with Mechanical Biological Treatment?

Landfill

100 Landfill[15] is the most familiar of the waste management methods. Because it has been a cheap and simple way of disposing of waste, and because of the previously plentiful of availability of holes in the ground, landfill has traditionally been the disposal method of choice in the UK. The UK puts 80% of its municipal waste in landfill, a higher proportion than most of its European partners. In South East Wales that figure is over 90%.

101 Growing concerns about environmental problems associate with leachate and gas from landfill, have meant that sites have become engineered to increasingly stringent standards.

102 Nevertheless, concerns have remained about environmental and health impacts of landfill. This, plus the growing awareness that landfill is wasteful of resources, have led to the current position that landfill is nolonger to be regarded as the preferred option for waste disposal and that alternatives must be found.

103 To overcome the inertia of continuing to use landfill, targets have been agreed by the European Union which, either directly or indirectly, divert increasing amounts of waste from landfill. These targets are incorporated in the National Waste Strategy and are outlined in the Regional Waste Assessment[16].

104 However, landfill has a continuing role in the waste management strategy of individual waste disposal authorities and in the region as whole for two reasons. First, there will inevitably be a period of transition when alternative waste management methods are being introduced and during this time waste will continue to be buried in existing landfill sites. Second, all other waste management methods reduce the amount of waste but leave residual amounts which it is anticipated will continue to be placed in landfill.

105 The targets which have been set by the National Waste Strategy still allow for landfill to play a significant role for the management of residual waste during the period of the Regional Waste Plan. The capacity of existing landfill sites continues to reduce and suitable locations for landfill new sites are more difficult to find as environmental standards become tighter and communities become less accepting of them. Landfill sites themselves must therefore be regarded as a scarce and diminishing resource.

106 To continue with landfill at as high a level as possible commensurate with meeting targets may be attractive in the short term. Investment in the facility has already been made. Location decisions have already been made and permissions and licences are in place. But because there will be a need for landfill into the foreseeable future, diminishing the resource in the early years of the waste management strategy may create a shortage of capacity in later years and so be regarded as not in accord with the Principle of Sustainability.(see paragraphs 31-32 above)

CHOICES

Should the role of landfill be maximised in the waste management strategy, while still meeting targets?

…. or should as much waste as possible be diverted to other methods of waste management?

107 The design and operation of landfill sites is subject to increasingly rigorous regulation. One change with substantial implications is the ending of 'co-disposal' of hazardous and non-hazardous wastes on the same site. The Landfill Regulations 2002 required operators to submit a Conditioning Plan and to indicate whether the site will be used for hazardous or non-hazardous wastes.[17] As the Regional Waste Assessment makes clear, the indication given by operators so far points to South East Wales having no hazardous landfill capacity after July 2004[18]. This is likely to create a significant problem for dealing with hazardous waste.

108 A distinction should be drawn between landfill sites taking biodegradable waste and those taking only inert waste. In the past environmental concerns about landfill have focused on leachate and gas and much of the increased regulation relates to these issues. These are problems arising from the decomposition of the biodegradable part of waste. However, proposals for landfill sites which would only take inert waste also attract objection, principally on grounds of other issues such as noise, dust and traffic.

Integrated Treatment and Disposal Strategy

109 None of these methods of dealing with waste will be sufficient on its own for the more than 5 million tonnes of waste produced in South East Wales each year. Rather, they will have to be used in combination in an integrated treatment and disposal strategy. This is the subject of the next chapter.

110 The integrated treatment and disposal strategy will then have to be integrated with arrangements for collection and transfer of wastes.

[1] Technical Advice Note 21: Waste, November 2001
[2] Delivering the landfill Directive: The role of New and Emerging Technologies, Dr Stuart RB McLanaghan, November 2002, report for the Government's Strategy Unit, – ONLY AVAILABLE ON THE INTERNET View
[3] For detailed description and assessment see pages 28-34 of Delivering the landfill Directive: The role of New and Emerging Technologies, Dr Stuart RB McLanaghan, November 2002, report for the Government's Strategy Unit, – ONLY AVAILABLE ON THE INTERNET View
[4] Page 21 of Delivering the landfill Directive: The role of New and Emerging Technologies, Dr Stuart RB McLanaghan, November 2002, report for the Government's Strategy Unit
[5] Mechanical Biological Treatment is described and assessed in "Waste Not, Want Not: A strategy for tackling the waste problem in England, November 2002, Annex G: Treatment and Disposal of Residual Waste – MBT in context" – ONLY AVAILABLE ON THE INTERNET View and in Delivering the landfill Directive: The role of New and Emerging Technologies, Dr Stuart RB McLanaghan, November 2002, report for the Government's Strategy Unit, pages 56-62– ONLY AVAILABLE ON THE INTERNET View
[6] 'Mechanical Biological Treatment – Applicability to Household Waste', Claudia Heerman, Warmer Bulletin, September 2002 View
[7] Paragraph 7 of Annex G of 'Waste Not, Want Not: A strategy for tackling the waste problem in England, November 2002', – ONLY AVAILABLE ON THE INTERNET View
[8] Paragraphs 21 and 22 of of Annex G of Waste Not, Want Not: A strategy for tackling the waste problem in England, November 2002, – ONLY AVAILABLE ON THE INTERNET View
[9] Paragraph 23 of Annex G of Waste Not, Want Not: A strategy for tackling the waste problem in England, November 2002 indicates **volume** reduction of 25%, – ONLY AVAILABLE ON THE INTERNET View ; page 55 of Delivering the landfill Directive: The role of New and Emerging Technologies, Dr Stuart RB McLanaghan, November 2002, report for the Government's Strategy Unit, page 55 indicates **weight** reduction of 25%– ONLY AVAILABLE ON THE INTERNET View
[10] Delivering the landfill Directive: The role of New and Emerging Technologies, Dr Stuart RB McLanaghan, November 2002, report for the Government's Strategy Unit, page 55 – ONLY AVAILABLE ON THE INTERNET View
[11] Other publications put the capacity range of MBT plants between 10,000 and 150,000 tonnes. See Mechanical Biological Treatment – Applicability to Household Waste', Claudia Heerman, Warmer Bulletin, September 2002 View
[12] For detailed description and assessment of both technologies see pages 38-46 of Delivering the landfill Directive: The role of New and Emerging Technologies, Dr Stuart RB McLanaghan, November 2002, report for the Government's Strategy Unit, – ONLY AVAILABLE ON THE INTERNET View
[13] For detailed description and assessment of both technologies see pages 47-54 of Delivering the landfill Directive: The role of New and Emerging Technologies, Dr Stuart RB McLanaghan, November 2002, report for the Government's Strategy Unit, – ONLY AVAILABLE ON THE INTERNET View
[14] The Medium Growth Scenario assumes that growth in waste volumes will continue for a short period but then reduction strategies have an increasing effect. South East Wales Regional Waste Assessment January 2003,

prepared by Regional Waste Group, Municipal Waste paragraph 27 page 5 and Commercial Waste paragraph 51 page 8 View

[15] The term 'landfill' is used her to refer to both the filling of voids and 'land-raising', the depositing of waste above the previous ground level.

[16] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group, Municipal Waste. Direct diversion targets are discussed in paragraphs 34-37 and 56-62. Targets which indirectly reduce landfill are discussed in paragraphs 31-33, 81-86, 111-113 and 120-123 View

[17] Sites can continue co-disposal until July 2004 by indicating that hazardous waste will be accepted but operators must then comply with stricter operating standards from July 2004 onwards.

[18] Table 37 of South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group, View

6 Dealing with Waste: the range of options

Introduction

111 From this brief assessment of the types of facilities which are available for dealing with waste, it is clear that there are many ways of combining them to address the waste problem of the different waste streams produced in South East Wales.

112 Not every combination can be considered. Therefore, a range of options has been identified which between them allow assessment of the advantages and disadvantages of the broad choices available. These are considered in the Options Development Report.[1]

113 This chapter summarises the Options and the way they have been developed. It then looks at the options in turn and gives an indication of the capacity of treatment and disposal facilities which will be needed across the region as a whole in respect of each waste stream. The capacity requirements of the Options for each local authority area are given in Appendix 5. Finally, it then looks at a how these Options relate to individual waste streams and to a number of specific wastes which need separate consideration because of their nature and the special provisions needed for dealing with them

Broad Choices

114 The Options were developed on the basis of choices at three levels. A decision is made at each tier before moving on to the next choice.

CHOICES
Tier 1
Should targets be met or exceeded?

Tier 2
What amount of recycling and composting should be aimed for?

Tier 3
What method should be used for dealing with residual waste?

115 **Tier 1** There are 3 basic choices:

- one choice is to 'do nothing' and continue with existing measures to deal with waste;
- another is to aim to meet targets set for composting, recycling and diversion of waste from landfill;
- or a choice can be made to seek to exceed targets.

116 **Tier 2** Targets have been set for recycling and composting together, with flexibility as to whether to put more emphasis on one or the other, or to pursue both equally. For example, by 2010 40% of all municipal waste must be recycled or composted with a minimum of 15% recycled and 15% composted.[2]

117 **Tier 3** There are then a number of choices for dealing with the residual waste. It is considered that, realistically, at present this amounts to three main methods:

- to use Mechanical Biological Treatment ;
- to use Thermal Treatment with an Energy from Waste facility; or
- or to continue to use landfill.

The Options

118 When the choices at these three tiers are put together they create more permutations than can be properly considered. From these, 7 have been identified which, between them, allow a broad comparison of all the choices either directly or indirectly. These 7 options represent a sufficient range of choices for dealing with waste in the region.

119 They are developed mainly in relation to Municipal Waste but have been adapted to apply to the other waste streams as well.

120 The Options are characterised by whether they meet or exceed targets and by the principal method for dealing with the residual waste.

121 The options identified in the Options Development Report are (see Section 2).

Option 0 *'Do Nothing' strategy*
This option maintains the current levels of recycling, composting, energy from waste and landfill, projected on to waste tonnages arising in 2013.

Option 1 *Meet 2013 Targets / MBT-led strategy for residual waste*
This option meets the WAG target for 2010 through increased recycling, minimal composting, and with all remaining residual wastes being treated, where possible, through Mechanical Biological Treatment (MBT). The additional diversion of residual wastes through MBT ensures the 2013 BMW Landfill Directive target is met and in fact exceeded.

Option 2 *Meet 2013 Targets / Thermal-led strategy for residual waste*.
This option meets the WAG target for 2010 through increased recycling, minimal composting with all remaining residual wastes, where possible, being treated through Thermal Treatment. The additional diversion of residual wastes through Thermal Treatment ensures the 2013 BMW Landfill Directive target is met and in fact exceeded.

Option 3 *Meet 2013 Targets / Landfill-led strategy for residual waste*.
This option meets the WAG target for 2010 through increased composting, minimal recycling followed by thermal treatment to achieve the 2013 BMW Landfill Directive target. All remaining residual waste is then sent to landfill.

Option 4 *Meet 2013 Targets / Landfill-led strategy for residual waste.*
This option meets the 2013 BMW Landfill Directive target through recycling and composting alone, with all remaining residual wastes being sent to landfill.

Option 5 *A 'Do More' strategy / Landfill-led strategy for residual waste.*
This option attempts to achieve the 2020 BMW Landfill Directive target in 2013 principally through high recycling and composting levels followed by some thermal treatment. All residual waste is then sent to landfill.

Option 6 *A 'Do More' strategy / MBT-led strategy for residual waste*
This option attempts to achieve the 2020 Landfill Directive target in 2013 principally through maximising recycling and composting levels with all remaining residual wastes being sent to MBT. The additional diversion of residual wastes through MBT ensures the 2020 BMW Landfill Directive target is met and in fact exceeded.

122 Each option is briefly considered in turn below, together with its broad implications for the region in terms of the amount of waste capacity requirement for each waste management method. Each option provides sufficient capacity to deal with the total of 5.1 million tonnes of controlled waste which will be produced in 2013 and each of the individual waste streams. For this purpose commercial and industrial waste (C&I) is split between 'inert' and 'non-inert' as they require different waste management methods. Reference should be made to the full Options Development Report for details of the development of the options and for detailed estimates of the implications for the region and each local authority area in terms of capacity of waste management method required.

Option 0 *'Do Nothing' strategy*

123 Clearly, this option will not meet current statutory and non-statutory targets set by the Government; however it is considered important to provide a comparison against which all other options can be assessed.

124 Of the 5.1 million tonnes of controlled waste forecast for the region in 2013, approximately 2.6 million tonnes will be recycled/re-used/recovered and 2.4 million tonnes will need to be disposed of (or treated) if current performance levels are maintained to the year 2013. In this option recycling and composing account for approximately 1 million tonnes of the 2.6 million tonnes recycled/re-used/recovered.[3]

Figure 5 **Option 0** regional capacity requirements

Waste Stream	Recycling	Re-use	Recovery	Total RRR	Treatment	Landfill	Total Managed
Municipal	77,448			77,448		915,469	992,917
C&I Non-inert	155,927	62,644	3,612	222,183	87,851	570,906	880,940
C&I Inert	193,321	392,391		585,712		259,975	845,687
C&D	531,180	1,223,820		1,755,000		585,000	2,340,000
Agricultural						16,434	16,434
All Waste	**957,875**	**1,678,856**	**3,612**	**2,640,343**	**87,851**	**2,347,784**	**5,075,978**
							tonnes

Option 1 *Meet 2013 Targets / MBT-led strategy for residual waste*

125 This option assumes that WAG recycling and composting targets for 2010 are met by increased recycling and minimal composting. Residual waste is sent to MBT, or landfill if this is not possible. The additional diversion of residual waste achieved through MBT ensures the 2013 Landfill Directive target for Biodegradable Municipal Waste is met and in fact exceeded.

126 Of the 5.1 million tonnes of waste forecast for the region, just under 4 million tonnes will be recycled/re-used/recovered and 1.1 million tonnes will need to be disposed of (or treated) if waste recovery and landfill diversion targets are to be met in the year 2013. In this option recycling and composting account for 2.3 million tonnes of the 4 million tonnes of all wastes recycled/re-used/recovered.[4]

Figure 6 **Option 1** regional capacity requirements

Waste Stream	Recycling	Re-use	Recovery	Total RRR	Treatment	Landfill	Total
Municipal	722,081			722,081		270,836	992,917
C&I Non-inert	458,454	35,612	3,348	497,414	110,294	273,235	880,943
C&I Inert	253,068	316,290		569,358		276,329	845,687
C&D	830,009	1,350,005		2,180,014		159,987	2,340,001
Agricultural	1,660			1,660		14,774	16,434
All Waste	**2,265,271**	**1,701,907**	**3,348**	**3,970,526**	**110,294**	**995,160**	**5,075,980**
							tonnes

Option 2 *Meet 2013 Targets / Thermal-led strategy for residual waste*

127 This option assumes that WAG recycling and composting targets for 2010 are met, also through increased recycling and minimal composting. However, residual waste is sent for thermal treatment, or landfill if this is not possible. The increased diversion of waste from landfill and recovery of energy from residual waste achieved through thermal treatment ensures the 2013 Landfill Directive target for Biodegradable Municipal Waste is met and in fact exceeded.

128 Of the 5.1 million tonnes of waste forecast for the region, some goes through more than one management process, raising the capacity requirement to 5.4 million tonnes. Approximately 4.5 million tonnes will be recycled/re-used/recovered and 0.9 million tonnes (45% of which is ash) will need to be disposed of if waste recovery and landfill diversion targets are to be met in the year 2013. In this option recycling and composting account for 1.7 million tonnes of the 4.5 million tonnes of all wastes recycled/re-used/recovered.[5]

Figure 7 **Option 2** regional capacity requirements

Waste Stream	Recycling	Re-use	Recovery	Total RRR	Treatment	Landfill	Total
Municipal	397,167		595,750	992,917		199,695	1,192,612
C&I Non-inert	225,698	35,612	509,338	770,648	110,294	151,797	1,032,739
C&I Inert	253,068	316,290		569,358		276,329	845,687
C&D	830,009	1,350,005		2,180,014		159,987	2,340,001
Agricultural	1,660		14,479	16,139		963	17,102
All Waste	**1,707,601**	**1,701,907**	**1,119,567**	**4,529,075**	**110,294**	**788,771**	**5,428,140**
							tonnes

Option 3 *Meet 2013 Targets / Landfill-led strategy for residual waste*

129 This option also assumes that WAG recycling and composting targets for 2010 are met through increased composting and minimal recycling. The 2013 Landfill Directive targets for Biodegradable Municipal Waste are achieved through thermal treatment of some residual waste. However, the majority of residual waste is sent for landfill. The additional diversion of residual waste biodegradable diversion achieved through thermal treatment of residuals ensures the 2013 Biodegradable Municipal Waste target is met but not exceeded.

130 Of the 5.1 million tonnes of waste forecast for the region, approximately 3.5 million tonnes will be recycled/re-used/recovered and 1.6 million tonnes will need to be disposed of (or treated) if waste recovery and landfill diversion targets are to be met in the year 2013. In this option recycling and composting account for 1.7 million tonnes of the 3.5 million tonnes of all wastes recycled/re-used/recovered.[6]

Figure 8 **Option 3** regional capacity requirements

Waste Stream	Recycling	Re-use	Recovery	Total RRR	Treatment	Landfill	Total
Municipal	397,167		140,540	537,707		497,372	1,035,079
C&I Non-inert	225,697	35,612	3,348	264,657	110,294	505,990	880,941
C&I Inert	253,068	316,290		569,358		276,329	845,687
C&D	830,009	1,350,005		2,180,014		159,987	2,340,001
Agricultural	1,660			1,660		14,774	16,434
All Waste	**1,707,600**	**1,701,907**	**143,887**	**3,553,394**	**110,294**	**1,454,453**	**5,118,141**
							tonnes

Option 4 *Meet 2013 Targets / Landfill-led strategy for residual waste*

131 This option assumes that Biodegradable Municipal Waste targets for 2013 are met entirely through recycling and composting. All remaining residual waste is sent to landfill for disposal.

132 Of the 5.1 million tonnes of waste forecast for the region, approximately 3.5 million tonnes will be recycled/re-used/recovered and 1.6 million tonnes will need to be disposed of (or treated) if waste recovery and landfill diversion targets are to be met in the year

2013. In this option recycling and composting account for 1.8 million tonnes of the 3.5 million tonnes all wastes recovered.[7]

Figure 9 **Option 4** regional capacity requirements

Waste Stream	Recycling	Re-use	Recovery	Total RRR	Treatment	Landfill	Total
Municipal	476,699			476,699		516,218	992,917
C&I Non-inert	225,676	35,612	3,348	264,636	110,294	506,012	880,942
C&I Inert	253,068	316,290		569,358		276,329	845,687
C&D	830,009	1,350,005		2,180,014		159,987	2,340,001
Agricultural	1,660			1,660		14,774	16,434
All Waste	**1,787,111**	**1,701,907**	**3,348**	**3,492,366**	**110,294**	**1,473,319**	**5,075,979 tonnes**

Option 5 *A 'Do More' strategy / Landfill-led strategy for residual waste*

133 This option assumes that by 2013 high levels of recycling and composting which exceed the 2013 Landfill Directive Biodegradable Municipal Waste requirement, followed by a small element of thermal treatment to achieve 2020 Biodegradable Municipal Waste targets by the year 2013. This option represents an intensive, integrated, recovery approach to waste management within the region and one which can be viewed as improving upon statutory and non-statutory Government targets for waste diversion.

134 Of the 5.1 million tonnes of waste forecast for the region, recycled/re-used/recovered wastes will increase to 4.2 million tonnes and disposal of residual waste will reduce to 0.9 million tonnes (including ash disposal) in the year 2013. In this option recycling and composting will account for more than 2.2 million tonnes of the 4.2 million tonnes recycled/re-used/recovered.[8]

Figure 10 **Option 5** regional capacity requirements

Waste Stream	Recycling	Re-use	Recovery	Total RRR	Treatment	Landfill	Total
Municipal	535,812		206,175	741,987		312,782	1,054,769
C&I Non-inert	399,072	22,552	3,348	424,972	110,294	345,676	880,942
C&I Inert	401,701	367,028		768,729		76,958	845,687
C&D	830,588	1,429,418		2,260,006		79,993	2,339,999
Agricultural	3,320			3,320		13,114	16,434
All Waste	**2,170,494**	**1,818,998**	**209,523**	**4,199,015**	**110,294**	**828,523**	**5,137,832 tonnes**

Option 6 *A 'Do More' strategy / MBT-led strategy for residual waste*

135 This option assumes that by 2013 levels of recycling and composting are maximised through source segregation, thus exceeding 2013 Landfill Directive Biodegradable Municipal Waste targets yet still not achieving the 2020 targets. Further diversion is however achieved through MBT treatment of residual waste, resulting in the 2020 Landfill Directive Biodegradable Municipal Waste target being met and in fact exceeded. This option represents an intensive, recycling and composting approach to waste management within the Region and one which can be viewed as improving upon statutory and non-statutory Government targets for waste diversion, recovery and recycling.

136 Of the 5.1 million tonnes of waste forecast for the region, recycled/re-used/recovered wastes will increase to 4.7 million tonnes and disposal of residual waste will reduce to 0.4 million tonnes in the year 2013. In this option recycling and composting will account for nearly 2.6 million tonnes of the 4.7 million tonnes recovered, higher than levels achieved for all other options considered.[9]

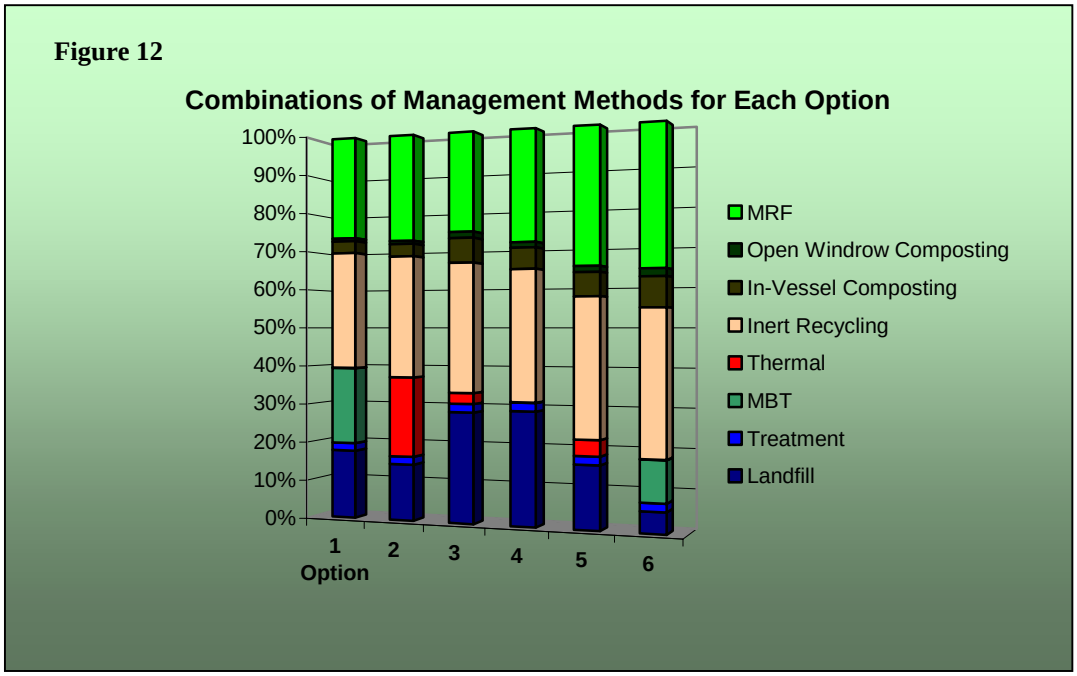
Figure 11 **Option 6** regional capacity requirements

Waste Stream	Recycling	Re-use	Recovery	Total RRR	Treatment	Landfill	Total
Municipal	857,658			857,658		135,259	992,917
C&I Non-inert	598,187	27,045	3,348	628,580	110,294	142,068	880,942
C&I Inert	401,701	443,986		845,687			845,687
C&D	831,168	1,508,832		2,340,000			2,340,000
Agricultural	3,320			3,320		13,114	16,434
All Waste	**2,692,034**	**1,979,863**	**3,348**	**4,675,245**	**110,294**	**290,441**	**5,075,980 tonnes**

Overview of options

137 The Tables above in Figures 5 to 11 give a summary of the types of waste management which are required for each option. These types of waste management could be provided by a number of different types of waste management method as outlined in Chapter 5. For example, recycling can be provide either by 'primary' recycling at a Materials Recycling Facility (paragraphs 60-61 above) or as part of a Mechanical Biological Treatment process (paragraph 78 above). Figure 12 below gives a graphical representation of the different types of waste management methods which each Option involves.

Figure 12



138 These Options apply to individual waste streams in different ways, as can be seen from the Tables in Figures 5-11. Some ways of dealing with waste are more appropriate to some waste streams than others. The composition of some waste streams means that there are large amounts of waste materials for which only a limited number of treatment/ disposal methods are appropriate.

139 Each waste stream is considered briefly below in terms of treatment/disposal methods and an indication is given of how the waste stream is distributed between the individual authority areas in the region. Appendix 5 details the capacity requirements for each option and gives an indication of number of facilities. Consideration is then given to individual wastes which are particularly problematical.

Construction and Demolition Waste

140 Construction and demolition (C&D) waste is the largest waste stream produced in South East Wales and, even though it is not expected to increase from the current 2.3 million tonnes, it will continue to account for about 45% of the region's waste[10]. Total arisings of C&D Waste and therefore the capacity of waste management methods required by 2013 are shown in Figure 13.

Figure 13

C&D Waste 2013

local authority area	tonnes
Blaenau Gwent	121,412
Caerphilly	290,741
Cardiff	558,461
Merthyr Tydfil	95,152
Monmouthshire	149,037
Newport	236,174
Powys (South)	117,409
Rhondda Cynon Taf	408,913
Torfaen	153,129
Vale of Glamorgan	209,572
South East Wales	**2,340,000**

Source: Table 25 Regional Waste Assessment & Table 3.9 WISARD Assessment

141 More than 80% of the waste stream is concrete, asphalt and soil[11] which are widely regarded as recoverable resources which should not be squandered. Re-use and recycling targets for construction and demolition waste are therefore significantly higher than for other waste streams both to reduce waste and to reduce call on primary resources.[12]

142 Predominant effort must therefore be put into re-use and recycling with little flexibility for choice. This is reflected in the 7 options. Unsurprisingly, the 'Do Nothing ' option (Option 0) would see a large amount, 585,000 tonnes, of construction and demolition waste go to landfill while 1,755,000 tonnes would be recovered or re-used. The four 'Meet Target' options (Options 1, 2, 3 and 4) would see an increase in recovery and recycling to 2,280,000 tonnes and a corresponding reduction of the amount going to landfill to 160,000 tonnes. Of the exceed Targets' options, Option 5, would see the amount going to landfill reduce even further to 80,000 tonnes while Option 6 involving Mechanical Biological Treatment would reduce landfill of construction and demolition waste to zero.

143 Treatment and disposal methods available for construction and demolition waste are limited to re-use/recycling options, involving inert reprocessing facilities including 'on site' processing, specialist 'secondary aggregate' facilities, as well as provision at MRFs and Mechanical Biological Treatment facilities. The amounts which need to be re-used/recycled to achieve the 'Meet Target' and 'Exceed Target' options significantly exceed the amounts of concrete, asphalt and soil parts of the waste stream and require provision for recycling the 'minority' waste fractions including plastics and metals. Capacity to deal with these minority materials can be provided by conventional facilities aimed at dealing with other waste fractions, and specialist operations such as metal recovery facilities.

CHOICE
Should facilities be provided to meet or to exceed re-use/recycling targets for construction and demolition waste?

144 In relation to construction and demolition waste the choice is therefore n whether to meet or to exceed targets.

Commercial and Industrial Waste

145 The combined commercial and industrial (C&I) waste streams account for just over 30% of the total waste produced in South East Wales, having reduced substantially with the ending of steel production at Llanwern steelworks. The forecast decline in the amount of industrial waste outweighs the increase in commercial waste such that by 2013 a combined small reduction is expected.[13]

146 For the purposes of carrying out environmental and sustainability appraisals of the Options (see next chapter) the commercial and industrial waste stream is subdivided into 'inert' and non-inert'. The 'inert' part of the waste stream amounts to some 846,000 tonnes, the non-inert part amounts to 881,000 tonnes.

147 Total arisings of inert commercial and industrial waste and therefore the capacity of waste management methods required by 2013 are shown in Figure 14.

148 The composition of inert commercial and industrial waste is taken to be similar to that for construction and demolition waste[14] and this is reflected in how the waste is dealt with under the 7 options. Again unsurprisingly, the 'Do Nothing' option (Option 0) would see 260,000 tonnes of inert Commercial and Industrial Waste go to landfill while 586,000 tonnes would be recovered or re-used. The four 'Meet Target' options (Options 1, 2, 3 and 4) would not introduce much change with in fact a slight reduction in recovery and recycling and a corresponding slight increase in the amount going to landfill. Despite this it is estimated that Options 1, 2, 3 and 4 exceed the 2010 target by more than 100,000 tonnes in respect of inert commercial and industrial waste.[15]

Figure 14

Inert C&I Waste 2013

local authority area	tonnes
Blaenau Gwent	42,337
Caerphilly	84,141
Cardiff	216,081
Merthyr Tydfil	23,219
Monmouthshire	36,969
Newport	55,441
Powys (South)	37,846
Rhondda Cynon Taf	115,147
Torfaen	65,096
Vale of Glamorgan	171,487
South East Wales	**847,764**

Source: Table 25 Regional Waste Assessment & Table 3.9 WISARD Assessment

149 Both the 'Exceed Targets' options would bring significant improvements. Option 5, would see the amount going to landfill reduce significantly to 77,000 tonnes while Option 6 involving Mechanical Biological Treatment would reduce landfill of inert commercial and industrial waste to zero.

150 As inert commercial and industrial waste is taken to have the same composition as construction and demolition waste the same types of waste management method are applicable.(see paragraph 144)

151 All of the options offer waste management methods which would reduce amounts of inert Commercial and Industrial Waste going to landfill to levels below the maximum target.

152 Total arisings of non-inert commercial and industrial waste and therefore the capacity of waste management methods required by 2013 are shown in Figure 15.

Figure 15

Non-inert C&I Waste 2013

local authority area	tonnes
Blaenau Gwent	44,102
Caerphilly	87,649
Cardiff	225,088
Merthyr Tydfil	24,187
Monmouthshire	38,510
Newport	57,752
Powys (South)	39,424
Rhondda Cynon Taf	119,947
Torfaen	67,810
Vale of Glamorgan	178,636
South East Wales	**883105**

Source: Table 25 Regional Waste Assessment & Table 3.9 WISARD Assessment

153 The composition of non-inert commercial and industrial waste is much more mixed in character with significant proportions of paper and card, metals and scrap equipment, and 'general and biodegradable'.[16] The whole range of conventional waste management facilities as outlined in Chapter 5 is therefore appropriate and can be applied to this waste stream. This is reflected in the wide differences between the 7 options as shown in the Tables in Figures 5-11.

Figure 16

Non-inert C&I waste Landfill (excluding ash)

Option	Tonnes
0	570,906
1	273,235
2	Nil
3	505,990
4	506,012
5	345,676
6	273,235
2010 target	**398,977**

Source: Tables 3-9 Options Development Report

154 The extent to which each option compares with the 2010 target for reduction in landfill in respect of non-inert commercial and industrial waste is shown in Figure 16.

155 From this it can be seen that Option 2 (involving thermal treatment) reduces landfill of non-inert commercial and industrial waste to zero, though it does require the landfill of 152,000 tonnes of ash. Options 1 and 6 (involving high levels of recycling and composting plus MBT) reduce it to well below the maximum allowed level, and Option 5 (involving high levels of recycling and composting) also achieves the target.

156 Option 0 again performs worst whilst Options 3 and 4 also fail to meet the targets. However, because the targets are set for the Commercial and Industrial Waste stream as a whole, and the fact that Options 3 and 4 achieve major reductions in terms of inert Commercial and Industrial Waste, they offer viable choices.

Municipal Solid Waste

157 Municipal waste amounted to some 778,000 tonnes in 2001 and is forecast to increase to 993,000 by 2013. It will then make up close to 20% of all waste produced in South East Wales compared with 15% now.[17] Total arisings of Municipal Solid Waste and therefore the capacity of waste management methods required by 2013 are shown in Figure 17.

Figure 17

MSW 2013

local authority area	tonnes
Blaenau Gwent	61,134
Caerphilly	137,372
Cardiff	212,754
Merthyr Tydfil	45,692
Monmouthshire	64,611
Newport	95,551
Powys (South)	43,675
Rhondda Cynon Taf	163,111
Torfaen	71,201
Vale of Glamorgan	89,882
South East Wales	**984,984**

Source: Table 25 Regional Waste Assessment & Table 3.9 WISARD Assessment

158 Like non-inert commercial and industrial waste, municipal waste is made up of many types of material some of which are more difficult to deal with than others. More than 25% is paper and card, some 30% is other biodegradable and just under 25% is of variable nature classed as 'other'. Other important waste materials are plastics, glass, metals and textiles.[18] The whole range of conventional waste management facilities as outlined in Chapter 5 is therefore appropriate and can be applied to municipal waste. This is reflected in the wide differences between the 7 options as shown in the Tables in Figures 5-11.

159 The extent to which landfill has to be reduced and alternative recovery facilities put in place in order to achieve the targets which have been set by the National Waste Strategy[19] is seen in Figure 18 by comparing the amount of municipal waste being recovered by the 'Do Nothing' option (Option 0) with the amount which would be recovered by each of the strategies in Options 1 to 6.

Figure 18

Municipal Waste
Recovery and Landfill (excluding ash)

Option	total recovery (tonnes)	landfill (excluding ash) (tonnes)
0	77,448	915,469
1	772,081	270,836
2	992,917	nil
3	537,706	497,373
4	476,699	516,218
5	741,988	374,635
6	857,658	135,259

Source: Options Development Report Tables 3-9

160 The least which needs to be recovered and diverted from landfill in order to meet targets, Option 4, is 6 times as much as under the 'Do Nothing' option. Options 1 and 6 (involving high levels of recycling and composting plus MBT) require recovery to be increased by 10 times and 11 times respectively. Option 5 (involving high levels of recycling and composting) also requires recovery to be increased by nearly 10 times. This is an indication of what has to be achieved.

161 Option 2 (involving thermal treatment) enables recovery of value from the whole waste stream, though it does require the landfill of 200,000 tonnes of ash.

Agricultural Waste

162 As explained in the Regional Waste Assessment, agricultural waste is not yet a 'Controlled' waste but some parts of the waste stream may be made subject to regulation in the near future. Potential controlled agricultural waste arisings are only a small fraction (1%) of total agricultural waste. It is also by far the smallest of the waste streams considered here, amounting to some 19,000 tonnes now and forecast to decline to 17,000 tonnes by the end of the Regional Waste Plan period, and to 15,000 tonnes by 2021. [20]

Total arisings of potentially controlled agricultural waste and therefore the capacity of waste management methods required by 2013 are shown in Figure 19.

Figure 19

Agricultural Waste 2013

local authority area	tonnes
Blaenau Gwent	121
Caerphilly	548
Cardiff	163
Merthyr Tydfil	192
Monmouthshire	3,769
Newport	524
Powys (South)	9,226
Rhondda Cynon Taf	668
Torfaen	200
Vale of Glamorgan	1,187
South East Wales	**16,600**

Source: Table 25 Regional Waste Assessment & Table 3.9 WISARD Assessment

163 A large proportion of potential controlled agricultural waste arisings, nearly 80%, is pesticides and sheep dips which are classed as hazardous waste. This limits the waste management methods which can be applied to the waste and reinforces the need for treatment.

164 Because agricultural waste is not yet Controlled waste no targets have been set for either recycling/composting or reduction of landfill. However, on the basis that, as a general principle, recovery should be maximised and landfill minimised, the comparison of the 7 options in Figure 20 is informative.

165 Unsurprisingly, the 'Do Nothing' option (Option 0) would see all potential controlled agricultural waste arisings go to landfill. The two 'Meet Target' options with a significant landfill component offer little improvement (Options 3 and 4), nor does Option 1 (involving moderate levels of recycling and composting plus MBT).

Figure 20

Agricultural Waste
Recovery and Landfill (excluding ash)

Option	total recovery (tonnes)	landfill (excluding ash) (tonnes)
0	nil	16,434
1	1,660	14,774
2	16,139	963
3	1,660	14,774
4	1,660	14,774
5	3,320	13,114
6	3,320	13,114

Source: Options Development Report Tables 3-9

166 The 'Exceed Target' options, Options 5 and 6, (involving high levels of recycling and composting) reduce landfill more, though surprisingly not by a great amount, as they put residual waste to landfill. Option 2 (involving thermal treatment) reduces landfill most, the majority being ash. .

167 The implication drawn from this is that if recovery is to be maximised and landfill minimised for potentially controlled Agricultural Waste, then the waste management method should either involve high levels of recycling and composting or have moderate levels of recycling and composting and include thermal treatment.

CHOICE
Should Agricultural Waste be dealt with by high levels of recycling and composting or by including thermal treatment?

Specific Wastes

168 A number of specific types of waste within these waste streams are considered to be particularly problematical because of their nature or because special provision is needed for dealing with them.[21] They are, in alphabetical order:

- End of Life Vehicles;
- Hazardous Wastes;
- Packaging Waste;
- Tyres;
- Waste Electrical and Electronic Equipment.

169 Each of these forms part of one or more of the main waste streams considered above and in that sense are provided for in broad terms by the waste management options identified. However, because of concern about them they are considered briefly here in relation to the waste management methods which are appropriate and available.

End of Life Vehicles

170 It is estimated that some 43,600 End of Life Vehicles are scrapped in South East Wales each year weighing about 52,000 tonnes. This is forecast to rise to close to 60,000 tonnes by 2013 as vehicle numbers increase.[22]

171 Nearly 70% of ELVs by weight are ferrous metals with other significant components being other kinds of metals and plastics. It should be noted that under the revised Hazardous Waste List ELVs will be classed as hazardous unless they have been drained of liquids and other hazardous components.[23]

172 A high proportion of vehicle parts can be re-used, recovered or recycled and other waste management methods are unlikely to play a significant role. It is probable that vehicles will go as whole units to be dealt with and the various component parts separated and bulked to send for re-use or recycling. It is therefore likely that ELVs will continue to be dealt with by specialist vehicle dismantlers and metal reprocessing facilities, rather than go to the facilities included in the waste management Options developed above.

Hazardous Wastes

173 Hazardous waste is dealt with at some length in Annex 9 of Part 2 of the National Waste Strategy. View There is currently some confusion between the terms 'Special Waste' and 'Hazardous Wastes' in that special waste is defined as waste on the Hazardous Waste List plus other wastes displaying defined properties such as being an irritant, and prescription drugs. The confusion is likely to be removed when the Special Waste Regulations are revised. Parts of all the main waste streams considered above fall into the 'hazardous' category.

174 It is forecast that Special Waste will decline from 285,000 tones in 2001 to 228,000 in 2010 in line with the National Waste Strategy targets.[24] It should be noted, however, that this position will be changed by an increase in the number of substances classed as hazardous in the future[25]. The effects of this are not yet known in detail but it is estimated that nationally the changes in categorisation could result in a 50% increase in the amount of hazardous waste produced. This and the changing nature of hazardous waste are matters which must be monitored as necessary information emerges and which may require an early Review of this part of the Plan.

175 Hazardous wastes are very varied in nature and include liquids such as mixtures of oil and water and solids such as ash from power stations/furnaces and asbestos from demolition work.[26] To deal with this diversity of materials a range of waste management methods are likely to be appropriate including thermal treatment, chemical treatment, and landfill. It is likely that specialist facilities, including in particular high temperature thermal treatment plants and chemical treatment plants, will be few in number across the UK and will serve large areas. The location of such facilities will emerge from the operation of market forces but it is likely that capacity will continue to be required in South Wales.

176 Nearly half of the Hazardous Waste produced in Wales in 2000/02 was managed outside of Wales and nearly a third of that went to landfill. Though there was an import of waste there was on balance a small net export from Wales to England.[27] After July 2004 the number of landfill sites in England and Wales accepting Hazardous Waste will reduce from 218 to 38 and in Wales there will be no 'open-gate' sites at all.

177 No targets are set in the National Waste Strategy for increasing recycling or treatment. However, the Landfill Directive prohibits the landfilling of liquid waste and requires the treatment of waste to reduce its hazardous nature. After July 2004 landfill will only be an option for residual treated solid waste, and other waste management methods will be

required. However, it is likely that for some Hazardous Wastes, such as bonded asbestos, the Best Practicable Environmental Option will continue to be landfill, and that such a facility will be needed to meet the needs of business and industry in South Wales. In addition the National Waste Strategy for Wales indicates that *"it may be necessary to have some high temperature incineration in Wales in order to meet the principles of self-sufficiency and proximity for the safe disposal of some hazardous wastes"*.[28] It is clearly imperative that any such facilities should be located, designed and operated to the highest possible standards to protect human health and the environment.

Packaging Waste

178 Again, packaging waste arises from all waste streams. Estimated at 174,000 tonnes in 2001 it is forecast to increase to 220,000 tonnes by 2013.[29]

179 Principal components are paper/cardboard, glass and plastics though with significant amounts of steel and wood.[30]

180 There is considerable scope for reducing packaging and for increasing the re-use of packaging and this should be the primary target of legislative and fiscal measures. For remaining packaging waste the full range of waste management methods discussed in Chapter 5 are appropriate, with principal emphasis on recycling and material recovery and with the exception of a very limited role for composting

Tyres

181 It is estimated that more than 10,000 tonnes of tyres are scrapped in South East Wales each year, a figure which is likely to increase in the same kind of proportion as End of Life Vehicles and reach close to 12,000 by 2013.[31] The Landfill Directive does not allow putting whole tyres in landfill and by 2006 this will extend to shredded tyres. Landfill of tyres is therefore not a waste management option.

182 It is probable that, as is the case with End of Life Vehicles, tyres will continue to be dealt with by specialist treatment and reprocessing facilities, rather than go to the facilities included in the waste management Options developed above. Tyres can be recycled in a number of ways including as 'retreads' or as rubber-based compounds such as play surfaces. In addition value can be recovered by using them as a fuel in kilns as a substitute for coal. New technologies are also being developed such as pyrolysis which enables recycling as 'carbon black' for use in inks and dyes, or manufacturing new tyres.

183 In 1998 half of all waste tyres in Wales were disposed of in landfill sites. There is currently reprocessing capacity for only 3,000 tonnes of tyres in Wales. Another 9,000 tonnes of tyres from Wales are used as fuel in furnaces outside Wales. There is capacity at 're-tread' facilities in Wales to produce 150,000 tyres a year but market conditions limit present sales to 35,000. There is thus an already built capacity for an 80% increase in reprocessing if market conditions improve. It is estimated that a strategic waste tyre reprocessing capacity of 10,000 tonnes is required in South Wales[32], possibly serving both South East Wales and South West Wales. The location of such a facility or facilities will depend on the nature of the process and the capacity which will determine the extent of area served. There is known to be commercial interest in developing a carbon black facility in the region but, as with most recycling facilities, this will emerge in response to market opportunities. This applies also to the increased use of tyres as a fuel in kilns and furnaces, a technology which is already developed but which will be implemented in response to market forces.

Waste Electrical and Electronic Equipment

184 Waste Electrical and Electronic Equipment (WEEE) currently amounts to about 24,000 tonnes each year in South East Wales and is forecast to increase to over 30,000 tonnes by 2013. Large household appliances and IT equipment account for about 40% each of the total.[33]

185 Certain types of Waste Electrical and Electronic Equipment are subject to special controls, in particular fridges, and special treatment and recycling facilities are needed for these. As with packaging, there is considerable scope for reducing waste and for increasing the re-use and reprocessing and this should be the primary target of legislative and fiscal measures. In particular, both community re-use/refurbishment schemes and commercial re-use/refurbishment businesses should be encouraged and could play a significant role. For residual wastes the management methods likely to be most appropriate are recycling and material recovery and other waste management methods included in the Options developed above are unlikely to play a significant role.

[1] Developing a Regional Waste Plan for South East Wales Region: Options Development Report, February 2003 prepared by SLR Consulting Ltd View
[2] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group, paragraph 31 View
[3]Table 3 of 'Developing a Regional Waste Plan for South East Wales Region: Options Development Report', February 2003 View
[4] Table 4 of 'Developing a Regional Waste Plan for South East Wales Region: Options Development Report', February 2003 View
[5] Table 5 of 'Developing a Regional Waste Plan for South East Wales Region: Options Development Report', February 2003 View
[6] Table 6 of 'Developing a Regional Waste Plan for South East Wales Region: Options Development Report', February 2003 View
[7] Table 7 of 'Developing a Regional Waste Plan for South East Wales Region: Options Development Report', February 2003 View
[8] Table 8 of 'Developing a Regional Waste Plan for South East Wales Region: Options Development Report', February 2003 View
[9] Table 9 of 'Developing a Regional Waste Plan for South East Wales Region: Options Development Report', February 2003 View
[10] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group,. paragraphs 76-80 and Table 25
[11] Figure B4 of 'Developing a Regional Waste Plan for South East Wales Region: Options Development Report', February 2003, View
[12] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group. paragraphs 81-86, Tables 20-22, and Graphs 12 and 13
[13] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group, paragraphs 42-55, Tables 15-17, and Graphs 7-10
[14] Figure B2 of 'Developing a Regional Waste Plan for South East Wales Region: Options Development Report', February 2003, View
[15] Inert waste is 49% of the Commercial and Industrial Waste stream. In 1998 977,885 tonnes were sent to landfill of which 479,163 tonnes is calculated to be inert. By 2010 the amount going to landfill should reduce to 80% of that in 1998, or 383,330 tonnes. Options 1, 2, 3, and 4 would see 276,329 going to landfill, 107,000 tonnes below the maximum allowed. Data from South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group, Municipal Waste. paragraphs 57 and Tables 17 and 'Developing a Regional Waste Plan for South East Wales Region: Options Development Report', February 2003, Tables 4-7 View
[16] Figure B3 of 'Developing a Regional Waste Plan for South East Wales Region: Options Development Report', February 2003, View

[17] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group,. paragraphs 26-30, Table 2, Graphs 4 and 16
[18] Figure B1 of 'Developing a Regional Waste Plan for South East Wales Region: Options Development Report', February 2003, View
[19] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group,. paragraphs 31-37, Table 7 and Graph 6 and Tables 10 and 11;

[20] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group, paragraphs paragraphs 87-97, and Tables 23 and 24, and Graph 14
[21] The amounts of waste indicated for these specific wastes are included in the data for the main waste streams and are not additional to them.
[22] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group, . paragraphs 114-123, Table 29, and Graph 18
[23] Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002, Annex 9, page 54
[24] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group. paragraphs 63-73, Table 19, and Graph 11
[25] Changes to the European Hazardous Wastes List are expected to be introduced into UK legislation this year adding a number of materials and products, and the Special Waste Regulations will be replaced by the Hazardous Waste Regulations. See Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002, Annex 9
[26] Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002, pages 55-58, Annex 9
[27] Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002, page 57-58, Annex 9
[28] Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002, page 64, Annex 9
[29] 2001 estimate calculated by apportioning on the basis of population the data for Wales in Table A10.1 of Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002. Forecast to 2013 using the Preferred Growth Scenario for municipal waste and commercial waste.
[30] Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002, Table A10.1
[31] Calculated by apportioning on the basis of population the data for Wales in Table A13.10of Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002 and forecasting on the basis of the data in Table 29 of South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group,.
[32] Wise about Waste: The National Waste Strategy for Wales Part Two pages 131-132
[33] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group. paragraphs 105-113, Table 27, and Graph 17

7 Dealing with Waste: assessment of the options

Introduction

186 The last chapter identified 7 options which between them allow assessment of the advantages and disadvantages of the broad waste management choices available. This chapter looks at how that assessment was carried out and what it shows.

187 Assessment of options for waste management through 'Best Practicable Environmental Option' (BPEO) assessments have tended to focus solely on the environmental consequences of specific waste management methods, either individually or in combination. This does not allow conclusions to be drawn on the sustainability of the options assessed, because they have not included either an economic or social dimension.

188 Technical Advice Note 21: Waste advocates a combined 'Sustainable Waste Management Options' assessment process that incorporates factors relating to economics, social consequences, practicability and consistency with policy, in addition to environmental factors[1]. This is given more detail in the National Waste Strategy[2] and guidance on how this should be carried out has been published by the Office of the Deputy Prime Minister.[3]

189 To achieve a degree of consistency across Wales this was the approach which was adopted by all three waste planning regions.

190 Three broad steps can be identified in this stage of the process:

- agreeing and weighting Objectives and Indicators
- a Life Cycle Assessment to assess environmental factors
- a Sustainability Assessment to add an analysis of social, operational and other factors.

191 Each of these is discussed in turn and then the results of the assessment are considered.

Objectives and Indicators

192 It was agreed that the Objectives and Indicators adopted should be modelled on the recommendations in the ODPM Report[4] and that, as far as was consistent with regional priorities, they should be consistent across the waste planning regions of Wales.

193 Accordingly 12 Sustainability Objectives were agreed based on research carried out for the DTLR in North West England and the parallel development of waste strategies being carried out in South West and North Wales. These addressed Environmental, Socio-economic, Operational and Waste Management Policy issues, as shown in Figure 21.

194 A range of Indicators was also agreed so that the Objectives could be assessed. Some of these Indicators are quantitative in that they can be measured, others are qualitative in that they require a degree of professional judgement. Either one or two Indicators were identified for each Objective. However, for Objective 3 relating to minimising air quality a range of

Figure 21 Sustainability Objectives

Environmental Objectives

***1**: To ensure prudent use of land and other resources.*

***2**: To reduce greenhouse gas emissions.*

***3**: To minimise air quality impacts.*

***4**: To conserve landscapes and townscapes.*

***5**: To protect local amenity.*

***6**: To minimise adverse effects on water quality.*

Socio-economic Objectives

***7**: To minimise local transport impacts.*

***8**: To provide employment opportunities*

***9**: To provide opportunities for public involvement and education.*

Operational Objectives

***10**: To minimise costs of waste management.*

***11**: To ensure reliability of delivery.*

Policy Objectives

***12**: To conform with waste policy.*

6 Indicators was identified in order to seek to combine global impacts, for example, ozone depletion, and human health (fine dust particles) with local amenity concerns, most commonly associated with dust and odour emissions.

195 The Objectives and Indicators are discussed in detail in the Sustainability Assessment Report.[5]

196 It was recognised that different people and different organisations would regard some Objectives and Indicators as more important than others. Therefore all the organisations represented on the Regional Waste Technical Group were invited to weight the Objectives and Indicators according to how important they considered them to be.[6] These weightings were then taken into account in the subsequent assessment.

Life Cycle Assessment

197 A Life Cycle Assessment was carried out as the first of a two-stage assessment process.

198 Life Cycle Assessment is an objective examination of environmental impacts from the beginning to the end of a process. It has been defined as *"the systematic identification of all environmental benefits and dis-benefits that result, both directly and indirectly, from a product or process throughout its entire life, from raw materials extraction, to their eventual return to the environment"*.[7] Its use in assessing strategic waste management options is encouraged as part of the overall sustainability assessment.[8]

199 In order to achieve comparability across Wales a Life Cycle Assessment was carried out for each of the three waste planning regions using the WISARD tool developed in 1999 by the Environment Agency. The programme considers all stages in the managing and processing of waste from a community or region for a period of one year, from the household front door through to its disposal or recovery.

200 Life Cycle Assessment is a technique primarily suited to assessing municipal waste but it was adapted for use with the other waste streams included in the Regional Waste Plan. Because it was developed some years ago newly emerging waste management methods are not covered by the model. It was therefore adapted to include Mechanical Biological Treatment.

201 It was decided that the assessment should be made for the year 2013, ten years from now. This will put in place a strategic plan to allow sufficient progress to be made to meet short and medium term targets but does not lock the process into decisions which do not yet need to be made on capital-intensive developments to meet longer term targets. Such decisions, in line with the Flexibility Principle, should more properly be made when Monitoring and Review of the Plan will provide a more informed knowledge of waste management requirements and will allow emerging technologies to be properly evaluated.(see paragraphs 40-41 and Chapter 10)

202 The details of how the WISARD model was developed for applying to assessment of the strategic waste planning options in Wales are presented in a separate report.[9]

203 The model assessed 7 environmental impacts:

- air acidification;
- eutrophication of water;
- depletion of non-renewable resources;
- greenhouse effect;
- dioxin emissions;
- depletion of the ozone layer; and
- human toxicity.

It considered the effects in respect of inert and non-inert wastes on each of these separately.

204 To carry out the analysis it was necessary to make 'working estimates' of the number and capacity of waste management facilities required for each option and the total distance travelled by the waste on different types of road. Therefore assumptions were made about 'typical' sizes of facilities[10] and these were applied to the amounts of waste going to different types of facilities at regional and local authority levels.[11] It must be stressed that at this stage the sizes of facilities and the estimate of the number required are only for the purposes of carrying out the assessment on a consistent basis and are **not** an indication of the number which should be built. Appendix 4 shows typical facility sizes and Appendix 5 indicates the number of facilities which might be required, but again this is by way of example for comparative purposes. Decisions on actual facility size and therefore the number needed to provide the required capacity will be made at a later stage by each local authority.

Sustainability Assessment

205 The second stage of the assessment process was a sustainability assessment to establish the Best Practicable Environmental Option by taking account of the other Objectives and Indicators in addition to those considered in the Life Cycle Assessment.

206 It had become clear from the WISARD Assessment that, the 'Do Nothing' option (Option 0), as expected, compared very badly with the other options and was not a practical future option. It was therefore decided to omit it from the Sustainability Assessment and to concentrate on comparing the 6 options designed to bring about improvement, an approach consistent with that in the other regions of Wales.

207 The details of how the Sustainability Assessment model was developed for applying to assessment of the strategic waste planning options in South East Wales are presented in a separate report.[12]

208 Of the 22 Indicators identified, 7 of them were fed into the Sustainability Assessment from the results of the WISARD Assessment. As part of the analysis these were given 'normalised' scores from zero (worst performing) to one (best performing) so that all the indicators could be compared on a consistent basis.[13]

209Of the remaining 15 Indicators which could not be assessed by WISARD, 7 could be assessed by a quantitative scoring based on established methodologies and available data. These are[14] :

- Land take;
- Total waste kilometres;
- Transport on roads other than motorways;
- Number of jobs created;
- Net revenue costs;
- Proportion of waste arisings landfilled;
- Proportion of waste arisings recycled/composted.

210 Those Indicators for which quantitative measures are not available have been assessed qualitatively by a panel of environmental professionals. As a check on this process qualitative scores were compared with those derived by similar processes carried out by other professionals elsewhere in Britain.[15] Qualitative Indicators are:

- Odour
- Dust
- Visual and landscape impacts

- Noise
- Litter
- Water pollution
- Opportunities for public involvement
- Likelihood of planning permission.

211 Scores for each Indicator within these three categories were combined to give overall an 'Performance Score' for each Option. These were put on a common basis with scores from zero (worst performing) to one (best performing) so that all the indicators could be compared on a consistent basis.[16]

212 As discussed above, the Indicators had been weighted according to importance attached to them by the organisations represented on the Regional Waste Technical Group (see paragraph 194 above). These weightings were applied to the scores for each option to give final scores for comparative analysis. The sensitivity tests discussed below indicated that using the weightings of specific stakeholder groups did not result in any significant differences in the ranking of options from that using an overall average of weightings.[17]

213 Because it is possible that the results are unduly influenced by some part of the assessment process, 'sensitivity analyses' were carried out to determine whether and how the final BPEO scores for each option depend on the underlying assumptions incorporated in the methodology. A number of different ways in which this might have happened were tested.[18] In general the sensitivity tests showed only minor changes in the scores and no change in the order in which the Options are ranked[19]. The conclusion can therefore be drawn that the methodology can be relied on in respect of its underlying assumptions and weighting preferences.[20]

Comparability of approaches between regions in Wales.

214 The 7 options identified to allow assessment of the broad choices of waste management methods were agreed between the waste planning regions in Wales.

215 It was hoped to achieve as much consistency as possible in the evaluation of these options. To this end the Life Cycle Analysis was carried out on a common basis for all three regions. However, the process of producing Sustainability Assessments for regional waste plans is technically complex and it is appropriate that each region should determine its own priorities in terms of Objectives and Indicators, and the importance which is attached to them.

216 Slight differences in techniques used in applying agreed methodologies to carry out the Sustainability Assessments for the three regions, in addition to the different characteristics of the regions, make it possible that there will be minor differences in overall outcome. This possibility is made more likely where the process uses professional judgement or choices of data sets used for quantitative and qualitative non-WISARD indicators.

Results of the Sustainability Assessment

217 When the environmental and human health Indicators of the Life Cycle Assessment are combined with the Social, Economic and other Indicators in a full Sustainability Assessment they give a clear indication of how the 6 options compare with each other.[21]

218 The final scores for this comparative analysis are shown in Figure 22. The score range is from zero (worst performing) to one (best performing).

219 The order of performance indicated by the scores, starting with the "best" option are as follows:

Figure 22
Final Scores for Comparative Analysis

Option	overall score
1	0.43
2	0.50
3	0.27
4	0.32
5	0.65
6	0.87

source: Table 13 BPEO Assessment

Option 6 *A 'Do More' strategy / MBT-led strategy for residual waste* **0.87**
The option which attempts to achieve the 2020 Landfill Directive target in 2013 principally through maximising recycling and composting levels with all remaining residual wastes being sent to MBT. The additional diversion of residual wastes through MBT ensures the 2020 BMW Landfill Directive target is met and in fact exceeded.

Option 5 *A 'Do More' strategy / Landfill-led strategy for residual waste* **0.65**
This option attempts to achieve the 2020 BMW Landfill Directive target in 2013 principally through high recycling and composting levels followed by some thermal treatment. All residual waste is then sent to landfill.

Option 2 *Meet 2013 Targets / Thermal-led strategy for residual waste* **0.50**
The option which meets the WAG target for 2010 through increased recycling, minimal composting with all remaining residual wastes, where possible, being treated through thermal treatment. The additional diversion of residual wastes through thermal treatment ensures the 2013 BMW Landfill Directive target is met and in fact exceeded.

Option 1 *Meet 2013 Targets / MBT-led strategy for residual waste* **0.43**
The option which meets the WAG target for 2010 through increased recycling, minimal composting, and with all remaining residual wastes being treated, where possible, through Mechanical Biological Treatment (MBT). The additional diversion of residual wastes through MBT ensures the 2013 BMW Landfill Directive target is met and in fact exceeded.

Option 4 *Meet 2013 Targets / Landfill-led strategy for residual waste* **0.32**
This option meets the 2013 BMW Landfill Directive target through recycling and composting alone, with all remaining residual wastes being sent to landfill.

Option 3 *Meet 2013 Targets/Landfill-led strategy for residual waste* **0.27**
This option meets the WAG target for 2010 through increased composting, minimal recycling followed by thermal treatment to achieve the 2013 BMW Landfill Directive target. All remaining residual waste is then sent to landfill.

220 Thus, "do-more" strategies (Options 5 and 6) perform more favourably than "meet 2013 targets" strategies. Within the "meet 2013 targets" strategies, those using increased recycling with treatment of residues by thermal treatment (Option 2) or MBT (Option 1) perform more favourably than the other two strategies (Options 3 and 4), which rely on landfill for residue disposal.

221 In general, the sensitivity tests involving combined scores across all indicators (see paragraph 211 above) reveal only minor changes in the scores, indicating that the methodology is fairly robust with respect to changes in the underlying assumptions and weighting preferences. The sensitivity tests show that:

- Option 6 consistently performed best followed by Option 5
- Option 2 consistently scores best of the options not seeking to exceed targets for 2013
- Options 3 and 4, which are both "meet 2013 target" strategies relying on landfill for residue disposal, consistently perform at similar relatively poor levels
- These two options are outperformed by Option 1 which is recycling-led with residues going to MBT) in nearly all the analyses**.**

222 The assessments carried out allows a direct comparison between the 6 options identified in terms of a range of environmental, social, operational and other indicators on a consistent basis and with a clear 'audit-trail' to allow the process to be tracked.

223 However, the Options identified also allow indirect comparison between the effects of different combinations of waste management methods and allow some conclusions to be drawn about combinations not tested directly. For example, Mechanical Biological Treatment is characterised in the way the Options have been developed as putting all residual waste to landfill. As paragraph 82 above shows, an alternative is for residual waste from Mechanical Biological Treatment to be used as Refuse Derived Fuel. If this were to happen then strategies involving MBT would score significantly higher because there would be more diversion from landfill and because energy would be recovered from the residual waste.

CHOICES

Which of the 6 options should form the basis for developing an integrated waste management strategy?

Are there any variations on these options which are better?

Are there any other options which should be considered?

[1]Technical Advice Note 21: Waste, November 2001 paragraphs 3.17-3.20
[2] Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002, Annex 16
[3] Strategic Planning for Sustainable Waste Management: Guidance on Option Development and Appraisal' Office of the Deputy Prime Minister, November 2002 View
[4] Strategic Planning for Sustainable Waste Management: Guidance on Option Development and Appraisal' Office of the Deputy Prime Minister, November 2002 paragraphs 2.11-2.14, Table 2.1 and Appendix 4
[5] South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003, prepared by Applied Environmental Research Centre Ltd for the South East Wales Regional Waste Group. View Paragraphs 2.3-2.24 and Table 1 deal with Objectives. Paragraphs 2.25-2.40 and Table 2 deal with Indicators.
[6] The weightings provided are summarised in Table 11 and detailed in Appendix 7 of South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003,
[7] Technical Advice Note 21: Waste, November 2001 paragraph 3.21
[8] Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002, Annex 16, page 146
[9] Developing a Regional Waste Strategy for SE Wales: WISARD Assessment, April 2003, prepared by SLR Consulting, Sections 3.2 and 3.3 and Figures 4-10
[10] Developing a Regional Waste Strategy for SE Wales: WISARD Assessment, April 2003, prepared by SLR Consulting, Table 3.1
[11] Developing a Regional Waste Strategy for SE Wales: WISARD Assessment, April 2003, prepared by SLR Consulting, Tables 3.2 to 3.15
[12] South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003, prepared by Applied Environmental Research Centre Ltd for the South East Wales Regional Waste Group. View
[13] For details see South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003, paragraphs 3.2-3.3 and Table 3
[14]For details see South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003, paragraphs 3.4-3.11 and Tables 6 &7

[15] For details of this process see South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003, paragraphs 3.12-3.14 and Tables 4&5
[16] For details see South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003, paragraphs 3.15-3.20 and Table 9&10
[17] See paragraph 5.3 of South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003
[18] Details of the sensitivity tests can be found in paragraphs 3.25-3.36 of South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003
[19] The one exception is that Option 2 moved to a higher or lower place in the rankings in a test to assess the types of indicators separately. – see paragraph 221 below and paragraph 4.9 of South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003
[20] Details of the results of the sensitivity tests can be found in paragraphs 4.4-4.9, and Table 14 of South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003
[21] See Section 4 'Results of Analysis' in South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003

8 Dealing with Waste: your views

Introduction

224 Previous chapters have considered the extent of the waste problem, the waste management methods available to deal with waste, how those methods might be combined in an integrated strategy, and a technical assessment of a broad range of strategy options available. This chapter looks at the extensive consultation undertaken to find out the views of individuals, communities, public bodies and organisations, business and industry, voluntary organisations, environmental groups, other interest groups, and the waste management industry. The aim was to make the process of preparing the Regional Waste Plan as inclusive as possible. This will lead to the consideration of a Preferred Strategy in the next Chapter which will then form the framework for preparation of Development Plans and the context for Municipal Waste Strategies by local authorities.

The 'Inclusive' Approach

225 From the outset the Regional Waste Technical Group consisted of those who could contribute information to the Regional Waste Assessment, including officers from local government, the Welsh Assembly Government, Environment Agency Wales and other government bodies, and representatives from the waste industry. When the information-gathering part of the process was nearing a conclusion the Technical Group was widened further to include environmental groups, business and industry, and other government bodies. (see Appendix 2) The intention in doing this was to involve as wide a range of 'stakeholder' viewpoints as possible throughout the process of preparing the Draft for Consultation of the Regional Waste Plan.

226 The Regional Waste Technical Group also drew up a Consultation Strategy, which, together with the Draft for Consultation, was agreed by the Members' Steering Group.

The Consultation Process

227 To this stage, representatives of different viewpoints had been involved in the preparation of the Plan. The next stage was to broaden the consultation not only to representatives of groups and organisations but to as many interested individuals and bodies as possible. This was to allow local considerations to be taken in to account and to allow consideration of viewpoints not put forward previously.

228 The consultation took place over an 8 week period beginning on 4 August with a media launch and extensive media campaign organised jointly for the South East and South West regions. There were 3 main strands to the consultation:

- a statistically structured survey of households and 'stakeholder' interests
- a broader consultation aimed at the whole population
- a broader consultation aimed at stakeholder interests

The Structured Survey

229 Consultants Research and Marketing Ltd were engaged to carry out the statistically structured survey at the regional level. The consultation had 4 principal elements:

- a **postal survey of 6,000 households** distributed proportionally at random across the region to provide a quantitative analysis of the preferences of the general public;
- in-depth investigation with **5 focus groups of householders** in different types of location with different socio-economic and age groups to help understand why people made the selections they did;

- **postal survey with targeted regional stakeholders** to provide a quantitative analysis of the preferences of stakeholders;
- in-depth investigation with a **focus group and interviews with stakeholders** to help understand their preferences and motivations.

230 In addition to this, the questionnaire and information leaflets used in the structured survey were made available throughout the region on the regional waste Plan web site and by individual councils. A regional 'Industry Seminar' was held with invitations to over 300 businesses and industries with an interest in waste management to find out views and preferences. The responses were analysed by Research and Marketing Ltd and used to reinforce the results from the structured survey.

231 The details of the results of this structured consultation are in the Report of Consultation by the consultants which is available on the Regional Waste Plan web site and for inspection or purchase as paper copies. Contact. The main conclusions are summarised below.

232 Although the response rate was lower than expected it is still at a level which gives statistical confidence in the results[1], particularly so in light of the clarity and consistency of the views expressed.

The broader consultation with householders and local stakeholders

233 Local authorities carried out consultation which they considered appropriate to their own area. To assist in this and to achieve consistency across the region a simplified questionnaire and suitable publicity material was designed and printed. Altogether 5,000 copies of the questionnaires were distributed to authorities it was made available on the waste plan web site. The questionnaires were made available in libraries and other public offices and authorities sought views in a number of different ways including:

- publicity and questionnaires on the councils' own web sites
- publicity and printed questionnaires to all householders in council newspapers
- special sessions at community forums
- debate in council committees and working groups

234 By one means or another the vast majority of the region's 550,000 households were contacted directly.

235 Despite the publicity and the wide availability of information and questionnaires, the formal response to this consultation was low. One reason for this was that most people who felt strongly enough to respond preferred to do so using the more detailed questionnaire designed for the structured survey.

236 The Draft for Consultation indicated a number of choices, clearly indicated in blue boxes in Chapters 5 and 6. These choices, included again in this Final Plan, are all decisions which have to be made in arriving at a preferred integrated waste strategy for the region. A number of the written representations made on the Draft Plan gave clear views on these choices.

237 Comments on the 'Choices' in the Draft Plan, are contained in the Report of Consultation Part 2. It can be seen from the report that both the secondary survey and the general comments on the Plan reinforced the results of the structured survey.

Making the Choices - the views expressed

238 The views expressed through the consultation process were very clear and consistent. They related to:

- preferences for specific waste management methods, and

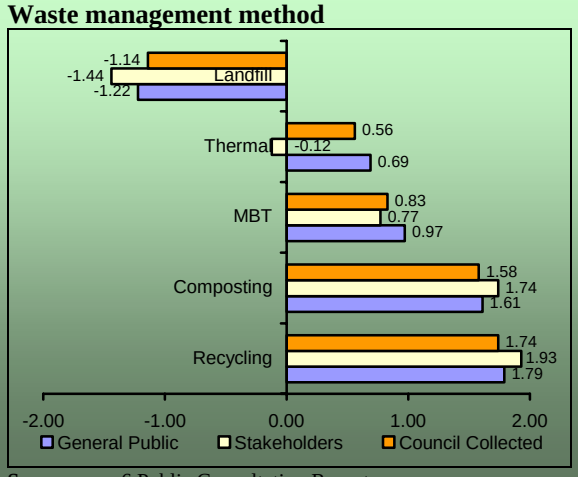
- preferences for specific Options as the basis of an integrated regional strategy.

Preferences for waste management methods

239 Both the public and stakeholders were asked to rate the methods available for dealing with waste, as described in Chapter 5, on a scale from 'Very Good' to 'Very Poor'. The views expressed are summarised in Figure 23.

240 It is clear from this that recycling and composting are considered to be the most environmentally acceptable ways of dealing with waste, with recycling emerging as more acceptable than composting. Four fifths (79%) of the public thought that recycling is 'Very Good' while two thirds (66%) considered composting to be 'Very Good'.[2]

Figure 23
Average Environmental Acceptability of each Waste management method



Source page 6 Public Consultation Report

241 Half the respondents said that there should be equal recycling and composting with the majority of the remainder preferring a greater emphasis on recycling rather than composting.[3] Information from the Focus Groups indicated that the comparatively lower rating of composting is due to concerns about the hygiene of storage of compostable material awaiting collection.[4]

242 There was clear preference for MBT as the most environmentally acceptable of the alternatives for dealing with the waste left after recycling and composting, with 67% of the public considering it to be either 'Good' or 'Very Good'.[5] However, there was also a significant view among the public that thermal treatment is either a 'Good' or 'Very Good' way of dealing with residual waste. When asked to choose one method from the alternatives for dealing with waste left over after recycling and composting, the gap between MBT and thermal treatment widened, with 54% of the public and 62% of stakeholders preferring MBT compared with 38% and 30% preferring thermal treatment.[6] It was clear from the survey that there is less support for thermal treatment among stakeholders than among the general public.

243 The surveys showed that landfill is now widely regarded as environmentally unacceptable and it attracted very little support as the preferred method of dealing with waste. Some 47% of respondents said it is 'Very Poor' and another 25% said it is 'Poor' in terms of environmental acceptability.[7]

Preferences for the identified Options

244 Views were also sought about preferences for the 6 Options identified in Chapter 6 and the views expressed were again clear and consistent.

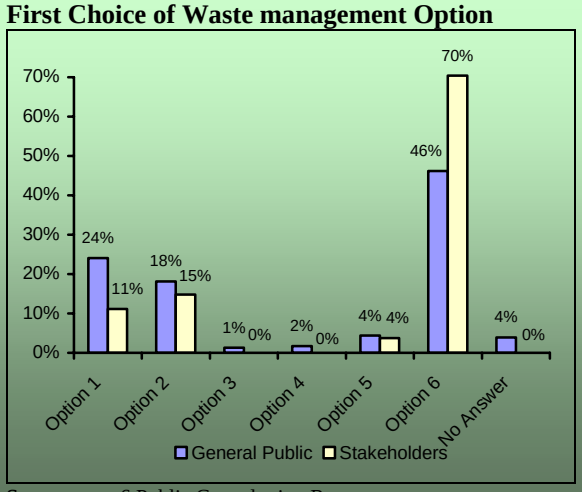
245 The 'simplified questionnaire' sought views specifically on the 6 Options identified in the Draft For Consultation. Though the number of forms completed was small, analysis showed that the responses confirmed the views expressed in the structured survey.[8]

246 The first Tier of decision making (see paragraphs 114-117 of Chapter 6) is whether targets should be met or exceeded. There was overwhelming support for seeking to exceed targets, 84% of the general public and 85% of stakeholders.[9] Feedback from the Focus Groups indicated

that those who were against, considered that not enough progress had yet been made towards achieving targets to have confidence to try to exceed them.[10]

247 The public and stakeholders were asked to rate the 6 Options from 'Very Good' to 'Very Poor'. This showed clearly that the favoured approach is Option 6, which seeks to exceed targets with high levels of recycling and composting and to deal with residual waste by an MBT-led strategy.[11] Unexpectedly, given the support for exceeding targets, the Option with the second highest level of support was Option 1, which seeks to meet rather than exceed targets.[12] The simplest explanation for this apparent conflict is that respondents feel that an MBT-led strategy is a good one whether it aims to exceed or merely meet targets.

Figure 24
First Choice of Waste management Option



Source page 6 Public Consultation Report

248 This is reinforced by the indication of 'first choice' among the 6 Options.[13] As Figure 24 shows, the preference of both the public and stakeholders for Option 6 is even clearer, with nearly half of the public (46%) putting it in first place and more than two thirds of stakeholders (70%) doing so. On the basis of first choice the second place of Option 1 is also confirmed. Option 6 and Option 1 are selected by the public as either first or second choice by around 61% and 56% respectively, rising to 85% and 48% with stakeholders.

249 The focus groups, which provided more information to help people make their choices and explored the issues in greater depth, showed the preference for Option 6 to be significantly higher than in the postal surveys, with around 80% making it their first choice.

250 Option 2 is put as first or second choice by 40% of the general public well ahead of those selecting Option 5. By contrast, 30% of stakeholders put Option 2 as first or second choice, well behind Option 5 at 37%. This confirms the views expressed in relation to the environmental acceptability of the Options (see paragraph 242).

251 The views of the general public and stakeholders are different in regard to the third highest placed with the public choosing Option 2, the '*Meet Targets / Thermal-led strategy*' while stakeholders preferred Option 5, the '*Exceed Targets / Landfill-led strategy*'[14].

Views on other issues

252 The stakeholders at regional level were all sent a copy of the Draft for Consultation as well as the questionnaires and background information. A number of organisations gave detailed written responses to the 'Choices' identified in the Blue Boxes in Chapters 5 and 6 of the Draft Plan and some made general comments. All these responses are summarised in the 'Report on Consultations 2'.

253 Generally the views expressed on the 'Choices' follow the decisions made leading to the Options and so reinforce the preferences expressed.

254 In some cases however, views were expressed on matters which are not directly related to the Options. Where these relate to the development of the strategy for the region, these are summarised below and detailed in Part 2 of the Report on Consultations.

Need for flexibility

255 A number of respondents expressed concern that the strategy should not include commitment to large scale waste management methods which required high levels of capital investment over long periods. This is partly to:

- avoid committing to technologies which may soon become out-dated;
- enable advantage to be taken of emerging technologies; and
- avoid waste being directed to those facilities rather than maximising opportunities for reduction/ re-use/recycling and composting.

256 These concerns are in line with the Principle of Flexibility, one of the Key Principles established in Chapter 3 which underpin the Plan. (see paragraphs 40-41)

Implementation and investment

257 The point was made a by a number of respondents that whichever option is chosen for the Preferred Strategy, considerable investment will be needed in sites and facilities. It is probable that this investment will involve both public and private sectors.

258 The scale of investment is such that, on the public sector side, local government is unlikely to be able to meet it unaided and a Welsh Assembly Government contribution must be looked for. The Assembly has made grants available to stimulate recycling and composting schemes in Wales over recent years via the Sustainable Waste Management Grant. In 2003-04 that amounted to £8.9 million in South East Wales. It is anticipate that the grant will continue to 2006-07 but it is considered that to enable authorities to meet targets it will be required to continue after that.

259 Funding will continue to be available to authorities under the Landfill Tax Credit Scheme but it is considered that this is unlikely be enough to bring about change on the scale and at the pace required. This may prove to be particularly the case with respect to facilities for treating and disposing of Hazardous Waste. Comparison with other European countries such as France shows that, not only have there been financial measures in place to tax hazardous waste for a number of years,[15] but Government investment in facilities for over a decade has meant that there is now a network of facilities in place in these countries. Given the scale and pace of change required in South East Wales and indeed in the UK as a whole, partnerships involving both government and private funding as well as local authorities and the community sector may be the best way of achieving results.

Dealing with residual waste from Mechanical Biological Treatment

260 Both the MBT-led Options are characterised in the Options Development stage, and for the purposes of the Life Cycle and Sustainability Assessments, as disposing of the residue from the process to landfill. However, as discussed in paragraph 223, an alternative is for the residue to be used as Refuse Derived Fuel, in which event an MBT option would score higher as the generation of energy would be a significant environmental benefit.

261 A number of views were expressed on this subject, some favouring the residue going to landfill, others favouring Refuse Derived Fuel. No clearly favoured view emerged.

Emerging Technologies

262 Views were expressed by advocates of particular technologies which are as yet in the development stage, that more technologies should be considered in the Plan. One of the starting points of the process of developing the range of Options was that all the technologies considered should already be available on an operational basis and their performance assessed. For this reason emerging technologies have not been included in the options considered in the Plan.

263 Nevertheless, the potential role of emerging technologies should be recognised in the way the Plan Strategy is developed with regard to the Principle of Flexibility.

Conclusions

264 The responses to the consultation exercise point very clearly to a number of conclusions from both public and stakeholder opinion regarding the development of an integrated strategy:

- the strategy should aim to exceed targets
- recycling and composting should be maximised
- residual waste should be dealt with by MBT
- the use of MBT is considered more important than whether targets can be exceeded
- Option 6 emerged as a very clear preference with Option 1 in second place
- landfill must now be seen as an option of last-choice

[1] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraph 10
[2] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraph 24
[3] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraphs 38 and 35
[4] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraph 25
[5] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraph 27
[6] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraph 40
[7] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraph 28 and graph paragraph 40
[8] South East Wales Regional Waste Plan : Consultation Report Part 2, paragraph 7 and 10
[9] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraphs 29 and 34
[10] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraphs 31-34
[11] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraph 42 and graph
[12] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraph 42
[13] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraphs 44 and 45
[14] South East Wales Regional Waste Plan : Consultation Report, Research and Marketing Ltd, paragraph 43
[15] See presentation on DEFRA research View

9 The Regional Waste Strategy

Introduction

265 The process followed in preparing this Regional Waste Plan has been to develop a range of options for dealing with waste in South East Wales and then to evaluate those options to see which performs best against a standard set of environmental and sustainability criteria and which has public and stakeholder support. From this process certain clear conclusions can be drawn:

- Option 6 emerges very clearly as the Preferred Option both on the basis of the Life Cycle and Sustainability assessments (see paragraphs 219 and 221) and on the basis of public and stakeholder preferences (see paragraphs 247 and 248);
- there is clear public and stakeholder preference for maximising recycling and composting;
- there is clear public and stakeholder preference for using Mechanical Biological Treatment for residual waste.

266 For the purposes of the Life Cycle and Sustainability assessments Option 6 was characterised as putting all residual waste from MBT into landfill. However, as has been noted, an alternative would be to use it as Refuse Derived Fuel (see paragraphs 82 and 223) with the added advantages of greater diversion from landfill and the recovery of energy from the waste. There was some support for this variation of Option 6 from members of the public and stakeholders as well as a certain level of support, particularly from the general public, for thermal treatment (see paragraphs 242 and 250).

267 It can also be concluded that both public and stakeholders have come to the view that continuation of landfill is nolonger an acceptable option for dealing with waste (see paragraph 243). Indeed it seems possible that the tide of opinion has turned against landfill to such an extent that it may make establishing new landfill sites difficult to achieve.

The Preferred Strategy

268 From the conclusions from this process a clear strategy for the region emerges. This Regional Waste Strategy is set out below:

Regional Waste Strategy

- aim to achieve the 2020 Landfill Directive targets by 2013
- achieve this principally through maximising recycling and composting
- deal with residual waste by Mechanical Biological Treatment
- choose between **either** sending the residual waste from MBT to landfill **or** using it as Refuse Derived Fuel
- limit the amount of waste going to landfill to that which can not be dealt with acceptably in any other way.

The Implications – Principal Waste Streams

269 To implement this Preferred Strategy for all the waste streams will require a wide range of waste management facilities. The capacity requirement for each type of facility for each waste stream by 2013 is shown below in Figure 25 for the region as a whole and in Appendix 4 for each local authority.

270 The diversity of South East Wales, ranging from large coastal cities to remote rural communities, means that it is appropriate that the decision on scale of facility should be left to each local authority to determine in relation to its own area (see paragraph 63). Clearly this will affect the number of facilities which are needed both to meet the capacity requirements locally and thus in the region as a whole.

Figure 25
South East Wales: Facility Capacity Requirements 2013

Facility type	Municipal	C&I non-inert	C&I inert	C&D	Agric	Total
MRF	430,132	241,013	401,701	831,168	3,320	1,907,334
Windrow Composting	51,949	49,762	0	0	0	101,711
In-Vessel Composting	207,798	199,048	0	0	0	406,846
Inert Recycling	0	27,045	443,986	1,508,832	0	1,979,863
MBT	303,038	249,317	0	0	13,114	565,469
Thermal Treatment	0	3,348	0	0	0	3,348
Treatment	0	110,294	0	0	0	110,294
Landfill	135,259	142,068	0	0	13,114	290,441
Civic Amenity	105,000	0	0	0	0	105,000
Transfer Station	244,000	62,000	84,000	84,000	0	474,000
All Types	**1,477,176**	**1,083,895**	**929,687**	**2,424,000**	**29,548**	**5,944,306**

Source page 6 Public Consultation Report tonnes

271 However, as a rough guide, and for no more than illustrative purposes, Figure 26 gives an indication of the number of facilities which might be required by 2013 for each waste stream in the region presuming that they are of the sizes assumed. The same indication is given for each local authority in Appendix 5. The 'Typical Capacity Range of Waste Management Facilities' is shown in Appendix 3 and from this the range of possible scenarios can be judged. For each facility type a 'mid-range' facility size has been assumed for the purpose of indicating the numbers required.[1]

Figure 26
South East Wales: Indication of Facility Requirements 2013

Facility type	Municipal	C&I non-inert	C&I inert	C&D	Agric	Total
MRF	28.7	16.1	26.8	55.4	0.2	127.2
Windrow Composting	10.4	10.0	0.0	0.0	0.0	20.3
In-Vessel Composting	20.8	19.9	0.0	0.0	0.0	40.7
Inert Recycling	0.0	0.9	14.8	50.3	0.0	66.0
MBT	5.1	4.2	0.0	0.0	0.2	9.4
Thermal Treatment	0.0	0.1	0.0	0.0	0.0	0.1
Treatment	0.0	5.2	0.0	0.0	0.0	5.2
Landfill	1.4	1.4	0.0	0.0	0.1	2.9
Civic Amenity	21.0	0.0	0.0	0.0	0.0	21.0
Transfer Station	4.1	1.0	1.4	1.4	0.0	7.9
All Types	91.3	58.7	43.0	107.1	0.6	300.7

Source page 6 Public Consultation Report

272 From this it can be seen for example that, in order to implement the Preferred Strategy, nearly 2 million tonnes of capacity will be required at Materials Recovery Facilities. Assuming that these have an average of 15,000 tonnes capacity each, 127 will be required in the region. This number will be considerably smaller if larger, 80,000 tonnes capacity commercial facilities are built. (see paragraph 62)

273 The largest capacity, and therefore the largest number of facilities, will be required for recycling and composting and for reprocessing inert industrial and construction/ demolition waste. By contrast, although Mechanical Biological Treatment facilities will be the key to dealing with residual waste from these recycling and composting plants, because they are fairly large[2] only 9 or 10 will be required for the region.

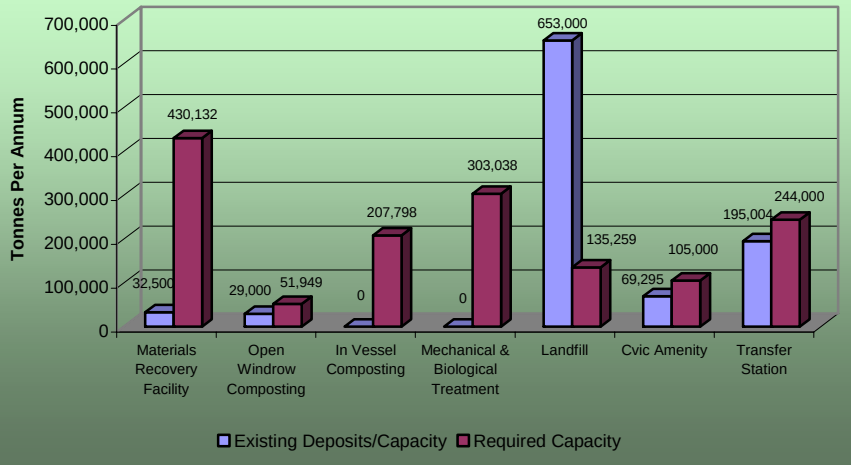
274 The total capacity requirement for all facilities will be 5.9 million tonnes. This is inevitably larger than the total of 5.1 million tonnes of waste which will be produced in the region by 2013 because some waste is 'double counted', one facility type passing it on

to another. For example, transfer stations send some waste to other waste management facilities and it is assumed that residual waste from MBT will go to landfill as 'stabilised biowaste'.

275 One of the clear benefits of meeting 2020 targets by 2013 by maximising recycling and composting is that landfill capacity can be conserved, reducing, though not removing, the need for replacement landfill sites.

276 Figures 25 and 26 and Appendixes 4 and 5 show the capacities which will be required by 2013 to implement the Preferred Strategy. Though, as the Regional Waste Assessment shows, some of this capacity is already in place,[3] a great deal more needs to be developed. Figure 27 below compares the treatment and disposal capacity for Municipal Solid Waste in the region in 2001 with the capacities of each type of facility required to implement the Preferred Strategy by 2013.

Figure 27
South East Wales: Comparison of existing and required capacities for MSW



277 From this it is clear that in order to implement the Strategy in respect of municipal waste there is a need for increased capacity of all types of waste treatment and disposal except for landfill. The 'capacity' shown for landfill is the amount of waste deposited in 2001, i.e. the capacity **required**, and **not** the capacity of the sites. The graph shows a marked drop in capacity required for waste going to landfill in 2013 compared with 2001, which is what the strategy is designed to achieve.

278 In order to achieve this there will need to be:

- a marked increase in capacity at Materials Recovery Facilities;
- a marked increase in capacity of in-vessel composting from zero level;
- a marked increase in capacity of Mechanical Biological Treatment facilities from zero level.

279 If the Preferred Strategy is successfully implemented, then the required landfill capacity for Municipal Waste across the region by 2013 will be 290,000 tonnes compared with 653,000 tonnes in 2001. It is calculated that the existing landfill capacity of 16.5 million tonnes[4] is likely to be sufficient until that time and beyond for both municipal waste and non-inert commercial and industrial waste.[5]

280The same comparison between existing and future required capacities for municipal waste is provided for each local authority in Appendix 6. These graphs show that though some authorities already have sufficient capacity of some types of facility already in place, all authorities need to provide for capacity increases. This capacity can be within an authority's own area or can be a shared facility with other authorities. Such sharing

already applies to landfill sites, with 3 sites serving a wider area than the local authority on which they are located. For this reason the 'landfill' comparison on the graphs in Appendix 6 should be treated with caution because the 2001 data has been recorded on the basis of where waste is deposited rather than where it arises.[6] The graphs show the capacity of facilities which each authority will need to provide, or demonstrate that it has secured access to, for municipal waste compared with the capacity in place or the amounts deposited in 2001.

281 Appendix 7 compares the capacity requirements for landfill for commercial and industrial waste and for construction and demolition waste streams in 2013 with those in 2001. In all cases they reflect the fact that the Preferred Strategy diverts waste from landfill and so reduces capacity requirements. (see Appendixes 7A, 7C and 7E) In order to achieve this, the capacity requirements for transfer stations for these waste streams generally increases. (see Appendixes 7B, 7D and 7F)

282 Direct comparisons between present capacity and future requirements for other types of facilities and waste streams is not at present possible.

283 Since the Regional Waste Plan process began and the Regional Waste Assessment established the 'baseline' position, many new facilities have been built and others are in the pipeline. Information on this is not yet available in a comprehensive form but will be available to advise the monitoring of the Plan leading to its review[7]. Nonetheless it is already clear that progress has been made towards achieving targets and this will be reflected in the First Monitoring Report. (see paragraphs 335-337)

284 In summary, the capacities of each type of facility which each authority must provide for are shown in Appendix 4.

The Implications – Specific Wastes

285 The analysis has looked at the main waste streams and shows the capacity requirements both for the region and for each local authority in respect of those. Consideration is now given to what additional provision may be necessary for the specific wastes within these waste streams identified in Chapter 6 (paragraphs 168-185).

286 The estimated amounts of waste in each of the specific wastes considered in Chapter 6 are indicated in Figure 28.

287 Appropriate methods of treatment and disposal in respect of each of these specific wastes were considered in turn in Chapter 6 (see paragraphs 172, 175-177, 180, 183, 185).

Figure 28
Amounts of Specific Wastes

Specific Waste	amount
ELVs	60
Hazardous	228 (342)
Packaging	220
Tyres	12
WEEE	30
	,000 tonnes

Source: paras 170, 174, 178, 181, 184

288 As far as packaging waste is concerned the situation is straightforward because the majority of it is likely to be dealt with by the facilities and within the capacities discussed above (see paragraph 180).

289 Unfortunately, consideration of what additional, specialist facilities are required to deal with the other wastes is far less clear. Making explicit provision for these wastes is confused by a number of factors.

290 **Categorisation of wastes are changing** The categorisation of hazardous waste is to be changed so that additional substances will be included. It has been estimated that this could increase the amount of waste classed as 'hazardous' by 50% (see paragraph 174). However, the relevant regulations this are still emerging and there is therefore as yet insufficient certainty or clarity about either the amounts of waste or the nature of that waste and how it might be treated.

291 **Waste reduction activity may change the scale of the problem**. It is known that capacity will be required to receive the hazardous waste currently deposited at landfill sites when the new site licensing regulations take effect in July 2004 (see paragraph 176). In 2000/01 that amounted to 119,000 tonnes[8]. But it is not known how much of this can be treated or separated at source to reduce the amount. It is probable, for example, that of the 42,000 tonnes of 'Construction and Demolition Waste and Asbestos' deposited in landfill in Wales in 2000/01[9] some was inert waste which could be separated at source from the asbestos to reduce the amount classed as hazardous and thereby reduce the capacity of hazardous landfill required. Given that all hazardous waste must be treated before disposal to landfill, some degree of reduction can be expected. (see paragraph 177)

292 **Changes in the economy will change the scale of the problem** Major changes in the structure of the economy in South East Wales are likely to result in major changes to the arisings of some specific wastes including hazardous wastes[10]. For example, the largest part of the Hazardous Waste stream in 1998/99 was 'filter cakes and sludges', accounting for nearly 90,000 tonnes out of 133,000 tones in Wales. The main source of filter cake wastes is the steel industry which has experienced a marked reduction in manufacturing capacity in South East Wales in recent years and continues to do so, with a consequent effect on wastes produced. It is anticipated that these changes will be reflected in both the amount and the make-up of specific waste streams when up-dated information is available

293 **Cross-categorisation may double-count some specific wastes** Two of the wastes which will be categorised as hazardous are End of Life Vehicles which have not been drained of fluids (see paragraph 171) and some parts of Waste Electric and Electronic Equipment (see paragraph 185). Initial treatment could therefore remove the hazardous elements from them thereby reducing the amount of waste classed as 'hazardous' significantly. But it is as yet unclear as to what the amounts of these different wastes will be and how they will be regulated. For example, the amount of fluids in ELVs is very small compared to overall vehicle weight and, when drained off, only that part will require further treatment or disposal as 'hazardous' waste.

294 **Variety of treatment and disposal methods** There is also uncertainty because some of these specific wastes could be dealt with by any one of a variety of ways. They could be subject to treatment and then disposal as 'waste' or in some cases they could be used as raw materials in an industrial process for the manufacture of products. For example it is estimated that capacity for dealing with 10,000 tonnes of tyres a year will be required in South Wales (see paragraph 183). This capacity could be provided in a number of different ways including reprocessing for use as 'retreads', extraction of carbon black for inks and dyes, or as a fuel. Therefore both the size and number of plants and their location and distribution within the region will be in response to market opportunities.

295 In general it is the case that facilities for the treatment of specific waste materials are likely to be highly specialised and serving large areas.

296 Some facilities for treating difficult wastes are already in place in the region but it is likely that more will be needed. However, with the present level of information available and because of the uncertainties considered above it is not possible at this stage to be specific about what treatment and disposal facilities or capacities might be required or the kinds of locations which might be appropriate.

297 Nevertheless, certain things are clear:

- in many cases the treatment or disposal of these specific wastes will require specialist facilities which may well deal with only limited range of materials
- the amounts of some of these specific wastes and materials is relatively small
- the area which the facility will serve is therefore likely to be large

298 For these reasons it is concluded that it is probable that facilities for dealing with these specific wastes will serve either the region as a whole or in some cases an even larger area. They will locate in response to the area from which the waste is drawn and the potential markets for products. In many cases this effectively makes them 'footloose' within the region, and even beyond, with broad location within the region determined by market forces and development proposals subject to locally determined criteria.

299 It has been acknowledged that landfill capacity for hazardous wastes will continue to be required in South East Wales (see paragraph 177) as all 'open-gate' landfill sites licensed to take hazardous waste choose not to do so after July 2004. (see paragraph 177) It is anticipated that there will be a particular problem with regard to hazardous soil and other materials from land reclamation schemes. However, there remain a few 'closed gate' landfill sites licensed to receive hazardous wastes from particular industrial operations. The opportunity should therefore be examined for some of these to offer a service to wider industry.

300 Because it is neither possible nor appropriate at this stage to make explicit provision for these specific wastes, two considerations are important:

- Unitary Development Plans must make policy provision for properly assessing development proposals for hazardous and other specific wastes;
- the movement of such wastes must be monitored to ensure that the Proximity Principle is being complied with both in terms of exports from the region and imports into it; and.
- as additional information on hazardous waste becomes available and is assessed, consideration can be given to bringing forward a Plan Update in advance of the 3-Year Review. This should be done at the earliest opportunity

Imports and Exports

301 Only a limited amount of information on movements of waste between South East Wales and other regions was available for the Regional Waste Assessment. It was known that on balance there was a small net export of hazardous waste from Wales to England though this was not broken down by region[11]. The Regional Waste Assessment indicates that of 1.3 million tonnes of waste deposited in 'open-gate' landfill sites in South East Wales 47,000 were from other regions in Wales and 10,000 tonnes from England[12]. No information was available on exports from the region and it was therefore not possible at that stage to consider the net balance of imports and exports.

302 In November 2003 a Waste Import and Export study for Wales was completed and made available.[13]. This analyses data for 2001/02 and shows that there was a net import into South East Wales in all waste streams, as shown in Figure 29.

Figure 29
South East Wales: Imports and Exports by Waste type 2001/02

waste type	Imports	Exports	Net import
MSW	36,261	76	**36,185**
C&I	196,339	43,869	**152,469**
Inert	14,618	4,552	**10,066**
Special	66,543	26,937	**39,606**
All controlled	**313,761**	**75,434**	**238,327**

Source
Waste Import and Export Study for Wales October 2003

303 The Report shows movements of waste to existing facilities with the largest net imports into the landfill sites in Merthyr, Rhondda Cynon Taf and Blaenau Gwent (271,000, 132,000 and 121,000 tonnes respectively) and Metal Recycling Sites in Cardiff (335,000 tonnes).[14]

304 The pattern of movement of waste will change in response to changing amounts of waste and increasing diversion of wastes from landfill to recycling, composting and other waste treatment facilities. Given that the largest proportion of net imported waste goes to landfill sites, 180,000 tonnes compared with 112,000 tonnes going to recycling or

treatment facilities,[15] the pattern of imports can be expected to change significantly as the Regional Strategy is implemented and reliance on landfill is reduced. It may well be the case that smaller facilities such as recycling and composting facilities will attract less imports than larger regional level facilities.

305 Further analysis of the import/export information is needed in order to assess the detailed implications for future changes.

306 However, the broad implications for capacity requirements are clear. South East Wales is committed to achieving Regional Self Sufficiency (see paragraphs 38-39). It is anticipated that other regions of Wales and England will be similarly committed. Detailed analysis of information will indicate whether wastes previously imported into the region can more appropriately be treated or disposed of nearer their point of origin. Nevertheless, it is concluded that because the capacity requirements estimated above (paragraphs 269-284) are based on the total amount of waste produced in South East Wales, there will be no need to provide for any additional treatment or disposal capacity either to reduce exports or to cater for imports. Indeed, as imports are reduced in compliance with Regional Self Sufficiency, South East Wales can expect to have greater flexibility in capacity.

307 Two qualifications need to be added. In some cases it is known that there are cross-boundary movements between regions which can be considered to be compliant with the Proximity Principle because they are between near-neighbours. In this regard the Proximity Principle should be regarded as outweighing the Principle of Regional Self Sufficiency. In other cases imports and exports will be to specialist facilities serving large areas in respect of treatment or disposal of specific materials. Nevertheless, it is right to assume that such cross-boundary movements should broadly balance out.

308 Therefore, as is the case with the specific wastes discussed above, the movement of all wastes must be monitored and analysed to ensure that Regional Self Sufficiency is being achieved and that, as far as is appropriate, the Proximity Principle is being complied with.

Location of Facilities

309 In line with the Principle of Flexibility and respecting the role of local decision-making, the way in which capacity requirements are met and the location of facilities is for each authority to determine either unilaterally or in collaboration with others. This relates both to the provision for or sharing of facilities and to the size of those facilities.(paragraph 270)

310 To assist with site allocation and the preparation of Unitary Development Plans, a guide to the locational requirements of each facility type is shown in Appendix 8. Authorities might consider that many of these facility types can be located appropriately on existing or proposed 'B2' industrial sites as *sui generis* uses. This applies particularly to transfer, re-use and recycling facilities. One of the advantages of the Preferred Strategy is that many of the facilities required to implement it can be located in a wide variety of acceptable locations in terms of environmental and community impacts.

311 Facilities which local planning authorities consider should not be located on estates for 'general' industry could with advantage be located on or close to sites which are currently or have recently been used for heavy industry and which are sufficiently separated from sensitive land uses.

Health Impacts

312 In recent years concerns have been increasingly expressed about the potential effects of waste management facilities on the health of people and communities. To assess the potential effects of implementing the Regional Waste Strategy a Health Impact

Assessment (HIA) of the Plan has been carried out by Applied Environmental Research Centre Ltd. This is in line with both the requirement of TAN 21[16] and the 'Better Health Better Wales document 'Developing Health Impact Assessment in Wales'.[17]

313 The HIA uses a combination of methods and procedures involving both qualitative and quantitative data to consider the potential impacts of policies, programmes or other developments on people's health and well being. HIA emphasises the importance of the input of people and communities who will be affected by a proposal.

314 The HIA takes into account both public perceptions of the potential health impacts of different waste management operations and scientific knowledge of these impacts.

315 Public perceptions are important because a number of studies have shown that people who are anxious about living near a particular type of waste facility may experience feelings of ill-health. Anxiety is a 'quality of life' issue and may itself lead to real adverse health impacts. Perceived health issues have been addressed by reviewing the public responses to questionnaires distributed during the consultation process for the Regional Waste Plan, as well as relevant published studies on public perceptions of different waste management options and facilities.

316 The scientific basis for potential health risks has been explored by examining the following sources:

- Epidemiological literature pertaining to the waste management operations utilised by the different options;
- Consultation responses of the Primary Care Trusts, the key statutory consultees for proposals having potential health implications;
- Human toxicity and dioxin scores generated by the WISARD Life Cycle Assessment already undertaken for each waste management option (see Chapter 7 paragraphs 197-204).

317 Taking and analysing evidence from all these sources, the HIA indicates Option 6 to be the option that is most consistent with the objective to protect human health against potentially harmful effects associated with waste management in South East Wales. This option maximises composting and recycling levels, with all residual waste being sent to MBT rather than to thermal treatment or landfill. This option, therefore, maximises health benefits and minimises disbenefits because:

- the public perceive recycling and composting as being more environmentally acceptable than incineration and landfilling;
- the epidemiological evidence relating to potential adverse public health impacts is strongest for landfills and incinerators;
- this option appears to be easily the most favoured by statutory health consultees, at least according to the limited responses received;
- the WISARD Life Cycle Assessment indicates that this option scores most favourably with respect to avoided burdens for human toxicity associated with reprocessing of inert waste and recycling of non-inert waste; and
- the WISARD Life Cycle Assessment indicates that Option 6 scores reasonably favourably with respect to dioxin emissions.

318 Potential health impacts should continue to be monitored and considered during the further development and implementation of the Regional Waste Plan. Further HIAs should be carried out to assess new evidence as it emerges and to evaluate whether health risks are being properly managed during implementation of the strategy.

Strategic Environmental Assessment

319 The Strategic Environmental Assessment (SEA) Directive only applies to plans and programmes which will be adopted after 21 July 2006. However, TAN 21 requires that

an SEA be carried out of the management and planning options examined in the Regional Waste Plan.

320 A Strategic Environmental Assessment is an environmental appraisal at the level of broad strategies, polices plans and programmes. It is distinct from an Environmental Statement which is submitted in support of a planning application for a particular development on a particular site under the Environmental Impact Assessment (EIA) Regulations.[18] An EIA shows what the environmental effects of a particular development might be and what measures need to be taken to mitigate those effects. An SEA by contrast enables choices to be made between a range of options by examining the different environmental consequences of each and allows consideration of the effects of different combinations of types of developments.

321 Because Strategic Environmental Assessments are not yet required in the UK there is no clear guidance on what they should contain. However, it is clear that the Life Cycle Assessment and the Sustainability Assessment carried out to examine the environmental, social and economic impacts of the waste management options and combinations of waste management techniques identified above are together a sophisticated and very detailed Strategic Environmental Assessment. It is noted that this accords with the methodology used for the Environmental Appraisal carried out in the National Waste Strategy for Wales.[19] The methods used for the Life Cycle Assessment and the Sustainability Assessment, and the results of the assessments, are described in Chapter 7 above and detailed in the respective Reports.[20]

Recommendations

322 On the basis of the analysis of the wastes arising in the region[21], assessment of options for dealing with that waste[22] and consultation with the public and with stakeholders[23], the Preferred Strategy discussed above should be adopted as the framework for land use planning in South East Wales for the period to 2013.

[1] The number of facilities is calculated using the following assumed facility capacities (tonnes): MRF 15,000; Windrow 5,000; In Vessel 10,000; Inert Reprocessing 30,000; MBT 60,000; Thermal 60,000; Treatment 21,100; Landfill 100,000; CA 5,000; Transfer 60,000.
[2] A mid-size of 60,000 tonnes is assumed
[3] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group Paragraphs 136-147 and Tables 39 and 51
[4] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group Table 40
[5] This is calculated by taking the amount of waste deposited in landfill in 2001, the amount deposited in 2013 and assuming a 'straight line' annual reduction between the two. This amounts to a total of 4.9 million tonnes of Municipal Waste and 4.8 million tonnes of industrial and commercial non-inert waste, totalling 9.7 million tonnes. This is then subtracted from the estimated landfill capacity of 16.5 million tonnes giving a remaining capacity by the end of the period of 6.8 million tonnes. This assumes that the other treatment and disposal facilities come on stream gradually across the Plan period. If the alternative capacities come on stream earlier then landfill capacity will be conserved. If the alternative treatment/disposal capacities do not come on stream until towards the end of the period then landfill capacity will be lost more rapidly.
[6] The data is based on that presented in South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group Table 30 which records it on the basis of the authority area where the waste is deposited rather than the authority in which it arises.
[7] Data for 2001/02 is to be published by Environment Agency Wales and the Office of National Statistics on 18 December 2004 but cannot be made public before that date. Data for 2002/03 has been collected by Environment Agency Wales and is currently being validated with a view to its being published in April 2004.

[8] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group Tables 30 and 31,
[9] Wise about Waste: The National Waste Strategy for Wales Part One, June 2002, Table A9.3
[10] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group paragraphs 42-43 and 47
[11] Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002, page 57-58, Annex 9
[12] South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group paragraphs 133-134, Figure 11 and Table 32
[13] Waste Import and Export Study for Wales: A Report to the Welsh Assembly Government by SLR Consulting Ltd, October 2003, made available November 2003
[14] Waste Import and Export Study for Wales Section 5.0 page 12 and Table 5.3
[15] Waste Import and Export Study for Wales Table 6.1 page 17
[16] Technical Advice Note 21 paragraphs 2.17 and 3.23-3.25
[17] Better Health Better Wales: 'Developing Health Impact Assessment in Wales, Welsh Assembly Government Health promotion Division , 1999
[18] Town and Country Planning Environmental Impact Assessment Regulations (England and Wales) 1999: SI 1999 No 293
[19] Wise about Waste: The National Waste Strategy for Wales Part Two, June 2002, page 150-153, Annex 17
[20] Developing a Regional Waste Strategy for SE Wales: WISARD Assessment, April 2003, prepared by SLR Consulting, View and South East Wales Regional Waste Plan: Analysis of Best Practicable Environmental Option, May 2003, prepared by Applied Environmental Research Centre Ltd for the South East Wales Regional Waste Group. View
[21] As contained in the South East Wales Regional Waste Assessment January 2003, prepared by Regional Waste Group
[22] As discussed in Chapter 7
[23] As discussed in Chapter 8

10 Next Steps

Introduction

323 The process of developing and assessing the Preferred Regional Waste Strategy must be followed through in 3 ways:

- provision must be made in Unitary Development Plans for meeting the capacity requirements for each facility type;
- the proposals must be implemented on the ground;
- the Plan must be monitored and reviewed.

324 These are the three next steps and each is dealt with in turn.

Unitary Development Plans

325 The National Waste Strategy for Wales and TAN 21 require that provision should be made in each local planning authority's Unitary Development Plan for meeting waste management requirements. TAN21 makes clear what is expected to be included in Unitary Development Plans.[1]

326 Among the requirements on UDPs are that:

- there should be a balance of site specific and criteria-based policies to provide as much information as possible on the locations likely to be acceptable for development of waste treatment and disposal facilities;[2]

- they should include a statement to explain how the Regional Waste Plan impacts upon the UDP policies and proposals and how the proposals and policies in the UDP help to facilitate implementation of the RWP;[3]

- they must demonstrate that there is adequate provision for waste management facilities to meet the targets in EU Directives.[4]

327 Some authorities will wish and be able to make provision for meeting these capacity requirements within their boundaries. In other cases authorities may wish to work in cooperation with neighbouring authorities to bring forward an integrated network of facilities. In the latter case "*UDPs will need to demonstrate the authority's place in the development of regional networks of waste management facilities, and will need to consider future needs and potential new demands within the regional framework*".[5]

328 TAN 21 requires that UDPs should incorporate the provisions of the TAN, and therefore of the Regional Waste Plan, "*at the earliest opportunity or in an early review*". The extent to which local planning authorities are likely to be given discretion as to how this should be achieved is an emerging issue.

Implementation

329 Unitary Development Plans will set the land use policy framework for implementing the integrated strategy in the Regional Waste Plan. But that does not achieve the development of the network of facilities on the ground. A range of actions and circumstances and the involvement of a full range of partners will be necessary to achieve that. (see paragraph 46) A key issue to be addressed is how to achieve the levels of investments necessary to put in place a comprehensive network of facilities, in particular the larger, capital-intensive facilities.

330 It is therefore important that local authorities encourage development in respect of those issues over which they have control. In respect of Municipal Solid Waste this will be

principally via the publication and implementation of the Municipal Waste Plan which local authorities are preparing in parallel with the Regional Waste Plan.

331 A key factor in putting waste management facilities in place can be the involvement of the community and voluntary sectors, particularly in respect of achieving the high levels of recycling and composting necessary to put the Preferred Strategy into effect. (see paragraphs 37, 46 and 63) Local authorities might therefore wish to consider securing the active involvement of the voluntary and community sectors at an early stage.

332 However, within the UK system, the comprehensive range of facilities necessary to deliver the effective operation of the Preferred Strategy is likely to be achieved only through the commercial operations of the waste management industry either as contractor or as partner. For example, it is probable that Mechanical Biological Treatment facilities will only be considered to be viable on a fairly large scale, possibly serving more than one authority area. (paragraph 273) The same is likely to be true of 'hi-tech' facilities of emerging technologies, such as advanced thermal treatments, if they are proven to be effective and so become available options.

333 The Regional Waste Plan is not intended to be prescriptive as to how the Preferred Strategy should be implemented. The Plan establishes the capacities which must be provided and has identified a Preferred Strategy which is acceptable in terms of environmental effects and to the general public and stakeholders. The way in which the strategy is implemented is a matter for each local authority to judge in relation to the needs and circumstances of its own area. (see paragraph 63 and paragraph 270)

334 In the case of specialist facilities locational decisions will be made by the waste management industry in the light of market considerations and development proposals will be considered by local authorities on the basis of locally determined criteria.

Monitoring and Review

335 TAN21 included a requirement to Review the Plan every 3 years. As part of this review process it is essential to monitor both the background information to the Plan as well as the extent to which its provisions are being implemented.

336 Preparation of the Plan indicated that there are gaps in information which could not be filled in time to contribute to bringing the Plan forward within the required deadline. More information, and analysis of that information, is needed on three matters in particular to enable more detailed planning:

- amounts and nature of hazardous wastes and available treatment methods for those wastes;
- imports and exports of wastes;
- capacity of current facilities, to more accurately assess what additional facilities need to be provided.

337 Provided that additional information comes available in a timely and reliable manner, consideration can be given to bringing forward a Plan Update in advance of the formal 3-Year Review.

The Last Word

338 One of the achievements of the process of preparing the Regional Waste Plan has been the active cooperation of the many partners involved. If continued and developed this collaborative working will contribute significantly to the successful implementation of the Regional Waste Strategy.

339A disappointment has been the poor level of involvement of industry despite best endeavours. A significant amount of waste arises from the industrial and commercial sectors and it is important that continued efforts are made to secure the active involvement of industry at all levels to ensure that the Strategy is fully implemented.

[1] Technical Advice Note 21: Waste, November 2001, Chapter 5
[2] Technical Advice Note 21: Waste, November 2001, paragraph 5.1
[3] Technical Advice Note 21: Waste, November 2001, paragraph 5.4
[4] Technical Advice Note 21: Waste, November 2001, paragraph 5.5
[5] Technical Advice Note 21: Waste, November 2001, paragraph 5.4

Contribution Statement

340 The Options developed for this Regional Waste Plan were all designed to either meet or exceed targets set by the European Union and encompassed in the National Waste Strategy for Wales.

341 When the Regional Waste Strategy is incorporated into Unitary Development Plans it will not only meet but exceed the targets set by European Union Framework Directive on Waste. When the infrastructure required to implement the Strategy is put into place it will meet and exceed the targets set in the Landfill Directive in respect of municipal waste and in respect of pretreatment.

342 In addition a number of Secondary targets set by the National Waste Strategy for Wales are met.

343 The principal targets which will be met are set out below. They are of three types:

- UK targets where Wales must meet targets for the UK set in EC Directives;
- Primary Wales-specific targets where the Assemble Government and its key partners (e.g. local government) have a direct influence over their outcome; and
- Secondary Wales-specific targets where the Assembly Government's influence is less.

Municipal Waste

Type	Target	NWSW Reference
Primary	Minimum recycling and composting targets for each local authority to deliver: • By 2003/04 achieve **at least** 15% recycling/composting of municipal waste with a minimum of 5% composting (with only compost derived from source segregated materials counting) and 5% recycling; • By 2006/07 achieve **at least** 25% recycling/composting of municipal waste with a minimum of 10% composting (with only compost derived from source segregated materials counting) and 10% recycling; • By 2009/10 achieve **at least** 40% recycling/composting of municipal waste with a minimum of 15% composting (with only compost derived from source segregated materials counting) and 15% recycling.	Page viii Page 38, Para. 5.29
UK	Targets to limit the amount of biodegradable municipal waste (BMW) landfilled: • By 2010 no more than 75% of the BMW produced in 1995 can be landfilled; • By 2013 no more than 50% of the BMW produced in 1995 can be landfilled; • By 2020 no more than 35% of the BMW produced in 1995 can be landfilled.	Page vii Page 45, Para. 5.51

Industrial and Commercial Waste

Secondary	To divert waste from landfill: • By 2005, to reduce the amount of industrial and commercial waste sent to landfill to less than 85% of that landfilled in 1998; • By 2010, to reduce the amount of industrial and commercial waste going to landfill to less than 80% of that landfilled in 1998.	Page ix Page 62, Para. 5.122
Secondary	To divert biodegradable waste from landfill: • By 2005, to reduce the amount of biodegradable industrial and commercial waste sent to landfill to 85% of that landfilled in 1998; • By 2010, to reduce the amount of biodegradable industrial and commercial waste going to landfill to 80% of that landfilled in 1998.	Page ix Page 64, Para. 5.133

Packaging Waste

UK	The 2002 targets for companies obligated under the Packaging Regulations: • Recover 59% of packaging waste; • Recycle at least 19% of each material.	Page vii Page 66, Para. 5.145

Construction and Demolition Waste

Secondary	To re-use and recycle construction and demolition waste: • By 2005, to re-use or recycle at least 75% of C&D waste produced; • By 2010, to re-use or recycle at least 85% of C&D waste produced.	Page ix Page 68, Para. 5.153

Best Practice Statement

344 Preparation of the Regional Waste Plan has been an innovative process in Wales. Certain parts of the process are worthy of consideration as 'Best Practice' while the experience indicated ways in which other things could be done better in future.

Project Management

345 The whole process of preparation of the Plan has been 'deadline-driven' by the timescale requirements in Technical Advice Note 21 which in turn was driven by European Union requirements. Two lessons have been learned from this process. First, very tight project management and setting timescale as the primary target enabled the deadline to be met. Second, setting timescale as the primary target requires flexibility in achieving Plan content.

Inclusivity

346 Involvement of a broad a range of stakeholder interests on the Regional Waste Technical Group from an early stage in the development of the Plan enabled consideration to be given to a broad spectrum of viewpoints and increased ownership of the emerging Plan. The challenge for the future is to increase the range of stakeholders making an input to the process. In particular there needs to be greater representation of industry and business interests.

Assessment Techniques

347 The use of the WISARD Life Cycle Assessment tool enabled environmental impacts of the identified options to be considered objectively. The tool was modified to allow modelling of Mechanical Biological Treatment, a newly emerged technology. There is a need for the WISARD to be updated as a matter of urgency for use in the future.

348 The use of Sustainability Assessment combined environmental impacts with broader socio-economic impacts and gave a more rounded, balanced assessment. The model developed by the Office of the Deputy Prime Minister was employed which gave robustness to the process. In addition this was modified to reflect local concerns, in particular with respect to modelling the potential impacts of dioxins on the environment and health.

349 A challenge for the future is that to achieve comparability of assessment across Wales there needs to be greater transparency in the process from the earliest stage of commissioning the work.

Health Impact Assessment

350 A Health Impact Assessment was commissioned to assess the impacts of the Regional Waste Strategy on the health of the region. This is an innovative approach and technique. The approach was to examine both public perceptions of the potential health impacts of different waste management operations and scientific knowledge of those impacts.

351 A challenge for the future is to ensure that further HIAs should be carried out to assess new evidence as it emerges and to evaluate whether health risks are being properly managed during implementation of the strategy.

Data Management

352 It quickly emerged in preparation of the Regional Waste Assessment that there were many gaps in available data. This was dealt with positively by tight 'data management', recognising the limitation of the data and not going beyond that limit.

353 Forecasts of future waste streams were made on the basis of agreed scenarios. This gave a very positive outcome and underpins the estimated capacity requirements to implement the Regional Waste Strategy. The basis of forecasts needs to be monitored and reviewed as appropriate in the light of emerging information

354 A challenge for the future is to improve data and to target efforts at improving data to those areas which will feed most directly into the Regional Waste Plan process.

Use of consultants

355 A number of parts of the Plan preparation process required technical expertise beyond the range of skills directly available within the lead authority. Judicious use of technical consultants enabled these skill-gaps to be filled and the work to be progressed on target.

Inter-regional Cooperation

356 There was recognition from an early stage that South East Wales was one of three regions in Wales and there has been close cooperation between the three from the outset. This enabled a common range of scenarios to be developed for forecasting future waste arisings and comparability of assessment of the options developed.

357This liaison was greatly facilitated by frequent informal contact between regional lead officers.

358 A challenge for the future is to ensure that where one region is using consultants for a specific part of the process that the potential impacts of that work are fed through to the other regions. Similarly, where there are opportunities to achieve synergetic improvements, the work in one region should be shared with others.

Information dissemination

359 Great emphasis has been placed on electronic means for disseminating information both to members of the Regional Waste Technical Group and the Members' Steering Group and more broadly. This has both speeded the process, facilitating the achieving of deadlines, and reduced the amount of paper generated

360 Part of this commitment to electronic communication was the development of a web site for the Regional Waste Plan. This was used both to make documents and information widely available, and to solicit response and feedback. Given that the Regional Waste Plan process is a Wales-wide process it is unfortunate that the opportunity was missed to create a Wales-wide waste web site. (www.wwww) This offers an opportunity for the future.

Acknowledgments

The contribution of the following to the preparation of the Regional Waste Plan is acknowledged:

The officers of the 10 councils in the region and the Environment Agency Wales for providing the majority of the data which underpins the Plan.

All representatives on the Regional Waste Technical Group for contributing views and comments throughout the process.

Applied Environmental Research Centre Ltd for carrying out the Sustainability Assessment and the Health Impact Assessment.

Research and Marketing Ltd for carrying out the consultation exercise.

SLR Consulting Ltd for carrying out the Life Cycle Assessment.

Appendix 1

Membership of Members' Steering Group

Blaenau Gwent County Borough Council

Brecon Beacons National Park Authority

Caerphilly County Borough Council

Cardiff County Council

Merthyr Tydfil County Borough Council

Monmouthshire County Council

Newport County Council

Powys County Council

Rhondda Cynon Taf County Borough Council

Torfaen County Borough Council

Vale of Glamorgan County Borough Council

Bridgend County Borough Council (Observer status)

Appendix 2

Membership of Regional Waste Technical Group

A Planning Officer and a Waste Management Officer representative of each of:
Blaenau Gwent County Borough Council
Brecon Beacons National Park Authority
Bridgend County Borough Council
Caerphilly County Borough Council
Cardiff County Council
Merthyr Tydfil County Borough Council
Monmouthshire County Council
Newport County Council
Powys County Council
Rhondda Cynon Taf County Borough Council
Torfaen County Borough Council
Vale of Glamorgan County Borough Council

Representatives of*:*
Campaign for the Protection of Rural Wales (CPRW)

Cardiff University School of Engineering

CBI Wales Environment Committee

Countryside Council for Wales (CCW)

Environment Agency Wales

Institute of Waste Management

National Association of Waste Disposal Officers (NAWDO)

South East Wales Economic Forum (represented by WDA)

The Wales Environment Trust (WET)

Wales Community Recycling Network (Cylch)

Waste and Resources Action Programme (WRAP)

Welsh Assembly Government (WAG)

Waste Strategy Unit

Welsh Development Agency (WDA)

Welsh Environmental Services Association (WESA)

Appendix 3

Typical Capacity Range Of Waste Management Facilities

This table gives typical capacity ranges for each type of facility. The estimates of facility size used for the purpose of comparative analysis throughout the Plan and its supporting documents are emphasised in red text (see Paras 204 & 271).

Facility Type	Typical Capacity Range (tpa)
Transfer Station	150,000 **60,000** 20,000
Civic Amenity Site	25,000 **5,000** 3,000
MBT	270,000 **60,000** 36,000
Thermal	600,000 **60,000** 26,000
Windrow Composting	250,000 **5,000** 2,500
In Vessel Composting	250,000 **10,000** 2,500
Inert Recycling Facility	50,000 **30,000** 10,000
Clean MRF	50,000 **15,000** 5,000
Landfill	**100,000** 50,000

Appendix 4

Capacity Requirements for Each Waste Stream
by local authority area

Area/ Authority	Stream	Materials Recovery Facility	Open Windrow Composting	In Vessel Composting	Inert Recycling Facility	Mechanical & Biological Treatment	Thermal Treatment	Treatment	Landfill	Civic Amenity	Transfer Station	Total
B Gwent	Municipal	26,696	3,224	12,897	0	18,808	0	0	8,395	6,517	15,144	91,682
	Commercial & Industrial Non-Inert	12,036	2,485	9,940	1,351	12,451	167	5,508	7,095	0	3,096	54,129
	Commercial & Industrial Inert	20,061	0	0	22,172	0	0	0	0	0	4,195	46,428
	Construction & Demolition	43,126	0	0	78,287	0	0	0	0	0	4,358	125,770
	Controlled Agricultural	24	0	0	0	96	0	0	96	0	0	215
	Total	**101,943**	**5,709**	**22,837**	**101,809**	**31,355**	**167**	**5,508**	**15,585**	**6,517**	**26,794**	**318,225**
Caerphilly	Municipal	59,989	7,245	28,981	0	42,264	0	0	18,864	14,644	34,030	206,016
	Commercial & Industrial Non-Inert	23,921	4,939	19,756	2,684	24,745	332	10,947	14,100	0	6,154	107,577
	Commercial & Industrial Inert	39,869	0	0	44,066	0	0	0	0	0	8,337	92,272
	Construction & Demolition	103,271	0	0	187,470	0	0	0	0	0	10,437	301,178
	Controlled Agricultural	110	0	0	0	433	0	0	433	0	0	976
	Total	**227,160**	**12,184**	**48,736**	**234,220**	**67,442**	**332**	**10,947**	**33,398**	**14,644**	**58,957**	**708,019**
Cardiff	Municipal	92,908	11,221	44,884	0	65,456	0	0	29,216	22,680	52,703	319,067
	Commercial & Industrial Non-Inert	61,430	12,683	50,734	6,893	63,547	853	28,112	36,211	0	15,803	276,266
	Commercial & Industrial Inert	102,387	0	0	113,165	0	0	0	0	0	21,410	236,961
	Construction & Demolition	198,365	0	0	360,096	0	0	0	0	0	20,047	578,509
	Controlled Agricultural	33	0	0	0	129	0	0	129	0	0	290
	Total	**455,123**	**23,904**	**95,618**	**480,154**	**129,131**	**853**	**28,112**	**65,555**	**22,680**	**109,964**	**1,411,093**
Merthyr	Municipal	19,953	2,410	9,640	0	14,058	0	0	6,275	4,871	11,319	68,525
	Commercial & Industrial Non-Inert	6,601	1,363	5,452	741	6,829	92	3,021	3,891	0	1,698	29,687
	Commercial & Industrial Inert	11,002	0	0	12,160	0	0	0	0	0	2,301	25,463
	Construction & Demolition	33,798	0	0	61,354	0	0	0	0	0	3,416	98,567
	Controlled Agricultural	38	0	0	0	152	0	0	152	0	0	342
	Total	**71,393**	**3,773**	**15,091**	**74,255**	**21,038**	**92**	**3,021**	**10,318**	**4,871**	**18,733**	**222,584**
Monmouth	Municipal	28,215	3,408	13,631	0	19,878	0	0	8,872	6,888	16,006	96,897
	Commercial & Industrial Non-Inert	10,510	2,170	8,680	1,179	10,872	146	4,810	6,195	0	2,704	47,266
	Commercial & Industrial Inert	17,517	0	0	19,361	0	0	0	0	0	3,663	40,542
	Construction & Demolition	52,938	0	0	96,099	0	0	0	0	0	5,350	154,387
	Controlled Agricultural	754	0	0	0	2,978	0	0	2,978	0	0	6,709
	Total	**109,934**	**5,578**	**22,311**	**116,639**	**33,728**	**146**	**4,810**	**18,046**	**6,888**	**27,722**	**345,801**
Newport	Municipal	41,726	5,039	20,158	0	29,397	0	0	13,121	10,186	23,670	143,298
	Commercial & Industrial Non-Inert	15,761	3,254	13,017	1,769	16,304	219	7,213	9,291	0	4,055	70,883
	Commercial & Industrial Inert	26,270	0	0	29,035	0	0	0	0	0	5,493	60,798
	Construction & Demolition	83,889	0	0	152,285	0	0	0	0	0	8,478	244,652
	Controlled Agricultural	105	0	0	0	414	0	0	414	0	0	934
	Total	**167,751**	**8,294**	**33,175**	**183,089**	**46,116**	**219**	**7,213**	**22,826**	**10,186**	**41,696**	**520,564**
RCT	Municipal	71,229	8,603	34,411	0	50,182	0	0	22,399	17,388	40,406	244,616
	Commercial & Industrial Non-Inert	32,735	6,759	27,036	3,673	33,863	455	14,981	19,296	0	8,421	147,219
	Commercial & Industrial Inert	54,561	0	0	60,304	0	0	0	0	0	11,409	126,274
	Construction & Demolition	145,246	0	0	263,667	0	0	0	0	0	14,679	423,592
	Controlled Agricultural	134	0	0	0	528	0	0	528	0	0	1,190
	Total	**303,905**	**15,362**	**61,446**	**327,645**	**84,574**	**455**	**14,981**	**42,223**	**17,388**	**74,915**	**942,892**
S Powys	Municipal	19,072	2,303	9,214	0	13,437	0	0	5,997	4,656	10,819	65,499
	Commercial & Industrial Non-Inert	10,759	2,221	8,886	1,207	11,130	149	4,924	6,342	0	2,768	48,387
	Commercial & Industrial Inert	17,933	0	0	19,820	0	0	0	0	0	3,750	41,503
	Construction & Demolition	41,704	0	0	75,705	0	0	0	0	0	4,215	121,624
	Controlled Agricultural	1,845	0	0	0	7,288	0	0	7,288	0	0	16,422
	Total	**91,313**	**4,525**	**18,100**	**96,733**	**31,855**	**149**	**4,924**	**19,628**	**4,656**	**21,552**	**293,435**
Torfaen	Municipal	31,093	3,755	15,021	0	21,905	0	0	9,777	7,590	17,638	106,779
	Commercial & Industrial Non-Inert	18,506	3,821	15,284	2,077	19,144	257	8,469	10,909	0	4,761	83,228
	Commercial & Industrial Inert	30,845	0	0	34,092	0	0	0	0	0	6,450	71,387
	Construction & Demolition	54,392	0	0	98,738	0	0	0	0	0	5,497	158,626
	Controlled Agricultural	40	0	0	0	158	0	0	158	0	0	356
	Total	**134,875**	**7,576**	**30,305**	**134,906**	**41,208**	**257**	**8,469**	**20,844**	**7,590**	**34,345**	**420,376**
VoG	Municipal	39,251	4,740	18,962	0	27,653	0	0	12,343	9,582	22,266	134,796
	Commercial & Industrial Non-Inert	48,753	10,066	40,264	5,471	50,432	677	22,310	28,738	0	12,541	219,252
	Commercial & Industrial Inert	81,257	0	0	89,810	0	0	0	0	0	16,992	188,059
	Construction & Demolition	74,440	0	0	135,132	0	0	0	0	0	7,523	217,095
	Controlled Agricultural	237	0	0	0	938	0	0	938	0	0	2,113
	Total	**243,938**	**14,806**	**59,226**	**230,413**	**79,023**	**677**	**22,310**	**42,018**	**9,582**	**59,322**	**761,316**
SE Wales	Municipal	430,132	51,949	207,798	0	303,038	0	0	135,259	105,000	244,000	1,477,176
	Commercial & Industrial Non-Inert	241,013	49,762	199,048	27,045	249,317	3,348	110,294	142,068	0	62,000	1,083,895
	Commercial & Industrial Inert	401,701	0	0	443,986	0	0	0	0	0	84,000	929,687
	Construction & Demolition	831,168	0	0	1,508,832	0	0	0	0	0	84,000	2,424,000
	Controlled Agricultural	3,320	0	0	0	13,114	0	0	13,114	0	0	29,548
	Total	**1,907,334**	**101,711**	**406,846**	**1,979,863**	**565,469**	**3,348**	**110,294**	**290,441**	**105,000**	**474,000**	**5,944,306**

Data from 'Developing a Regional Waste Strategy for SE Wales; WISARD Assessment April 2003' Tables 3.10 - 3.15
Figures indicate facility capacity required. Some double counting purposely occurs, e.g.: all landfill figures include ash from thermal and landfill fraction of MBT

Appendix 5

Indicative Number of Facilities for Each Waste Stream
by local authority area

Area/ Authority	Stream	Materials Recovery Facility	Open Windrow Composting	In Vessel Composting	Inert Recycling Facility	Mechanical & Biological Treatment	Thermal Treatment	Treatment	Landfill	Civic Amenity	Transfer Station	Total
B Gwent	Municipal	1.8	0.6	1.3	0.0	0.3	0.0	0.0	0.1	1.3	0.3	5.7
	Commercial & Industrial Non-Inert	0.8	0.5	1.0	0.0	0.2	0.0	0.3	0.1	0.0	0.1	2.9
	Commercial & Industrial Inert	1.3	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.1	2.1
	Construction & Demolition	2.9	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.1	5.6
	Controlled Agricultural	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**6.8**	**1.1**	**2.3**	**3.4**	**0.5**	**0.0**	**0.3**	**0.2**	**1.3**	**0.4**	**16.3**
Caerphilly	Municipal	4.0	1.4	2.9	0.0	0.7	0.0	0.0	0.2	2.9	0.6	12.7
	Commercial & Industrial Non-Inert	1.6	1.0	2.0	0.1	0.4	0.0	0.5	0.1	0.0	0.1	5.8
	Commercial & Industrial Inert	2.7	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.1	4.3
	Construction & Demolition	6.9	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.2	13.3
	Controlled Agricultural	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**15.1**	**2.4**	**4.9**	**7.8**	**1.1**	**0.0**	**0.5**	**0.3**	**2.9**	**1.0**	**36.2**
Cardiff	Municipal	6.2	2.2	4.5	0.0	1.1	0.0	0.0	0.3	4.5	0.9	19.7
	Commercial & Industrial Non-Inert	4.1	2.5	5.1	0.2	1.1	0.0	1.3	0.4	0.0	0.3	15.0
	Commercial & Industrial Inert	6.8	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.4	11.0
	Construction & Demolition	13.2	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.3	25.6
	Controlled Agricultural	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**30.3**	**4.8**	**9.6**	**16.0**	**2.2**	**0.0**	**1.3**	**0.7**	**4.5**	**1.8**	**71.2**
Merthyr	Municipal	1.3	0.5	1.0	0.0	0.2	0.0	0.0	0.1	1.0	0.2	4.2
	Commercial & Industrial Non-Inert	0.4	0.3	0.5	0.0	0.1	0.0	0.1	0.0	0.0	0.0	1.6
	Commercial & Industrial Inert	0.7	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	1.2
	Construction & Demolition	2.3	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.1	4.4
	Controlled Agricultural	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**4.8**	**0.8**	**1.5**	**2.5**	**0.4**	**0.0**	**0.1**	**0.1**	**1.0**	**0.3**	**11.4**
Monmouth	Municipal	1.9	0.7	1.4	0.0	0.3	0.0	0.0	0.1	1.4	0.3	6.0
	Commercial & Industrial Non-Inert	0.7	0.4	0.9	0.0	0.2	0.0	0.2	0.1	0.0	0.0	2.6
	Commercial & Industrial Inert	1.2	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.1	1.9
	Construction & Demolition	3.5	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.1	6.8
	Controlled Agricultural	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	Total	**7.3**	**1.1**	**2.2**	**3.9**	**0.6**	**0.0**	**0.2**	**0.2**	**1.4**	**0.5**	**17.4**
Newport	Municipal	2.8	1.0	2.0	0.0	0.5	0.0	0.0	0.1	2.0	0.4	8.9
	Commercial & Industrial Non-Inert	1.1	0.7	1.3	0.1	0.3	0.0	0.3	0.1	0.0	0.1	3.8
	Commercial & Industrial Inert	1.8	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.1	2.8
	Construction & Demolition	5.6	0.0	0.0	5.1	0.0	0.0	0.0	0.0	0.0	0.1	10.8
	Controlled Agricultural	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**11.2**	**1.7**	**3.3**	**6.1**	**0.8**	**0.0**	**0.3**	**0.2**	**2.0**	**0.7**	**26.3**
RCT	Municipal	4.7	1.7	3.4	0.0	0.8	0.0	0.0	0.2	3.5	0.7	15.1
	Commercial & Industrial Non-Inert	2.2	1.4	2.7	0.1	0.6	0.0	0.7	0.2	0.0	0.1	8.0
	Commercial & Industrial Inert	3.6	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.2	5.8
	Construction & Demolition	9.7	0.0	0.0	8.8	0.0	0.0	0.0	0.0	0.0	0.2	18.7
	Controlled Agricultural	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**20.3**	**3.1**	**6.1**	**10.9**	**1.4**	**0.0**	**0.7**	**0.4**	**3.5**	**1.2**	**47.7**
S Powys	Municipal	1.3	0.5	0.9	0.0	0.2	0.0	0.0	0.1	0.9	0.2	4.0
	Commercial & Industrial Non-Inert	0.7	0.4	0.9	0.0	0.2	0.0	0.2	0.1	0.0	0.0	2.6
	Commercial & Industrial Inert	1.2	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.1	1.9
	Construction & Demolition	2.8	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.1	5.4
	Controlled Agricultural	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.3
	Total	**6.1**	**0.9**	**1.8**	**3.2**	**0.5**	**0.0**	**0.2**	**0.2**	**0.9**	**0.4**	**14.3**
Torfaen	Municipal	2.1	0.8	1.5	0.0	0.4	0.0	0.0	0.1	1.5	0.3	6.6
	Commercial & Industrial Non-Inert	1.2	0.8	1.5	0.1	0.3	0.0	0.4	0.1	0.0	0.1	4.5
	Commercial & Industrial Inert	2.1	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.1	3.3
	Construction & Demolition	3.6	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.1	7.0
	Controlled Agricultural	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**9.0**	**1.5**	**3.0**	**4.5**	**0.7**	**0.0**	**0.4**	**0.2**	**1.5**	**0.6**	**21.4**
VoG	Municipal	2.6	0.9	1.9	0.0	0.5	0.0	0.0	0.1	1.9	0.4	8.3
	Commercial & Industrial Non-Inert	3.3	2.0	4.0	0.2	0.8	0.0	1.1	0.3	0.0	0.2	11.9
	Commercial & Industrial Inert	5.4	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.3	8.7
	Construction & Demolition	5.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.1	9.6
	Controlled Agricultural	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**16.3**	**3.0**	**5.9**	**7.7**	**1.3**	**0.0**	**1.1**	**0.4**	**1.9**	**1.0**	**38.5**
SE Wales	Municipal	28.7	10.4	20.8	0.0	5.1	0.0	0.0	1.4	21.0	4.1	91.3
	Commercial & Industrial Non-Inert	16.1	10.0	19.9	0.9	4.2	0.1	5.2	1.4	0.0	1.0	58.7
	Commercial & Industrial Inert	26.8	0.0	0.0	14.8	0.0	0.0	0.0	0.0	0.0	1.4	43.0
	Construction & Demolition	55.4	0.0	0.0	50.3	0.0	0.0	0.0	0.0	0.0	1.4	107.1
	Controlled Agricultural	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.6
	Total	**127.2**	**20.3**	**40.7**	**66.0**	**9.4**	**0.1**	**5.2**	**2.9**	**21.0**	**7.9**	**300.7**

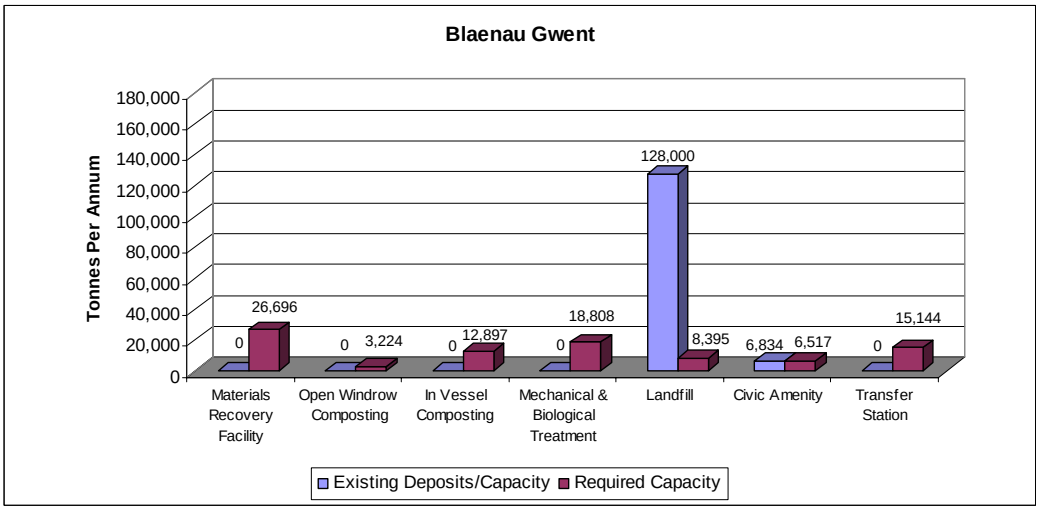
Assumed facility capacities (tonnes): MRF 15,000; Windrow 5,000; In Vessel 10,000; Inert Recycling 30,000; MBT 60,000; Thermal 60,000; Treatment 21,100; Landfill 100,000; CA 5,000; Transfer 60,000.
'Required Capacity' data from 'Developing a Regional Waste Strategy for SE Wales; WISARD Assessment April 2003' Tables 3.10 - 3.15

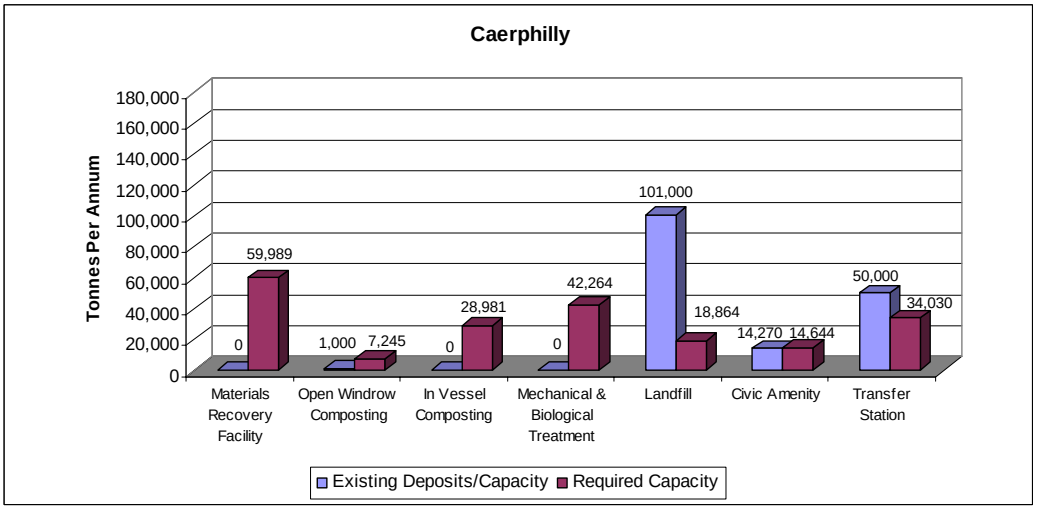
Appendix 6

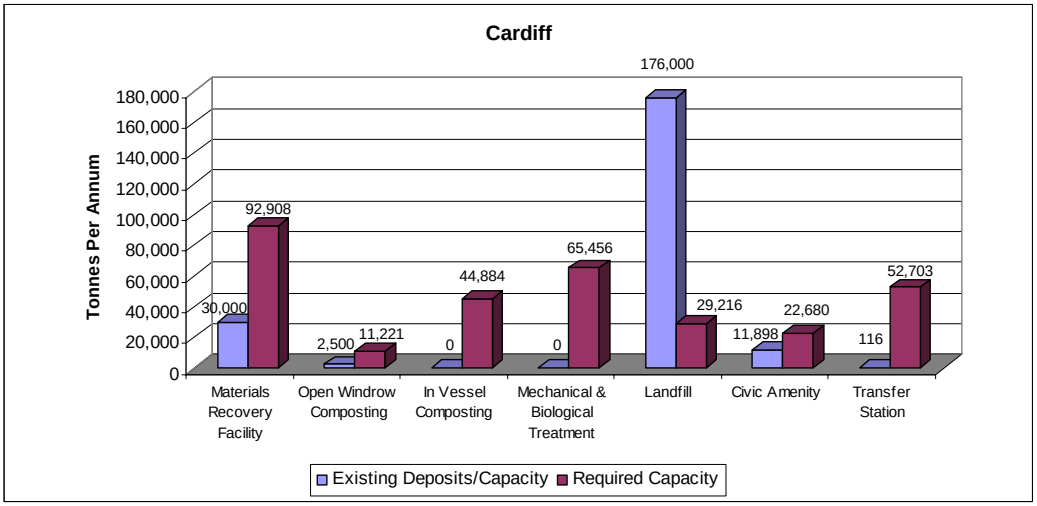
Comparison of Existing and Future Capacity Requirements for Municipal Solid Waste

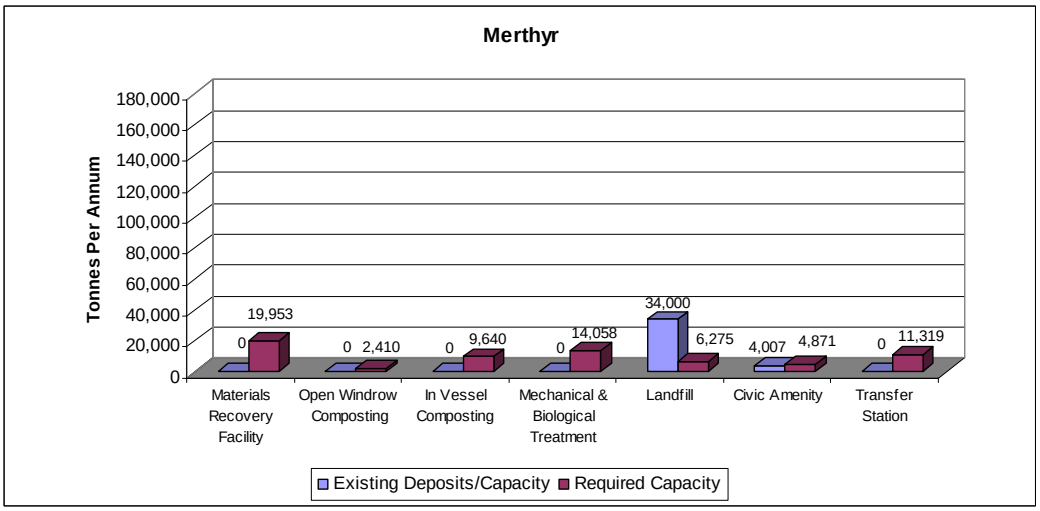
by facility type by local authority area

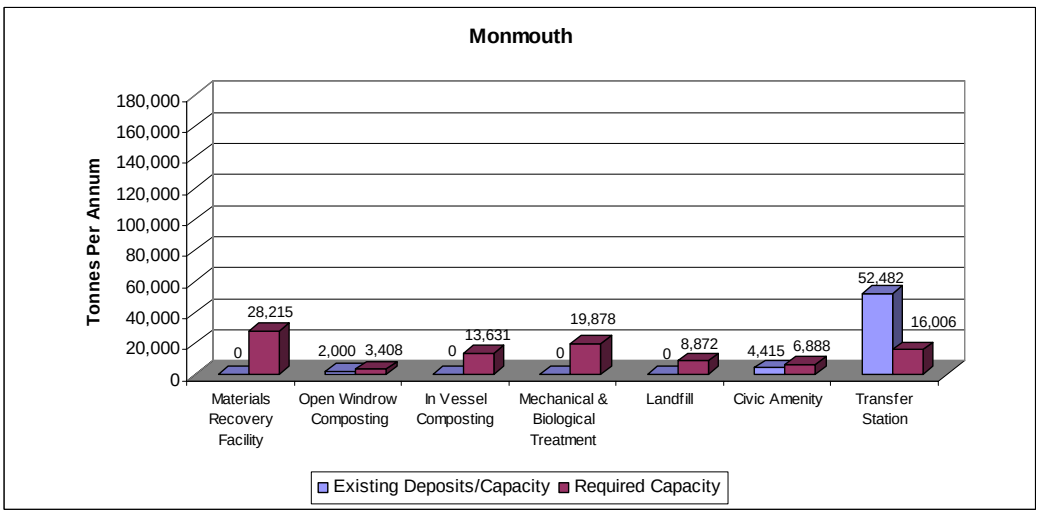
The potential for making direct comparisons between present capacity/deposits and future capacity requirements for all waste streams and facility types is limited by the data available in the Regional Waste Assessment. Appendixes 6 & 7 present all of the comparisons that are possible with the RWA data. (Most comparisons in these Appendixes are for the municipal stream – this reflects the fact that the capacity and deposit data in the RWA is most complete for the municipal waste stream.)

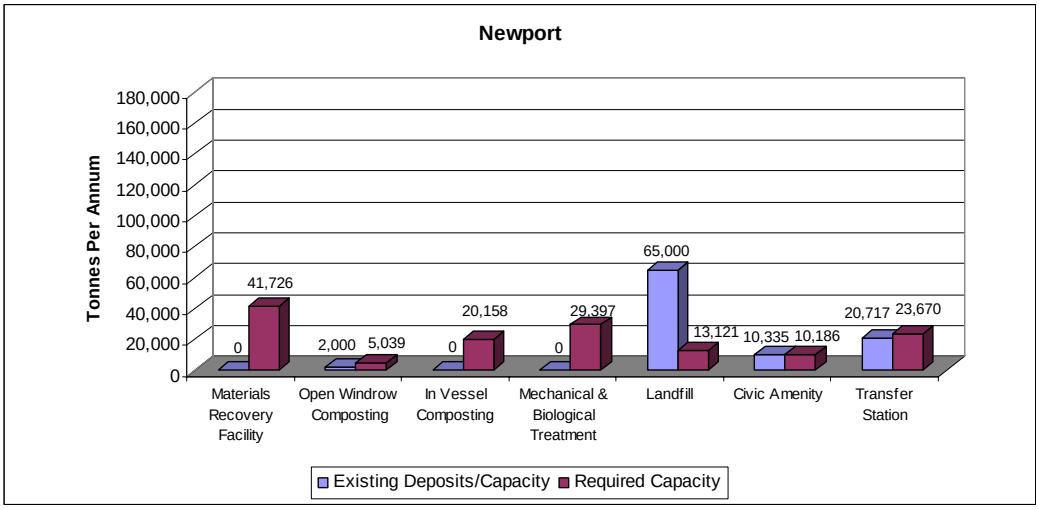


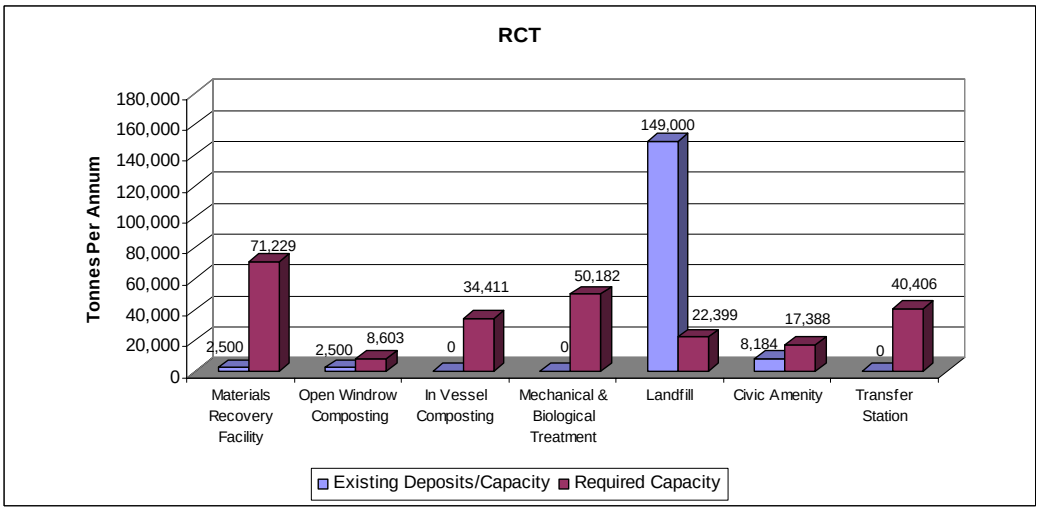


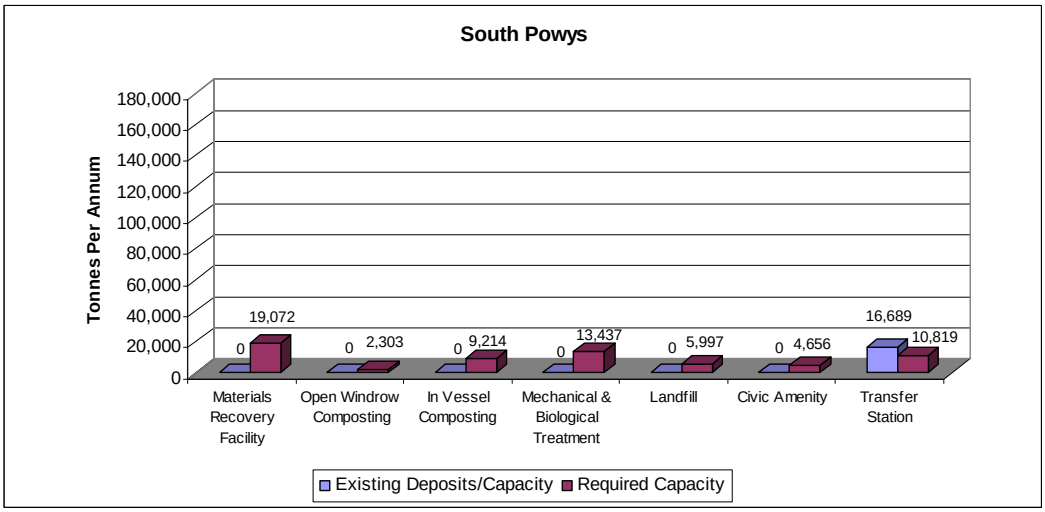

Cardiff
Tonnes Per Annum
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
30,000
92,908
2,500
11,221
0
44,884
0
65,456
176,000
29,216
11,898
22,680
116
52,703
Materials Recovery Facility
Open Windrow Composting
In Vessel Composting
Mechanical & Biological Treatment
Landfill
Civic Amenity
Transfer Station
Existing Deposits/Capacity
Required Capacity

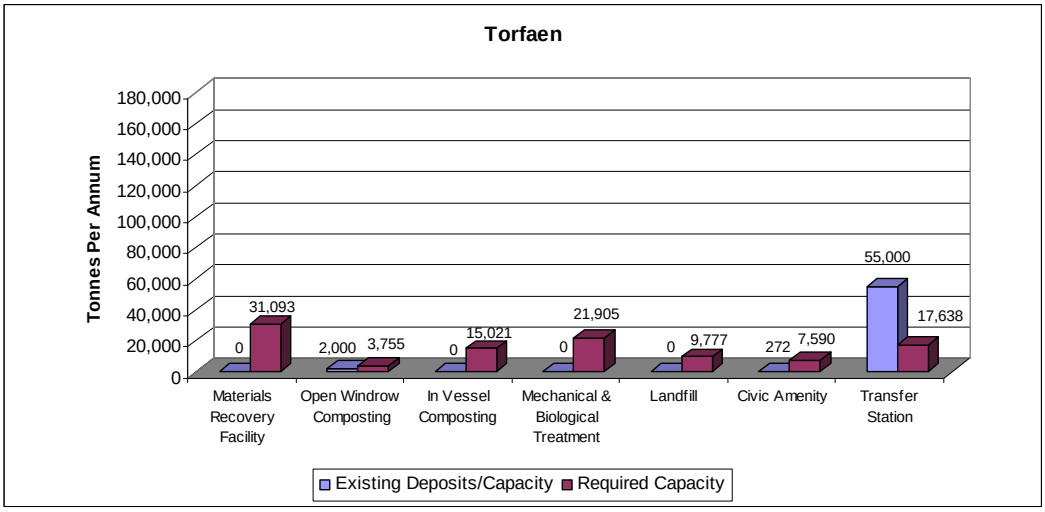

Merthyr
Tonnes Per Annum
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
0
19,953
0
2,410
0
9,640
0
14,058
34,000
6,275
4,007
4,871
0
11,319
Materials Recovery Facility
Open Windrow Composting
In Vessel Composting
Mechanical & Biological Treatment
Landfill
Civic Amenity
Transfer Station
Existing Deposits/Capacity
Required Capacity

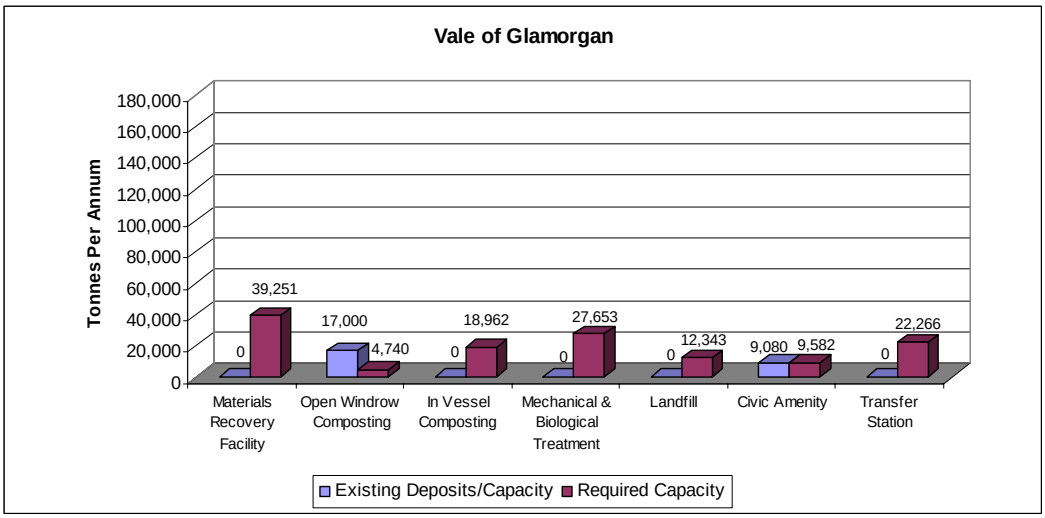

Monmouth
Tonnes Per Annum
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
0
28,215
2,000
3,408
0
13,631
0
19,878
0
8,872
4,415
6,888
52,482
16,006
Materials Recovery Facility
Open Windrow Composting
In Vessel Composting
Mechanical & Biological Treatment
Landfill
Civic Amenity
Transfer Station
Existing Deposits/Capacity
Required Capacity

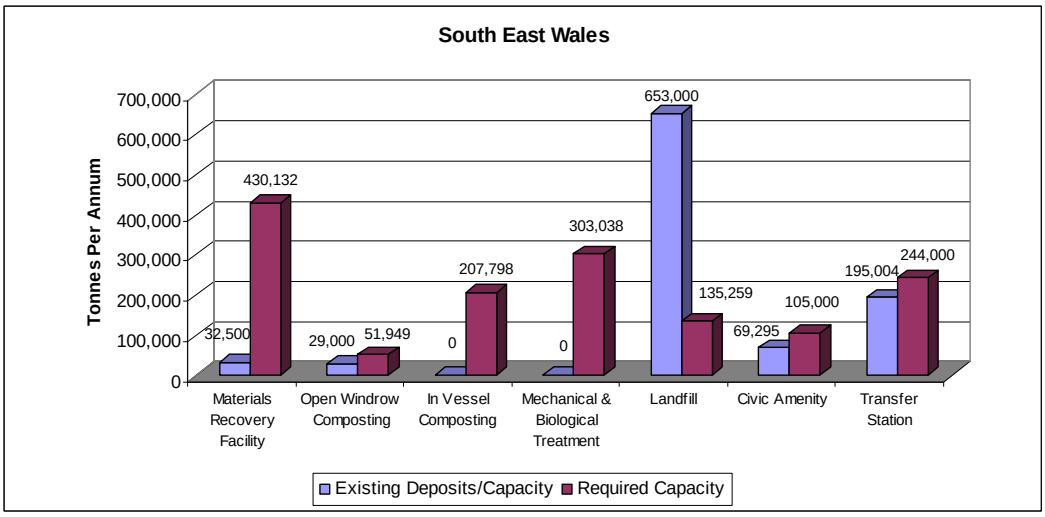

Newport
Tonnes Per Annum
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
0
41,726
2,000
5,039
0
20,158
0
29,397
65,000
13,121
10,335
10,186
20,717
23,670
Materials Recovery Facility
Open Windrow Composting
In Vessel Composting
Mechanical & Biological Treatment
Landfill
Civic Amenity
Transfer Station
Existing Deposits/Capacity
Required Capacity


RCT
Tonnes Per Annum
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
2,500
71,229
2,500
8,603
0
34,411
0
50,182
149,000
22,399
8,184
17,388
0
40,406
Materials Recovery Facility
Open Windrow Composting
In Vessel Composting
Mechanical & Biological Treatment
Landfill
Civic Amenity
Transfer Station
Existing Deposits/Capacity
Required Capacity


South Powys
Tonnes Per Annum
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
0
19,072
0
2,303
0
9,214
0
13,437
0
5,997
0
4,656
16,689
10,819
Materials Recovery Facility
Open Windrow Composting
In Vessel Composting
Mechanical & Biological Treatment
Landfill
Civic Amenity
Transfer Station
Existing Deposits/Capacity
Required Capacity







Sources:

"**Existing Deposits/Capacity**" data for:
Recycling from RWA Tab 43 'Municipal Waste Recycling and Composting Facilities' annual throughput;
Open Windrow Composting from RWA Tab 43 'Municipal Waste Recycling and Composting Facilities' annual throughput;
In Vessel Composting, assumed that none of the composting capacity in RWA Tab 43 was In Vessel;
MBT, no plants presently operating in SE Wales therefore zero for all authorities;
Landfill from RWA Tab 30 'Waste Deposited at Open Gate Landfill Sites 2000/01';

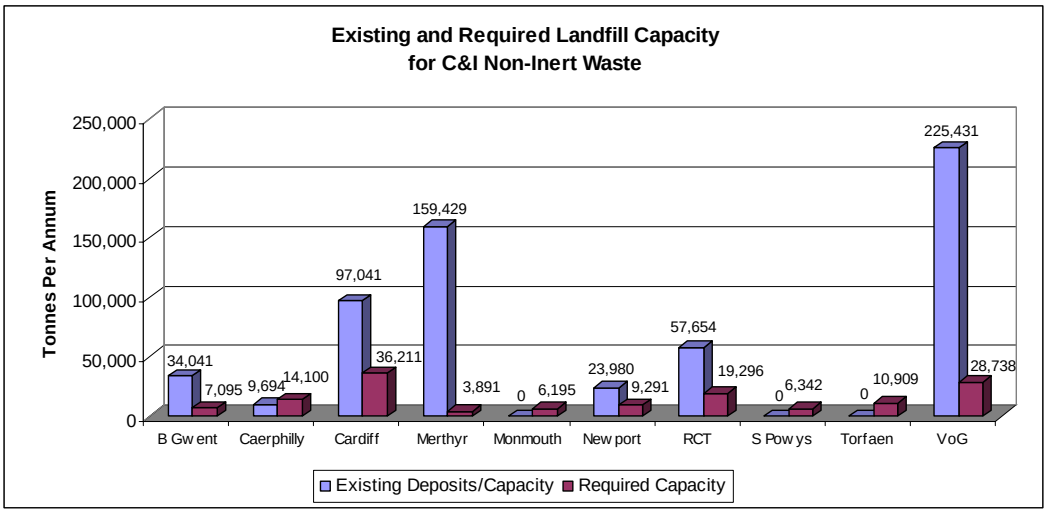
Civic Amenity sites From RWA Tab 35 ‘Waste Deposited at Household Amenity/Civic Amenity Sites 2001/02’;
Transfer Stations from which ever was greater of 1) RWA Tab 36 ‘Waste Deposited at Open Gate Transfer Stations 2001/02’, and 2) RWA Tab 49 ‘Municipal Waste Transfer Station Capacity’.

“**Required Capacity**” data from 'Developing a Regional Waste Strategy for SE Wales; WISARD Assessment April 2003' Tables 3.10 - 3.15. Figures indicate facility capacity required. Some double counting purposely occurs, e.g.: all landfill figures include ash from thermal and landfill fraction of MBT.

Appendix 7

Comparison of Existing and Future Capacity Requirements
Commercial and Industrial Non-Inert Waste
Landfill and Transfer Stations

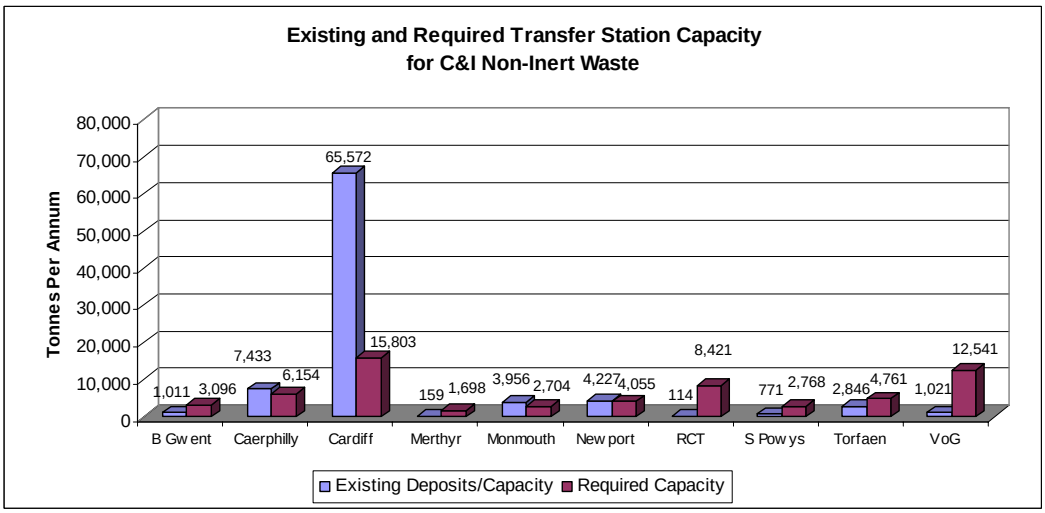
Appendix 7A



Source:
"Existing Deposits/Capacity" data from 1) Non-Inert fraction of I&C PLUS all Special Waste in RWA Tab 30 'Waste Deposited at Open Gate Landfill Sites 2000/01', PLUS 2) Non-Inert fraction of I&C PLUS all Special Waste in RWA Tab 31 'Waste Deposited at Restricted Used Landfill Sites 2000/01'. Inert/Non-Inert fraction used is that calculated and used by SLR Consulting Ltd in the 'Draft Options Development Report' and the 'WISARD Assessment' for 2013, i.e. 0.49 Inert, 0.51 Non-Inert.

"**Required Capacity**" data from 'Developing a Regional Waste Strategy for SE Wales; WISARD Assessment April 2003' Tables 3.10 - 3.15. Figures indicate facility capacity required. Some double counting purposely occurs, e.g.: all landfill figures include ash from thermal and landfill fraction of MBT.

Appendix 7B

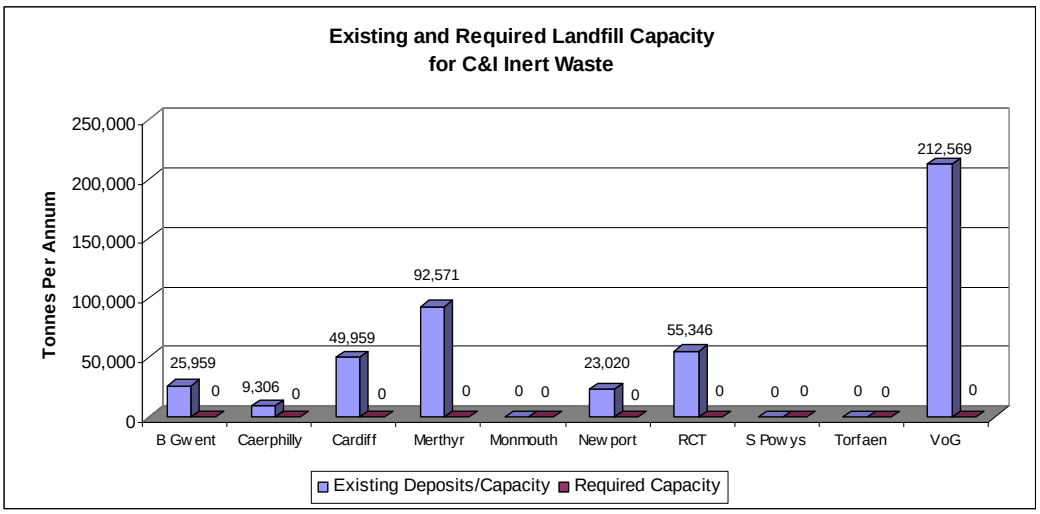


Source:
"**Existing Deposits/Capacity**" data from 1) Non-inert fraction of I&C PLUS Special Waste in RWA Tab 36 'Waste Deposited at Open Gate Transfer Stations 2001/02', PLUS 2) Non-inert fraction of I&C PLUS Special Waste in RWA Tab 37 'Waste Deposited at Restricted User Transfer Stations 2001/02'.

"**Required Capacity**" data from 'Developing a Regional Waste Strategy for SE Wales; WISARD Assessment April 2003' Tables 3.10 - 3.15. Figures indicate facility capacity required. Some double counting purposely occurs, e.g.: all landfill figures include ash from thermal and landfill fraction of MBT.

Comparison of Existing and Future Capacity Requirements
Commercial and Industrial Inert Waste
Landfill and Transfer Stations

Appendix 7C

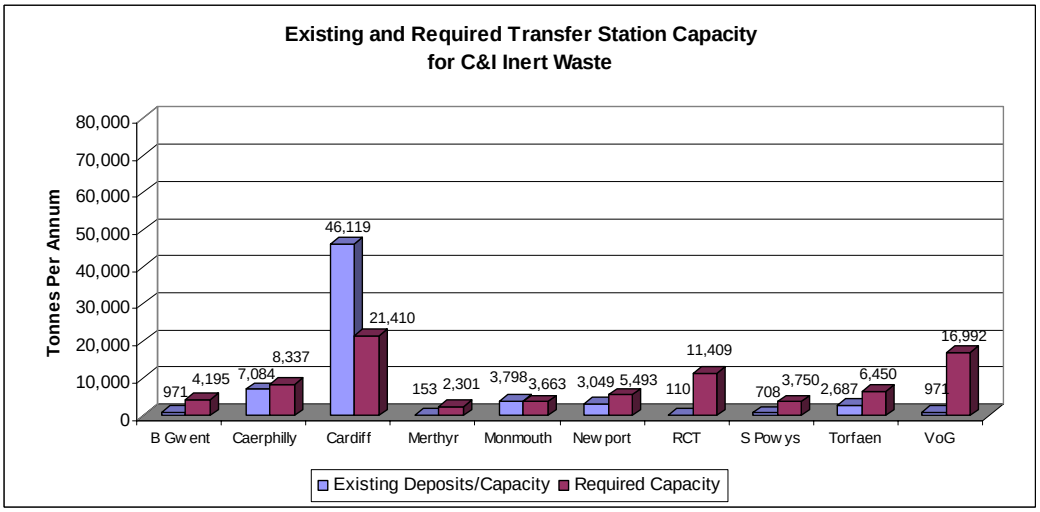


Source:

"**Existing Deposits/Capacity**" data from 1) Inert fraction of I&C in RWA Tab 30 'Waste Deposited at Open Gate Landfill Sites 2000/01', PLUS 2) Inert fraction of I&C in RWA Tab 31 'Waste Deposited at Restricted Used Landfill Sites 2000/01'.

"**Required Capacity**" data from 'Developing a Regional Waste Strategy for SE Wales; WISARD Assessment April 2003' Tables 3.10 - 3.15. Figures indicate facility capacity required. Some double counting purposely occurs, e.g.: all landfill figures include ash from thermal and landfill fraction of MBT.

Appendix 7D



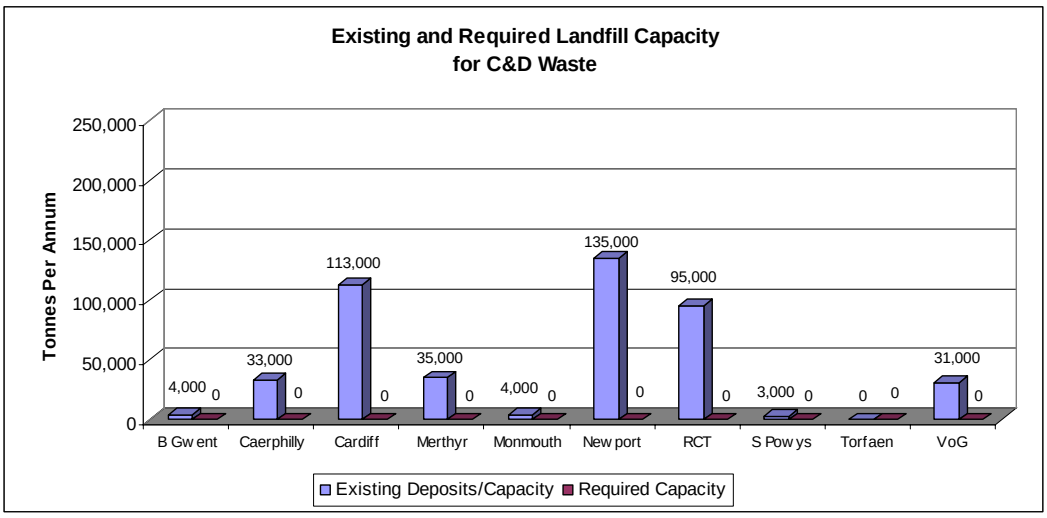
Source:

"**Existing Deposits/Capacity**" data from 1) Inert fraction of I&C in RWA Tab 36 'Waste Deposited at Open Gate Transfer Stations 2001/02', PLUS 2) Inert fraction of I&C in RWA Tab 37 'Waste Deposited at Restricted User Transfer Stations 2001/02'

"**Required Capacity**" data from 'Developing a Regional Waste Strategy for SE Wales; WISARD Assessment April 2003' Tables 3.10 - 3.15. Figures indicate facility capacity required. Some double counting purposely occurs, e.g.: all landfill figures include ash from thermal and landfill fraction of MBT.

Comparison of Existing and Future Capacity Requirements
Construction and Demolition Waste
Landfill and Transfer Stations

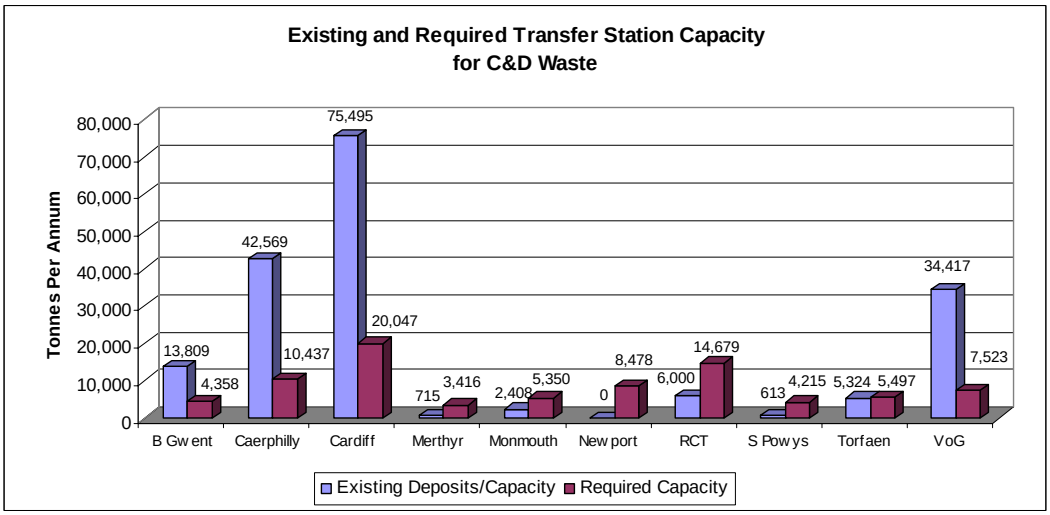
Appendix 7E



Source:
"**Existing Deposits/Capacity**" data from RWA Tab 30 'Waste Deposited at Open Gate Landfill Sites 2000/01'.

"**Required Capacity**" data from 'Developing a Regional Waste Strategy for SE Wales; WISARD Assessment April 2003' Tables 3.10 - 3.15. Figures indicate facility capacity required. Some double counting purposely occurs, e.g.: all landfill figures include ash from thermal and landfill fraction of MBT.

Appendix 7F



Source:
"**Existing Deposits/Capacity**" data from RWA Tab 36 'Waste Deposited at Open Gate Transfer Station' 2001/02.

"**Required Capacity**" data from 'Developing a Regional Waste Strategy for SE Wales; WISARD Assessment April 2003' Tables 3.10 - 3.15. Figures indicate facility capacity required. Some double counting purposely occurs, e.g.: all landfill figures include ash from thermal and landfill fraction of MBT.

Appendix 8

Site Requirements and Considerations for Waste Management Technologies

Waste Transfer

Technology	Typical Capacity Range	Land Requirements m2 if < 80,000 tpa	Land Requirements m2 if > 80,000 tpa	Environmental and Public Health Issues	Visual Considerations	Locational Considerations	Other Information
Transfer Station – Road	20,000 to 150,000 tpa	Up to 10,000	10,000 upwards depending on throughput	• Potential for odour at non-inert sites. Significantly reduced by being in a building with air treatment (unless using intermodal units for collection). • Potential for noise pollution. • Potential for traffic pollution from heavy vehicles.	• Bunkers of materials awaiting transport (inert sites). • For biodegradable wastes best if enclosed in standard industrial type building with air control (unless using intermodal units for collection then storage of ISO containers).	• Location should take account of possible odour pollution. • Location should take account of possible noise pollution. • Would increase heavy vehicle traffic movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles.	• Convenient way of bulking materials for transport purposes – intermodal collection and transport currently being trialed which makes transfer no more than a pile of ISO containers.
Transfer Station – Rail	No data	Up to 30,000	30,000 upwards depending on throughput	• Potential for odour at non-inert sites. Significantly reduced by being in a building with air treatment. • Potential for noise pollution. • Potential for traffic pollution from heavy vehicles.	• For biodegradable wastes best if enclosed in standard industrial type building with air control (unless using intermodal units for collection then storage of ISO containers).	• Location should take account of possible odour pollution. • Location should take account of possible noise pollution. • Could increase heavy vehicle traffic movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles.	• Convenient way of bulking materials for transport purposes – intermodal collection and transport currently being trialed which makes transfer no more than a pile of ISO containers.
Transfer Station – Water	No data	Up to 20,000	20,000 upwards depending on throughput	• Potential for odour at non-inert sites. Significantly reduced by being in a building with air treatment. • Potential for noise pollution. • Potential for traffic pollution from heavy vehicles.	• For biodegradable wastes best if enclosed in standard industrial type building with air control (unless using intermodal units for collection then storage of ISO containers).	• Location should take account of possible odour pollution. • Location should take account of possible noise pollution. • Could increase heavy vehicle traffic movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles.	• Convenient way of bulking materials for transport purposes – intermodal collection and transport currently being trialed which makes transfer no more than a pile of ISO containers.
Transfer Station – Hazardous Waste	No data	Up to 10,000	10,000 upwards depending on throughput	• Potential for water pollution. • Potential for odour. • Potential for noise pollution. • Potential for traffic pollution from heavy vehicles. • Safe storage of chemical wastes, depending on size may require COMAH and/or hazardous substances planning regulations.	• Stacked and palletised drums, and bulk tanks – could be housed in standard industrial type building.	• Location should take account of possible odour pollution. • Location should take account of possible noise pollution. • Could increase heavy vehicle traffic movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles.	• Convenient way of bulking materials for transport purposes – care must be taken in storage of hazardous wastes.

Civic Amenity Site	3,000 to 25,000 tpa	1,200 minimum	No data	• Potential for noise pollution. • Potential for litter. • Potential for traffic pollution from heavy vehicles.	• Split-level facility with at least 10 roll-on/off skips and vehicle parking.	• Should be located near to a centre of population to maximise usage and located to minimise the overall distance travelled by the waste. • Site should be of sufficient size for the circulation and manoeuvring of traffic within the site. • Location should take account of possible noise pollution. • Would increase vehicle traffic movements in the locality - public access and heavy vehicles. Should have good access by road to minimise congestion and reduce risk of accidents.	• Convenient way of segregating waste for recycling and composting.

Waste Treatment

Technology	Typical Capacity Range	Land Requirements m2 if < 80,000 tpa	Land Requirements m2 if > 80,000 tpa	Environmental and Public Health Issues	Visual Considerations	Locational Considerations	Other Information
Mechanical Biological Treatment	• Waste management companies / developers are seeking to deliver facilities for local authorities of 36,000 to 270,000 tpa. • Plants exist up to 400,000 tpa. • Modular units available at 60,000 tpa.	10,000	16,000 upwards	• Concerns that process could result in release to atmosphere of volatile organic compounds, ammonia, methane and heavy metals. • Acceptable release levels under controlled operating conditions would have to be demonstrated to the Environment Agency before an individual facility is licensed. • Controlled releases: no liquid process emissions; with efficient biofilters would release to air mainly CO_2 and moisture from initial biological drying. • Odours: low to medium. Odours limited by biofilters. • Noise levels anticipated to be generally low-medium as with proximity to a typical farming operation (traffic and mobile plant). • Shredding of waste could create higher noise levels. • Potential for traffic pollution from heavy vehicles.	• Unobtrusive, agricultural/industrial estate type buildings.	• Fully enclosed plant in atmosphere controlled building. Noise and odours: low to medium. Odours limited by biofilters and noise levels anticipated to be generally low-medium as with proximity to a typical farming operation (traffic and mobile plant). Shredding of waste would provide higher noise levels requiring controls. • Would increase heavy vehicle traffic movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles. • Where possible, major sites should be served by alternative modes of transport. • The Environment Agency's position on Composting and Health Effects (Environment Agency, 2001) and presumption against permitting new composting process within 250m of a sensitive receptor (unless the application is accompanied by a satisfactory site-specific risk assessment) could be a consideration.	• Modular units available at 60,000 tpa size – slight saving on land take per unit when more than one sited together so 16,000m2 area shown for two units giving 120,000 tpa capacity.
Hazardous Waste Treatment - Biological	No data	10,000	No data	• Potential for water pollution. • Risk of odour but should be eliminated through process controls. • Potential for noise pollution. • Potential for traffic pollution from heavy vehicles • Possible COMAH requirement depending on quantities stored and/or hazardous substances planning regulations.	• Sewage works type installation, tanks both enclosed and open, could be housed in an industrial type building.		
Hazardous Waste Treatment - Chemical	No data	10,000	No data	• Potential for water pollution. • Risk of odour but should be eliminated through process controls. • Potential for noise pollution. • Potential for traffic pollution from heavy vehicles • Possible COMAH requirement depending on quantities stored and/or hazardous substances planning regulations.	• Industrial process plant with palletised drums in stacks and bulk storage tanks.		
Hazardous Waste Treatment – Physical	No data	10,000	No data	• Potential for water pollution. • Risk of odour but should be eliminated through process controls. • Potential for noise pollution. • Potential for traffic pollution from heavy vehicles • Possible COMAH requirement depending on quantities stored and/or hazardous substances	• Industrial process plant with palletised drums in stacks and bulk storage tanks.		

				planning regulations.			
Incineration – Mass Burn	• Waste management companies / developers are seeking to deliver facilities for local authorities of 26,000 to 600,000 tpa. • Fluidised-bed plants are typically smaller than MBI's using moving grate technology.	30,000	30,000 to 50,000	• Technology suffers from poor public perception - perception of air quality health risks from heavy metals, dioxins and furans. • Emission releases are required to be within the standards set by the Waste Incineration Directive. Risks to public health of exposure to pollutant releases regarded as insignificant in recent NSCA report (National Society for Clean Air and Environmental Protection 2000). • Controlled releases: Waste Incineration Directive requires most stringent EU control of releases to air and water. • Low odours due to process controls. Odours from waste handling are contained within the building which is kept under negative pressure with air from the refuse storage pit area being used as combustion air in the generators. • Low-to-medium noise levels. • Potential for traffic pollution from heavy vehicles. • Small quantities of hazardous wastes generated from flue gas treatment.	• Large-scale industrial plant, totally enclosed • Chimneystack up to 90m and buildings up to 50m in height. Actual height of stack dependant on topography. • Good examples of more innovative architectural designs in mainland Europe - slowly being adopted in the UK.	• Opportunities for use of Combined Heat and Power (CHP) technology are dependent on purpose designed development or industrial processes nearby. • Low to medium noise levels and low odours due to process controls. • Waste transport movements considerable for large-scale plants. Would increase heavy vehicle traffic movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles. • Where possible, major plants should be served by alternative modes of transport.	• 50,000 m2 area will handle 250,000 tpa plant.
Hazardous Waste Incineration	No data	10,000	No data	• Air emissions well inside waste incineration directive standards. • Risk of odour but should be eliminated through process controls. • Potential for water pollution. • Potential for noise pollution. • Potential for traffic pollution from heavy vehicles. • Small quantities of hazardous wastes generated from flue gas treatment and water treatment. • Possible COMAH requirement depending on quantities stored and/or hazardous substances planning regulations.	• Industrial plant, either looks like a chemical plant or can be housed in industrial type building, with stack.		

Recycling and Composting

Technology	Typical Capacity Range	Land Requirements m2 if < 80,000 tpa	Land Requirements m2 if > 80,000 tpa	Environmental and Public Health Issues	Visual Considerations	Locational Considerations	Other Information
Windrow Composting	• Waste management companies / developers are seeking to deliver facilities for local authorities of 20,000 to 250,000+ tpa. • Can be operated on a 'micro-scale' within communities. • 1,000 to 5,000 tpa plant are exempt from WMLR criteria. • Many waste companies see <15,000 to 20,000 tpa as uneconomic on account of WMLR requirements (different for on-farm situations).	7,500 to 80,000	80,000 upwards	• Controlled releases: releases to air consist mainly of carbon dioxide and moisture during aerobic degradation. Bio-aerosols are a particular concern with open-Windrow systems and affect location of these sites. Releases to water do not generally result: any leachate arising is generally re-circulated or sent to a sewage treatment plant. • Odour levels: low to medium. • Noise levels generally low to medium as with proximity to a typical farming operation (traffic and mobile plant), but at times can be high (e.g. shredding of green waste). • Potential for traffic pollution from heavy vehicles.	• Linear rows of waste in various states of composting from as collected to brown earth like material, situated on a concrete pad – should have a water treatment plant to deal with run off. • Aesthetics: minimal impact - modern agricultural style buildings. • Windrow has a larger footprint than in-vessel. • No chimneystack.	• In its position on composting and Health Effects (Environment Agency, 2001), the Agency indicated a presumption against permitting new composting process within 250m of a sensitive receptor, unless the application is accompanied by a satisfactory site-specific risk assessment. This current 250m limit was backed by a report for the Health & Safety Executive in 2003. • Windrow may need large areas of land. • Odour levels: low to medium. Control of odours will normally be a Waste Management Licensing condition for control at the perimeter of the site, use of a biofilter can help minimise odour releases. • Noise levels generally low to medium as with proximity to a typical farming operation (traffic and mobile plant), but at times can be high (e.g. shredding of green waste). • Would increase heavy vehicle traffic movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles. • Where possible, major plants should be served by alternative modes of transport.	• 7,500m2 just sufficient space for 5,000 tonnes green waste per annum. • 80,000m2 area quoted for 80,000 tpa.
In Vessel Composting	• Waste management companies / developers are seeking to deliver facilities for local authorities of 20,000 to 250,000+ tpa. • Can be operated on a 'micro-scale' within communities. • 1,000 to 5,000 tpa plant are exempt from WMLR criteria. • Many waste companies see <15,000 to 20,000 tpa as uneconomic on account of WMLR requirements (different for on-	75 to 120,000	6,000 to 80,000 dependant on process and throughput	• Controlled releases: releases to air from in-vessel systems consist mainly of carbon dioxide and moisture during aerobic degradation. • Releases to water do not generally result: any leachate arising is generally re-circulated or sent to a sewage treatment plant. • Risk of odour and bio-aerosols but should be eliminated through process controls and containment. • Potential for noise pollution. • Potential for traffic pollution from heavy vehicles.	• Very wide range of potential visual appearances from industrial buildings with external maturation of compost product to containerised units with external pipe work; external maturation area.	• In its position on composting and Health Effects (Environment Agency, 2001), the Agency indicated a presumption against permitting new composting process within 250m of a sensitive receptor, unless the application is accompanied by a satisfactory site-specific risk assessment. This current 250m limit was backed by a report for the Health & Safety Executive in 2003. • Low-to-medium noise levels and low odours due to process controls. • Flies and vermin minimised with in-vessel system (i.e. access restricted), although this is not an issue for green waste. • Waste transport movements considerable for large-scale plants. Should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles. • Where possible, major plants should be served by alternative modes of transport.	• Large variety of options including small community or large industrial/commercial producer scale options.

	farm situation).						
Inert Recycling Facilities	10,000 to 50,000 tpa	2,000 to 9,000	9,000 upwards	• Potential for noise pollution. • Potential for dust pollution. • Potential for traffic pollution from heavy vehicles.	• Crusher, and piles of aggregate, similar to aggregate quarries.	• May be done at centralised facilities or, using mobile plant, on demolition sites as a temporary activity. • Location would need to take account of noise pollution. • Location would need to take account of dust pollution. • Would increase heavy vehicle movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles. • Where possible, major plants should be served by alternative modes of transport.	• 9000m2 plant unlikely to be needed.
Metal Recovery Facilities	No data	Up to 10,000	10,000 upwards	• Potential for water pollution. • Potential for noise pollution. • Potential for dust pollution. • Potential for traffic pollution from heavy vehicles.	• Industrial character - open crushing, chopping, and stacking of metals. • Modern facilities require industrial buildings to accommodate workshops and storage space in addition to metal processing and sorting equipment. • Vehicle de-pollution sites under ELV Directive likely to look more like a modern garage	• Location would need to take account of potential noise pollution. • Location would need to take account of potential dust pollution. • Would increase vehicle movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles.	
Anaerobic Digestion	• Waste management companies / developers are seeking to deliver facilities for local authorities of 5,000 to 100,000+ tpa. • Interest in the UK centres around 10,000 to 100,000 tpa. • Can be operated on a 'micro-scale' within communities.	2,000 upwards	26,000 upwards	• Controlled releases: no process releases to air or water. • Minimal bio-aerosol consideration on account of fully enclosed process. • Odour levels generally low as plant fully contained. Ammonia smell can result from the aeration stage of digestate treatment. • Noise levels generally low to medium as with proximity to a typical farming operation. • Flies and vermin minimised. • Potential for traffic pollution from heavy vehicles. • Health and safety issues in connection with potential explosion risks associated with combustible gas.	• Aesthetics: minimal impact - industrial/agricultural style buildings embracing modern designs. Tanks both enclosed and open, could be housed in an industrial type building with shredder for basic pre-treatment, and gas collection pipe-work and gas storage • No chimney stack • Larger plants can require digesters of 12-15m.	• Opportunities for use of Combined Heat and Power (CHP) technology are dependent on purpose designed development or industrial processes nearby. • Location would need to take account of potential odour pollution. • Location would need to take account of potential noise pollution. • Feedstock delivered by lorries. Digestate taken off-site via tanker and AD cake/aerated compost via truck. Transport could also include liquid irrigation of digestate to farmland without the need for tankers, where the biogas plant is sited on a farm. • Plant would increase vehicle movements in the locality and therefore should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles. • Where possible, major plants should be served by alternative modes of transport.	

Clean Materials Recovery Facility	• Waste management companies / developers are seeking to deliver facilities for local authorities of 5,000 to 50,000 tpa. • Can be operated on a 'micro-scale' within communities.	Depends on waste collection method – up to 14,000.	14,000 upwards	• Concerns that process could result in release to atmosphere of volatile organic compounds, ammonia, methane and heavy metals. • Acceptable release levels under controlled operating conditions would have to be demonstrated to the Environment Agency before an individual facility is licensed. • Controlled releases: no direct process regulated releases to air or water. Biofilters are seen as a low-cost and highly efficient means of controlling exhaust air and odours. • Risk of water pollution but should be controlled through process control. • Odours should be very low and controlled through process control • Noise levels are generally low to medium as with proximity to a typical farming operation (traffic and mobile plant), however more automated plants may need particular control. • Potential for traffic pollution from heavy vehicles.	• Aesthetically minimal impact: standard industrial/modern agricultural style buildings. • No chimneystack.	• Impacts on the locality would be similar to any other industrial process. • Could be co-located with other compatible waste management facilities. • Location would need to take account of potential noise pollution. • Would increase vehicle movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles – this could be achieved by locating adjacent to other, related, waste management facilities. • Where possible, major plants should be served by alternative modes of transport. Locality would need to take account of noise pollution.	
Dirty Materials Recovery Facility	• Usually of a larger scale than clean MRFs – up to 200,000+ tpa.	Up to 14,000	14,000 upwards	• Concerns that process could result in release to atmosphere of volatile organic compounds, ammonia, methane and heavy metals. • Acceptable release levels under controlled operating conditions would have to be demonstrated to the Environment Agency before an individual facility is licensed. • Controlled releases: no direct process regulated releases to air or water. Biofilters are seen as a low-cost and highly efficient means of controlling exhaust air and odours. • Risk of water pollution: plant design should include provision to collect any liquid that might drain from dirty MRFs (e.g. due to accidental egress of rainwater). In the unlikely event of leachate accumulating, this would be pumped from the collection area and transported off-site by tanker for treatment at a sewage treatment plant. • Odour levels should be low to medium at dirty MRFs requiring control of odours (normally a Waste Management Licensing condition) at the perimeter of the site and can be minimised through use of biofilters. • Noise levels are generally low-medium as with proximity to a typical farming operation (traffic and mobile plant), however more automated plants may need particular control. • Potential for traffic pollution from heavy vehicles.	• Aesthetically minimal impact: standard industrial/modern agricultural style buildings. • No chimneystack.	• Impacts on the locality would be similar to any other industrial process. • Could be co-located with other compatible waste management facilities. • Location would need to take account of potential odour pollution. • Location would need to take account of potential noise pollution. • Would increase vehicle movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents and should be located so as to minimise the overall distance travelled by vehicles – this could be achieved by locating adjacent to other, related, waste management facilities. • Where possible, major plants should be served by alternative modes of transport.	• May have long term problems with marketing recyclates.

Final Disposal

Technology	Typical Capacity Range	Land Requirements m2 if < 80,000 tpa	Land Requirements m2 if > 80,000 tpa	Environmental and Public Health Issues	Visual Considerations	Locational Considerations	Other Information
Landfill Inert	No data	Dependant on depth of fill and length of anticipated life	Dependant on depth of fill and length of anticipated life	• Potential for noise pollution. • Potential for dust pollution. • Potential for traffic pollution from heavy vehicles.	• Similar to quarries.	• Site should take advantage of existing topography so as to reduce the visual impact. • Would increase vehicle movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents. The necessity to locate these facilities in remote areas increases distance travelled by vehicles. • Where possible, major sites should be served by alternative modes of transport.	
Landfill Biodegradable	• While landfills can potentially be of any size, 50,000 to 100,000 tpa is considered to be typical for facilities in SE Wales.	Dependant on depth of fill and length of anticipated life	Dependant on depth of fill and length of anticipated life	• Potential for water pollution. • Landfill gas. • Potential for odour. • Potential for noise pollution. • Potential for dust pollution. • Potential for litter pollution. • Potential for traffic pollution from heavy vehicles. • Site may attract seagulls and other vermin.	• Similar to quarries but with added litter problems.	• Specialised geological requirements will restrict the areas suitable for landfill sites. • Site should take advantage of existing topography so as to reduce the visual impact. • Would increase vehicle movements in the locality. Should have good access by road to minimise congestion and reduce risk of accidents. The necessity to locate these facilities in remote areas increases distance travelled by vehicles. • Where possible, major sites should be served by alternative modes of transport.	• Should not be sited within 250m of occupied property.
Landfill Hazardous	No data	Dependant on depth of fill and length of anticipated life	Dependant on depth of fill and length of anticipated life	• Potential for water pollution. • Landfill gas. • Potential for odour. • Potential for noise pollution. • Potential for dust pollution. • Potential for traffic pollution from heavy vehicles.	• Similar to quarries.		

Adapted from:

O'Brien, C. (Nov 2002) *Matrix of Waste Management Technologies*, WAG Waste Strategy Unit, Cardiff

Using information from:

Crook, B., Gilbert, E., Kelsey, A., & Swan, J. (2003) *Occupational and Environmental Exposure to Bio-aerosols from Composts and Potential Health Effects - A Critical Review of Published Data* HMSO, Norwich
Devon County Council (2002) *Devon County Waste Local Plan, First Deposit Version, December 2002*, Devon County Council, Exeter
Gloucestershire County Council (2001) *Gloucestershire Waste Local Plan Revised Deposit Draft April 2001*, Gloucestershire County Council
McLanaghan, R (2002) *Delivering the Landfill Directive: The Role of New & Emerging Technologies*, Associates in Industrial Ecology, Penrith
South East Wales Waste Group (2003) *South East Wales Regional Waste Plan: Draft for Consultation, July 2003*, South East Wales Waste Group, Pontllanfraith

Appendix 9

Current Waste Arisings by Local Authority Area

tonnes

Waste Type	B Gwent	Caerphilly	Cardiff	Merthyr	Monmouth	Newport	RCT	S Powys	Torfaen	VoG	SE Wales
Municipal Waste Arisings 2001/02	48,273	108,473	167,997	36,080	51,019	75,450	128,797	34,487	56,222	70,974	**777,772**
Industrial Waste Arisings 1998/99	73,900	124,200	219,200	26,700	36,600	1,268,700	169,500	45,066	110,600	321,400	**2,395,866**
Commercial Waste Arisings 1998/99	16,400	46,700	182,000	17,600	31,700	61,800	64,200	27,724	27,100	52,700	**527,924**
Special Waste 2000/01	7,156	64,845	31,255	64,913	0	96,970	15,219	0	0	4,426	**284,783**
Construction and Demolition Waste Arisings 2000/01	120,998	289,750	556,559	94,827	148,529	235,369	407,520	124,982	152,608	208,858	**2,340,000**
Potentially Controlled Agricultural Waste Arisings 1998	139	631	187	221	4,339	604	770	10,620	230	1,367	**19,108**
Waste Electrical and Electronic Equipment Arisings 2000	1,234	2,954	5,675	967	1,514	2,400	4,155	1,274	1,556	2,130	**23,859**
Weight of ELV's 2001	2,388	6,379	11,396	1,881	4,274	5,148	8,306	3,658	3,580	5,274	**52,285**
Totals	**270,488**	**643,933**	**1,174,269**	**243,189**	**277,975**	**1,746,441**	**798,466**	**247,811**	**351,896**	**667,128**	**6,421,597**

Notes

Data from RWA Tabs 1, 13, 14, 18, 20, 23, 26, 28.

SE Wales Total in Tabs 20 & 26 split by proportion of population using 2001 Census data.

Tab 28 SE Wales Total split on the basis of Numbers of Cars and Vans in 2001 Census Key Statistics for local authorities Table KS17.

Appendix 10

South East Wales Waste Net Import by Treatment Facility Type for all Controlled Waste (tonnes per annum)

Waste Facility Type	Facility Code	B Gwent	Caerphilly	Cardiff	Merthyr	Monmouth	Newport	RCT	S Powys	Torfaen	VoG
Co-Disposal Landfill Site	A01	121,446			270,618			-33			
Other Landfill Site taking Special Waste	A02			70			-954	132,365			
Borehole	A03										
Household Commercial & Industrial Waste Landfill	A04		57,910					1,516	16,511		
Landfill taking Non-Biodegradable Wastes	A05					91					
Landfill taking other wastes	A06	1,900	1,606		5,652		71,510	5,195			14,558
Industrial Waste Landfill (Factory Curtilage)	A07						0				-15,887
Lagoon	A08										
Special Waste Transfer Station	A09	6,629	-1,399	-41			-138			-57,658	-5,133
In-House Storage Facility	A10										
Household, Commercial & Industrial Waste Transfer Stn	A11	175	-40,056	-62,043	-5,062	-32,062	4,379	0	-17,899	730	-4,678
Clinical Waste Transfer Station	A12			-36	-312		-13	-53			608
Household Waste Amenity Site	A13			0	4,059	4,273					
Transfer Station taking Non-Biodegradable Wastes	A14							1,000			
Material Recycling Treatment Facility	A15						2,618	-3			
Physical Treatment Facility	A16			10,361		166	1,676				2,651
Physico-Chemical Treatment Facility	A17							8,456			
Incinerator	A18	0									
Metal Recycling Site (Vehicle Dismantler)	A19		218	-6							
Metal Recycling Site (Mixed MRS's)	A20		-2,950	335,488				-3,788			
Chemical Treatment Facility	A21						71,524				
Composting Facility	A22										
Biological Treatment Facility	A23										
Mobile Plant	A24										
Total		**130,150**	**15,330**	**283,792**	**274,956**	**-27,532**	**150,603**	**144,655**	**-1,388**	**-56,927**	**-7,882**

Notes
Source: Table 5.3 in SLR Consulting Ltd (2003) *Waste Import and Export Study for Wales*, WAG, Cardiff
Net Import = Import - Export

Glossary of terms

Anaerobic Digestion	A natural biological process of treating **biodegradable waste** by means of bacterial action in the absence of oxygen. The process generates **digestate** and **biogas**.
Animal By-products	The EU Animal By-Products Regulation (1774/2002) states that animal by-products are the entire bodies or parts of animals, or products of animal origin, not intended for human consumption.
Best Practicable Environmental Option	The **BPEO** procedure establishes the waste management option, or mix of options, that provides the most benefits or the least damage to the environment as a whole, at acceptable cost, in the long-term as well as in the short-term (See Waste Strategy 2000, Part 2 section 3.3 for more detail).
Bio-aerosols	Airborne micro-organisms.
Biodegradable Waste	Waste that is capable of being broken down by plants (including fungi) and animals (including worms and micro-organisms).
Bio-filter	Bio-filters use moist organic materials (including compost, soil, peat, and chipped wood/wood bark) to trap the compounds in exhaust gases which then become a food source for the ecosystem living on the organic materials.
Biogas	Gas produced by **biodegradable waste** as it breaks down by biological and chemical reaction. The gas can be used as a fuel and/or in a Combined Heat and Power system.
Biological Treatment	Any biological process that changes the properties of waste (e.g. **anaerobic digestion**, **composting**). Biological treatment includes landspreading activities that are licensed.
Bring (drop-off) Recycling	**Recycling** schemes where the public bring material for recycling to centralised collection points, (e.g. bottle and can banks) at **civic amenity** sites, supermarket car parks and similar locations.
Civic Amenity	Civic Amenity waste is a sub-group of **household waste** and **municipal solid waste**, normally delivered by the public direct to Civic Amenity sites provided by the local authority. It consists generally of bulky items such as beds, cookers and garden waste as well as recyclables and ordinary dustbin waste.
Cleanstream	A registered name for Cylch's approach to managing the collection, storage, bulking, handling and onward transportation of separate, clean, uncontaminated secondary materials for **re-use** or processing. By keeping them clean in this way the recyclable materials are more useable by industry and therefore more likely to have a

	market.
Clinical Waste	Healthcare waste such as blood, tissue, needles, soiled dressings, drugs etc. which is infectious or could cause harm in some other way. It may be produced from hospitals, medical, nursing, dental, veterinary, pharmaceutical or similar practices or from home treatment, e.g. diabetes.
Commercial Waste	Waste arising from premises used wholly or mainly for trade, business, sport, recreation or entertainment, excluding **municipal waste** and **industrial waste**.
Compost Plant	A facility for carrying out **composting**. Large-scale schemes may handle kitchen and garden waste collected directly from households and **civic amenity** sites and may accept suitable waste from municipal parks and gardens.
Composting	A process where biodegradable material (such as garden and kitchen waste) is converted, in the presence of oxygen from the air, into a stable granular material which, applied to land, improves soil structure and enriches the nutrient content.
Construction and Demolition Waste	Waste arising from the construction, repair, maintenance and demolition of buildings and structures, including roads. It consists mostly of brick, concrete, hardcore, subsoil and topsoil, but it can also contain quantities of timber, metal, plastics and (occasionally) special (hazardous) waste materials.
Controlled Waste	The UK terms for wastes controlled under the Waste Framework Directive: any **household waste**, **industrial waste** or **commercial waste**.
Digestate	The solid and/or liquid residue produced by **Anaerobic Digestion**. Can be used as a fertiliser/compost.
Dioxins	A family of chemicals produced by, among other ways, the burning of plastics (PVCs) at low temperatures (less than 700^{o}C). Some are known to be carcinogenic.
Diversion	A term used to refer to avoiding disposal of waste in **landfill** and instead diverting it into other waste management methods, especially **re-use**, **recycling**, **composting** and Mechanical Biological Treatment and Thermal Treatment.
Doorstep Collection	Waste collected from the householder or business doorstep for the purposes of **re-use**, **recycling** and **composting.**
Energy Recovery	The **recovery** of useful energy in the form of heat and/or power from burning waste. Generally applied to **incineration**, but can also include the combustion of **landfill** gas and gas produced during **anaerobic digestion**.
Environment Agency	The principal environmental regulator in England and

	Wales. Established in April 1996 to combine the functions of former waste regulation authorities, the National Rivers Authority and Her Majesty's Inspectorate of Pollution. Intended to promote improved waste management and consistency in waste regulation across England and Wales.
Epidemiology	The medical and scientific study of the causes of disease and ill health.
EU Directive	A European Union (formerly EC – European Community) legal instruction, binding on all Member States but which must be implemented through national legislation within a prescribed time-scale.
Exempt facility	A waste **recovery** operation (also occasionally certain disposal at the waste producer and some storage activities) registered with, but not licensed by, the **Environment Agency**. Exempt facilities are subject to general rules (e.g. on the types and quantities of wastes received).
Hazardous Waste	See **Special Waste**. Defined by EU legislation as the most harmful wastes to people and the environment.
Household Waste	It includes domestic waste from household collection rounds, waste from services such as street sweepings, bulky waste collection, litter collection, **hazardous** household waste collection and garden waste collection, waste from **civic amenity** sites and wastes separately collected for **recycling** or **composting** through **bring** (**drop-off) recycling** schemes and **kerbside recycling** schemes.
Incineration	The burning of waste at high temperatures in the presence of sufficient air to achieve complete combustion, either to reduce its volume (in the case of MSW) or its toxicity (e.g. for organic solvents and PCBs). MSW incinerators **recover** heat and/or power. The main emissions are carbon dioxide, water and ash residues.
Industrial Waste	Waste from any factory or industrial process (excluding mines and quarries).
Inert Waste	Chemically inert, non-combustible, non-**biodegradable waste** and non-polluting waste defined in the **EU Directive** on the **Landfill** of Waste.
Integrated Pollution Control	A system introduced under Part 1 of the Environmental Protection Act, designed to ensure best available techniques not entailing excessive costs, are used to prevent, or where that is not practicable, to reduce emissions from a range of the potentially most polluting industrial processes, including some waste management facilities. Gradually being replaced with Integrated Pollution, Prevention and Control requirements under the EU IPPC Directive.

Kerbside Recycling	Collection of recyclable or compostable wastes usually from the pavement (hence the name), outside premises, including collections from commercial or industrial premises as well as from households.
Land-Use Planning	The development planning system that regulates the development and use of land in the public interest.
Landfill (Sites)	Licensed facilities where waste is permanently deposited for disposal.
Landfill Tax Credit Scheme	A Way of reducing tax liability whilst benefiting 'good causes'. If landfill operators give 20% of their tax liability to environmental projects the Inland Revenue will refund 90% of that amount to the company.
Leachate	The liquid run-off carrying polluting chemicals from waste deposited in **landfill sites**.
Licensed Site/Waste Management Facility	A waste disposal or **recovery** facility licensed under the Environmental Protection Act.
Life Cycle Assessment	The systematic identification and evaluation of all the environmental benefits and disbenefits that result, both directly and indirectly, from a product or function throughout its entire life from extraction of raw materials to its eventual disposal and assimilation into the environment. LCA helps to place the assessment of the environmental costs and benefits of these various options, and the development of appropriate and practical waste management policies, on a sound and objective basis.
Mass-Burn Incineration	The burning of the complete **waste stream** without any sorting, **treatment** or removal of materials for **recycling** and **composting**.
Materials Recovery Facility	A plant of varying scale where those materials which can be **recycled** or **composted** are separated out of unsorted waste.
Municipal Solid Waste	**Household waste** and other wastes collected by a **waste collection authority** or its contractors, such as municipal parks and gardens waste, beach cleansing waste and any **commercial waste** and **industrial waste** for which the collection authority takes responsibility.
Open-gate landfill	A **landfill** run as a commercial operation that receives waste from many waste producers.
Primary Resources	Virgin materials that have been extracted from the Earth.
Recovery	A term used to refer to the recovery of economic value from waste by separation of materials or energy.
Recycling	Involves the reprocessing of wastes, either into the same material (closed-loop) or a different material (open-loop recycling). Commonly applied to non-**hazardous wastes** such as paper, glass, cardboard, plastics and metals. However, **hazardous wastes** (e.g. solvents) can also be recycled by specialist companies, or by in-house

	equipment.
Reduction	Reducing the quantity or the hazard of a waste produced from a process. It usually results in reduced raw material and energy demands – thus also reducing costs.
Residual Waste	Waste remaining to be disposed of after re-use, **recycling**, **composting** and **recovery** of materials and energy
Restricted-User Landfill	Sometimes known as "factory-curtilage **landfill**" sites within ownership of the waste producer or restricted to specific users.
Re-use	Using materials or products again, for the same purpose, without material reprocessing (e.g. the use of returnable milk bottles).
Source Separation	The separation of materials suitable for **re-use**, **recycling** and **composting** from waste at the point where it is produced by households and businesses.
Special Waste	Defined by the Environment Protection (Special Waste) Regulations 1996 (as amended) and is broadly any waste on the European Hazardous Waste List that has one or more of fourteen hazardous properties.
Stabilised Biowaste	**Biodegradable waste** which is treated so that it is biologically stable and therefore no longer reacts to produce either **leachate** or **landfill** gas.
Stabilised Waste	Waste that has been **treated** so that it is chemically stable.
Sustainable Waste Management	Using material resources efficiently to cut down on the amount of waste produced. And, where waste is generated, dealing with it in a way that actively contributes to the economic, social and environmental goals of sustainable development.
Transfer Stations	Refuse collection vehicles deliver waste to a trans**fer station** where it is loaded onto larger lorries for transportation to **treatment** or disposal facilities.
Treatment	A catch-all term for a very wide range of physical, thermal, chemical or biological processes that change the nature of waste in some way.
Unitary Development Plan	A **land-use planning** document required by Act of Parliament to set the polices and framework for making decisions on planning applications.
Waste Collection Authority	A local authority (a district, borough or unitary) responsible for the collection of **household waste** in its area.
Waste Disposal Authority	A local authority (generally a county or unitary) responsible for the management of the waste collected and delivered to it by constituent collection authorities. The processing and/or final disposal of the waste is usually contracted to the private sector waste

	management industry.
Waste Management Industry	The business involved in the collection and management of waste.
Waste Management Licensing	The system of permits operated by the **Environment Agency** under the Environmental Protection Act to ensure that activities authorised to **recover** or dispose of waste are carried out in a way which protects the environment and human health.
Waste Stream	A way of classifying waste according to its source and nature.
Waste Transfer Station	A waste management facility to which waste is delivered for separation or bulking up before being removed for **recovery** or disposal.

Glossary of acronyms

AD	Anaerobic Digestion
BPEO	Best Practicable Environmental Option
BMW	Biodegradable Municipal Waste
C&I	Commercial & Industrial
C&D	Construction & Demolition
CHP	Combined Heat and Power
COMAH	Control Of Major Accident Hazards
DTLR	Department for Transport, Local Government and the Regions.
EIA	Environmental Impact Assessment
ELV	End of Life Vehicle
EU	European Union
HIA	Health Impact Assessment
HWRC	Household Waste Recycling Centre
ISO	International Organization for Standardization
IT	Information Technology
MBT	Mechanical Biological Treatment
MRF	Materials Recycling Facility
MSW	Municipal Solid Waste
NAW	National Assembly for Wales
NSCA	National Society for Clean Air and Environmental Protection
PCB	Polychlorinated Biphenyls
ODPM	Office of the Deputy Prime Minister
RDF	Refuse Derived Fuel
RRR	Recycling, Reuse & Recovery
RWP	Regional Waste Plan
SEA	Strategic Environmental Assessment
SWMA	Strategic Waste Management Assessment
TAN	Technical Advice Note
TPA	Tonnes Per Annum
UDP	Unitary Development Plan
WEEE	Waste Electrical & Electronic Equipment
WISARD	Waste: Integrated Systems Analysis for Recovery and Disposal
WMLR	Waste Management Licensing Regulation

South East Wales Regional Waste Plan

Blaenau Gwent CBC
Brecon Beacons National Park Authority
Caerphilly CBC
Cardiff CC
Merthyr Tydfil CBC
Monmouthshire CC
Newport CC
Powys CC
Rhondda Cynon Taf CBC
Torfaen CBC
Vale of Glamorgan CBC

Campaign for the Protection of Rural Wales (CPRW)
CBI Wales Environment Committee
Countryside Council for Wales (CCW)
Environment Agency Wales
Institute of Waste Management
National Association of Waste Disposal Officers (NAWDO)
School of Engineering, Cardiff University
South East Wales Economic Forum (represented by WDA)
The Wales Environment Trust (WET)
Wales Community Recycling Network (Cylch)
Waste and Resources Action Programme (WRAP)
Welsh Assembly Government (WAG)
Waste Policy Support Unit
Welsh Development Agency (WDA)
Welsh Environmental Services Association (WESA)