Pembrokeshire County Council
Local Development Plan (to 2021)

Waste Planning Background Paper

Development Plans

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Table of contents

Section	*Page*
Table of contents	2
Introduction	2
Section A – The current legislative position, strategic framework and implications for Local Authority municipal waste management	5
Section B – Energy from Waste – an overview of the technological options	10
Section C – Inter-authority collaboration on waste planning	12
Section D – Summary of the facilities required	12
Appendix 1 – Municipal waste collected for recycling / composting	15
Appendix 2 – Detail of technological options	18
Appendix 3 – Waste facilities in Pembrokeshire (2008)	22

Introduction

1 This background paper examines the current issues affecting waste planning, focusing on the implications for Pembrokeshire and indicating some possible directions for Local Development Plan (LDP) policies and proposals. The South West Wales Regional Waste Plan, First Review (2008) is published separately as a background paper and this paper seeks to supplement / update that review and to provide background information specific to the plan area.

2 Planning Policy Wales Edition 3 (PPW3) requires Local Planning Authorities, in preparing LDPs, to have regard to the national waste strategy and to ensure that LDP policies to facilitate the delivery of the waste management objectives in the Waste Strategy for Wales, as well as meeting the obligations required by European legislation, including the identification of sites for waste facilities or areas where such facilities may be suitable.

3 PPW3 also says that Development Plans should show that consideration has been given to any Regional Waste Plan, together with any waste management and recycling plans relevant to its area.

4 A further requirement of PPW3 is that policies proposing major development should incorporate adequate and effective waste management facilities.

5 Elaborating on these points, Local Planning Authorities are required by the EC Framework Directive on Waste to make provision for establishing an integrated and adequate network of waste disposal installations. PPW3 identifies a general requirement (which affects but is not exclusive to Local Planning Authorities) to ensure that waste is recovered or disposed of without harming the environment, without causing a nuisance through noise or odours and without adversely affecting the countryside or places of special interest.

6 PPW3 explains that the approach taken to waste management is based on a hierarchy of reduction, re-use and materials recovery (including recycling and composting), energy recovery with effective use of waste heat and finally safe disposal. Landfill and landraising are the least desirable options and the Council is actively seeking to minimise the amount of waste disposed of in this manner. There is an increasing emphasis on reduction, re-use and recovery and progressively less reliance on disposal without recovery. Local Planning Authorities are expected to consider the Best Practicable Environmental Option to the management of waste, although this will be site-specific and subject to local circumstances and will often be supplemented by an assessment of the most Sustainable Waste Management Option (SWMO), the latter also taking account of social and economic impacts.

7 PPW3 expects waste to be managed or disposed of as close to its point of generation as possible. This is known as the proximity principle and is applied on a regional basis in Wales. Therefore as far as is practicable, waste should not be exported to other regions; in the case of Pembrokeshire, management and disposal should therefore occur in the South West Wales region. Where movement of waste is necessary, PPW3 advocates use of rail and water rather than road wherever economically feasible.

8 The Council's LDP will set out policies and proposals for the plan area (Pembrokeshire excluding the National Park). These will respond to the requirements of the Waste Strategy for Wales, European legislation and the South West Wales Regional Waste Plan, the first review of which was published in August 2008. PPW3 expects each Local Authority to consider what facilities are required to manage all waste streams generated within its area but acknowledges that some facilities need to be shared (with facilities for managing special or clinical waste quoted as an example).

9 Waste planning in Wales has a strong regional component to it, reflected not just through the preparation of Regional Waste Plans but also through the Welsh Assembly Government's Waste Infrastructure Procurement Programme and through regional consortium procurement of new waste treatment facilities (for instance large anaerobic digesters). One of the implications of taking a regional approach to the provision of waste facilities is that the requirements any particular LDP area may be met in part or whole within another LDP area of the same region.

10 The possibility of merchant facilities being proposed by the private sector independently from the regional procurement process cannot be discounted either. Hence LDPs should have a policy framework in place which facilitates the evaluation by the Local Planning Authority of any such proposals coming forward on unallocated sites. Should merchant facilities be provided outside an LDP area (but preferably within the same region), these may be able to contribute to the handling and treatment of waste generated in the plan area. Likewise, merchant facilities within a plan area may contribute to meeting waste management and disposal requirements of other areas (again, preferably those within the same region).

11 This background paper presents information on various aspects of waste planning and provides a context for the development of an appropriate policy approach in the Council's LDP. The paper has four sections, discussing A) the current legislative position and strategic framework, B) energy from waste – an overview of the technological options, C) inter-authority collaboration on waste planning and D) the waste facilities that might need to be provided in the Council's LDP area.

Section A

The current legislative position, strategic framework and implications for Local Authority municipal waste management

The current Legislative Position

12 A broad range of international agreements, EU Directives and domestic legislation impacts on how waste management decisions are made and how facilities must be operated.

13 The key drivers affecting municipal waste management are:

- **Article 5 of the European Council Directive (1999/31/EC) on the Landfill of Waste**; and
- The revised **Waste Framework Directive 2008/98/EC**.

Each of these is discussed below, with links to other important documents and a summary of the requirements of the newly published **Waste Strategy for Wales – towards Zero Waste**.

14 Article 5 of the European Council Directive (1993/31/EC) on the Landfill of Waste (often referred to as the EC Landfill Directive) is transposed into UK law in the Waste and Emissions Trading Act which is implemented in Wales through the Landfill Allowances Scheme (Wales) Regulations 2004.

15 The EC Landfill Directive sets mandatory targets which, for the UK, require the following:

- By 2010 to reduce biodegradable municipal waste (BMW) landfilled to 75% (by weight) of that produced in 1995;
- By 2013 to reduce BMW landfilled to 50% (by weight) of that produced in 1995; and
- By 2020 to reduce BMW landfilled to 35% (by weight) of that produced in 1995.

16 The Landfill Allowances Scheme (Wales) Regulations set targets for the tonnage of biodegradable municipal waste each Local Authority in Wales can send to landfill. Pembrokeshire's targets are set out in Table 1, below:

Table 1: Landfill Directive Targets for BMW to Landfill

Year	*BMW Allowance (tonnes)*
2007/08	34278
2008/09	31879
2009/10	29481
2010/11	26126
2011/12	22809
2012/13	19491
2013/14	18662
2014/15	17832
2015/16	17003
2016/17	16173
2017/18	15344
2018/19	14515
2019/20	13685

17 The revised Waste Framework Directive 2008/98/EC lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use.

18 EU Member states are required to bring into force by 12 December 2010 the laws, regulations and administrative provisions necessary to comply with the revised Waste Framework Directive. The Welsh Assembly Government (WAG) is responsible for the transposition of these provisions in Wales and has produced a Waste Strategy for Wales – towards Zero Waste in accordance with the Directive's requirements.

19 Under newly devolved powers[1], the proposed Waste (Wales) Measure 2010 was laid before the National Assembly for Wales on the 22nd February 2010. The proposed measure makes provision to reduce the amount of waste and litter in Wales and provides for a more effective system of waste management. There are two proposals in particular within the proposed Measure that will have a significant impact on Local Authority municipal waste management. These are:

- Statutory municipal waste targets, with financial penalties for non-compliance; and

- Provision of powers to Welsh Ministers, enabling them to ban or restrict the disposal of specified waste[2] to landfill.

20 This will have a significant impact on sorting facilities, bulking-up points / transfer stations and re-processing / re-use facilities required within the County, as a consequence of more materials being extracted from the residual waste stream.

The strategic framework

21 The Waste Strategy for Wales - towards Zero Waste was published in June 2010. To support the Strategy, a series of Sector Plans will be prepared, which will describe how the outcomes, targets and policies set out in 'Towards Zero Waste' will be delivered. One of these will be a Sector Plan for Municipal Waste Collected by Local Authorities. This will be issued in two parts, the first of which will be issued in late 2010 and the second in 2012. The second part will address outstanding issues arising from the EU Waste Framework Directive.

22 The Waste Strategy for Wales – Towards Zero Waste, sets new targets relating to Municipal Waste. These build on, but are tougher than, those in the earlier document Wise about Waste (the National Waste Strategy for Wales, 2002), which set minimum recycling and composting targets for Municipal Waste that every Local Authority in Wales was required to deliver in compliance with EU Waste Directives. The earlier document required at least 40% recycling / composting, with a minimum of 15% composting (with only compost derived from source segregated materials counting) and 15% recycling, by 2009/10. The new targets will include the creation of a new waste stream for source segregated food waste and a 70% reuse / recycling / composting target which must be achieved by 2024/25. The details of the new targets are set out in Table 2, below.

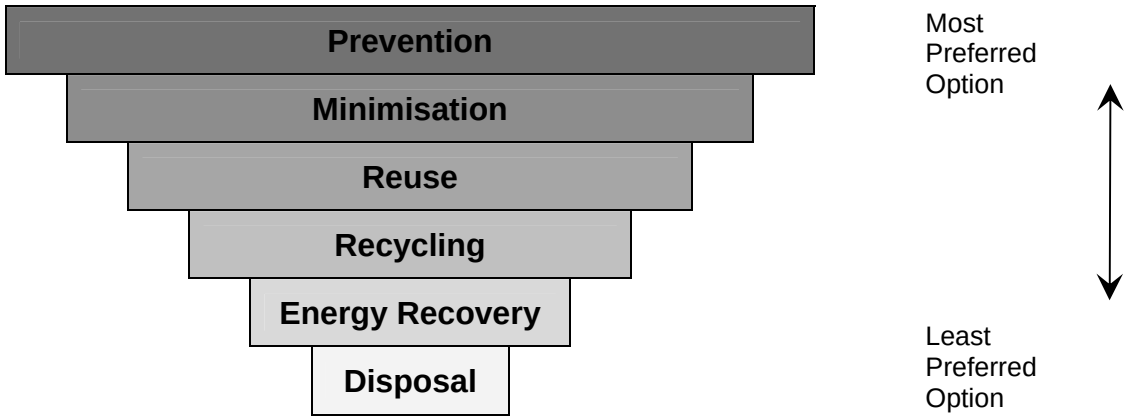
[1] The National Assembly for Wales (Legislative Competence) (Environment) Order 2010 has conferred the National Assembly for Wales with legislative competence to make primary legislation (known as 'Assembly Measures') in respect of waste.
[2] Likely to be food waste, green waste, paper / card, textiles, wood, glass, metals, plastics and finally waste electrical and electronic equipment (WEEE).

Table 2: Summary of revised municipal waste targets set out in the Waste Strategy for Wales – towards Zero Waste

TARGET FOR EACH INDIVIDUAL LOCAL AUTHORITY:	*TARGETS FOR EACH TARGET YEAR*				
	09-10	*12-13*	*15-16*	*19-20*	*24-25*
Minimum levels of reuse and recycling / Anaerobic Digestion (or composting) The Welsh Assembly Government will consult on proposed minimum levels of composting (or Anaerobic Digestion) of source separated food waste from kitchens in their municipal sector plan	40%	52%	58%	64%	70%
Minimum proportion of reuse/recycling/ composting that must come from source separation (kerbside, bring site and / or Civic Amenity Site)	80%	80%	80%	80%	80%
Maximum level of energy from waste (net)	-	-	42%	36%	30%
Maximum level of landfill	-	-	-	10%	5%
Minimum levels of reuse (excluding Waste Electrical and Electronic Equipment) The Welsh Assembly Government proposes to undertake research with a view to building on this target in the municipal waste Sector Plan.		0.4%	0.6%	0.8%	1.0%

23 The Waste Strategy for Wales follows the principles of the waste hierarchy set out in PPW3 and also earlier in this paper. Figure 1, below, is a diagrammatic explanation of this:

Figure 1 – the Waste hierarchy



24 The Waste Strategy for Wales also aims to reduce Wales' ecological footprint from waste to that set out in the Welsh Assembly Government's document One Wales: One Planet. To do this, there is a need to focus on waste reduction (i.e. generating less waste in the first place) and more sustainable ways of consuming and producing.

The implications of the proposed Waste Strategy for Wales on municipal waste management

25 Whilst there is adequate in-County provision for landfill disposal, there is a requirement for enhanced environmentally-beneficial collection and treatment facilities to meet the Welsh Assembly Government's targets and reduce the County's ecological footprint. The latter could be achieved through measures such as:

- Provision of one or more food waste treatment facility (which could be a regional treatment facility).
- Provision of an 'Energy from Waste' facility (EfW) (which could be a regional facility).
- Provision of windrow green waste composting facilities.
- Provision of transfer stations for bulking up of materials – such as food, residual waste for an EfW facility, dry recyclate and WEEE.
- Provision of an improved facility to replace or supplement the Tenby civic amenity site.

- The expansion and improvement of other civic amenity sites.

- Provision of reprocessing and reuse facilities.

26 For information, a table showing the quantity of municipal waste collected for recycling / composting in Pembrokeshire for 2008/09 is presented in Appendix 1.

Section B

Energy from Waste – an overview of the technological options

27 A detailed scoping study was prepared by Pembrokeshire County Council during 2007 (with inputs from Price-Waterhouse-Coopers, Entec, RPS and the Environment Agency), to identify options for dealing with residual waste. The study, titled 'Scoping Study into the Use of Energy from Waste (EfW) Technology for Disposing of Residual Waste', examined the waste management treatment options for biodegradable municipal wastes arising in in Pembrokeshire, Ceredigion and west Carmarthenshire and was funded by the Welsh Assembly Government. Nine waste treatment options were initially considered of which seven received further assessment to a greater level of detail.

28 Subsequently, the Welsh Assembly Government has published its Waste Strategy for Wales – towards Zero Waste and this has resulted in the creation of a new waste stream for source-separated food waste which has to be accounted for separately in future proposals.

29 A summary of the main findings of the Scoping Study referred to in paragraph 27 is presented below. Although it was prepared before the Waste Strategy for Wales – towards Zero Waste, the conclusions remain valid.

30 The approach taken to the appraisal of options for residual waste treatment technologies took account of guidance presented in the following documentation:

- *'A Practice Guide for the Development of Municipal Waste Management Strategies',* DEFRA, 2005

- *'Strategic Planning for Sustainable Waste Management: Guidance on Option Development and Appraisal', ODPM, 2002*

- *'European Commission Strategic Environmental Assessment Directive 2001/42/EC'*

- *'Planning Policy Statement 10: Planning for Sustainable Waste Management'*, ODPM, 2005

- *'Sustainability Appraisal of Regional Spatial Strategies and Local Development Documents',* ODPM, 2005

  (The last two documents relate specifically to the England)

31 The study undertook mathematical modelling of municipal waste systems in west Wales, researched various technologies and was augmented by site visits to various facilities. Environmental aspects of the processes were considered through a lifecycle analysis using the WRATE[3] tool (see below). All site evaluations were documented.

32 Nine initial options were considered. One of these was for a 'do nothing' scenario, two were not evaluated because of lack of reliable data and the remaining six were considered in some detail. A short narrative on each option is presented in Appendix 2.

33 Some of the emerging technologies (pyrolosis and gasification) show promise as residual waste treatments, but there is no data to support the use of these options on a commercial scale to deal with unsorted municipal residual waste. Consequently, there would be a significant risk associated with an investment in these technologies.

34 In the original report anaerobic digestion was recognised as being an effective treatment for source separated food wastes, but it was considered unwise to create new waste streams as this had the potential to reduce the viability of establishing an EfW facility based on modern incineration technology. However, the option to utilise incineration as the single solution for all residual wastes is no longer available and hence the initial conclusions of the study have been slightly modified. These are that:

- Anaerobic Digestion is the most suitable form of treatment for source-separated food wastes; and

- Incineration is the most effective treatment option for the remaining residual wastes.

[3] WRATE is a software package designed to predict the environmental impact of waste management initiatives. The purpose of the software is to assess all environmental aspects of the differing waste management options and strategies during their whole lifecycle – collection, disposal and treatment. Developed in accordance with ISO 14041 on lifecycle assessment, the software enables the analysis of different options, to conform to a high and verifiable technical standard.

35 It is unlikely that either of these options will be cost-effective for the Authority working in isolation and hence will probably be provided in partnership with other organisations, on a regional basis.

Section C

Inter-authority collaboration on waste planning

36 With an identified need for the establishment of new treatment facilities which would cost millions of pounds to develop, it is increasingly important for authorities to work together to develop new infrastructure. In west Wales (as in mid and north Wales) authorities do not generate sufficient waste arisings to make individual residual waste treatment facilities financially viable.

37 Such realities will inevitably lead to significantly increased waste miles as the required scale of facilities draws in material from a wider area, and scarcity of resource has already had a major impact on some authorities as is the case for example with Swansea forced to transport waste across south Wales when its own landfill became unavailable.

38 The Welsh Assembly Government is providing funding for the establishment of new waste facilities. This is channelled through procurement hubs, where several authorities work together to procure the necessary infrastructure. In other words, funding supports a collaborative approach to the provision of shared waste facilities. Hence, there is no funding available for authorities working in isolation.

Section D

Summary of the facilities required

39 It is difficult to predict future requirements for waste treatment facilities because technology, legislation and guidance have all rapidly changed and are likely to continue to do so. In particular, new legislation (such as the recently introduced statutory requirement to arrange for the separate collection of food wastes) has created new, previously unconsidered, requirements.

40 There will be a requirement for an anaerobic digester to deal with source-separated food wastes. A further requirement will be for a residual waste treatment facility. The regional procurement exercise should lead to the rapid resolution of the anaerobic digestion issue in west Wales. The procurement documents for anaerobic digestion nominate sites at Nant y Caws and Velindre (neither of which is in Pembrokeshire). For residual treatment, the multi-national company Covanta is proposing the establishment of a facility at Merthyr Tydfil which would accept residual waste from across south and west Wales (including Pembrokeshire), with material transported to the facility by rail. However, there is no planning permission for this at present.

41 There is potential to establish an 'Energy from Waste' facility in the County and this would probably need to be located close to an end-user for the energy created – in other words, a major existing industrial facility.

42 In-building facilities for waste processing may be required in the future. Where such demand arises, it is best directed to existing use class B2 employment sites (including some major industry sites), several of which exist in the County, but subject to such proposals being acceptable in terms of the nature of the processes undertaken, the products of those processes and the likely impacts on neighbours and the local environment. This is because 'advances in technology, together with the introduction of new legislation, policies and practices, mean that many modern waste management / resource recovery facilities appear no different from any other industrial building and on the inside contain industrial processes or energy generation activities that are no different to many other modern industrial processes in terms of their operation or impact' (South West Wales Regional Waste Plan, 1st Review, August 2008, paragraph 11.1.1).

43 Detailed information on the methods available for managing waste are presented in Chapter 6 of the Regional Waste Plan, 1st Review, for example recycling, composting, mechanical biological treatment (including anaerobic digestion), mechanical heat treatment, energy from waste (incineration with energy recovery and including three conventional incineration forms, pyrolysis and gasification) and (although no longer the preferred management option in Wales) landfill. Chapter 6 of the Regional Waste Plan 1st Review includes summaries of the methods used for waste treatment and the products generated by those activities.

44 There are some Pembrokeshire-specific requirements for new and upgraded civic amenity, household waste recycling and waste management facilities, to meet locally generated needs. It is also possible that other specialist public and private sector organisations, like FRAME, may wish to establish new enterprises within the County.

45 In summary:

- The procurement of a new Anaerobic Digester to meet regional needs is underway, but it is unlikely to be located in Pembrokeshire (and hence a Pembrokeshire LDP allocation is unlikely to be needed);

- There is a possibility that a major company operating outside the County (and maybe outside the region) may establish a new facility for treatment of residual waste, with such waste being transported out of the County from a dedicated railhead;

- There is potential to develop an Energy from Waste facility in Pembrokeshire, linked to a major energy user (and hence an LDP allocation may be needed);

- In-building facilities may be required for waste processing and these are often most appropriately located on existing class B2 employment sites (these should be identified by the LDP); and

- Some new and extended facilities (civic amenity / household recycling / waste management) are likely to be required within Pembrokeshire, to meet local needs (these should also be identified by the LDP).

46 The bulleted list, above, sets out the broad requirements that the Council's LDP will respond to. However, because of the uncertainties involved, it is also desirable that the Council's LDP includes criteria-based policies to allow evaluation of proposals for waste facilities on unallocated sites. These might be needed in the event of the regional procurement process or local waste management requirements moving in an unexpected direction with regard to selection of site(s) and also to address the possibility that merchant facilities (those proposed by the private sector) might be put forward independently from the regional procurement process.

47 For information, the permitted waste facilities in Pembrokeshire (2008) are set out in Appendix 3.

Appendix 1 - *Table setting out the quantity of municipal waste collected for recycling / composting by source (tonnes):*

Pembrokeshire 2008-09									
Quantity of municipal waste collected for recycling / composting by source (tonnes)									
	Kerbside schemes	Civic amenity sites	Bring sites	Private and voluntary collections	Non-household recycling	Total municipal recycling	Domestic refuse residual	Trade refuse residual	Civic amenity site residual
Green glass		239	981			1,220			
Brown glass		179	372			551			
Clear glass		318	868			1,186			
Mixed glass					155	155			
Paper	3,964	269	764	3	109	155			
Card	1,392	430			24	1,846			
Books		17	10			27			
Steel cans	470	20	30			520			
Aluminium cans	64	3	4			71			
Plastics	727					727			
Textiles and footwear		50	220			270			
Green waste only		4,577			1,729	997			
Wood		2,679				2,679			
Furniture		4		223		228			
Rubble		3,497			584	2,906			

Pembrokeshire 2008-09									
Quantity of municipal waste collected for recycling / composting by source (tonnes) (continued)									
Fridges and freezers		241				241			
Other electrical goods		602				602			
Other white goods		403				403			
Other scrap metal		1,099				1,099			
Fluorescent tubes		6				6			
Aluminium foil	18					18			
Automotive batteries		36				36			
Non-automotive batteries		4				4			
Vegetable oil		7				7			
Mineral oil		24				24			

Pembrokeshire 2008-09									
Quantity of municipal waste collected for recycling / composting by source (tonnes) (continued)									
Paint		79				79			
Other materials		41				41			
Food / kitchen					5	5			
TOTALS	6,635	14.823	3,249	226	2,607	16,102	29,498	3,928	9.063

Appendix 2 – detail of the technological options

Option 0 – 'Do Nothing' Scenario

This option was considered for assessment purposes only. It assumes that levels of current recycling, composting and landfill remain fixed. This option was used as a basis for comparison between the status quo and the effects that the different waste management options would produce. It was not intended that this scenario would be implemented, but it was considered important to provide a baseline against which other options could be compared.

Option 1 – Maximising Existing Service

This option was evaluated as a stand-alone scenario but was also a generic aspiration for further options 2-6, specifically for maximising source segregated recycling and increasing composting. This option actively engages with the Welsh Assembly Government's aspirations, as expressed in the Waste Strategy for Wales – towards Zero Waste.

When modelled as a stand alone option it showed increased diversion of material from landfill. But sole reliance on maximising existing services would not allow the Authority to meet future targets.

The evaluation of the other scenarios based on differing technologies (scenarios 2-6) is predicated on maximising current recycling and composting initiatives.

Option 2 – MBT > Pyrolysis

This option modelled residual waste managed via a Mechanical / Biological (MBT) process with consequential Refuse Derived Fuel (RDF) treated at a pyrolysis plant. The MBT process is based upon a generic process from WRATE:

- *11088 MBT dry stabilisation & RDF GENERIC process.* [4]

Under this scheme a facility receives mixed municipal solid wastes and mechanically sorts the material before biologically stabilising it. The residual fraction (RDF) has a high calorific value ready for thermal treatment. This feedstock is then processed by a pyrolysis plant:

[4] The bulleted numbers in the text are references to the technology options selected from WRATE for analysis

- *21224 Pyrolysis (RDF Only) Compact Power process*

It is assumed that the MBT plant is built on the same site as the pyrolysis plant and that there is therefore no transport element to assess. It also assumed that all non-hazardous bottom ash will be recycled as an aggregate substitute, with all remaining residues being disposed of to landfill.

The technology shows some promise as a treatment option but a lack of long–term data on the operation of commercial-scale facilities for processing municipal solid wastes creates significant uncertainty. Hence this option poses a higher risk than some of the other choices. Data obtained also shows that it will be far more costly to treat municipal solid wastes using this process, in comparison with some of the other options.

Option 3 – MBT > Gasification

This scenario is similar to Option 2, but instead of utilising pyrolosis for the disposal of the RDF it uses gasification technology. In this instance the scheme utilises the same generic MBT process to create RDF from mixed municipal wastes, followed by treatment at a gasification facility:

- *11268 Gasification (RDF only) Energos process*

It is assumed that the MBT plant is built on the same site as the gasification plant and that there is therefore no transport element to assess. It is also assumed that all non-hazardous bottom ash will be recycled as an aggregate substitute, with all remaining residues being disposed of to landfill.

As with pyrolosis, this technology shows some promise as a treatment option but again the lack of long–term data on the operation of commercial-scale facilities for processing municipal solid wastes means that this option poses a higher risk than some of the other choices.

If the long-term reliability of this technology can be proved then it will provide one of the cheaper disposal options.

Option 4 – MBT > Landfill

The management of waste is through MBT and creates low grade compost. The process is based upon an MBT anaerobic digestion (AD) composting process from WRATE:

- *20216 MBT AD & low grade compost Global Renewables process*

Under this scheme a facility receives mixed municipal solid wastes and mechanically sorts the material before it is biologically stabilised. The residual fraction (RDF) is then landfilled as no thermal treatment option has been proposed to treat it.

It is assumed that all composted waste, along with any rejects from the process, is disposed of to landfill. A landfill with clay liner and clay cap has been modelled.

All options relying heavily on landfill perform badly, because of the increasing cost of sending waste to landfill. Gate fees for landfill are increasing above the rate of inflation and step changes in the level of taxation imposed on landfill mean that within a short time this option will be significantly more expensive than other forms of disposal or recovery.

Option 5 – Incineration

This option was modelled using data for a high level thermal treatment plant – the Chineham incinerator modelled within WRATE:

- *12300 Incinerator medium power – Chineham*

This particular example was selected as it utilises heat as well as electricity. No pre-treatment is required for this process and all ferrous metal recovered from the process is recycled. The scenario is modelled on the assumption that all bottom ash will be sent to landfill. However there is also an option for this ash to be used as an aggregate substitute.

Incineration is a well-understood technology with a clear functionality and a good track record for reliability. Process control of incineration is high and it guarantees complete stabilisation of bio-degradable waste. It also provides the most cost effective option for the disposal of residual waste.

Option 6 – Anaerobic Digestion

The management of residual waste within this option is through high levels of biological treatment of the waste, using the process of Anaerobic Digestion (AD). Specialised AD facilities treat source-separated waste and hence the separate collection of kitchen waste (food waste) is an assumption of modelling. The technology that has been used in this option has been taken from the WRATE model:

- *11036 AD Small low solid Greenfinch Process*

Biogas production from the process is offset against the electricity production within the marginal project energy mix. The resulting compostable material from the process is sent for compost use. It is envisaged that the use of this compost might be by the agricultural industry in Pembrokeshire, if outlets can be found. Experience from the Greenfinch project indicates that this would not generate any income and also that there would be costs incurred in transporting the material to the disposal point.

AD is relatively cheap to operate in comparison with most of other options, although there is still a significant price advantage to using incineration. The additional expense incurred with AD is mainly attributable to the costs associated with collection of the material.

AD offers the prospect of high diversion rates for source-separated food waste, although there can be difficulties in finding outlets for the residues. However, when unseparated municipal solid wastes are processed, the resultant material has no horticultural or agricultural value and all the material is therefore sent to landfill.

Because AD only targets a fraction of the municipal waste stream (albeit that food waste is a significant fraction), the remaining material will remain untreated. Hence while the Authority may be able to meet short to medium term targets, but is unlikely to meet longer term goals.

Option 7 – Autoclave > Pyrolysis

The analysis of this option was not undertaken, because there is a lack of reliable data on the autoclave process.

Option 8 – Autoclave > Gasification

The analysis of this option was not undertaken, because there is a lack of reliable data on the autoclave process.

Appendix 3 – waste facilities in Pembrokeshire (2008)

PPC No	*Facility type*	*Site name*
34113	Physical treatment	Merlins Bridge Waste Treatment Works
34120	Landfill	Solbury Mountain (NW of Tiers Cross)
34122	Civic Amenity Site	Waterloo Recycling Centre, Pembroke Dock
34125	Civic Amenity Site	Tenby Civic Amenity Site
34160	Civic Amenity Site	Hermon Civic Amenity Site
34161	Civic Amenity Site	St. Davids Civic Amenity Site
34162	Civic Amenity Site	Manorowen Civic Amenity Site
34163	Civic Amenity Site	Winsel Civic Amenity Site, near Merlins Bridge
34213	Non-hazardous waste transfer	Thomas Brothers Skips, Waterston
34219	Non-hazardous waste transfer	Enviroventure Waste Solutions Recycling Centre, Carew Airfield
34221	Non-hazardous waste transfer	Manian Fawr, near St. Dogmaels
34274	Non-hazardous waste transfer	Greenacres Skip Hire, Dinas Cross and Celtic Link Business Park, Scleddau
34280	Material Recycling Facility (MRF)	A J Recycling Ltd, Meigan Wells, near Eglwyswrw
34295	Material Recycling Facility (MRF)	Material Recycling Facility (SITA), Withyhedge
34229	Car breaker	Halfway Motor Spares, Johnston
34246	Car breaker	Carew Car Dismantlers, Carew Airfield
XP3830UR	Cheese producer	Haverfordwest (Merlins Bridge) Creamery (cheese factory)
---	Landfill	Withyhedge Landfill, Rudbaxton
---	Landfill	Dredgman Hill, near Haverfordwest

Notes:

- Haverfordwest Creamery (First Milk / Dairy Crest) at Merlins Bridge is a PPC-permitted installation and not strictly a waste facility.
- Other waste facilities also exist, operating under waste exemptions rather than a waste management licence. There are many such sites in Pembrokeshire. Exemptions arise when agreement is reached with the Environment Agency Wales to import material without the need for a waste management licence.