9. POLICY DEVELOPMENT

The principal aim of the Waste Management Plan for South East Region is to ensure that both European and National waste management policies are achieved. In the preparation of this Plan different waste management scenarios were reviewed.

This section of the plan outlines the scenarios that were examined with the aim of determining the most comprehensive waste management solution for MSW arisings in the South East Region. The scenarios consist of components (different waste management techniques) which are part of an overall integrated waste management system. In each scenario, all organic waste and dry recyclables collected are processed in the same manner. The variation between the scenarios relates to the different options considered for the treatment of the residual waste component.

9.1. Waste Management Scenarios

In the Joint Waste Management Plan for the South East Region (2002), four scenarios were defined and these covered the entire range of waste management options. These scenarios were:

Scenario 1 Zero Waste to landfill
Inspired by the general wish to avoid landfilling and based on very high recycling rates. When the integrated biological treatment facilities are in place, the collection system is expanded to a three-bin system for the entire region. Dry material recovery facilities are required.

Scenario 2 Waste Treatment and Residual to Landfill
Quite similar to scenario 1. However, the recycling rates have been reduced compared to scenario 1 to more realistic and achievable rates. Scenario 2 also requires a three-bin system.

Scenario 3 Thermal Treatment Scenario
This scenario requires a thermal treatment facility. In this scenario the two-bin collection system is maintained for the entire period of the plan. This means that organic waste, which is not home composted, will go into the bin with residual waste and is disposed of by thermal treatment.

Scenario 4 Full Range Treatment Scenario
This scenario is a combination of scenario 2 and 3 and is an integrated waste management approach including biological treatment, dry materials recovery, and thermal treatment. The two-bin system has been maintained for the rural areas for the entire period of the plan, whereas an additional bin for organic waste will be required in urban areas, when the integrated facilities are in place.

Scenario 4 was considered to be the most appropriate waste management system after environmental, financial and resourcing impacts were assessed. This review resource compares thermal treatment with waste recovery/stabilisation options (for residual work) such as mechanical biological treatment (MBT). The four waste management scenarios being examined for this review process for the South East are:

Scenario 1: full recycling/recovery with residual to landfill only
Scenario 2a: full recycling/recovery with residual to a Mechanical Biological Treatment (MBT) facility and thermal treatment
Scenario 2b: full recycling/recovery with residual to MBT facility and landfill
Scenario 3: full recycling/recovery with residual to thermal treatment and landfill

9.2. Scenario Components

The following phrases and acronyms are used in the discussion of the waste management scenarios:

Full recycling/ recovery- This applies to the dry recyclables bin (bin 1) and the organic bin (bin 2). Dry recyclables are recovered in a MRF and organic wastes are composted for beneficial re-use.

Residual waste (bin 3) is the waste fraction remaining after removal of dry recyclables and organic material from the waste stream at source.

The scenarios consider the three main components to municipal waste, which are:

- household
- commercial
- industrial

The four scenarios are identical as regards waste collection systems (3-bin collection system). Materials which are collected from the three bin system, the network of bring centres and recycling centres will be processed as follows:

Dry Recyclable Collection

Recyclable materials will be recovered in a dry Material Recovery Facility (MRF). Sorting equipment and or picking lines will separate the waste into paper, cardboard, ferrous metals, non-ferrous metals and plastic fractions.

Organic Waste Collection

The organic fraction of MSW will be biologically treated for beneficial reuse.

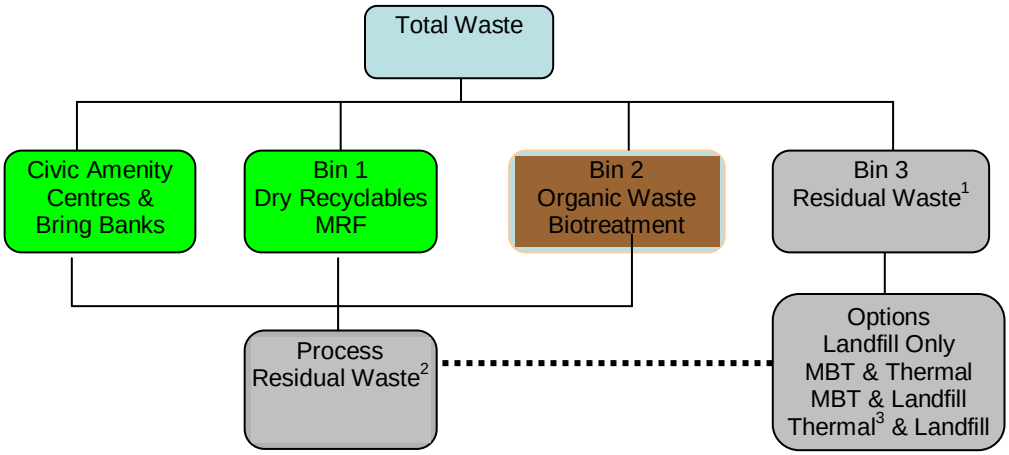
Residual Waste Collection

There are four options for management of the residual bin:

- the residual waste goes straight to residual landfill (without further processing)
- pre-treatment in a MBT facility prior to landfill disposal
    - pre-treatment in a MBT facility prior to recovery in a thermal (waste to energy) facility with the non-combustible waste materials and ash landfilled
    - recovery in a thermal (waste to energy) facility with the non-combustible waste materials and ash landfilled.

The scenarios vary in the options available for the treatment or disposal of the residual waste originating from the 3-bin collection system which will be provided to the household and commercial sectors. Figure 9.1 outlines the different pathways for each of the three bins.

Figure 9.1: Pathways for the Treatment and Disposal of the 3-bin Collection System



[1] This residual waste is waste that cannot be recycled/recovered or composted economically or at all

[2] Process Residual waste arises after the processing of waste at a material recovery facilities and biological treatment facilities. This is waste that has been placed in the wrong bin or which is contaminated and cannot be recycled i.e. dirty paper, composite materials etc.

[3] 20 – 23% of a thermal treatment plant input corresponds to the quantity of bottom ash produced. Provision for bottom ash management will be provided in the Region. Fly ash will more likely be managed in the short to medium term in an approved facility.

The design year for the provision of the dry material recovery and biological waste treatment facilities is 2009. The use of the year 2009 was to coincide with the next major Landfill Directive target. The use of the year 2011 for the provision of the thermal treatment facility is in keeping with the design year used in the Joint Waste Management Plan for the South East (2002) for comparative purposes with the original Plan.

The scenario assessment does not account for the portions of waste categories such as industrial waste which, at present, are managed by the industries themselves and so do not enter the normal collection/disposal regime.

9.2.1. Scenario 1 – Full Recycling/Recovery with Residual to Landfill only

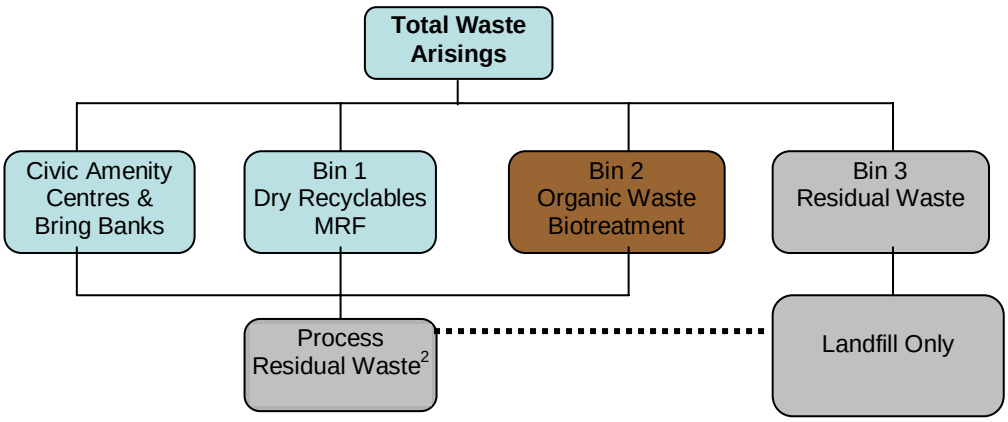
This scenario assumes that the existing 1-bin and 2–bin system for residual waste and dry recyclables is expanded to a 3-bin system where a third bin is added for organic waste collection. The waste infrastructure required in this scenario is:

- home composting (in rural areas not provided with a 3-bin collection system)
- network of bring banks and recycling centre sites
- transfer station(s)
- biological treatment facility(s)
- dry material recovery facility(s)
- residual landfill(s)

Garden waste from households is assumed to be brought by the public to recycling centres for subsequent treatment at a biological treatment plant together with the organic waste originating from the household and commercial sectors.

Scenario 1 assumes that all waste originating from the residual bin (bin-3) is landfilled. Figure 9.2 outlines the pathways for each of the three bins in Scenario 1.

Figure 9.2: Pathways for the treatment and disposal of the 3-bin system in Scenario 1



9.2.2. Scenario 2a and 2b – Full Recycling/Recovery with Residual to a MBT Facility followed by Thermal Treatment or Landfill

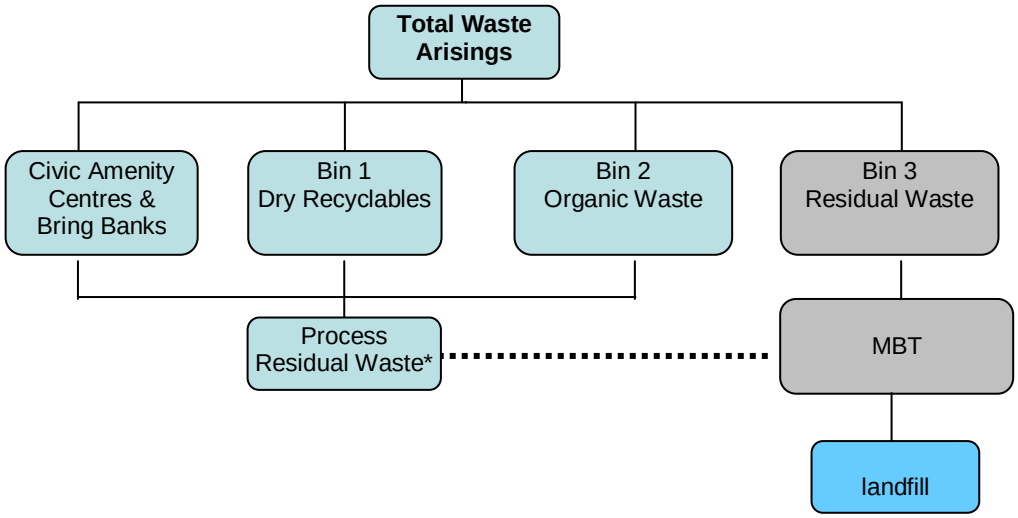
This scenario assumes that the residual waste collected in bin 3 is processed at a mechanical biological treatment (MBT) facility. This will result in the stabilisation of the biodegradable fraction of the residual waste stream. Recyclable fractions present in the residual bin such as glass, metals and plastic are recovered during the process. The waste that is processed through these facilities is not 100% recyclable which results in a residue from the process. This residue is termed "dross" which is a combination of textiles, paper/cardboard and organics. This dross can be either thermally (combustible products only) treated (scenario 2a) or landfilled (scenario 2b).

Scenario 2 (a) and (b) requires:

- Home composting (in rural areas where there is no 3-bin collection system in place)
- Network of bring banks and recycling centres
- Transfer station(s)
- Biological treatment facility(s)
- Dry material recovery facility(s)
- Mechanical Biological Treatment (MBT) facility
- Residual landfill(s)
- Thermal treatment facility

Figures 9.3 and 9.4 outline the pathways for each of the three bins in Scenario 2 (a) and (b).

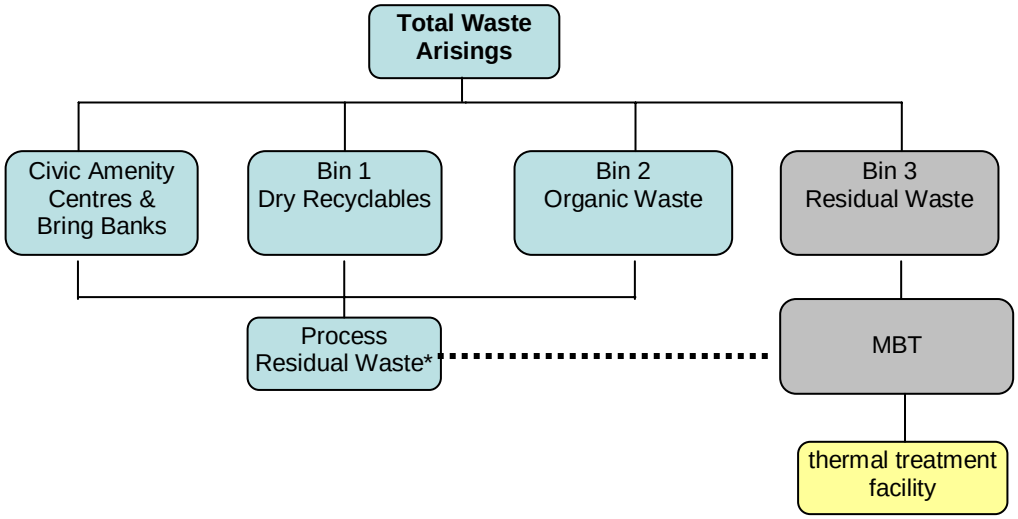
Figure 9.3: Pathways for the Treatment and Disposal of the 3-bin System in Scenario 2 (a)



[1] This residual waste is waste that can not be recycled/recovered or composted

[2] Process Residual waste arises from after the processing of waste at a material recovery facility, bring banks, biological treatment facilities. This is waste that has been placed in the wrong bin or which is contaminated and cannot be recycled i.e. dirty paper, wrong coloured glass. Process residual waste may not necessarily be disposed of in the county of origin

Figure 9.4: Pathways for the Treatment and Disposal of the 3-bin System in Scenario 2 (b)



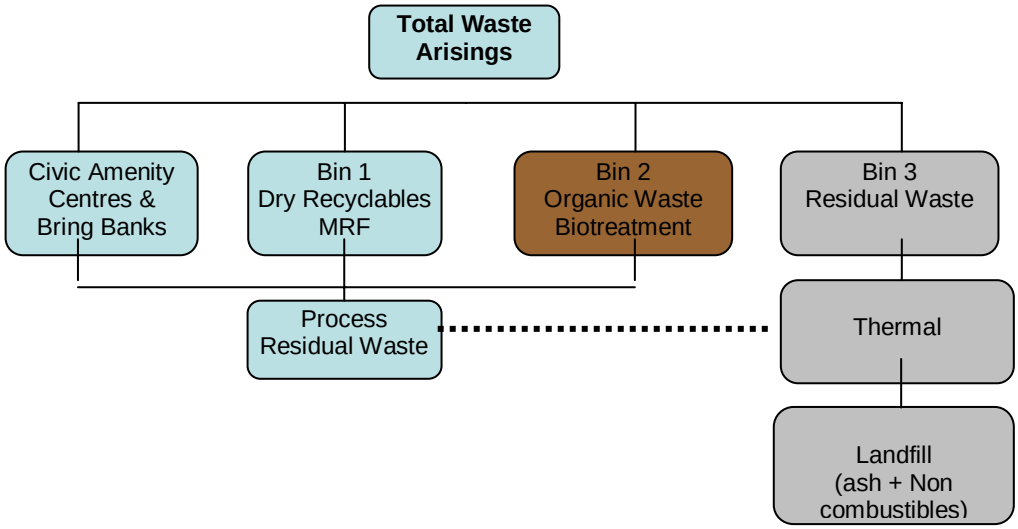
9.2.3. Scenario 3 – Full Recycling/Recovery with Residual to Thermal Treatment and Landfill

In Scenario 3, there is full recovery/recycling of the dry recyclable and organic bins. The third bin, except the non-combustible waste fraction is thermally treated. Scenario 3 requires:

- home composting (in rural areas not provided with a 3-bin collection system)
- network of bring banks and civic amenity sites
- transfer station(s)
- biological treatment facility(s)
- dry material recovery facility(s)
- thermal treatment facility(s)
- residual landfill(s)

Figure 9.5 outlines the pathways for each of the three bins in Scenario 3.

Figure 9.5: Pathways for the Treatment and Disposal of the 3-bin System in Scenario 3



20 – 23% of a thermal treatment plant input corresponds to the quantity of bottom ash produced. Provision for bottom ash management will be provided in the Region. Fly ash will more likely be managed in the short to medium term in Germany/Norway.

9.3. Recycling and Collection Efficiencies of Waste

The four scenarios are identical as regards collection systems (3-bin system) and treatment systems for recycling/recovery of the dry recyclables and biowaste. The waste stream collected in the three bins can be broadly divided into the following waste fractions:

- glass
- paper and cardboard
- metal including drink cans
- plastics
- textiles
- organic waste – this includes both garden or green waste and biological/ organic waste e.g. food waste
- other waste

Separately Collected waste from the household, commercial/industrial sectors will be treated using various techniques as outlined in Scenarios 1–3. The quantity of waste that will enter the different waste management routes will be defined by the following factors:

- composition
- collection efficiency
- recycling efficiency

Tables 9.1 and 9.2 outline the different composition, collection and recycling efficiencies of household, commercial and industrial waste airings.

Table 9.1: Collection and Recycling of Household Waste

Waste Fraction	Composition %	Suggested Frequency (per annum)	Waste accounted for	Collection Efficiency	Recycling Efficiency
Glass	4	Bring Banks	100%	70%	95%
Paper and Cardboard	22	26	100%	60%	75%
Metal including cans	4	26	100%	70%	95%
Plastic	12	26	100%	70%	70%
Textiles	4	2	100%	40%	60%
Organic Waste	35*	26-52	100%	50%	80%
Other waste	19	26	100%	100%	0%
Total	100				

* 4 % of this total is assumed to be home composted

To explain Table 9.1 and the other tables which follow, the example of 'paper and cardboard is taken from Table 9.1:

- Waste fraction - Refers to the generic waste fraction for that element, expressed as a % of the total household waste stream
- Composition - 22% of the household waste stream is paper and cardboard including magazines, packaging etc
- Frequency - 26, the number of collections per year, in this case fortnightly
- Waste accounted for - 100%, in this case all types of paper/cardboard used in the household is collected, (however some may not be in the right bin or is not recyclable i.e. soiled. etc.)
- Collection efficiency - 60%, only 60% of the paper/cardboard fraction ends up in the correct bin. The remaining 40% is assumed placed in the residuals bin and goes to pre-treatment and or disposal
- Recycling efficiency - 75%, only 75% of the collected paper/cardboard is recyclable, the remaining 25% is dross/soiled/rejected and is sent for disposal (to landfill/thermal treatment).

The frequency of collection specified in Table 9.1 reflects the number of waste collection per annum. Ideally organic waste will be collected weekly in order to avoid odour nuisances from decomposing waste, especially in the summer season and to ensure efficient composting/biotreatment. The frequency may be reduced to once a fortnight in the winter due to lower ambient temperatures and less garden waste.

Textiles are to be collected only twice a year through special campaigns and glass is brought to the nearest bring centre/civic amenity.

The separate collection will require a 3-Bin system. The three bins are for dry recyclables, organic/green waste and residual waste.

The three fractions paper/cardboard, metal and plastic are placed in the bin at the household for "dry recyclables". These should be clean and kept segregated from other material to avoid contamination.

It is assumed that not all recyclables are correctly disposed of in the 3-Bin system and some recyclables will be unfit for recycling i.e. soiled paper as explained above.

The "organic waste" (garden and household organic) is assumed to be biologically treated. It is assumed that 4% of the total household waste is home composted and thus is not included in the overall organic composition for household waste.

Other waste, which is not collected for recycling, will have a recycling rate of zero in a disposal only scenario.

Industrial and commercial sectors are assumed to have slightly higher collection frequencies and recycling efficiencies than those of household waste. Organic waste not collected in the bio bin is assumed to end up with residual waste fraction.

The collection frequency is not considered relevant for these sectors with the exception of organic waste, which should be collected frequently to avoid nuisance issues and to minimise treatment issues at the biotreatment facilities. They use existing waste collection schemes, organised by the private sector. Table 9.2 show the generation and treatment of both commercial and industrial waste.

Table 9.2: Collection and Recycling of Commercial and Industrial Waste

Waste Fraction	Composition %	Frequency (per annum)	Collection Efficiency %	Recycling Efficiency %
Glass	7*	Commercial Collections	80	95
Paper and Cardboard	49	Commercial Collections	60	75
Metal including cans	3	Commercial Collections	80	95
Plastic	10	Commercial Collections	75	80
Textiles	1	Commercial Collections	50	60
Organic Waste	21	Commercial Collections	80	85
Other waste	9	Commercial Collections	100	0
Total	100			

*or bring banks