

## EXECUTIVE SUMMARY

### INTRODUCTION

The arc21 (formerly Eastern Region Waste Management Group) Waste Management Plan was adopted in January 2003. The first formal review of the plan was scheduled for 2007. This was brought forward to coincide with the review being undertaken by the other Waste Management Groups and to comply with the request of the Department of the Environment (DOE). It has been updated to account for recent developments in waste management in Northern Ireland, including:

- The Landfill Allowance Scheme (Northern Ireland) Regulations 2004 (NILAS);
- The Northern Ireland Best Practicable Environmental Option (NI BPEO) 2005
- The Thematic Strategy on the Prevention and Recycling of Waste
- The Northern Ireland Waste Management Strategy 2006;

The development of the Waste Management Plan also takes account of obligations relating to Strategic Environmental Assessment (SEA).

The eleven district council areas and boundary of the arc21 grouping are shown in Figure 1.



**Figure 1 Location of arc21 Councils**

This Plan sets out how arc21 propose to deal with our wastes for the next 15 years. It also considers our immediate needs and changes that need to be made in waste management in light of progress since the Waste Management Plan was adopted in January 2003 and provides proposals up to 2020. The central focus of this Waste Management Plan is an analysis of the waste streams arising in the arc21 Region and associated potential for waste prevention, recycling and recovery and disposal. This Plan sets out the range of facilities

that will be needed to deliver the strategic targets and criteria for locating these. The primary areas of change from the Waste Management Plan adopted in 2003 are:

- A revised projection of municipal waste growth up to 2020 (detailed in Chapter 5);
- An updated review of the arisings of commercial, industrial, construction, demolition and excavation wastes in the arc21 region (detailed in Chapter 5);
- A chapter focused on measures to optimise waste prevention (Chapter 6); and
- An updated preferred waste management solution for arc21 consistent with the Northern Ireland BPEO (detailed in Chapter 10)

## STRATEGIC PRINCIPLES

The principal objective of the Plan is to identify the options for managing waste within the arc21 Region, which draws the right balance between:

- meeting strategic targets for reduction, recycling and recovery
- the protection of the environment for present and future generations; and
- the provision and maintenance of sufficient disposal and treatment capacity to deal with the waste produced.

The targets and methods for dealing with municipal wastes have been updated to take account of the Northern Ireland Landfill Allowance Scheme (NILAS) and the Northern Ireland Waste Management Strategy 2006. The primary targets for household waste specified in these documents are:-

### **Household Waste Recycling and Composting Targets**

- To recycle and compost 35% of household wastes by 2010
- To recycle and compost 40% of household wastes by 2015
- To recycle and compost 45% of household wastes by 2020

### **Waste Diversion Targets**

- Reduce the quantity of biodegradable municipal waste landfilled, through adherence to NILAS allowances for arc21 District Councils, to:
  - 75% of 1995 baseline levels by 2010
  - 50% of 1995 baseline levels by 2013
  - 35% of 1995 baseline levels by 2020

The arc21 Waste Management Plan recognises these primary targets. It also subscribes to the full range of supplementary targets for municipal, commercial and industrial, construction, demolition, excavation and other wastes set out in the NI Waste Management Strategy, although it acknowledges that delivery of some of these is outside direct Council control and that Councils may therefore have limited scope in influencing them.

Diversion of biodegradable municipal waste from landfill to comply with the NILAS allowances is a key target in this plan. Failure to achieve these targets is estimated to result in domestic penalties totalling approximately £177 million over the plan period, if no further action to address residual waste is taken by arc21.

## ANALYSIS OF THE WASTE STREAMS

The Plan deals with the following waste streams, described as *controlled wastes*:

- municipal waste
- commercial & industrial waste
- construction, demolition and excavation waste
- hazardous waste
- packaging waste

Within these waste streams, certain “*priority waste streams*” such as batteries, tyres, healthcare waste, electrical and electronic equipment and end of life vehicles are considered separately. Additionally, a number of non-controlled waste streams, namely agricultural and mining and quarrying wastes are also reviewed.

A summary of the controlled waste arisings and predicted growth to 2020 is given in Table 1. Current management of these wastes continues to rely heavily on landfill disposal, with presently an estimated 650,000 tonnes of industrial, commercial and municipal wastes (excluding construction and demolition wastes) being disposed of at landfill sites in the arc21 Region. Hazardous wastes are no longer deposited in landfill sites in the arc21 Region. In general the vast majority of hazardous wastes for disposal are transported outside Northern Ireland for treatment prior to disposal. Healthcare wastes are processed through a treatment facility in Antrim or transported to England for incineration and disposal.

**Table 1 Summary of Estimated Waste Arisings and Growth over Plan Period**

Waste Category	Estimated Waste Arisings 2005/2006 (tonnes)	Estimated Waste Arisings 2020 (tonnes)
Municipal	589,855	729,899
Commercial & industrial	408,100	492,800
Construction & demolition	1,889,785	2,215,610

Reducing the amounts of wastes produced in the arc21 Region is considered a priority to improve waste management and the consequent impact of human behaviour on the environment. Measures to reduce the amount of waste produced are identified in the plan as fundamental. The 2003 Waste Management Plan identified the municipal waste growth rate of 2.9% per annum. The Northern Ireland BPEO (2005) more recently identified waste growth for the whole of Northern Ireland as 2.4% per annum. Further quantification of this in the arc21 region has been undertaken for this plan and a more realistic scenario has been developed with growth rate starting at 1.8% in 2005 reducing to 1% by 2020. This scenario takes account of the effect of waste prevention measures introduced by the Councils.

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The quantity of municipal waste is predicted to increase by 25% over the next 15 years and the amounts of commercial, industrial, construction and hazardous wastes are also expected to increase. A combination of limited landfill capacity in the arc21 region and evolving policy means that alternative treatment and disposal options to landfill are required for the majority of these wastes.

## **OPTIONS AND SCENARIOS FOR FUTURE WASTE MANAGEMENT**

To optimise the management of waste a combination of waste management options will be required. These should work in harmony with one another to provide an integrated waste management system for the arc21 Region. The Plan assesses the potential for a number of waste management options to contribute to future waste management requirements in the arc21 Region, including:

- prevention
- reuse
- recycling
- biological treatment
- mechanical treatment
- Energy from Waste (EfW)
- landfill disposal.

The various methods for waste collection, treatment and disposal can be combined in many different ways to provide an integrated waste management system for the arc21 Region. In selecting the preferred solution for municipal waste management in the arc21 Region consideration has been given to a range of options, comparing their advantages and disadvantages and developing a scenario that best meets the arc21 objectives. New systems for the collection of recyclable and compostable materials have been implemented across the arc21 Region as a result of the proposals in the original Waste Management Plan. In developing this revised plan a number of new scenarios have been modelled and assessed. The new scenarios focus on additional recycling opportunities as well as treatment and disposal technologies.

A systematic approach to comparing the scenarios was applied based on methodology for choosing the preferred solution which entailed a technical assessment that took account of Government advice and built upon the guidance provided in the Northern Ireland BPEO. This process involved developing, modelling and refining eight possible waste management scenarios.

The choice and assessment of the scenarios has taken into account:

- the specific needs of the arc21 Region as a whole;
- the current and estimated future arisings of municipal waste in the arc21 Region;
- the need to meet all relevant policies and targets (particularly NI BPEO);
- the concurrent SEA process; and
- collection and recycling arrangements implemented since 2002

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The eight scenarios were evaluated against environmental, economic and deliverability factors to ensure they are workable, achievable and affordable. Complex software models and assessment techniques have been used to do this comparison. The scenarios were also subject to independent validation through the NI BPEO modelling process. In addition to the no treatment scenario, the eight scenarios modelled comprise:

- E1 – Energy from waste;
- E1a – Energy from waste with pre-sorting of recyclables;
- E2 – Biological mechanical treatment with energy from waste;
- E3 - Biological mechanical treatment and additional in-vessel composting and energy from waste;
- E4 – Mechanical biological treatment with energy from waste;
- E5 – Mechanical biological treatment;
- E6 – Mechanical treatment and anaerobic digestion with energy from waste
- E7 - Mechanical treatment and anaerobic digestion

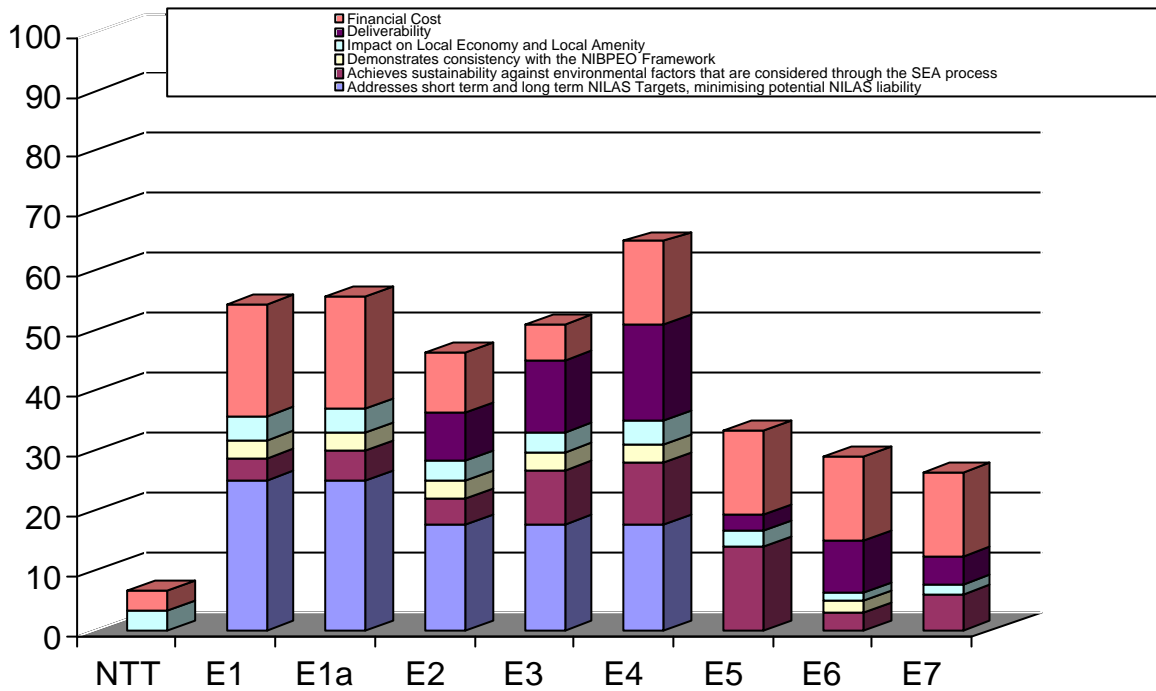
All scenarios adopt the principles of the waste hierarchy (reduction, reuse, recycling and recovery) and have been designed to deliver the NILAS targets for diversion of waste from landfill while achieving recycling and composting targets. However, results of modelling indicate that all scenarios still require the provision of continuing adequate landfill capacity throughout the plan period.

The assessment shows that due to the potential impact of landfill fines, a no treatment technology scenario will cost more than implementing a new system to manage wastes. This is reflected in the high cost of the No Treatment Technology scenario compared to other scenarios. Costs were generally higher in scenarios that include multiple treatment technologies for residual waste. All scenarios will require the support and involvement of householders and commercial customers served by Councils, to enable the recycling/composting targets and the landfill diversion targets to be achieved throughout the plan period.

In order to achieve the challenging landfill diversion targets in the later years of the Plan, the analysis shows the chosen system for dealing with residual waste will either have to rely solely on an energy from waste (EfW) capacity or include a more integrated system incorporating elements of mechanical, biological treatment and EfW. However, the deliverability criteria for systems that solely rely on energy from waste are significantly lower than for the other scenarios.

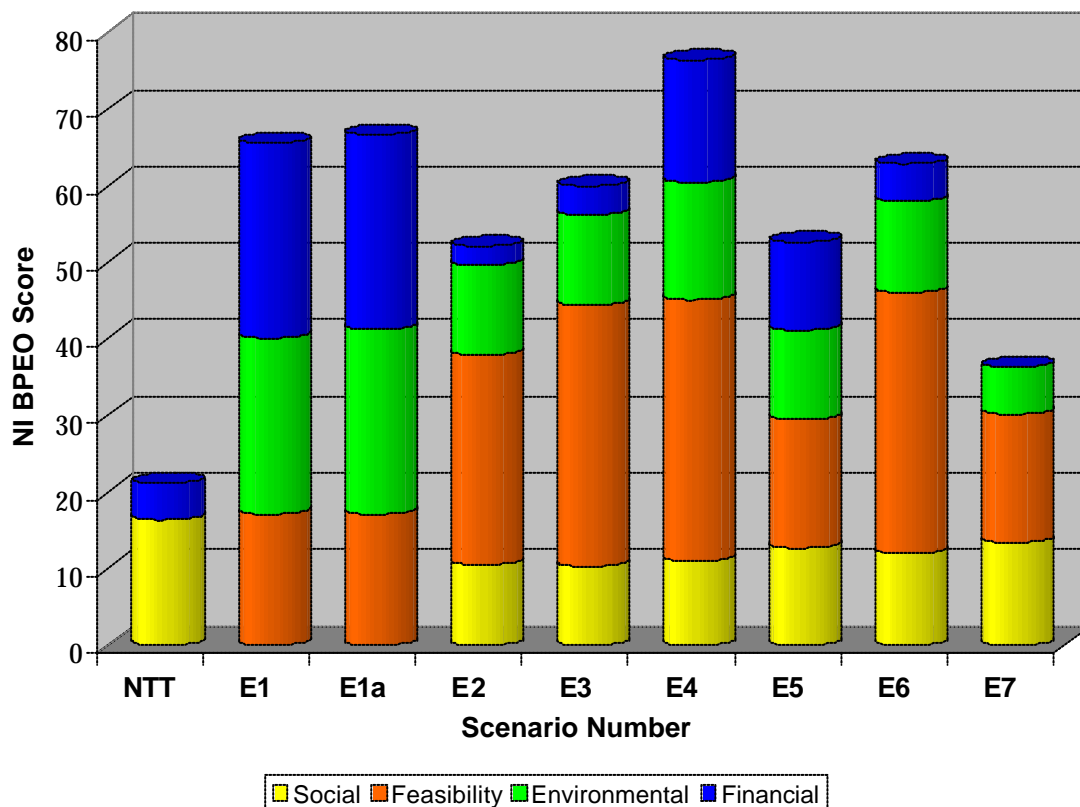
An illustration of the performance of each scenario against decision criteria is given in Figure 2. Overall the detailed analysis concluded that Scenario 4 was the preferred scenario (mechanical biological treatment with energy from waste) ahead of Scenarios 1 and 1a (energy from waste only). As described, the Scenarios were subject to a separate assessment against the NI BPEO decision criteria. A summary of the results are illustrated in Figure 3. Again Scenario 4 performed consistently well against all the criteria and was again identified as the preferred scenario.

**Figure 2 Summary of Scenario Assessment –**



Note: Scenario reference E1 – E7 refers to “exceed model” run as part of technical assessment. Further details of Scenarios and explanation of exceed model are provided in Chapter 10.

**Figure 3 Summary of Scenario Assessment against NIBPEO Criteria –**

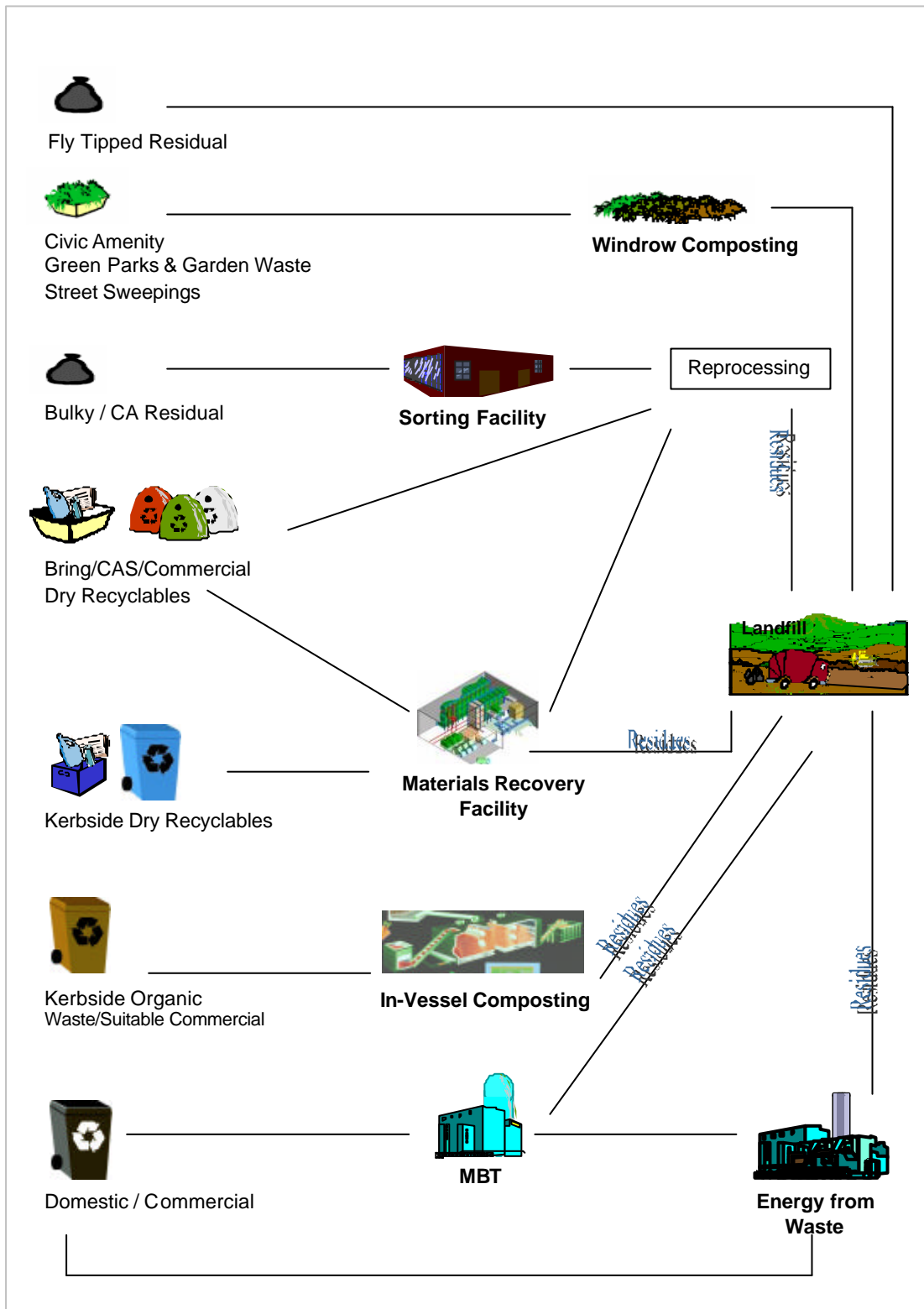


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The preferred solution identified is illustrated in Figure 4 and is based on Scenario 4. In this scenario, existing recycling and composting initiatives are combined with a mix of treatments for residual wastes. This scenario will require:

- complete implementation of the 3-stream collection of organics, dry recyclables and residual wastes to be provided to suitable households in the arc21 Region;
- dry mixed recyclables to be sorted and/or bulked at a materials recovery facility;
- segregated garden waste to be treated by windrow composting up to 2007 and then by in-vessel composting with the addition of kitchen waste, to be introduced during 2007;
- windrow composting of green waste collected at the Civic Amenity sites;
- sorting of CA site residual waste, street sweepings and litter and bulky household wastes at a suitable sorting facility from 2008 to boost recycling and composting rates;
- treatment of residual wastes from households/commercial premises at a mechanical biological treatment facility from 2009 (the facility to sort recyclables, organic materials to be composted at the facility and where appropriate sort a suitable range of calorific value materials) with due regard to relevant targets;
- an energy from waste facility for a suitable range of calorific value materials from either/or both MBT and of residual wastes from 2013 with due regard to relevant targets;
- any balance of residual wastes and residues from waste treatment processes to continue to be disposed to landfill with due regard to relevant targets.

**Figure 4 Illustration of Preferred Solution**



The recycling and composting rate for arc21 beyond 2009 is estimated to reach 46%. This reflects a performance at the kerbside consistent with Best Practice presently experienced elsewhere in the UK.

A summary of the costs for the preferred scenario is given in Table 2 and Table 3.

**Table 2 Summary of Costs of Preferred Scenario – Collection**

Facility type	Costs		
	Collection cost £/Household		
	2005	2010	2020
Clean MRF	£116.00	£73.74	£70.43
Compost – windrow			
Compost – in vessel			

Costs based on existing data held by arc21

**Table 3 Summary of Costs of Preferred Scenario - Treatment**

Facility type	Costs		
	Treatment Cost (Totals)		
	Treatment NPV	Landfill NPV	Total NPV
MBT	£165m	£226m	£392m
EFW			
Landfill			

Cost estimated based on data for existing plants capital and operational cost for MBT and EFW. Costs include sorting and treatment costs as well as landfill gate fee and landfill tax.

## REQUIRED FACILITIES

The Plan has identified a need for new waste facilities for the management and disposal of all controlled wastes produced in the arc21 Region. Table 4 summarises the capacity and likely number of new facilities that may be required based on the preferred scenario for municipal wastes. Additionally, the number of new facilities was considered against the anticipated capacity requirements that would make development viable for the private sector.

It should be noted that the proposal, in terms of residual waste, will be subject to the outcome of a Business Case and Procurement Process which may have an affect on the detail e.g. waste flows, relative capacities, contract bundling and proprietary technologies offered.

**Table 4 Summary of Capacity and Facility Requirements for Municipal Waste**

Facility	By 2010	By 2020
<b>Clean Materials Recovery</b>	1 facility Total capacity c60,000 tpa	1 facility Total capacity c60,000 tpa
<b>Sorting Facility/Reprocessors<sup>1</sup></b>	Total capacity c80,000 tpa	Total capacity c90,000 tpa
<b>In-vessel composting</b>	1-3 facility: in-vessel compost Total capacity c100,000 tpa	1-3 facility: in-vessel compost Total capacity c110,000 tpa
<b>Composting (Windrow)</b>	3 facilities Total capacity c35,000 tpa	3 facilities Total capacity c40,000 tpa
<b>MBT</b>	3 facilities Total capacity c285,000 tpa	3 facilities Total capacity c325,000 tpa
<b>Energy from waste</b>	No facility	1 facility Total capacity c 43 MWe /370,000 tpa
<b>Landfill – major facilities</b>	2 – 3 sites for non-haz waste  Total capacity requirement: Municipal waste: 320,000 tpa	2 – 3 sites for non-haz waste  Total capacity requirement Municipal waste: 265,000 tpa

Notes: 1: Sorting Facility/reprocessors is assumed to include existing reprocessors. Further sorting facilities may be required. Facilities in 2010 and 2020 denotes the total number required by that date.

In terms of the EfW facility, the ultimate technological and capacity requirements for arc21 also depends on a number of factors not yet determinable. In particular, it may be in the public interests to take advantage of any economies of scale accruing from third party sources. Accordingly, for waste management planning purposes it is considered appropriate to plan for a range of capacities up to a maximum of 370,000 tonnes per annum to ensure flexibility. Similar comments are pertinent to the MBT capacity identified.

It is also pertinent to plan for the thermal capacity of the EfW facility. The ultimate thermal capacity is likely to be influenced by a number of factors not yet fully determined. It is considered appropriate to plan for an overall total energy of 43 MWe per year to ensure flexibility with regards thermal capacity.

Arc21 is committed to ensure that the EfW facility will afford the most efficient level of energy recovery addressing both heat and electricity.

## SITING NEW FACILITIES

Site assessment criteria have been developed to help identify suitable locations and to test the appropriateness of proposed sites or areas for the development of waste management facilities. These criteria consider the nature of existing site conditions, site availability and commercial matters such as proximity to waste arisings and accessibility. The criteria are designed to assist developers and the arc21 Councils in selecting appropriate locations for new waste management facilities. They are also provided in the Plan as a material consideration which may be used to assist the determination of any future planning applications. Indicative areas for the location of future waste management facilities for

municipal waste management in the arc21 Region are shown in Table 5. Additional suitable sites will be required to meet the facility requirements in the long term.

**Table 5 Indicative Areas for Waste Management Facilities**

<b>Area / Type of Site</b>	<b>Comments</b>
<b>Materials Recovery Facilities</b>	<b>Industrial sites/land zoned for industry close to the main sources of waste arisings</b>
Newtownabbey (Existing)	To serve all arc21 Council areas
<b>Windrow Composting</b>	<b>A range of smaller local facilities are required throughout the sub-region</b>
North	To serve the sub regional Council areas of Antrim, Ballymena, Larne, Newtownabbey and Carrickfergus
Central	To serve the sub regional Council areas of Ards, Belfast, Carrickfergus, Castlereagh, Newtownabbey and North Down
South	To Serve the sub regional Council areas of Lisburn and Down
<b>In-vessel Composting</b>	<b>Industrial sites/quarries reuse and restoration of land</b>
North	To serve the sub regional Council areas of Antrim, Ballymena, Larne, Newtownabbey and Carrickfergus
Central	To serve the sub regional Council areas of Ards, Belfast, Carrickfergus, Castlereagh, Newtownabbey and North Down
South	To Serve the sub regional Council areas of Lisburn and Down
<b>Mechanical Biological Treatment</b>	<b>Industrial sites/reuse and restoration of land</b>
North	To serve the sub regional Council areas of Antrim, Ballymena, Larne, Newtownabbey and Carrickfergus
Central	To serve the sub regional Council areas of Ards, Belfast, Carrickfergus, Castlereagh, Newtownabbey and North Down
South	To Serve the sub regional Council areas of Lisburn and Down
<b>Energy From Waste</b>	<b>Industrial sites/reuse and restoration of land</b>

Area / Type of Site	Comments
Greater Belfast area	To serve arc21 and third party waste where appropriate
<b>Landfill</b>	<b>Major regional facilities in quarries or other despoiled/under-utilised land</b>
North / Central	To minimise transfer distances for residual waste in the northern part of the sub-region
Central / South	To minimise transfer distances for residual waste in the southern part of the sub-region

These indicative locations pay due regard to transport modes, routes and population acknowledging within these locations there will be areas of development constraint. Some of the facilities may be established as integrated waste management facilities on the same site.

Given the scale of the Northern Ireland as a whole, suitable locations for the required facilities may also be provided in the adjoining Waste Management Group areas. Specific site proposals will be rigorously assessed against the site location criteria set out in the Plan.

### Implementation, Monitoring and Review of the Plan

Implementing the policies in the Plan and the preferred solution for the arc21 Region will require new waste management arrangements and infrastructure to be established. This in turn will require the Councils to work in partnership with the private sector. Implementation will need to be supported by programmes to educate and involve the public, businesses and industry, if the challenging targets for waste diversion and recycling are to be achieved.

Implementation of the Waste Management Plan will follow formal adoption, and will include:

- the development of an education and awareness programme including a waste communication fund to promote waste prevention and increase participation in recycling and composting schemes;
- all District Councils to draw up a waste prevention action plan to deal with their own waste;
- priority for continued joint procurement of services by arc21 Councils;
- letting of contracts for composting and recovery facilities to meet targets;
- full implementation of new kerbside collection systems, with schemes to be fully operational during 2007;
- full implementation of proposed improvement of civic amenity centres / recycling centres and development of new bring facilities; and
- preparation of suitable contract(s) for long term provision of waste management services.

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The Plan will also be monitored to assess the effects and effectiveness of its policies and to reflect new information as it becomes available. A major review of the Waste Management Plan will be conducted at least once every five years.