

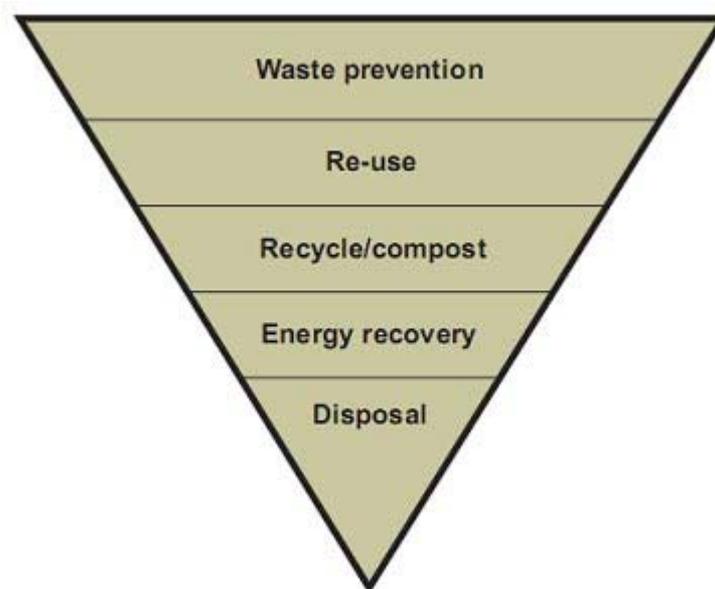
## **Chapter 4 – Waste Hierarchy Options**

The 'Waste Hierarchy' has for some time provided the framework for managing waste both locally and nationally and at a European level. The hierarchy provides a range of options that the Partner Authorities can employ for managing waste, and the North London Joint Waste Strategy outlines how the Partner Authorities are seeking to move waste up the hierarchy. In this way a significant reduction in the amount of waste requiring disposal to landfill will be achieved in the period of this Strategy.

However, whilst recent studies, as noted in the national Waste Strategy for England 2007, have confirmed that the waste hierarchy remains a good general guide to the relative environmental benefits of different waste management options, the Waste Strategy for England 2007 also notes that there will be exceptions to this for particular materials and in particular circumstances. So, Waste Strategy for England 2007 recommends that the use of the waste hierarchy should also be informed by life-cycle thinking and the broader sustainable consumption and production agenda. This thinking also needs to be taken into account in the implementation of the North London Joint Waste Strategy.

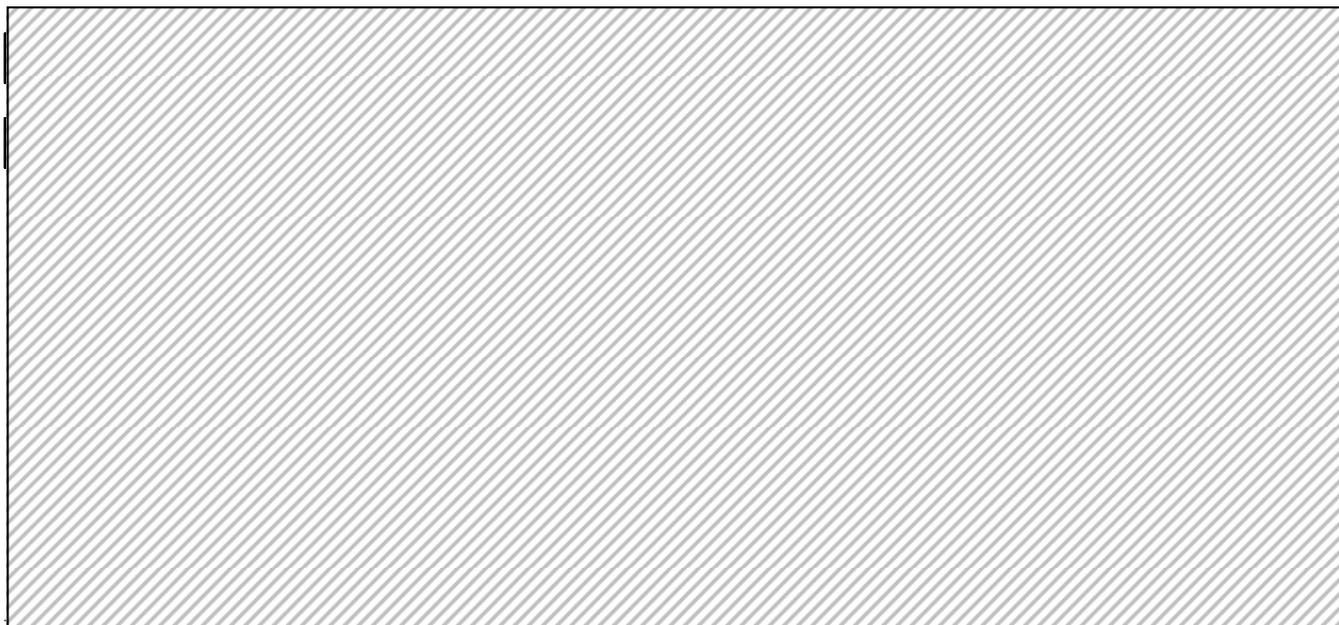
### ***North London Waste Treatment Option Hierarchy***

#### ***The Waste Hierarchy***



\* Source: Waste Strategy for England, 2007

## ~~North London Waste Treatment Option Hierarchy\*~~



~~\* As adapted from the Organisation of Economic Co-operation and Development working definition on waste minimisation agreed at the Berlin Workshop 1996.~~

### 4.1 Waste Prevention

Waste prevention is here taken to mean any action that prevents waste requiring collection and disposal by the Partner Authorities. Waste prevention therefore includes waste avoidance (action to limit waste from products at source), waste reduction (avoiding unnecessary waste arising through consumer choice and control of services), reuse of waste (through repair and refurbishment, for example), together with home and community composting.

Waste prevention activities tend to be expensive, initially have low outputs and have to compete for Partner Authority funds against services with statutory requirements like recycling. But it is the collective effects of all waste prevention activities in North London that will determine whether waste is controlled or continues to increase at the current rate over the period of this Strategy. Government incentives to the Partner Authorities to invest in waste prevention are principally the Landfill Tax and the new default mechanism for apportioning the North London Waste Authority's levy across the North London Boroughs that means over time that delivering less waste means the relevant Borough pays a lower proportion of the North London Waste Authority's net costs

4.A The Partner Authorities are gravely concerned about the year-on-year growth in waste and would urge greater action from Government to minimise waste and will lobby Government to achieve this.

#### 4.1.1 Waste Avoidance

Waste avoidance – action taken by designers, manufacturers and retailers of products to eliminate waste - appears at the very top of the waste hierarchy, as it is always the best environmental option.

European legislation is incrementally incorporating ‘producer responsibility’ requirements to eliminate waste during the design, manufacture, use and disposal of products and these now extend to packaging, waste electrical and electronic equipment and motor vehicles. These requirements are already having a considerable impact, for example on packaging, where packaging weight has significantly reduced in the recent past. However, residents, businesses and communities are generally unaware of these requirements and often approach the Partner Authorities to ask how best to ensure that manufacturers produce less waste at the outset.

In the past, several North London Boroughs have actively supported Waste Watch Business Networks in their areas. These were networks in which local businesses came together to consider what actions they can take to prevent waste arising and thereby make efficiencies and savings. Elsewhere, the Partner Authorities have supported Middlesex University’s Centre for Business and the Environment and Waste Buster campaigns. It is proposed that the Partner Authorities actively support a network of business forums focusing on waste prevention across North London throughout the period of this Strategy.

The North London Boroughs also have specific powers under the Packaging (Essential Requirements) Regulations 2003 and 2007, which require that local manufacturers of packaging ensure that “all packaging shall be so manufactured that the packaging volume and weight be limited to the minimum adequate amount to maintain the necessary level of safety, hygiene and acceptance for the packed product and for the consumer”.

Local Trading Standards services can therefore take action against any North London manufacturer believed to be guilty of over-packaging goods. In reality, very few complaints are received because there are few examples where the complainant is able to establish the manufacturer of an over-packaged product and limited resources are available to conduct pro-active monitoring of compliance with the regulations.

As this is another significant area where the Partner Authorities can contribute to waste prevention, external funding for an integrated North London approach to educating local packaging manufacturers about the requirements of the Regulations is proposed.

- 4.A2 The North London Partner Authorities will actively support Business Networks encouraging demonstrably effective waste prevention and minimisation amongst local businesses.
- 4.A3 The North London Partner Authorities will seek external funding or regional support to develop a packaging waste prevention campaign with local manufacturing companies.

#### **4.1.2 Waste Reduction**

Waste reduction is here taken to involve action taken by consumers to avoid waste and by local authorities to discourage waste generation through controlling how waste services are accessed.

##### 4.1.2 (i) Consumer Campaigns

The Partner Authorities have powers under the Waste Minimisation Act 1998 to take any reasonable action to minimise waste provided that other relevant authorities are consulted about the proposed action.

Waste reduction activity taken by the Partner Authorities in the past has included a highly commended 'Wipe Out Waste!' campaign conducted by the London Borough of Enfield. Residents were encouraged to join the campaign to receive a pack of leaflets that showed how to reduce waste at home, by accessing local services that avoided waste, and by shopping carefully.

Stickers were provided to discourage leafleting and unwanted free newspapers and to encourage residents to use the Mailing Preference Service, which stops junk mail being sent to residents in the post. The overall campaign, which included other waste minimisation activities, enabled some residents to cut their waste in half.

These services are expensive for individual Partner Authorities to provide but are a crucial activity if waste generation is to be controlled. It is therefore proposed that the Partner Authorities seek external funding to introduce a waste reduction public awareness campaign across North London throughout the period of this Strategy.

##### 4.1.2 (ii) Controlling access to Waste Services

Local Authorities can also control the amount of waste arising through providing waste services that limit the amount of waste that residents and businesses can throw away. For example, introducing a wheeled bin collection may have advantages in terms of reducing street litter, but is also thought to lead to increases in the amounts of waste collected per household, although if integrated with effective recycling services these increases may be minimised or avoided.

All Partner Boroughs with Reuse and Recycling Centres have taken action to discourage their misuse by local commercial traders by instituting rigorous checks to ensure that only waste from households was accepted and height barriers to discourage commercial vehicles. These changes have significantly reduced the amount of waste arising at some sites.

Working together to achieve statutory recycling and composting targets has focused the Partner Authorities on the possible additional waste that may result from introducing some waste services. By sharing good practice, the Partner Authorities are improving the integration of services in an attempt to reduce waste.

#### 4.1.2 (iii) Charging for Waste Services

Household waste disposal is paid by the North London Boroughs through the North London Waste Authority levy, i.e. the North London Waste Authority pays for the costs of disposal and then passes the cost back to the Boroughs through a levy. Previously the Boroughs' share of the levy was based upon the number of Band D-equivalent Council Tax properties that each Authority had as a proportion of the total Council Tax-base of residential properties in North London. This meant that there was little incentive for waste reduction as each Borough's levy was pegged to the number of household types that it had in its borough rather than to the tonnes of waste it collected and delivered for disposal.

Whilst the Partner Authorities recognised the advantages of moving to a tonnage based levy, they did not however agree unanimously on a method to do so, and the impact on some of the Partner Authorities of a move was considered financially unacceptable. Accordingly, the North London Waste Authority lobbied for a change in legislation to require a tonnage-based levy, and the Mayor of London also supported such a move within his Municipal Waste Management Strategy.

New legislation was successfully introduced in 2006 to require authorities such as the North London Waste Authority to move to a tonnage-based levy over a three-year period. This move allowed the change to have due regard to the financial impact on each Partner Authority and put appropriate transitional arrangements in place to reduce this impact. From 1<sup>st</sup> April 2008, the tonnage-based levy arrangements come into full force in North London.

The Mayor of London's Municipal Waste Management Strategy suggests that providing financial or other incentives to householders for recycling more, or rebates from council tax payments to residents for reducing the amount of waste presented for collection are the best way to increase recycling and introduce a "polluter pays" principle to waste management in London. The Partner Authorities are keen to consider the opportunities offered by rebate and incentive systems during the implementation of this Strategy. In 2006 one of the Partner Authorities, Haringey, was involved in a Department for Environment Food and Rural Affairs funded trial investigating the impact of incentive schemes for recycling, both individual and community-based incentives.

The United Kingdom is currently the only European Union country where direct charging for the amount of waste generated by householders is outlawed. Instead, residents are charged a flat rate through the Council Tax for waste and recycling which bears no relation to the amount of waste they generate and provides no incentive to reduce waste. Whilst the difficulties of introducing direct charging for waste are not to be underestimated, and the need for direct charging is not yet fully demonstrated, the Partner Authorities accept that this may be necessary in the long term if the increase in waste growth is to be controlled.

Similarly, the move to increasing separation of waste streams to reduce their environmental impact and / or facilitate their reuse, recycling or recovery may mean that differential charging for different waste streams is increasingly necessary. For example, a financial incentive, the Biodegradable Incentive Payment Scheme, to the Partner Authorities has been introduced from 1<sup>st</sup> April 2006 to encourage a further move of biodegradable municipal waste away from disposal, e.g. through greater use of composting and recycling. The Partner Authorities will also review the need for direct and differential charging for waste during the period of this Strategy.

- 4.B1 The Partner Authorities will seek external funding to run waste prevention public awareness campaigns across North London throughout the period of this Strategy.
- 4.B2 The Partner Authorities will share good practice on waste prevention activities and will have regard to the effects on waste arising when introducing new waste services.
- 4.B3 The Partner Authorities support a move to a tonnage-based levy system provided the transitional financial impact on Partner Authorities is minimised. [Please note that since the publication of the original North London Joint Waste Strategy this has now happened, as noted above.]
- 4.B4 The Partner Authorities will consider the opportunities presented by offering incentives and rebates to residents for reducing waste and will review the need for direct and differential charging for waste during the implementation of this Strategy.

#### **4.1.3 Waste Reuse**

Waste reuse is here taken to mean the repair, refurbishment or other reuse of materials that have become waste such that they do not require immediate recycling, recovery or disposal. Waste reuse therefore either reduces or delays waste generation but does not necessarily prevent waste in all cases, and is therefore lower in the waste hierarchy than waste prevention and reduction.

Reuse is usually more expensive than waste recycling or disposal but offers other benefits that may more than offset the hidden costs of managing waste. The Community Sector has a crucial role to play in waste reuse, often providing specialist knowledge of particular waste streams and making connections that enable social benefits as well as environmental benefits to arise.

The Government has considered Best Value Performance Indicator proposals for reuse, and has concluded that it is best to measure and set targets to reduce the amount of waste not reused, recycled or composted, largely because this can be measured. The tonnage-based levy referred to above now means that all Partner Authorities can see direct financial benefits from reuse services and can therefore assess the business case for specific proposals or projects.

The Partner Authorities were awarded £72,000 from the London Recycling Fund to introduce a collection of reusable furniture and waste electrical and electronic goods from all North London Reuse and Recycling Centres in January 2003. The service, which was provided by Restore Community Projects, is expected to divert 150 tonnes of waste to benefit over 1,400 individuals with social needs in North London. The North London Waste Authority supported a successful bid by Restore Community Projects to the Community Recycling and Economic Development Fund to expand and extend the collections until December 2005. Subsequently, the North London Waste Authority has supported a research project to investigate how best to expand Restore's services still further in North London. The work includes the potential for establishing more formal relationships, Service Level Agreements, between Restore and the individual North London Boroughs, as well as the opportunity to find new outlets for the material collected.

The London Borough of Camden and the North London Waste Authority supported a pilot nappy reuse collection service programme in the London Borough of Camden, aimed at encouraging up to 1,000 residents to begin using nappy washing services as an alternative to disposable nappies, which constitute approximately 2% of all rubbish collected directly from households. The pilot offered a £35 subsidy for each participant towards the cost of purchasing a start-up kit of reusable nappies. Following the completion of the pilot, the subsidy was extended across North London and the Authority now provides a one-off £54.15 cash-back incentive per child to parents who are washing reusable nappies at home (or an equivalent contribution towards the cost of a local laundry service), or alternatively a redeemable voucher to the value of £54.15 for parents living in those boroughs participating in the pan-London Real Nappies for London scheme.

The Partner Authorities were awarded £21,000 by the London Recycling Fund to develop best practice working with North London charity shops and to encourage the claiming of third party reuse "credits" equivalent to the deferred cost of disposal for each tonne of textiles reused by participating charity shops. The project identified the best way for the Partner Authorities and Charity Shops to provide consistent messages to the public, the need to avoid duplicating reuse and recycling services, and the need to improve understanding of waste legislation in this sector. The Authority subsequently introduced paying 'reuse' credits to third parties across North London from 1<sup>st</sup> April 2007.

- 4.C1 The Partner Authorities will continue to actively support the development of best practice in waste reuse and will encourage the development of community sector and other partnerships to deliver effective reuse services.
- 4.C2 The Partner Authorities will continue to support bids for external funding of reuse services and will seek to develop a means of rewarding effective reuse services directly through a reuse “credit”, to reflect the avoided or deferred cost of disposal.

#### 4.1.4 Home Composting

Home composting is where residents collect biodegradable garden waste and kitchen scraps and use compost heaps or purpose built “bins” to break these down in their gardens to a compost which can then be used as a soil improver. Home composting is the most sustainable way to manage biodegradable waste as it is managed by the resident at source, therefore avoiding the need for collection vehicles to pick up the material; it never becomes waste and forms a usable product that is a useful alternative to peat, the extraction of which is causing habitat destruction in many parts of the world. There are estimated to be approximately 330,000 gardens in North London. In 2004 it was estimated that only 7% of North London residents with gardens composted at home; this figure has now (2007) risen to 10.9% (based on 35,845 home composters and wormeries having been distributed in North London up to the end of financial year 2006/07). Home composting has probably declined due to a reduction in garden sizes, increased use of peat, concerns about pests, and the use of gardens as outside rooms rather than places for growing plants and vegetables.

The Government has decided that the difficulty in measuring home composting means it cannot directly contribute to the achievement of statutory composting standards. Nevertheless, all the Partner Authorities offer residents purpose-built compost bins either free of charge or at a subsidised rate. Around 25,000 compost bins have been provided to residents by the Partner Authorities.

Increasing the number of residents home composting is a crucial target for North London because organic waste makes up some 37% of all household waste in North London (according to the 2003/04 survey) and if more residents do not compost at home, collections of biodegradable waste for composting could initially increase the amount of waste arising in the municipal waste stream. It is anticipated that by increasing the proportion of residents composting at home from the 2004 7% figure to 25%, up to 40,000 tonnes of waste could be diverted from collection each year by the year 2015.

A concerted and on-going home composting promotional campaign is therefore required in North London. As the North London region varies considerably in the proportion and types of gardens, the North London Boroughs will continue to provide these campaigns tailored to their local residents’ needs, but these services will be co-ordinated to share best practice across North London and to obtain economies of scale, for example, by joint purchasing of compost bins.

Early in 2004 the North London Waste Authority successfully acted as a lead authority in bidding to the London Recycling Fund for the North London Integrated Compost Project. This secured £4m for relevant Partners and included some £120,000 for a 'Master Composter' project to be delivered by the London Community Recycling Network to promote home and community composting in North London. Although this project funding has come to an end, some of the Partner Authorities continue to support local 'Master Composter' schemes where resident volunteers become home compost experts who can promote the benefits of home composting and support their neighbours in doing the same.

4.D1 The Partner Authorities will provide a concerted and on-going promotional campaign to encourage home composting throughout the period of this Strategy, offering residents purpose-built bins at subsidised rates and providing support to residents wishing to compost at home.

4.D2 The Partner Authorities will aim to ensure that 25% of all residents with gardens compost at home by 2014 to divert approximately 40,000 tonnes from the waste stream.

#### **4.1.5 Community Composting**

Over half of households (approximately 370,000 properties) in North London do not have access to a garden, and many other residents do not wish to compost at home. Community-based compost projects, where biodegradable kitchen waste is collected for composting in local parks or communal areas, therefore offer a sustainable alternative to home composting. The Government has decided that such collections can contribute to statutory composting standards, and therefore the Partner Authorities consider encouraging community composting to be a key strategic opportunity. There are 21 known community composting operations active in North London. (These are detailed in Appendix 8.) Some of these take green waste from householders and other municipal sources and one has begun trial collections of biodegradable household kitchen waste.

The outbreak of foot and mouth disease in 2001 led the Government to amend the Animal By-Products Order of 1999 and introduce new regulations in July 2003. These require the treatment of all waste either containing animal by-products, or potentially to have come into contact with animal by-products (e.g. in a kitchen) before these can be used on land where animals may be infected by any disease within the waste. The regulations have effectively banned open composting of animal by-products, requiring instead that such wastes be composted in containers or special enclosed facilities - or "in-vessel" - at specified minimum temperatures and in specified ways.

The Partner Authorities will need to collect and compost biodegradable materials including animal by-products in order to meet higher recycling standards. These regulations will therefore inevitably increase the costs of compost treatment significantly for the Partner Authorities.

The Partner Authorities recognise community composting as a fundamental part of the successful implementation of this Strategy and will work with community groups to increase capacity of this treatment option within North London throughout the period of this Strategy. An immediate way of doing this identified in 2004 was through the Environmental Protection (Waste Recycling Payments) Regulations (1992), which allow payments to third parties for delivery of recycling or composting services equivalent to the tonnages diverted from landfill, and such a scheme is now in place. A further way is to identify the capital investment needed to increase capacity and to support bids to external funding sources to provide this capacity.

As noted above at 4.1.4, the North London Waste Authority successfully secured from the London Recycling Fund some £120,000 for a 'Master Composter' project to be delivered by the London Community Recycling Network to promote home and community composting in North London, and has also made recycling credit payments for tonnages diverted from disposal via community composting.

4.E The Partner Authorities will actively support appropriate community compost projects in North London, particularly where these contribute to statutory compost targets, through patronage of bids for external funding, direct support and through payment of third party recycling credits.

#### **4.1.6 Overall effect of Waste Prevention Activities**

It is difficult to estimate the potential contribution of waste prevention activities due to the dependence upon the success of the Partner Authorities, Government and other agencies in persuading residents, businesses and communities to take action.

The Prime Minister's Strategy Unit considered that the combination of waste minimisation activities proposed in the "Waste Not, Want Not" Report (home composting, nappy reuse, consumer waste reduction and other research and development) would enable a reduction from a baseline 3% growth in household waste to a 2% level from 2005/06. The National Resource and Waste Forum toolkit on waste prevention estimates that an overall 3% to 7.5% reduction in waste can be achieved by implementing a combination of measures including action on unwanted mail, home and community composting, home and community reuse schemes, promoting the replacement of goods with services and encouragement of reusable nappies. However, it is likely that, if direct charging for waste is not introduced, the effects of producer responsibility will have the greatest external effect on minimising waste in North London during the period of this Strategy.

The Partner Authorities consider the maximum potential annual contribution of the waste prevention activities that they will undertake directly in the period of this Strategy to be as indicated in the table below. This estimated contribution is optimistic in that it relies upon considerable goodwill by North London stakeholders, but is also considered to be realistic in terms of the potential of the waste minimisation options available and the likely increasing impact that these may have.

Whilst the total estimated contribution may be small in relation to the projected total municipal waste levels in 2020 of up to 1.5 million tonnes (if waste grows as outlined in Chapter 2), the effect is still significant in reducing the numbers of waste services and facilities that would be required by the Partner Authorities.

Waste Minimisation option	North London		Maximum diversion per year (2020)
	Targeted waste stream	Approximate targeted tonnage (2020)	
Waste Prevention	All Business and Packaging Waste	As yet un-quantified	5 - 10,000 tonnes
Waste Reduction	All municipal waste	1.45 million tonnes	5 - 10,000 tonnes
Waste Reuse	Reusable waste and nappies	(4% of all household waste) 50,000 tonnes	5 - 10,000 tonnes
Home and Community Composting	Garden waste and kitchen vegetable scraps	(22% of household waste) 250,000 tonnes	25 - 50,000 tonnes
Waste Minimisation Estimated Total			40 - 80,000 tonnes

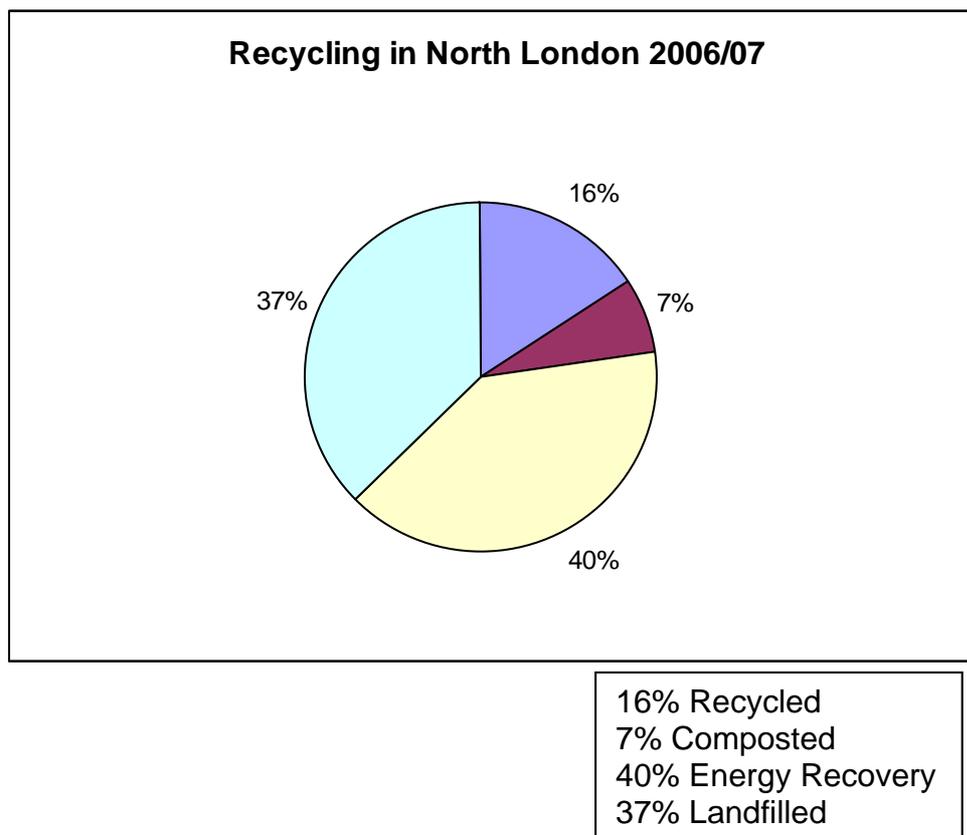
The waste prevention actions proposed are considered essential to give comfort to the Partner Authorities that municipal waste growth will indeed fall from the historic 3% level to the 2.5% level recommended by the Prime Minister's Strategy Unit, and projected within this Strategy from 2010/11. This is equivalent to a reduction from 3% growth levels of approximately 5,000 tonnes in 2010 to 80,000 tonnes by 2020. The Mayor of London's Municipal Waste Management Strategy notes that since 1996/97 London's municipal waste has grown by just over three percent per year and looking back, at less accurate data, to 1986 the growth rate has been about two and a half percent.

The Partner Authorities' active work on waste prevention will also contribute to reducing environmental and climate impacts, and to reducing the amount of residual waste in pursuit of national targets.

## 4.2 Waste Management

Once all waste prevention activity has been undertaken, the Partner Authorities are then presented with waste to manage. The waste hierarchy suggests that recycling and composting should be considered before treatment of waste to recover energy. Finally, any residual waste must be landfilled.

A total of about 776,728 tonnes of household waste needed to be managed in 2006/07, and 22.82% of this was recycled or composted.



Note: figures are rounded upwards to the nearest 1% in the diagram above.

#### 4.2.1 Recycling and Centralised Composting

Recycling involves the reprocessing of waste into new products. Recycling is beneficial when it reduces the amounts of raw materials and energy required in the manufacture of new products, but it also prevents waste from requiring energy recovery or taking up space in diminishing landfill.

Centralised composting involves the collection of biodegradable (organic) kitchen and garden waste for composting in a centralised facility rather than within resident's gardens or at a local community composting site.

Waste for recycling is collected by the Partner Authorities in four main ways; through bottle banks and other on-street "bring" systems, at Reuse and Recycling Centres, direct from households via door-to-door services or from properties of multiple occupancy. Some material may also be extracted for recycling from an energy recovery incineration process, e.g. metal may be extracted from the ash that remains after incineration, but this does not count towards statutory recycling targets.

Waste for centralised composting is either collected door-to-door from residents as kitchen and/or garden waste, or from parks and streets as leaf litter.

In providing all these services the Partner Authorities recognise the need, as outlined in the strategic environmental assessment environmental report, for the needs of disadvantaged and hard to reach groups within the community to be fully taken into account and for equality issues to be considered.

The following sections provide details of the Partner Authorities' objectives in terms of provision of services to all sections of the community.

#### 4.2.1 (i) "Bring" Recycling Collection Systems

"Bring" systems are the collective name for recycling services that require residents to bring waste to local collection points – typically a series of large banks or smaller wheeled bins, (typically collecting paper, glass, cans and sometimes textiles or other materials, such as laminated drinks carton such as those produced by Tetrapak), located in convenient places such as shopping parades, at transport connections, in car parks and at public buildings including schools.

All the North London Boroughs have extensive bring services, with a total of nearly 400 sites across the North London area. This is equivalent to about one site per 2,000 households. In 2006/07 approximately 19,000 tonnes were collected for recycling through bring systems in North London. This contributed almost a quarter of all tonnages collected. The greatest part, 9,000 tonnes, was paper, and a further 6,000 tonnes was glass.

Some of the London Boroughs have also developed guidance within their existing Unitary Development Plans as to what bring recycling services should be provided within new property developments. All North London Boroughs also offer bring collection systems for schools, which assists in getting the recycling message across to the young.

The Mayor of London's Municipal Waste Management Strategy requires that an extensive, well-distributed and full range of recycling banks be provided. It also specifies a ratio of one site per 500 households for multiple occupancy properties not served by doorstep collection of recyclables. *This is covered at section 4.2.1(v) below.* The Partner Authorities accept that bring systems will play a continuing and important part in the achievement of the targets within this Strategy. However, difficulties in identifying sites acceptable to local residents mean that the proportional role that bring sites can play in comparison to other recycling collection systems is expected to decrease.

4.F1 The Partner Authorities will provide a bring collection system throughout the period of this Strategy.

~~4.F2 The Partner Authorities will aim to provide as a minimum service level one collection site per 500 households for multiple occupancy premises not served by doorstep collection of recyclables.~~

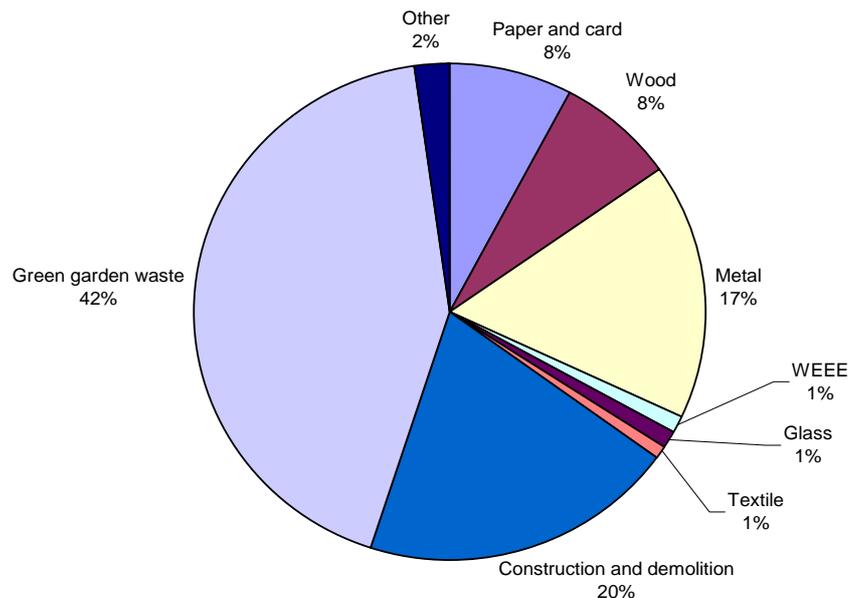
#### 4.2.1 (ii) Reuse and Recycling Centres

There are currently eight Reuse and Recycling Centres in North London where residents can deliver their household (and especially bulky) wastes. The London Borough of Waltham Forest has three Reuse and Recycling Centres. The London Borough of Haringey has two Reuse and Recycling Centres and the London Boroughs of Barnet, Camden, Enfield and Islington each have one Reuse and Recycling Centre. The London Borough of Hackney does not yet have a Reuse and Recycling Centre (see Appendix 5 for details for each Partner Authority).

In 2006/07, 25,401 tonnes of waste were collected for recycling and composting from reuse and recycling centres out of a total waste stream of 52,659 tonnes (including construction and demolition waste), giving a combined recycling and composting rate of 48%. Construction and demolition waste is recycled at these sites, but the Government has determined that this waste cannot contribute to recycling standards so the figures quoted above are higher than the figures used in the annual Best Value Performance Plan 2007.

The sites vary significantly, both in capacity and recycling rate. They collect an increasingly large range of materials for recycling (over 40 different types of material are collected at one site), and use staff incentives to increase recycling rates and raise awareness amongst customers about the importance of recycling. The diagram below shows the breakdown of recyclable material collected from the North London reuse and recycling centres in 2005/06.

Breakdown of recyclables collected at Reuse and Recycling Centres during 2005/06



In January 2003 the North London Partner Authorities were awarded £379,000 to carry out improvements to three Reuse and Recycling Centres to enable all to achieve combined recycling and composting rates of 33%.

The Mayor of London is proposing to seek that the legal obligation on Boroughs to provide Reuse and Recycling Centres (section 1 of the Refuse Disposal Amenity Act) is repealed. This would mean the duty for making civic amenity provision would fall to the North London Waste Authority under section 51(b) of the Environmental Protection Act 1990. The Mayor of London suggests this would encourage a more strategic approach to site provision and enable local authorities to use the stricter definition of waste under the Environmental Protection Act to control waste entering the sites.

The North London Waste Authority conducted a Best Value review of civic amenity provision in 2001. This concluded that the key requirement for a successful Reuse and Recycling Centre was the effective co-ordination of the agencies operating the collection site, the transport arrangements and those arranging for reprocessing or disposal rather than whether the sites were operated by Waste Collection or Waste Disposal Authorities.

In 2003, the North London Waste Authority let a contract for the transport of waste from all civic amenity sites that reflects these conclusions and under which all North London Boroughs with a Reuse and Recycling Centre also now choose to arrange the transport of some materials for recycling. This has increased the integration of services across North London and provided efficiencies in terms of recycling.

In 2007 Government officials have again suggested that it will soon consult on the legal changes sought by the Mayor of London in relation to whether the London Boroughs or the North London Waste Authority should have the sole duty to provide this service.

The Mayor of London has set a policy that all Reuse and Recycling Centres must be available free of charge to all Londoners when depositing household waste. The London Borough of Enfield introduced a permit system for their residents at a time when the Government was consulting on the introduction of a tonnage-based levy system for waste disposal. This was considered necessary as the Borough then received over 40,000 tonnes of waste through the two civic amenity sites in the Borough, and the cost of moving to a tonnage-based levy would have been in excess of an additional £1 million. The restrictions successfully reduced the amount of commercial waste received at the sites significantly, and the Borough subsequently decided to relax the requirement for non-Enfield residents to pay to use the site.

The North London Partner Authorities recognise the use of Reuse and Recycling Centres as an effective opportunity to increase recycling and composting rates and that all Reuse and Recycling Centres will need to improve these rates significantly if the targets within this Strategy are to be achieved.

The Mayor of London is also conducting a review of Reuse and Recycling Centres in London. The Partner Authorities will seek to ensure that any new North London Reuse and Recycling Centre will have a recycling and composting diversion rate in excess of 50% and will be freely available for the deposit of household waste by all Londoners, so long as no restrictions are placed by other waste disposal authorities on the receipt of wastes from North London residents.

- 4.G1 The Partner Authorities will provide continuously improving Reuse and Recycling Centres in excess of the minimum statutory provision throughout the period of this Strategy, which shall be freely available for the deposit of household waste by all Londoners on a reciprocal basis.
- 4.G2 The Partner Authorities will aim to achieve 60% recycling and composting diversion rates at all North London Reuse and Recycling Centres by 2015.
- 4.G3 The Partner Authorities will seek to ensure that all new Reuse and Recycling Centres have a recycling and composting diversion rate in excess of 50%.

#### 4.2.1 (iii) Door-to-Door Recycling Collection Systems

All the North London Boroughs offer a Borough-wide door-to-door recycling collection service from households. The range of materials collected in each Borough varies, but all Boroughs already comply with the 2010 target set by the Household Waste Recycling Act (to collect a minimum of two materials for recycling), and had also met the Mayor's target of collecting a minimum of three materials from households by September 2004.

In all cases, residents are provided either with a plastic collection box or bag to store recyclables in the home until a weekly collection occurs. The North London Partner Authorities then employ several different types of collection service to collect "dry" recyclable materials (i.e. paper, plastic, cardboard, glass, cans, textiles and sometimes other non-organic materials).

In the London Boroughs of Barnet, Hackney and Waltham Forest, collection boxes are hand-sorted on street into separate "stillages" on larger collection vehicles. This enables a large range of materials to be collected from householders and avoids the need for a separate centralised sorting plant or materials recovery facility to sort the recyclable material elsewhere, but requires a higher degree of manual handling and greater local vehicle movements. It does, however, produce better-quality, higher-value separated recyclable materials.

In the London Boroughs of Camden, Enfield, Haringey and Islington materials for recycling are collected commingled (mixed up together) and are then transferred to a Materials Recovery Facility in Greenwich where they are sorted for reprocessing elsewhere. This collection service substantially reduces the time and cost spent collecting materials on the street and increases the amount that can be collected in each vehicle, but requires much greater investment and energy at the central sorting facility. Hackney also provides a commingled service to some of its multiple occupancy premises.

In 2006/07 43,747 tonnes of waste was collected through door-to-door collection services, equivalent to 51% of the total recycled.

Door-to-door collections are expected to increasingly provide a greater proportion of the materials collected by the Partner Authorities in the period of this Strategy.

#### 4.2.1 (iv) Biodegradable Waste Door-to-Door Collection Services

All of the seven collection Partner Authorities also offer a collection of biodegradable waste for composting.

The material collected is either separately-collected garden waste or kitchen waste in the case of Hackney, or mixed kitchen and garden waste in the case of the other six boroughs (Camden has been trialling kitchen waste collections). Residents are offered either sacks (London Borough of Camden) for garden waste, wheeled bins (London Boroughs of Barnet, Hackney and Waltham Forest) or sealed containers (London Borough of Enfield, Haringey and Islington) to store the waste ready for collection. These collections are either weekly or fortnightly.

All Partner Authorities propose to offer a service in accordance with the Mayor's requirement that a collection be offered for biodegradable waste that is not composted at home or in community compost projects. The North London Boroughs expect biodegradable door-to-door collection services to play an important role in their achievement of the Strategy targets for recycling and composting. The contribution of these services is therefore expected to increase from 7% of total recycling and composting collections in 2003/04 to 21% in 2008/09.

The efficiency of the services provided will need to increase significantly if higher recycling and composting standards are to be achieved. This will require better promotion of the services available in order to get more residents to take part, will need those taking part to participate consistently, and will require improved quality services to minimise the contamination of materials and subsequent rejection of waste by reprocessors.

As noted above at 4.1.4 and 4.1.5, early in 2004 the North London Waste Authority successfully acted as a lead authority in bidding to the London Recycling Fund for the North London Integrated Compost Project. This secured £4m for relevant Partners and included a £1.7m contribution towards a composting facility and nearly £2.2m over two years towards capital and revenue costs for biodegradable waste collections.

It is estimated that 95% of residents will need to be provided with comprehensive recycling services and participation rates will need to increase to enable 65% of targeted materials to be captured if the recycling and composting targets within this Strategy are to be achieved.

4.H1 The Partner Authorities will aim to provide door-to-door recycling services to 95% of relevant households and achieve 65% capture rates of targeted recycling materials during the period of this Strategy.

4.H2 The Partner Authorities will offer door-to-door collections of biodegradable waste for all relevant households where home or community composting services are not provided in the period of this Strategy.

#### 4.2.1 (v) Properties of Multiple Occupancy

Approximately 56% of North London residents live in properties of multiple occupancy (396,000 households are either purpose-built or converted flats or housing estates) and therefore require specialised recycling and composting collection services to address the absence of gardens for home composting and the limited storage space that may be available for waste in general.

In September 2002 the London Borough of Islington led a successful £2.3 million joint bid in partnership with the London Boroughs of Camden, Enfield, Haringey and Waltham Forest to the London Recycling Fund for the introduction of over 500 “estates” recycling sites across North London. The project, which built on successful pilot work in the London Borough of Camden, involves the introduction of “near entry” collection wheeled bins, in consultation with residents. The collections typically include paper, glass, cans and textiles, but organic collections were also being piloted.

Following the estates scheme introduction, all seven boroughs have rolled out further services to estates. The Mayor of London has proposed that where door-to-door recycling collection services cannot be provided to multi-occupancy properties, “near entry” collection points should be provided for every 500 householders as a minimum. The Partner Authorities will aim to achieve this target.

The Partner Authorities recognise that successful collections from these properties are crucial to achievement of the recycling and composting standards, and so door-to-door collection services and incentives to recycle may also be offered to these properties in the period of this Strategy.

To achieve the higher recycling targets, the Partner Authorities will need to increase participation rates to enable 65% of targeted recycling materials to be captured by 2015 and thereafter.

- 4.11 The Partner Authorities will work to provide all residents in multi-occupancy housing with either door-to-door collection services or a minimum of one “near entry” recycling site per 500 households as soon as possible.
- 4.12 The Partner Authorities will work to achieve 65% capture rates of targeted recycling materials for recycling services serving multi-occupancy housing during the period of this Strategy.

#### 4.2.1 (vi) Recycling and Composting Facilities

When waste is collected for recycling, time can either be taken to separate the materials into separate compartments on a collection vehicle or the different materials can be quickly loaded onto a vehicle still mixed together and then separated later at a central Materials Recovery Facility. When considering between the two options it is important to take into account the total cost and impacts of collection, sorting, transfer and reprocessing.

Garden waste collected for composting can either be composted in open windrows – lines of screened and shredded material turned regularly in the open air – or, if mixed with other biodegradable waste such as kitchen scraps, must be composted “in-vessel” – in sealed containers which enable control of temperature and emissions in accordance with the Animal By-Product Regulations 2003.

There are several types of in-vessel system available ranging from modular “batch” systems where small containers are used to compost a single load of compost at a time, to large enclosed hall or tunnel systems where a continuous process of composting can be undertaken on a large scale.

In September 2002 the North London Waste Authority contracted Enviro Consulting Limited to conduct feasibility studies into the appropriate facilities that would be required to achieve the 2005/06 recycling and composting standards, given the known collection infrastructure proposed by the North London Boroughs. The completed Feasibility Studies are attached as Appendix 6.

Within the North London area they recorded six licensed recycling bulking facilities employed by the Partner Authorities, but none of the Materials Recovery Facilities or composting facilities employed were located in the North London area. (These facilities are shown in Appendix 8.) The six recycling bulking facilities had a combined capacity of approximately 34,000 tonnes per year. This meant that most waste for recycling or composting was then being taken out of the North London area for sorting, transfer and reprocessing.

The Recycling Feasibility Study suggested that in the period through to 2005/06, the best option for recycled materials was to provide a bulking facility of approximately 16,000 tonnes capacity to serve the London Boroughs of Enfield and Haringey at the Edmonton site, and to complete a bulking facility at the Hornsey Street site to offer a capacity of approximately 50,000 tonnes to the London Boroughs of Camden, Islington and Hackney. The London Boroughs of Barnet and Waltham Forest were thought to be self-sufficient for recycling facilities in the period up to 2005/06.

The Composting Feasibility Study suggested that for the period through to 2005/06, no North London Borough had sufficient facilities to meet their collection requirements. The study suggested that the best option for organic waste would be to develop a modular “enclosed hall” or “tunnel” composting facility capable of handling 20,000 tonnes per annum of mixed organic wastes by 2004 / 2005. With the expected increasing demands on existing windrow composting capacity outside the North London area, the Composting Feasibility Study recommended that a 30,000 tonne windrow facility be developed by 2004/05 with capability to increase to an estimated 40,000 tonne capacity by 2015.

The North London Waste Authority’s bid to the London Recycling Fund in 2003 for support for a recycling bulking facility at Edmonton was not successful. Nevertheless, improvements to LondonWaste Limited’s bulking capacity at Edmonton, and the North London Waste Authority’s demand for bulking bays at the new Hornsey Street Waste and Recycling Centre now provide sufficient bulking to ensure that recycling facilities are available in line with the Recycling Feasibility Study at the present time.

However, as part of the North London Integrated Compost Project mentioned above, £1.7m capital support was secured from the London Recycling Fund to help develop a 30,000 tonne modular in-vessel composting facility at Edmonton within the existing North London Waste Authority waste disposal contract and as part of LondonWaste Limited’s EcoPark proposals.

This has enabled the Partner Authorities to not only comply with the Mayor of London’s proposal that the North London Boroughs conduct a Feasibility Study into the viability of providing source-separated organic collections from households by September 2004, but to turn this into real services for local people.

The Feasibility Study did not identify any immediately suitable locations for the windrow composting facility, and this material continues to be composted outside of the Partner Authorities’ area.

The Feasibility Study indicated the facility needs for North London in the short-term over a timescale that has now substantially elapsed. As ever-higher recycling and composting standards are required to be met, the facilities that offer the best overall option are likely to change in some regards, so future developments may be different. In the short term from 2008/09 the North London Waste Authority has a budgeted capital programme and will commence the procurement of additional services for the sorting of commingled recyclables and for the treatment of biodegradable wastes before the successor arrangements to the contract with LondonWaste Limited have been concluded. As part of the Partner Authorities' requirements for developing a tender specification for services post-2014 (when the North London Waste Authority's contract with LondonWaste Limited comes to an end), further modelling of future facility requirements is being undertaken. Chapter 6 of this Strategy reviews the mix of facilities which were proposed in 2004 when the North London Joint Waste Strategy was first produced, but subjects these mixes to a more complete environmental assessment through the Environment Agency's new, specialist modelling tool, WRATE.

This Strategy requires the Partner Authorities to work together to ensure that the necessary facilities are provided in a timely way and in accordance with the incremental need. The Partner Authorities recognise that it may be necessary for the North London Waste Authority to use its powers of direction to ensure that the necessary facilities are developed, and that these are organised in an integrated way and that appropriate feedstock materials are guaranteed to secure the necessary private or public investment. The Strategic Environmental Assessment of the North London Joint Waste Strategy undertaken in 2007 assumes that the current mix of collection systems being used by the collection Partner Authorities remains unchanged in the future (as opposed to the original Strategy BPEO modelling that assumed all boroughs standardised on either kerbside sorting or central sorting of dry recyclable wastes).

- 4.J1 The Partner Authorities will work together to plan, develop and deliver the recycling and compost facilities required for North London throughout the period of this Strategy and will seek the development of these facilities within the North London area in accordance with the proximity principle.
- 4.J2 The Partner Authorities agree that the North London Waste Authority should use its power of direction where necessary as a contractual mechanism when working in partnership and with the agreement of relevant Partner Authorities or to achieve its own statutory targets.

#### 4.2.1 (vii) Other Recycling Options

The Mayor of London has proposed that the Partner Authorities should further explore opportunities for non-household waste recycling, make arrangements for composting parks green waste, compost market waste where practicable, ~~and~~ sell waste-derived compost to residents *and recycle or compost street litter where possible*. These parts of the waste stream have already been targeted by some of the Partner Authorities for recycling and composting.

The London Boroughs of Barnet, Enfield and Haringey send the leaves collected from street cleansing operations for composting. The London Borough of Hackney delivers green waste from its parks and housing services to a community composting operation in Hackney Marshes. Parks waste is also composted within the parks in the London Borough of Enfield. All of the North London Boroughs also sell waste-derived compost at their Reuse and Recycling Centres, and through LondonWaste Limited the North London Waste Authority arranges for compost produced from waste from North London to be provided free-of-charge in bulk to local allotments and borough parks departments.

The London Boroughs of Camden and Enfield have also been trialling a commercial waste recycling service, and the Partner Authorities are keen to see what opportunities there might be to maximise economies of scale by integrating household waste recycling and composting services with non-household waste streams. To encourage this, the North London Waste Authority introduced in 2006/07 an incentive scheme for the North London Boroughs whereby the North London Waste Authority passes on half of the value of avoided landfill allowance use for biodegradable municipal waste recycled or composted, regardless of whether it is from household or non-household sources.

4.K1 The Partner Authorities will make arrangements to compost street leaves, parks and other green waste wherever practicable in the period of this Strategy.

4.K2 The Partner Authorities will work to increasingly recycle and compost more *street litter and* non-household biodegradable waste to ensure that the need to purchase Landfill Allowances is minimised

#### 4.2.1 (viii) Recycling and Composting Summary

A comprehensive and integrated approach to recycling and composting will be necessary to achieve the increasingly higher statutory recycling and composting standards that are expected during the period of this Strategy. A high level of diversion through composting will be particularly important if the requirements of the Waste and Emissions Trading Act 2003 are to be met within North London.

The Mayor of London stated that the Partner Authorities should work to ensure that London as a whole exceeds statutory recycling targets set in 2005/06, and some Partner Authorities agreed Public Service Agreement standards for recycling and composting either to exceed their statutory standards or to achieve these early. It has also been indicated by the Government that for the North London Waste Authority to secure Private Finance Initiative credit funding for the facilities it needs post-2014, when its contract with LondonWaste Limited comes to an end, it will need to reach the national household waste recycling and composting target of 50% by 2020.

It will be necessary for the Partner Authorities to commit to the achievement of this target through inter-authority agreements. Through the achievement of statutory and local targets set by all the Partner Authorities, the Partner Authorities will ensure that the North London area contributes collectively to the Mayor of London's objective to exceed standards across London as much as they can.

The Government has also offered all local authorities two opportunities to pool their collective recycling and composting standards to encourage greater partnership working and enable authorities to stage the introduction of their recycling and composting services on a regional basis. The Partner Authorities have a wide range of current recycling and composting standards, and whilst they have had real successes by working in partnership, the fact that this is still relatively new means that the opportunities for pooled targets offered by Government have not yet been taken up as locally suitable; but the Partner Authorities will review this when any future opportunity arises.

The collective North London household waste recycling and composting performance target in 2003/04 was 12%, and was exceeded. The second target of 18% in 2005/06 was also achieved, and further work and investment has taken performance to nearly 23% in 2006/07. The Partner Authorities have agreed to aim to achieve a rate of 45% by 2015, and as stated above, will also need to demonstrate real commitment to 50% recycling and composting by 2020 if they wish to secure Private Finance Initiative credits. The commitment to these targets will also demonstrate the Partner Authorities' commitment to recycling and composting in North London and thereby to minimise the need for other recovery processes for landfill diversion.

In 2004 it was accepted that a maximum recycling rate was likely to be up to 60%. Such a recycling rate is likely to require the introduction of even more comprehensive recycling and composting services than exist locally now, fortnightly collections of residual waste, stronger education and enforcement programmes and legislation for the direct charging for waste, but this is not currently favoured by Government. The Mayor of London therefore accepted that more realistic maximum recycling targets should be those suggested by the Prime Minister's Strategy Unit in the "Waste Not, Want Not" Report as being 35% recycling by 2010 and 45% by 2015. However, the Mayor of London believes that with the removal of the appropriate fiscal and legislative barriers, recycling targets of 50% by 2010 and 60% by 2015 could be achieved, and is expected to increase his targets for London to the same level as the more recent national targets when he next reviews his Municipal Waste Strategy.

These rates are ambitious when considered in the North London context, but have been achieved elsewhere. Assuming that the waste growth outlined in Chapter 2 occurs, and the waste prevention programme described earlier in this chapter is successful, a recycling rate of 45% would divert approximately 660,000 tonnes of household waste from landfill by 2015 (including approximately 110,000 tonnes of post-collection recycling) and would achieve a 50% recycling rate by 2020.

4.L1 The Partner Authorities undertake to individually achieve the statutory recycling and composting standards set by Government and to exceed these standards wherever practical.

4.L2 The Partners will work to achieve ~~40%~~ 35% recycling and composting standards by 2010, 45% by 2015, and 50% by 2020 in line with the Government's Waste Strategy for England 2007.

#### 4.2.2 Recovery

Recovery is here taken to include waste management processes that treat mixed waste to enable reclamation of energy, refuse-derived fuels or marketable products. In accordance with the waste hierarchy, waste recovery should generally only be undertaken for wastes remaining after waste prevention, recycling and composting have been maximised.

If the waste growth assumptions outlined in Chapter 2 are correct, and the waste minimisation and recycling and composting activities proposed in this Strategy are successful, the Partner Authorities will still require a significant recovery treatment process, (estimated at approximately 530,000 tonnes net diversion capacity per year) by 2020 to divert sufficient waste to ensure that no additional Landfill Allowances are required to be purchased by the North London Waste Authority on behalf of the Partner Authorities.

A significant proportion of the residual mixed waste is potentially recoverable. Waste Strategy for England 2007 includes national targets for the recovery of waste, and the North London Waste Authority records performance indicators for North London, but no statutory recovery standard exists. In North London, the Edmonton Energy-from-Waste facility has treated mixed waste to "recover" heat for electricity generation, and metals and construction materials for recycling since 1971. The incineration process reduces the volume of the waste incinerated by 90% and the weight of the waste by ~~70%~~ 80% (much of which is recycled as metals or secondary aggregates), producing enough energy in the process to provide power sufficient for 66,000 homes.

To comply with the Waste Incineration (England and Wales) Regulations (2002) improvements to the Edmonton facility have been necessary. LondonWaste Limited has refurbished the existing boilers and grates and installed other equipment to meet the lower emissions standards set by the Regulations by the end of December 2005, particularly carbon monoxide, nitrogen oxide and particulates from the facility. These improvements ensure that the Edmonton Energy-from-Waste facility meets the new emission standards.

However, the Edmonton facility is unlikely to be able to treat all the Partner Authorities' residual waste, meaning that alternatives must be considered to supplement it, and the Partner Authorities recognise too that the Edmonton facility may have come to the end of its useful operational life by the end of the North London Waste Authority waste disposal contract in 2014. The Partner Authorities are therefore considering the recovery treatment alternatives for residual mixed waste within this Strategy.

The Renewables Obligation Order 2002 requires electricity suppliers to provide a minimum percentage of their electricity from renewable sources and to demonstrate this through the purchase of Renewables Obligation Certificates. The new order, unlike the previous Non-Fossil Fuel Obligation regime, explicitly excludes conventional Energy-from-Waste incinerators, like the Edmonton facility, from qualifying for Renewables Obligation Certificates, unless they operate in high-quality CHP (combined heat and power) mode. This puts conventional incinerators at a financial disadvantage compared to so-called "New and Emerging Technologies" for energy treatment. The Mayor of London has also stated in his Municipal Waste Management Strategy (proposal 36) that he will be 'giving preference to new and emerging advanced conversion technologies for waste'. Given that the North London Joint Waste Strategy is now required to be in general conformity with the Mayor of London's Waste Strategy it is important for the North London Joint Waste Strategy to take this into account.

The Mayor of London has previously also stated his desire to assist LondonWaste Limited in the development of a heat distribution network to provide the waste heat from the Edmonton plant to local buildings. The North London Waste Authority has endeavoured to establish such networks in the past, but there are significant difficulties in co-ordinating the construction of appropriate buildings and the available supply and off-take. The support of the Mayor of London is therefore welcomed by the Partner Authorities.

The Mayor of London evaluated the "New and Emerging Technologies" for energy treatment of mixed waste within the "City Solutions" Report in April 2003, which itself informed the development of the Mayor's Municipal Waste Management Strategy. The evaluation criteria used to select the "New and Emerging Technologies" for consideration within the report restricted the technologies chosen to those able to demonstrate full-scale working plants as opposed to models or trial schemes.

The Partner Authorities reviewed the technologies arising from the City Solutions report to consider which should be included within the strategic modelling undertaken to determine the best treatment option for North London. The North London Waste Authority also considered “New and Emerging Technologies” as part of its consideration of the LondonWaste Limited options for meeting the Waste Incineration Directive.

Further assessment of new and emerging technologies will need to be undertaken by the North London Waste Authority as the Partner Authorities progress towards the North London Waste Authority letting a new contract or contracts for waste management services in North London from 2014. This will have regard to more recently published reports and analyses from the Mayor of London and others, particularly in relation to climate change.

#### 4.2.2 (i) Pyrolysis and Gasification

Pyrolysis involves the heating of residual waste or refuse-derived fuel in the absence of oxygen to break down the waste into its basic chemical parts: a solid “char” together with gas and liquid streams that can all be used as fuels. Gasification is similar to pyrolysis but it involves heating the waste in an atmosphere where a small amount of oxygen is permitted. This allows greater control over the process and the materials that can be produced by it. Gasification produces a gas including carbon, methane and hydrogen.

Neither technology is essentially new, but no large-scale operating plants treating municipal waste yet exist in the United Kingdom. However, plants in Germany and Japan are now operating at scales of up to 225,000 tonnes of waste per year. These plants combine the pyrolysis and gasification processes to produce a synthesis gas (50-60% by weight) that can be used as a fuel, a vitreous aggregate (20-25% by weight), water (10% by weight) and small quantities of metals and salt.

Pyrolysis and Gasification plants therefore involve thermal treatment in broadly similar plants that have to meet the same emission standards as conventional Energy-from-Waste incinerators such as the Edmonton Facility. Pyrolysis and Gasification technologies have advantages in that they normally generate less ash for disposal than conventional Energy-from-Waste incineration plants and reduce the amount of ‘hazardous’ material contained within the ash; they may also be more thermally efficient than an incineration plant, although this may vary according to the technology used and the use of the end products from the process. Pyrolysis and Gasification are not yet proven at the same scale as conventional incineration, however, and require a greater degree of pre-sorting of waste. They usually require the residual waste to be pre-treated in some way, for example through a Mechanical Biological Treatment (MBT) plant to produce a more homogenous material or ‘Solid Recovered Fuel’ (SRF).

Both technologies have advantages over other energy treatments in that they can both immediately use the fuel derived from the process to generate “green” power. Pyrolysis and Gasification plants are eligible for Renewable Obligation Certificates, which partly offset their increased cost compared to conventional Energy-from-Waste incinerators.

#### 4.2.2 (ii) Anaerobic Digestion (AD)

This process involves the fermentation of organic material in the absence of oxygen to produce a biogas - a mix of hydrogen, methane and carbon dioxide - and a sludge or digestate that, with further processing, can be used as a soil improver. The gas can be used to heat the reaction vessel in which the process takes place. Anaerobic digestion has been used in sewage treatment since the 1960s; more recent demonstration plants have also been built to show the potential for using anaerobic digestion in waste treatment.

The City Solutions report included a source-separated organic waste stream treated through an anaerobic digester, rather than mixed waste, as a proven example of anaerobic digestion. Large-scale plants, treating over 50,000 tonnes per year, also operate elsewhere in Europe using both source-separated organic waste and mixed waste. Both source-separated and mixed waste processes require a high degree of pre-screening or sorting to remove unsuitable waste. The source-separated anaerobic digestion process typically produces approximately 40% digestate soil improver (by weight) and extracts a further 10% of materials for recovery (typically glass, aggregates and metals), with the remainder requiring landfill.

Anaerobic digestion facilities can contribute to statutory composting standards and qualify for Renewable Obligation Certificates, but are still expensive when compared to conventional composting unless existing sewage treatment facilities are employed. One such facility exists at Thames Water Utilities Deephams Sewage Treatment Works in Edmonton.

#### 4.2.2 (iii) Mechanical and Biological Treatment (MBT)

These processes are also termed Mechanical and Biological Recycling. Typically the process includes a mechanical sorting system followed by biological treatment. Mechanical biological treatment can be used to stabilise the waste or be used to reduce its mass through drying, and may also be used to prepare a waste-derived or 'solid recovered' fuel (SRF) or soil conditioner, depending upon the nature of the process. It can also facilitate the recovery of any remaining recyclable materials that were not separated before the waste was collected. Typically mechanical biological treatment facilities involve the mechanical separation (through screening, sorting and grading processes) of metal, glass and aggregates from mixed waste before aerobic composting (in a controlled environment) to separate a stabilised organic fraction with the residual matter being made into SRF. A variant is Biological and Mechanical Treatment, where the mixed waste is dried and stabilised before mechanical separation takes place.

Large-scale mechanical and biological treatment plants are widely used elsewhere in Europe and in North America, and East London Waste Authority also uses the process as the primary technology for delivery of its waste disposal contract.

Mechanical Biological Treatment is perhaps better defined as “pre-treatment” technology, which prepares waste for further treatment and is therefore highly dependent upon a successful integration with other recovery technologies. The advantage of Mechanical and Biological Treatment processes is that by stabilising the waste, water is removed, increasing the calorific value of the residual refuse-derived fuel fraction (ranging from 15% - 45% by weight). The fuel developed qualifies for Renewables Obligation Certificates, and although it can be burned within a conventional incinerator under normal operational circumstances it is also well suited for a gasification or pyrolysis plant or other specifically adapted combustion processes. SRF can be produced to a specific standard and may also be sent to a third party user such as an industrial user with a combustion process rather than a stand-alone waste facility.

It is also possible that the recycling extracted by the process (ranging from 10 - 15% by weight) will be able to contribute to statutory recycling standards, but the compostable fraction (varying between 15 - 45% by weight) is unlikely to meet the national compost standard (PAS 100) and is usually only suitable for landfill cover, meaning this is unlikely to contribute to statutory composting standards. The process benefits from being comparatively affordable in relation to other “New and Emerging Technologies”.

#### 4.2.2 (iv) Recovery Summary

The Edmonton Energy-from-Waste facility has enabled the Partner Authorities to significantly reduce the amount of waste that would otherwise have been landfilled over the last 32 years. Through the North London Waste Authority’s waste disposal contract, the Partner Authorities are committed to LondonWaste Limited and the Edmonton Energy-from-Waste facility for all suitable residual wastes until December 2014.

The continued operation of this facility is expected to assist the North London Waste Authority keep within its 2010 landfill allowances under the Waste and Emissions Trading Act (2003). The increasing cost of landfill may mean that providing additional recovery treatment capacity could be beneficial to LondonWaste Limited, and therefore the Partner Authorities, during the period of the current waste disposal contract.

The Partner Authorities will need increased and significant energy treatment capacity - potentially 500,000 tonnes input per annum by 2020 - to comply with the later requirements of the Landfill Directive. “New and Emerging Technologies” are increasingly offering attractive alternatives both to landfill and to conventional incineration.

The Partner Authorities will need to review the recovery treatment options that provide the most acceptable option for North London within the North London Waste Authority contract tendering processes, taking account of the North London Waste Plan, the Mayor of London's strategies and preferences in relation to energy from waste technologies, and the affordability, deliverability and performance of the different alternatives from a waste management and climate change perspective. The Partner Authorities will favour recovery technologies that are eligible for Renewables Obligation Certificates when considering proposals for waste disposal contracts in North London provided the technologies concerned provide the best overall option (See Chapter 6).

- 4.M1 The Partner Authorities are committed to the continued use of the Edmonton Energy-from-Waste facility for the period of the current waste disposal contract.
- 4.M2 Where recovery treatment is selected within any new waste disposal contract, the Partner Authorities undertake to favour processes that qualify for the Renewables Obligation Certificates where these provide the Best Practicable Environmental Option.

#### **4.2.3 Disposal to Landfill**

Landfill involves the depositing of untreated mixed waste in lined void spaces or holes in the ground, usually created by the quarrying of clay, lime or aggregates. Landfill sites are tightly regulated to prevent pollution emissions to the local environment, but emissions of greenhouse gases, in particular methane, do occur as waste decomposes, leading to the increasing regulatory framework to discourage the use of landfill. Disposal to landfill therefore falls at the bottom of the waste hierarchy and should be reserved for the residues of other treatment processes or waste where other treatment is not practical.

The Partner Authorities disposed of 290,348 tonnes of household waste to landfill in 2006/07. There are no landfill sites in the North London area and therefore sending waste to landfill involves the transport of waste over long distances.

The majority of North London's waste, for example, is currently landfilled at sites in Brogborough in Bedfordshire and Calvert in Buckinghamshire. In 2006/07 44.58% of the waste sent to landfill from North London was sent by rail from the Hendon waste transfer station. This reduces the environmental impact when compared to road transport, which is the method used to transport the remainder of North London's waste to landfill.

The East of England Regional Assembly has indicated that they see it as essential that London as a whole becomes self-sufficient in the management of its waste, and that every effort should be made by London to manage the waste it generates. The East of England Regional Waste Management Strategy 2002 states that 'it is essential that the high level of export of waste from London should be drastically reduced.' SERPLAN also has a policy (SERP 160 'Revised Waste Planning Advice' 1996) that London should aim to reduce waste exports progressively such that by 2010 only residues from the processing of waste should be landfilled outside London, and the East of England regional waste plan considers this to be a valid aim which the region should recognise and complement. Accordingly Policy 3 of the Regional Waste Management Strategy states that local authorities in the region will apply the principle that after 2010 the import of waste from outside the region will only be acceptable in very special circumstances. Only residues from other waste processes, or very exceptionally (where it can be demonstrated that there is no other practical option) waste from outside the region which would not benefit from treatment, will be acceptable in landfills in the region.

The Mayor of London has also agreed a policy stating that waste disposal authorities in London should aim to meet their Landfill Allocations. The North London Partner Authorities have undertaken to do so.

If the waste growth assumptions outlined in Chapter 2 are correct, and the waste minimisation, recycling and composting and energy recovery activities proposed in this Strategy are successful, the Partner Authorities will still need to landfill approximately 294,000 tonnes of municipal waste in 2020, of which approximately 200,000 tonnes would be process residues from other treatment options.

The North London Waste Authority expects to have sufficient Landfill Allowances to ensure that no additional Allowances will be required until 2010/11, assuming current facilities remain available and recycling and composting targets are met. The Partner Authorities must, however, plan fully for the subsequent Landfill Directive target years, by which time additional recovery capacity will be needed.

The Mayor of London has proposed in the past that the Greater London Authority should act as a "broker" for Landfill Allowances and that any London authorities with excess Landfill Allowances should agree to offer first option on purchase of these allowances to other London authorities. The Partner Authorities recognise the potential advantages for other London local authorities of these proposals and, provided that they offer Best Value to the Partner Authorities at the time, have no objection to the proposals in principle.

The Mayor of London has stated that waste disposal authorities should encourage the use of landfill gas as an energy source, and that any new waste disposal contracts that include disposal to landfill should incorporate this policy. The Partner Authorities undertake to incorporate this policy in future waste disposal contracts.

4.N The Partner Authorities will seek to minimise disposal to landfill throughout the period of this Strategy and undertake to seek the recovery of energy from landfill gas wherever practicable.

#### **4.2.4 Addressing the environmental impact of new waste management facilities**

The environmental report produced as part of the strategic environmental assessment of this Strategy recommends that the environmental impacts of providing new recycling, composting and recovery facilities and services could be made more certain by providing more detail in the North London Joint Waste Strategy of how they would be managed. The Partner Authorities accept that in order to minimise the impact of any new facilities proposed as part of implementing this Strategy, new facilities should:

- Reach a high standard of sustainable design and construction.
- Site selection for new facilities should have regard to the preferred locations that will be identified within the forthcoming North London Waste Plan, as the plan and locations within it will have already have been subjected to a sustainability appraisal process (including equalities impact assessment) and public consultation as well as an independent inspector's review and report.
- Prioritise the use of previously developed and industrial land for locations for new treatment facilities.
- Prioritise the co-location of facilities to reduce land take.

It is also anticipated that any new facilities will be subjected to individual environmental impact assessments and referred to the Mayor of London for consideration and planning decision given their likely size and strategic nature.

### **4.3 Summary of Waste Hierarchy Options**

The proposed approach to the waste hierarchy options available to the Partner Authorities would give the following change in municipal waste management in North London.

**Proportions of North London Municipal Waste  
Treated by Options within the Waste Hierarchy (2006 - 2021)**

2006/07			2020/21	
Reduction		NB:1		Reduction
Reuse		NB:1		Reuse
Recycling and Composting (293,731 tonnes)	31%	NB:2	51%	Recycling and Composting (699,913 tonnes)
Recovery (293,303 tonnes)	31%	NB:3	36%	Recovery (492,101 tonnes)
Disposal to Landfill (368,359 tonnes)	39%	NB:4	13%	Disposal to Landfill (184,465 tonnes)
Total (955,393 tonnes)	100%		100%	Total (1,376,480 tonnes)

1. Reduction and reuse initiatives are expected to be undertaken and contribute to reducing the waste growth. We have assumed a fixed waste growth of 3% and 2.5%, so waste minimisation is required to make up for increasing household number, i.e. the growth rate would be even higher without reduction and reuse initiatives.
2. Includes all recycling such as commercial waste, metals from EfW ash recycling and construction and demolition waste recycling. Equivalent to a household waste recycling rate of 27.1 % in 2006/07 and 50.2% in 2020/21 (excluding rejects and recycling from residual treatment e.g.MBT)
3. Includes all waste not landfilled, excluding recycling
4. Includes residues from recycling, composting and recovery treatment options e.g. ash.

This Strategy proposes a significant movement towards more sustainable and integrated waste management in North London, increasing recycling and composting, recovering energy and sending less to landfill. ~~The Partner Authorities are disappointed that, despite the substantial waste prevention programme proposed, the current framework for waste management may effectively limit the contribution that waste reduction and reuse can make to this Strategy's implementation.~~