Logistics and the waste sector: a London case study.

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Abstract

London has traditionally exported most of its waste to former mineral workings in surrounding counties for landfill. Many of these sites are being filled and opportunities for new sites are limited. Virtually all waste reprocessing and recycling facilities, with the exception of textile sorting and some facilities for glass and organic waste composting, are outside London. The Mayor of London's Vision for Waste in London is that by 2020, municipal waste should not compromise London's future as a sustainable city. This will involve managing waste better, so that its impact on the local and global environment and on London communities, economy and health is minimised. The majority of waste and recyclable materials in London are currently collected and transported for recovery, disposal or reprocessing by road in large vehicles. Environmental costs include, adding to congestion, noise, energy usage, air pollution, and accidents. The Mayor is keen to increase recycling and reuse of waste materials in London, and to ensure that as more of London's waste is diverted away from landfill sites to recycling facilities. Several projects and initiatives have been established and these are reviewed in the paper.

Keywords: waste, freight, logistics, London

Introduction

Waste transport and logistics activities have a wide range of negative social and environmental impacts in urban areas including noise pollution, air pollution, contribution to traffic congestion, involvement in traffic accidents, and the deposit of dirt and waste on the road network. Many waste transport and logistics activities take place at sensitive times (especially waste collections early in the morning), which can exacerbate the noise impacts. The paper discusses the developments in legislation and policy developments in waste management in the UK, and presents a case study of waste management, policy and initiatives in London.

Waste management and policy in the UK

The UK Government has set out its key waste objectives in its 2007 Waste Strategy for England, These including to decouple waste growth in all sectors from economic growth and put more emphasis on waste prevention and re-use, to meet and exceed the Landfill Directive diversion targets for biodegradable municipal waste in 2010, 2013 and 2020; and to obtain "the most environmental benefit from that investment, through increased recycling of resources and recovery of energy from residual waste using a mix of technologies" (Defra, 2007). This Waste Strategy includes several targets which include (Defra, 2007):

- reducing the amount of household waste not re-used, recycled or composted from over 22.2 million tonnes in 2000 by 29% to 15.8 million tonnes in 2010 with an aspiration to reduce it to 12.2 million tonnes in 2020 – a reduction of 45% (this is equivalent to a fall of 50% per person)
- recycling and composting of household waste rates of at least 40% by 2010, 45% by 2015 and 50% by 2020;
- recovery rates for municipal waste of 53% by 2010, 67% by 2015 and 75% by 2020.
- setting a new national target for the reduction of commercial and industrial waste going to landfill. Commercial and industrial waste that is landfilled is expected to fall by 20% by 2010 compared to 2004.
- The Government is considering a target to halve the amount of construction, demolition and excavation wastes going to landfill by 2012 as a result of waste reduction, re-use and recycling.

The UK Government has estimated that the impact of its current waste strategy will be an annual net reduction in global greenhouse gas emissions from waste management of at least 9.3 million tonnes of carbon dioxide equivalent per year compared to 2006 (Defra, 2007).

Operational management of municipal waste in London

The Mayor of London published his Municipal Waste Management Strategy in 2003 (Mayor of London, 2003). The Mayor's goal is that by 2020, municipal waste should not compromise London's future as a sustainable city. To achieve this long-term goal, lifestyle habits must change so that Londoner's produce only the minimum amount of waste, and reduce the pressures on the environment. This will involve managing waste better, so that its impact on the local and global environment and on London communities, economy and health is minimised. This Waste Strategy will be led by waste reduction, reuse and recycling.

There is no single body responsible for day-to-day operational management of municipal waste management in Greater London. The Greater London Authority is the strategic authority for municipal waste in London. The 32 London boroughs and Corporation of London each have a statutory duty for the collection of municipal waste. However, in the case of waste disposal, the responsibilities are not uniform or consistent across London. The Corporation of London and 11 London boroughs also have responsibility for the disposal of their municipal waste (i.e. a single tier system). The other 21 boroughs are arranged into four statutory joint waste disposal authorities (i.e. a two-tier system). These statutory waste disposal authorities are led by a committee of councillors from their constituent boroughs and are responsible for making arrangements for disposal on behalf of the constituent councils (Mouchel Parkman, 2005).

The boroughs often subcontract waste collection, operation of Civic Amenity sites and transfer stations to specialist waste companies. Waste authorities will also manage the disposal of municipal waste through contracts with private sector companies. The Mayor of London attempted to gain powers to control all of London's waste disposal services under a capital-wide single waste authority. However, this was rejected by the Secretary of State for Communities and Local Government in summer 2006 (Cartledge, 2006).

Waste generated in London

About 18 million tonnes of waste is generated in Greater London each year (which covers an area of 1587 square kilometres). This comprises municipal solid wastes, commercial and industrial wastes and construction and demolition wastes. In 2003, 70% of London's municipal solid waste was sent to landfill, together with 40% of commercial and industrial wastes and 15% of construction and demolition wastes C&I waste (Greater London Authority, 2006 - see Table 1).

Table 1: Total waste produced and disposal method, London 2003

Source of waste	Million tonnes per annum	Disposed to landfill (%)	Recycled (%)	Incinerated (%)	Other (%)
Municipal solid waste	4.3	70	11	19	0
Commercial & industrial	6.6	40	44	5	11
Construction & demolition	7.2	15	85	0	17
Total *	**18.1**	**37**	**53**	**6**	**4**
* Of which, hazardous waste	0.3	62	4	1	32

Source: Greater London Authority, 2006.

Table 2 shows changes in the handling of municipal waste arising in London between 2000/1 and 2005/6. Over this period the proportion of municipal waste sent to landfill has fallen from 72 per cent to 64 per cent, while the proportion being recycled and composted has risen from 8 per cent to 18 per cent. With the predicted 900,000 increase in London's population to 8.3 million by 2026 and additional housing requirements and employment increases, waste levels are expected to rise to 23.6 million tonnes a year by 2020 (Greater London Authority, 2006). However, there is some evidence of total waste quantity stabilisation as demonstrated by the municipal waste statistics in Table 2.

Table 2: Waste trends for municipal wastes in London 2000/1-2005/6

Method	2000/01		2001/02		2002/03		2003/04		2004/05*		2005/06	
	000 t	%	000 t	%	000 t	%	000 t	%	000 t	%	000 t	%
Landfill	3,207	72	3,244	73	3,163	71	3,021	70	2,856	65	2,692	64
Incineration with EfW	886	20	842	19	872	20	826	19	869	20	767	18
Incineration w/o EfW	1	0	2	0	1	0	1	0	1	0	0	0
RDF manufacture	0	0	0	0	0	0	0	0	0	0	0	0
Recycled/composted	344	8	351	8	410	9	494	11	643	15	763	18
Other	0	0	0	0	0	0	0	0	0	0	0	0
Total**	**4,438**	**100**	**4,438**	**100**	**4,446**	**100**	**4,342**	**100**	**4,370**	**100**	**4,223**	**100**

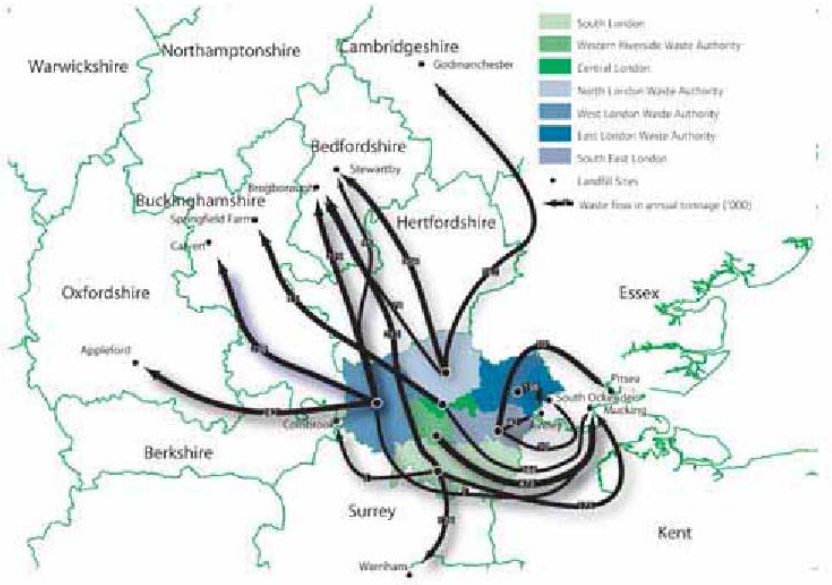
Notes: * Totals may not add up due to rounding. ** 2004/5 was the first year for which estimates were based on returns made to WasteDataFlow database by Local Authorities.
EfW - *energy from waste* RDF - *Refuse Derived Fuel*
Source: Defra, 2006.

Managing London's waste

Currently almost all the waste generated in London is collected by goods vehicles and transported by road to a waste facility for treatment, recycling or transfer to another facility.

There are relatively few landfill and recycling sites in London so the vast majority of the residual municipal, commercial and industrial and construction and demolition wastes transported to these sites are taken outside the capital. Most of landfill sites used for London's waste are located in the east and southeast of England (see Figure 1).

Figure 1: Disposal routes outside London for London's municipal waste



Source: Mayor of London, 2003.

Road is by far the dominant mode for the movement of waste from transfer stations in London to recycling or waste facility or to landfill site. In 2005, 790,000 tonnes of municipal waste was moved from waste transfer stations in London by rail out to landfill sites outside the capital (Waste Recycling Group, 2006). Other construction wastes are moved by rail on an ad hoc basis. Approximately 600,000 tonnes per annum of municipal waste is currently transported by barge from central London boroughs up the River Thames to Mucking landfill site at Thurrock in Essex. However, these movements will stop at the end of 2007 as existing landfill capacity at Mucking will have been used up.

The number of road journeys undertaken to collect segregated waste streams from bring or kerbside schemes are higher than the traditional mixed waste rounds of the past. However, as more new waste management facilities come on stream in the capital, journey distances for these collected wastes will decrease.

The development of more waste facilities in London handling both commercial and industrial waste and municipal solid waste, and the effective utilisation of capacity in existing facilities will be central to the Mayor's waste strategy target that 85 per cent of London's wastes will be managed in the capital by 2020. Table 3 shows the totals quantities of wastes to managed inside the Capital.

Table 3: Net self-sufficiency: Waste to be managed in London (million tonnes and percentage)

Source of waste	2010		2015		2020	
	Amount	Per cent	Amount	Per cent	Amount	Per cent
Municipal solid waste	2.4	50	3.9	75	4.6	80
Commercial and industrial	5.9	75	7.1	80	8.4	85
C, D & E*	7.4	95	8.2	95	7.7	95
All wastes	15.8	75	19.2	80	20.6	85

Note: * construction, demolition and excavation
Source: Greater London Authority, 2006.

The Mayor has outlined detailed policies relating to the transport of waste by road and other modes in his Waste Strategy for London (Mayor of London, 2003). An example of the approach is shown in exhibit 1.

Exhibit 1: The Mayor's Waste Objectives

Waste Collection by road

- Vehicles used to collect waste by road must meet appropriate standards and be operated as efficiently as possible (e.g. ensure routes are planned efficiently and have regard to sensitive times of the day). Driver training can also help to minimise impacts.
- Consolidating waste at London's transfer stations can help to reduce the number of vehicle movements required when sending the waste for treatment, reprocessing or final disposal.

Use of non-road modes for waste collection

- The Mayor, through Transport for London, will work with the waste authorities, and other relevant partners to encourage the movement of waste by rail and water. This will also be encouraged by protecting waste management facilities that have, or may have, water and rail access. Non road modes should be considered whenever new waste contracts are being developed.
- The canal and river network can play a small, but significant, role in the future collection of waste and recyclables. This can help to relieving busy roads from slow-moving heavy vehicular traffic. Such a system requires the acquisition of appropriate equipment.
- Infrastructural barriers that prevent the use of water and rail can be resolved by using grants to improve or install facilities on the water or rail networks.

Waste transport projects and initiatives in London

Transport for London (TfL) is the integrated body responsible for London's transport system. Its role is to implement the Mayor's Transport Strategy for London and manage the transport services across the capital for which the Mayor has responsibility. A Freight Unit has been established within TfL and the London Freight Plan is due to be published in 2007. The Mayor required the development of the London Sustainable Distribution Partnership (LSDP) to bring together policymakers, industry representatives and other stakeholders with an interest in freight transport. A Waste Industry Action Group has been formed as part of the LSDP. TfL's work with stakeholders in the waste industry has primarily focussed on understanding the waste implications of the planned growth of London, as well

as investigating opportunities for modal shift. Several waste initiatives and projects have already been started by the TfL Freight Unit in conjunction with the LSDP. These are summarised below.

A London-wide waste land-use and transport model for municipal, commercial and industrial waste streams including the environmental impacts of waste transport is being developed for TfL. It is being used to consider the increasing transport demand and use of vehicles and the role of different modes as greater proportions of London's waste is recycled and recovered. This model will have the ability to influence strategic and local planning, which will inform the number and type of new waste management facilities that will be required in the capital.

A major study into commercial opportunities for London's canals was carried out in 2003/2004. Stage 1 of the study surveyed potential wharf sites and opportunities for waste, recyclables and construction materials (Peter Brett Associates, 2004). The work helped to initiate projects including the movement of 70,000 tons paper annum of cardboard from Park Royal to Maidenhead. This uses the section of canal between Park Royal and Slough where the load is transferred to road. This equates to 8,750 lorry journeys saved (in and out) using 16 ton lorries. The return journey from Park Royal to Slough is 31 miles giving a total of 271,250 miles lorry miles saved per year. Stage 2 identified volumes of commercial and industrial waste and other 'bulk' commodities suitable for transport along the canal and the anticipated volumes which could be transported now and in the future (Peter Brett Associates, 2005). A Lower Lee study is planned to look at the movement of waste and construction materials, similar to that on the Grand Union Canal.

A new canal wharf has been constructed at Old Oak Sidings on the Grand Union Canal in north west London to service Powerday's Material Recycling Facility which is scheduled to open in 2008. The £450,000 wharf is part of a package of measures to achieve modal switch to water for recyclables and secondary aggregates (Waterscape.com, 2006). Selective dredging has been undertaken to increase the capacity for freight movements along the Grand Union Canal, above that needed for pleasure craft. The Park Royal commercial and industrial waste project started in 2005, funded by TfL through the Park Royal Partnership, to capture waste streams to use the canal and the Material Recycling Facility at Old Oak Sidings (Peter Brett Associates, 2006; Rolandon Water and Sea Freight Advisory Services, 2006).

Hackney Waste-by-water pilot was undertaken in 2004 to prove the costs and benefits of a, a multi-modal method of municipal waste and recyclables collection using multi-modal refuse collection vehicles (MMRCVs) and transfer to the Edmonton waste incinerator by barge on the River Lee (Urbecon, 2005). An Investigation of MMRCV potential across London is to be undertaken to develop the findings from the Hackney Pilot to a commercial solution. TfL has invested £0.5 million in the MMRCV pilot vehicle and wider use assessment. Operational trials will commence in 2007.

A Borough Fleets survey was undertaken in 2004 which included waste fleets. TfL is also developing Delivery and Servicing Plans, and considering how best to include waste, other freight and service transport arrangements in these. The study of water and rail use for waste and construction for the Olympics in 2012 is also taking place.

Conclusions

As the review illustrates the movement of waste raises important transport issues both in terms of the volume of transport, the mode used and the timing of trips. Many of the trips associated with waste transport occupy road space during the peak hours and it is difficult to change this by shifting to other times of operation. In addition, the organisation of waste logistics is complex with several overlapping administrative and policy layers combined with considerable variation in contractual, business and operational practices. This can make it very difficult to change the physical transport chain in response to new policy initiatives.

Changes in legislation and waste management practices in London are resulting in the need for greater consideration of transport issues in London. This has brought to the fore the importance of devising more sustainable solutions to the transport of waste within London. In attempting to make the London waste operations more sustainable overall the movements are likely to become more complicated. In the past simply exporting the waste may have generated transport trips but helped to minimise complexity. The future approach will require a more complicated treatment of waste involving

separation, recovery and so on, and resulting in more of the waste being dealt with within London itself. This in turn will give rise to a more complicated pattern of transport and given the reliance on road movement it is inevitably a concern that this could increase road waste movements. There is a clear opportunity for water and rail to play a larger part in the future strategy for waste movement – however this will result in the need to changes some of the current operating and administrative practices.

A number of recent projects and initiatives in London have provided encouragement that by adopting a more supply chain approach there can be some significant sustainability benefits. Understanding the opportunity for each transport mode to play its part and for optimising the operational aspects of the various modes suggest that there is much that could be done to reduce the environmental impact of waste transport while still maintaining a high level of service to both residents and business. Improvements in waste movement could make an important contribution to London becoming a more sustainable city but for this to happen successfully it is essential that the good practice lessons that emerge form the pilot projects and other initiatives are spread widely among across London's complex waste management structure.

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