

TOPIC PAPER 4: WASTE FACILITIES

Introduction

The majority of Greater Manchester's waste is currently sent to landfill. However, there is a finite amount of void space for landfilling and this is increasingly being seen as an unacceptable method of waste management and does not conform to the ideals of the waste hierarchy¹. As a result, a variety of new technologies for waste management have been developed, which could be used alongside more traditional facilities.

This topic paper details different types of waste management facilities and their processes. The paper is divided into existing (traditional) facilities and 'new technologies'. Experience in dealing with planning for new waste technologies is limited, with some still in their developmental stages. Furthermore, it is likely that other new technologies will emerge in the future.

EXISTING FACILITIES

Waste Transfer Station

Waste transfer stations (WTS) are facilities for receiving and 'bulking up' waste before its onward journey for treatment, recycling or disposal elsewhere. They are used to transfer waste from smaller road vehicles to vehicles with a larger capacity or trains/barges, thus reducing waste related traffic. A variety of WTS are in place, managing waste from industry, commerce and the public. WTS may look similar to a tall industrial unit and there are usually bays inside for receiving waste.

Materials Recovery Facility

At Materials Recovery Facilities (MRF), waste is sorted mechanically/manually and any recyclable material is bulked up and transferred for reprocessing. There are two types of MRF: clean and dirty. The former processes waste that has been source separated whilst the latter processes non-separated waste or 'putrescible' materials. MRF look similar to large warehouse units.

Household Waste Recycling Centre

Household Waste Recycling Centres (HWRCs, previously known as Civic Amenity sites) are small-scale facilities used by the public for the deposit of household wastes. Materials accepted may include refrigerators, batteries, paint, oil, wood, furniture, rubble and garden waste.

Older sites are often open air on areas of hard standing. Newer sites can accommodate purpose built facilities which can be undercover to contain problems such as noise and dust.

¹ See Topic Paper 1 for an explanation of the Waste Hierarchy.

Incineration (Conventional Thermal Treatment)

Incineration is the burning of waste at high temperatures. This reduces its volume by turning it to ashes and also generates heat, which may be used to generate electricity. Some industrial processes co-incinerate (mix waste with conventional fuel) to produce energy. Thermal recovery facilities use waste to generate heat/electricity, and are also known as Energy from Waste plants, of which Greater Manchester has one located in Bolton.

LANDFILL AND LANDRAISE

There are two main ways of disposing of waste to land: landfill and landraise. Landfill is where a large hole, for example an old quarry, is filled up with waste whereas in a landraise, waste is placed on top of the existing ground, raising the height of the land. These have traditionally been the main methods of waste disposal in Greater Manchester. However, in the future it will be necessary to divert waste from disposal to land and 'move it up the waste hierarchy'. Despite this, there will always be a need for some disposal to land for waste from which there is no potential value or further processing option. Both landfill and landraise facilities are operated under licence from the Environment Agency, who are responsible for ensuring that all facilities are well engineered and comply with the relevant regulations.

NEW TECHNOLOGIES

Composting (Aerobic Digestion)

Composting is a biological process in which biodegradable wastes, such as garden and kitchen wastes are decomposed in the presence of air by the action of micro-organisms (for example bacteria and fungi).

Composting processes for municipal waste management primarily fall into two categories: windrow composting, for garden derived wastes and 'In-vessel' composting which is temperature controlled in a contained system, and can process garden and kitchen/catering derived organic wastes.

Windrow composting is an established technology for dealing with green wastes, where the material is shredded and then piled in elongated rows (windrows) and aerated through either turning of the windrows or by forcing air through the material. Windrow composting may take place in buildings or externally.

In-vessel composting (IVC) embraces a variety of techniques whereby the kitchen and garden wastes may be composted together in an enclosed vessel. The products of IVC are carbon dioxide and water vapour, leaving a residue which, depending on its quality and composition, may be used as a soil conditioner. There is limited experience of In-vessel composting in the UK to date but it is likely that this will be a growing area of biodegradable waste treatment.

Anaerobic Digestion

At an anaerobic digestion (AD) facility, organic waste such as garden and kitchen waste is placed in an enclosed vessel and processed at an elevated temperature in the absence of oxygen. Decomposition occurs faster than would normally happen in a landfill. A variety of wastes may be treated, however, this technology has yet to establish a track record for dealing with household waste in the UK although there are operational plants in Europe and North America.

AD facilities range in size depending on the area they serve, larger units may look like other industrial units.

Mechanical Biological Treatment

Mechanical Biological Treatment (MBT) is a generic term for the integration of several processes commonly found in other waste management technologies such as Materials Recovery Facilities (MRFs), sorting and composting plants (aerobic and anaerobic digestion). MBT plants stabilise and separate the residual waste stream into less harmful and/or more beneficial output streams.

MBT plants may be used to pre-treat waste going to landfill, mechanically sort non-biodegradable waste materials for recycling and/or energy recovery, or divert biodegradable waste from landfill.

Advanced Thermal Treatment

Advanced thermal treatment (ATT) is different to traditional incineration techniques because they may be done on a smaller scale, have reduced emissions and produce syngas which is an efficient fuel. There are two main types of ATT, pyrolysis and gasification. The associated buildings look similar to other industrial units but have much shorter stacks than traditional incinerators.

Pyrolysis

Pyrolysis is the thermal treatment of waste at very high temperatures in the absence of oxygen. This process produces syngas and a solid residue. The syngas comprises a mixture of gases, including carbon monoxide and hydrogen. Once cleaned, this gas can be used to generate heat and power. The solid residue comprises non-combustible materials and carbon and any of the residue with a calorific value can be used as a fuel.

Gasification

Gasification is the partial oxidation of waste at a high temperature, which means that full combustion does not occur. This process produces syngas, which has a high calorific value and may be used to generate heat and power. In addition to this, a solid residue comprising non-combustible materials is produced.

Mechanical Heat Treatment

Mechanical heat treatment (MHT) is a generic term used to describe combinations of mechanical and thermal technologies. The most common form of MHT is autoclaving, in which mixed waste is treated by steam in an enclosed vessel before being mechanically separated. This technology is mainly used for the treatment of clinical waste and the use of this technology for other waste streams is in its infancy.

Questions you may wish to consider in advance of the stakeholder events:

1. In addressing the future strategy, there are a range of options that can be pursued and this will have a bearing on the types of facility. E.g. adopt a strategy that relies on maximising recycling. Consider the above and a possible range of options that can be debated at the events. In so doing consider which types of technology are most / least desirable.