Viridor laing (Greater Manchester) Limited

factsheet

Mechanical Biological Treatment (MBT) and Anaerobic Digestion (AD)

Under the new contract between Greater Manchester Waste Disposal Authority (GMWDA) and Viridor Laing (Greater Manchester) Ltd (VLGM), five state-of-the-art Mechanical Biological Treatment (MBT) plants are planned for our area.

So what is MBT?

MBT is the name given to several processes that are used to treat the waste that arrives at the plant. As the name suggests, MBT involves both mechanical and biological methods.

The 'mechanical' part refers to the processes that are used for preparing and separating the waste when it arrives at the plant. There are a number of waste preparation techniques, such as shredding and sieving, which are used mainly to reduce the size of the waste. Further methods, such as screens, separators, and secondary crushing, are then used to separate the waste into 'fractions'.

How will it work in Greater Manchester?

Waste arrives at the plant, where it is tipped into a large reception hall. It then goes to the mechanical treatment area, where, using some of the processes mentioned above, it is separated into the following fractions:

- Fine or organic - small particles of mainly organic and non- metallic materials
- Light - mainly non-recyclable plastic, paper, card and textiles
- Ferromagnetic metals - segregated for recycling
- Non-ferromagnetic metals - all other metals, also separated for recycling
- Heavy residue - mainly stones and similar materials, to be used as aggregate

The organic fraction gets mixed with water and processed further to recover any more recyclable materials, such as sand or plastic, and to produce a slurry. Light material is incorporated into a High Calorific Value Refuse-Derived Fuel (HCV-RDF) and heavy residue is reused as aggregate.

So where does the biology come in?

The 'biological' part of MBT refers to either composting or digesting of the slurry using aerobic bio-drying, aerobic in-vessel composting or anaerobic digestion. Greater Manchester's MBT plants will use a wet AD process.

What is Anaerobic Digestion?

This is a renewable energy technology that captures gas (methane) from the decomposition of organic materials, such as manure and slurry; sewage sludge and food waste. By harnessing the natural process that occurs when organic matter is broken down by bacteria in a closed vessel (a bit like what happens in your home composter – but on a bigger scale) the biogas produced can be used as an energy source for both heat and power.

In Greater Manchester the slurry passes through a hydrolysis tank after which it remains in Anaerobic Digestion tanks for up to 25 days. The biogas produced goes to the gas accumulator for use in a Combined Heat and Power (CHP) plant. The remaining product then goes through a process known as de-watering and is further dried to produce a material suitable for use as a Low Calorific Value Refuse-Derived Fuel (LCV-RDF).

A Combined Heat and Power (CHP) plant at Runcorn, Cheshire will use the HCV-RDF and LCV-RDF to produce electricity and steam, replacing non-renewable sources of energy.

What are the advantages of MBT using wet AD?

The main advantages of MBT using wet AD are:

- The mass of waste coming into the plant is reduced
- Additional recyclable materials can be extracted
- The technologies are proven
- The calorific value of waste is increased, so it can be used as fuel
- Works well as part of an integrated waste management system

For more information about MBT and AD, please contact:

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Materials Recovery Facility (MRF)

Under the new contract between Greater Manchester Waste Disposal Authority (GMWDA) and Viridor Laing (Greater Manchester) Ltd (VLGM), a brand new 'clean' Materials Recovery Facility (MRF) is planned for Longley Lane, Manchester.

Why use a MRF?

Using this system, less than 5 per cent of the material that enters the MRF leaves it as waste, significantly reducing the amount that ends up going to landfill. The MRF has to recover 95 per cent of the 'input tonnage' that goes into it.

Why is it called a clean MRF?

This MRF will prepare and sort the materials that most of us recycle in a single container (co-mingled) at the kerbside: cans, glass and plastic bottles. It uses a range of state-of-the-art preparation and separation technologies to make sure each bale of steel, aluminium and plastic bottles, as well as glass, which is stored loose, is in the best possible condition ready for recycling - hence the term 'clean' Materials Recycling Facility.

What are the advantages of a 'clean' MRF?

The main advantages of a 'clean' MRF are

- High processing efficiency
- Revenue from the sale of materials
- High quality recyclate
- Good for achieving high recycling rates
- Proven technology
- Can take material from both kerbside collections and bring sites
- Provides work opportunities

What happens to our waste when it gets to the MRF?

First it goes into a pre-sort cabin, where any unwanted items are removed. From there an over-band magnet separates out any steel cans.

Obviously, the magnet does not pick up glass, which goes through a breaker screen and then onto a clean-up system where it is refined further and sorted according to colour. A metal separator is used to remove aluminium foil and cans, which are baled separately ready for recycling.

Did you know? Cans are processed at the MRF using a piece of equipment called a can densor - a machine that sorts, separates and squashes them into 2,500lb bundles.

All the plastic bottles go into another separator unit that has the capability to divide them into the following different types: mixed plastic, HDPE and clear PET.

The separate streams of plastic are inspected before heading for the storage silo, ready for baling. Before it completes its journey the plastic bottles pass through an additional piece of equipment, to squash and flatten the bottles to improve their storage capacity.

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In April 2009 Greater Manchester Waste Disposal Authority (GMWDA) and Viridor Laing (Greater Manchester) Ltd (VLGM) signed a £3.8bn contract - Europe's largest ever waste management Private Finance Initiative (PFI) - that will enable the Authority to achieve its vision of providing a world-class solution for our waste.

Working together

Viridor Laing (Greater Manchester) Ltd is a consortium made up of Viridor Waste Management Ltd, a leading UK waste management and recycling company which currently handles nine million tonnes of waste per year, and John Laing plc, a leading investor, developer and operator of privately financed public sector infrastructure projects.

GMWDA is the largest of the English waste disposal authorities, providing services for more than 970,000 households across nine Districts: Bolton, Bury, Manchester City, Oldham, Rochdale, Salford, Stockport, Tameside and Trafford.

Our targets

- A recycling and composting rate of 33% for 2010
- A recycling and composting rate of 50% for 2020
- Meeting the following - and intermediate - LATS targets: 2009/10, 2012/13 and 2019/20
- Stabilising waste growth to 1% per annum by 2010
- Reducing waste growth to 0% per annum by 2020

The signing of the contract heralds the beginning of an enormous and exciting construction programme to create a network of state-of-the-art waste and recycling facilities across the Greater Manchester area, creating over 5,000 jobs in the process.

It will take about four years before all the new infrastructure is up and running. During this time, the consortium will be responsible for various activities including: design and planning, building, financing, operations/maintenance and communications.

Proposed technologies and facilities

Household Waste Recycling Centres (HWRCs)
There will be a major overhaul of the current network of HWRCs including proposed new sites and upgraded facilities, many of which will be 'split level'.

There will also be four public education centres at Raikes Lane, Bolton; Bredbury Parkway, Stockport; Pilsworth, Bury; and Longley Lane, Manchester.

Materials Recovery Facility (MRF)
A brand new 'clean' MRF, located at Longley Lane in Manchester, will sort cans, glass and plastic bottles from the kerbside collections across the Greater Manchester area.

Mechanical Biological Treatment (MBT) and Anaerobic Digestion (AD)
New MBT/AD plants will replace the existing treatment facilities at Longley Lane and Reliance Street (Manchester), Cobden Street (Salford), Bredbury Parkway, (Stockport) and Arkwright Street, (Oldham), (MBT with no AD).

Refuse Derived Fuel (RDF)
Approximately 275,000 tonnes of High Calorific Value Refuse Derived Fuel (HCV-RDF) from the MBT/AD process will travel by rail to a Combined Heat and Power (CHP) facility at Ineos Chlor in Runcorn, Cheshire.

Energy from Waste (EfW)
The EfW facility at Bolton will continue to operate.

In-Vessel Composting (IVC)
Four new enclosed IVC facilities will treat kitchen and garden waste at: Bredbury Parkway, Stockport; Waithlands, Rochdale; Salford Road, Bolton; and Trafford.

Green Waste Shredding (GWS)
The facilities at Every Street, Bury and at Longley Lane, Manchester will be upgraded and improved.

Transfer Loading Stations (TLS)
These will be upgraded - or new ones created - at: Raikes Lane, Bolton; Every Street, Bury; Arkwright Street, Oldham; Waithlands, Rochdale; Cobden Street, Salford; Bayley Street, Tameside; and Bredbury Parkway, Stockport.

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Thermal Recovery Facility (TRF)

Under the contract between Greater Manchester Waste Disposal Authority (GMWDA) and Viridor Laing (Greater Manchester) Ltd. (VLGM), the Thermal Recovery Facility (TRF) will continue to operate, creating enough energy to power 7,000 homes.

What is Thermal Recovery?

Thermal Recovery is a process by which the energy produced from burning waste is used to create electricity.

The Bolton TRF generates enough power to operate the plant, plus approximately seven megawatts of electricity, which is then transferred to the National Grid for use in our homes.

How does it work in Greater Manchester?

When waste arrives at the plant it is tipped into a large reception hall, where a mechanical shovel is used to move the waste into a pit. A large claw-like grab is used to mix the waste; this helps to prevent too much of one type of material being burned at once.

The waste is transferred to the furnace, where it is burned. The furnace reaches temperatures of over 850°C and reduces the waste to ash. This falls out of the bottom of the furnace and is passed under a magnet to remove any ferrous (iron-based) metals, which can be recycled. The remaining ash is either sent to landfill or used in construction materials.

The heat generated from the furnace is used to boil water, which creates steam. The steam is then used to power a turbine that turns a gearbox and drives the generator to produce electricity.

Ammonium, lime and activated charcoal are added to neutralise acid gases and other potential air pollutants. The gases then pass through a bag filtration system which removes the additives and any other particles. This is known as "fly ash" and it is sent for safe disposal.

What are the advantages of Thermal Recovery?

Thermal Recovery is important for sustainable waste management as it reduces the amount of material going to landfill

It allows the further recovery of ferrous metals for recycling and the possibility of using the ash in the construction industry

Thermal Recovery is a proven technology, with 20 plants in the UK and over 1,000 around the world

How do we compare to the rest of Europe?

Several European countries incinerate a higher proportion of their waste than the United Kingdom. "Currently, the incineration rate of municipal waste in the UK is 9%. This compares with: Belgium 34%, Netherlands 38% and Germany 35%. These three countries also have a recycling and composting rate of 60% or over, proving that higher incineration rates do not necessarily have a negative impact on recycling levels."
(Eurostat 2007)

For more information about Thermal Recovery please contact:

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