

Visit to MBT-AD plant in Lübeck – February 22, 2007

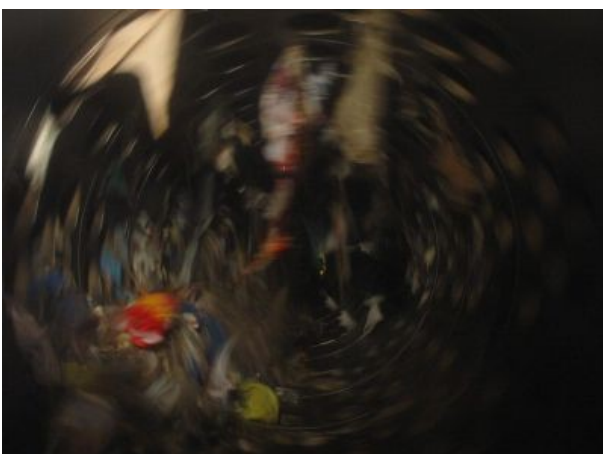
The waste treatment plant in Lübeck in northern Germany is designed to treat 150,000 tonnes of residual ('black bag') waste per year using Mechanical Biological Treatment (MBT) with Anaerobic Digestion (AD). The plant is about a year old, and is similar in scale and technology to the plants that are planned for Greater Manchester.



The MBT process has two stages. The first stage involves mechanical sorting of the waste. Waste is delivered to a loading bay (at the far left of the left-hand picture above):



The waste is first fed into a shredder, and is then mechanically separated by size via a trommel screen and by weight via the "windsifter" (the rotating drum on the left):



The waste is then sorted into a number of fractions via a series of conveyors (above right):

- Metals (ferrous and non-ferrous) are recycled;
- The heavy fraction (which tends to be glass, stone and large objects that don't get crushed up - an example I saw was a shoe!) goes to landfill;
- The large, light fraction (generally paper, card and plastic) is used as refuse derived fuel (RDF);
- The small fraction (mostly organic material, less than 40mm in size) goes for anaerobic digestion.

The RDF is stored in containers and transported to a power plant in neighbouring Neumünster to generate electricity and district heat for households and industry:



The small fraction gets mixed with water to form a slurry, which also helps separate out any inorganic fragments (e.g. stone and glass), and is then piped into the anaerobic digestion tanks (on the far right):



The anaerobic digestion (AD) process takes about 20 days, and produces methane and a liquid digestate.

The methane is used in a combined heat and power (CHP) plant to produce the 1 MW of electricity needed to run the plant (pictured on the left below), and heat to dry the digestate at the end of the AD process. It is also used in the regenerative thermal oxidiser (RTO) that is used to scrub any waste gases that are emitted from the plant (on the right):



The liquid digestate is dried in a series of rotating centrifuges and drums to produce an inert soil-like material (contaminated with bits of plastic) that can be used on brownfield sites or as landfill cover:



Overall, the plant currently processes about 100,000 tonnes of waste a year, comprising roughly 3% metals, 3% heavy non-recyclable material, 50% RDF material (paper, card, plastic) and 44% organic waste. The outputs are 2.5% metals for recycling, 6% non-recyclable material, 48% RDF, 28% to landfill, 17% evaporated water and 500 cubic metres per hour of methane.

In the UK, it is anticipated that the proportion of metals and biodegradable content will be higher (due to lower recycling/composting rates), which will enable the plant to produce more biogas and hence generate an additional 1 MW of electricity for export to the grid. Also, it is planned to add the dried digestate from the AD process to the refuse derived fuel (RDF) produced during the mechanical separation rather than send it to landfill.