

# Organic Waste Anaerobic Digestion (AD) and Mechanical Biological Treatment (MBT)

## *Capability Statement*



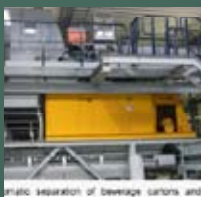
### Our Team

In November 2009, HTP and MWH agreed to team together to pursue waste management projects within the UK. The two parties bring together extensive experience in the areas of:-

- Waste analysis and the design of MBTs
- Materials recycling and sorting
- Anaerobic digestion design
- Biogas management
- Digestate disposal and downstream treatment



The MWH and HTP team are confident of being able to design the most appropriate treatment train for municipal organic waste and food processing wastes. The team can provide a full range of independent consulting services for:-



- Feasibility - waste characterisation and project technology selection.
- Conceptual design - project development
- Detail Design - conventional or within a Design and Build (D&B) consortium
- Client Technical Advisor (TA)
- Trouble shooting of existing treatment plants - debottle necking or refurbishment to treat new wastes.



**MWH**

**BUILDING A BETTER WORLD**



*Air classifier for medium size particles*



*Light weight separator followed by an automatic cleaning stage by a NIR separator*



*Air Classifier*



*Drum screen with subadjacent vibrating screen*

## **MWH-HTP Partnership**

HTP is one of the leading engineering-consultants in Germany for waste sorting and recycling. Founded in the early 1990's, it has designed over 50 reference plants in Germany and Northern Europe, treating a wide variety of waste such as food waste, various organic waste streams and municipal solid waste. HTP has worked with all leading European mechanical equipment and process suppliers and thus has a clear understanding of the capabilities of each supplier and their equipment. HTP is independent and so is able to design the most appropriate waste processing solution, independent from specific suppliers.

MWH is a global engineering-consultant in the water, waste, energy and environmental sector. It has designed hundreds of waste management facilities across the globe for waste streams ranging from sewage treatment sludge and bio-residuals over domestic solid waste to hazardous industrial waste and medical waste. References include controlled landfills, materials sorting and recycling facilities, mechanical biological treatment plant, mass burn Energy from Waste plants as well as gasification plants and biomass power plants. MWH has designed tens of anaerobic digestion plants for sludge and organic waste, often in combination with cogeneration and digestate treatment.

By combining their forces, MWH and HTP can offer the most comprehensive expertise and services currently available on the UK waste market. It brings decades of European and Global expertise to the UK through MWH's UK network of 10 offices with over 1000 employees.

## **Materials Sorting and Mechanical Pre-treatment**

MWH-HTP can offer independent experience to Materials Recycling Facilities (MRF), Sorting Facilities and Mechanical Pretreatment processes. MWH-HTP's extensive experience allows expert project feasibility assessment.

MWH-HTP works closely with the client to characterise the waste. Waste characterisation enables MWH-HTP to design and specify the most appropriate flow sheet for the client, and also provide flexibility in the design to treat the full range of proposed waste streams.

Typically in Germany, HTP characterise the waste, produce the concept design, develop the detailed design, specify the required equipment, review the contractor's submissions and supervise the construction and commissioning. This experience across their portfolio of references has enabled the company to gain a large amount of experience of projects and equipment throughout the project life cycle. This experience not only provides certainty to a client in the delivery of a project, it also enables HTP to be able to provide advice on the feasibility of a proposed project both in terms of scale, operability and also project financial payback.

## **Anaerobic Digestion**

MWH have designed a number of different anaerobic digestion processes, specific to project requirements, and have included a number of AD variants, undertaking conceptual, detail design and contractor review roles. The type of anaerobic digestion processes have been designed specific to project requirements and have covered a number of AD variants: single stage, two phase, temperature phase and thermal hydrolysis.



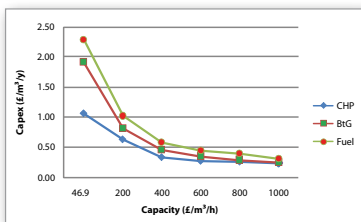
*Igean Digestion Plant*



**Blackburn Anaerobic Digestion Plant – 740m<sup>3</sup>/d, 2MWe**  
**Blackburn enhanced AD plant - 740m<sup>3</sup>/d, 2MWe**



**Bran Sands enhanced AD Plant – 35,200tds/y, 4MWe enhanced AD plant**



**Davyhulme thermal hydrolysis AD plant – WRAP demonstration Biogas upgrade project**



**IGEAN Composting plant, Belgium**

Organic AD - MWH have provided technical support on anaerobic digestion facilities for municipal, food and other organic waste streams. For example we are currently retained by a major UK waste management business for provision of Project Management and Owners Engineer Services for a County Council MBT/AD waste facility treating up to 312,000 tonnes per annum.

MWH staff performed the conceptual engineering design of the MBT plant for Igean (North Belgium) in partnership with key process supplies and the EPC contractor.

Enzymic two phase hydrolysis – MWH were engaged to provide an enhanced digestion upgrade to Blackburn AD treatment centre, to produce a fully pasteurised digestate product. Blackburn was the first Enhanced Enzymic Hydrolysis process installed in the UK. It is also unusual as it co-digests wastewater sludges and food production wastes from three main regional traders.

Thermal hydrolysis – MWH were engaged to provide an enhanced digestion upgrade to Northumbrian Water’s Bran Sands AD centre. Bran Sands has just come on stream and at present is the largest installed reference utilising Cambi thermal hydrolysis technology.

### Biogas Management

The commercial viability of any organic waste AD or MBT project is strongly dependent upon maximising the revenue from the AD biogas. Three main options are developing in the UK biomass AD market:

- On-site cogeneration
- Biogas cleaning and injection into the national gas grid
- Biogas conditioning for commercial fuel applications

MWH has developed a financial model to assess the three options on a project feasibility basis. The model incorporates all of the financial incentives available to project developers at present and also predicts the sensitivity to planned future incentives.

MWH are technical advisors to WRAP for the United Utilities Davyhulme biogas upgrade demonstration project. The demonstration project involves the installation of equipment to upgrade the biogas for vehicle fuel and also to be injected into the gas mains system.

The project will generate reference data, to provide the basis of a reference design, this information will then be used by industry to scale up to larger plants.

### Digestate Disposal

The disposal of digestate is critical to the viability of a MBT project, typically dewatered digestate is:-

- Composted
- Pre-dried and used for energy resources in regional MSW Energy from Waste (EfW) plant.

MWH staff were responsible for the design of the IGEAN mechanical biological treatment plant near Antwerp in Belgium. This plant also included a digestate composting, maturation and sieving unit to produce a soil conditioner that is sold to the market.

Pre-drying can take place at the MBT site, through energy recovery and reuse of heat energy from the on-site cogeneration system. This approach utilises belt drying technology, an example of this approach is MWH's proposed energy factory at Alphen Noord in the Netherlands. The dried granulate can then be used as an energy fuel in an EfW facility.

### The growing demand for Organic Waste AD and MBT plants in the UK

The UK government and the European Union have confirmed their commitment to the development of organic waste AD and MBT projects by the introduction of present and future legislation and financial incentives:

#### Present and future legislation and financial incentives:

- **Present** – Renewable Obligation Certificates (ROC) provided financial incentives to the generation of renewable green energy.
- **2010** – Government to introduce feed-in tariff for small-scale low-carbon electricity generation.
- **2010** – EU Landfill Directive requires member states to reduce biodegradable municipal waste sent to landfill by 25% from 1995 levels.
- **2011** – Government to introduce renewable heat incentive. Includes support for injection of biomethane into gas grid.
- **2012** – UK carbon budget requires reduction of all UK greenhouse gas emissions by 22% from 1990 level.
- **2013** – EU Landfill Directive requires member states to reduce biodegradable municipal waste sent to landfill by 50% from 1995 levels.
- **2013** – Landfill tax to reach £72/tonne
- **2017** – UK carbon budget requires reduction of all UK greenhouse gas emissions by 28% from 1990 level.
- **2020** – EU Renewable Energy Directive requires 16% of all UK's energy consumption to come from renewable energy sources.
- **2020** - EU Landfill Directive requires member states to reduce biodegradable municipal waste sent to landfill by 65% from 1995 levels.
- **2020** - EU Waste Directive requires member states to meet 50% reuse and recycling target for household waste.

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