



# Avonmouth

**Mechanical Biological Treatment (MBT) facility**  
with low-carbon and renewable energy generation

New Earth Solutions is a specialist business dedicated to delivering sound technical and environmental solutions to the UK's waste problems.

Driven by the outcomes of the Kyoto Protocol on Climate Change, New Earth Solutions has developed a wide range of technologies and processes designed to recover value from waste and to mitigate its impact on the environment.

The facility is New Earth's largest with a capacity of 200,000 tpa. It treats residual household waste streams for the West of England Partnership, which includes the four Councils of Bath and North East Somerset, Bristol, North Somerset and South Gloucestershire, well as capacity for other local authority and private sector customers.

The facility diverts waste away from landfill, helping local authorities to meet rising diversion targets and maximizing the recycling potential of the waste it treats by extracting valuable metals and plastics from the organic waste.

## What is MBT?

The New Earth process at Canford utilises Mechanical Biological Treatment. In the mechanical stage, materials such as plastics and metals are recovered from the waste and sorted into the valuable recycling streams. Biodegradable waste is also separated for further treatment.



Avonmouth  
Facility

In the biological stage the biodegradable waste is composted in a fully-enclosed, controlled environment, to produce a useful land remediation compost. The MBT process can also produce a refuse-derived fuel suitable for use in low-carbon renewable energy generation in the planned energy facility.

## Energy Generation

New Earth has been granted planning permission to build a low-carbon renewable energy facility on the site. The co-location with the MBT plant minimises the transportation requirements for the waste treatment by-products and diverts them away from landfill. This helps avoid rising landfill taxes as well as the added environmental advantages of renewable energy. The energy facility will generate up to 7.5MW of low-carbon renewable electricity.



# New Earth MBT Process



**Initial Preparation** Upon delivery waste undergoes sorting to remove any oversized items that cannot be processed. The recovery of recyclable materials then begins with a “long-particle separation” process. The smaller biomass-rich particles known as ‘fines’, go to the bio-stabilisation halls for processing.



**Sorting** The remaining waste is sorted using various processes including magnets to extract ferrous metals, a windsifter to sort light waste from heavy, and optical sorting to identify and remove plastics by polymer type.



**Bio-stabilisation Halls** The fines and shredded waste is stored in long heaps, or ‘windrows’, in enclosed halls for a period of around 5 to 6 weeks. The composting process is self-heating, with the only manual intervention required being regular turning in order to maintain optimum conditions.



**Environmental Controls** Wireless probes inserted along the length of the windrows monitor the temperature and transmits data to the control system. Unique software translates this data into the optimum requirements for the waste to compost effectively, irrigating and oxygenating the windrows automatically.



**Pasteurisation** Bio-stabilised material is screened to remove contraries such as remaining plastics. The fine compostable output is then sanitised using pasteurisation vessels to ensure compliance with the Animal By Product Regulations.



**The Product** The resulting material can be used as a land remediation compound or soil conditioner for brownfield sites. Oversized screening residues can form part of a refuse-derived fuel for use in low-carbon renewable energy facilities, such as that planned for the Avonmouth facility.



**Automated Control System** The facility operates a continuous emissions monitoring system which enables control of the process environment as well as monitoring emissions to the atmosphere. This system ensures compliance with environmental monitoring standards and is assessed by the Environment Agency.



**Emissions Control** Facilities are held under negative air pressure, helping to draw air inwards when doors are opened and minimise air escaping from the buildings. Avonmouth has a sophisticated emissions control system incorporating a chemical air ‘scrubber’ and a wood chip bio-filter before air

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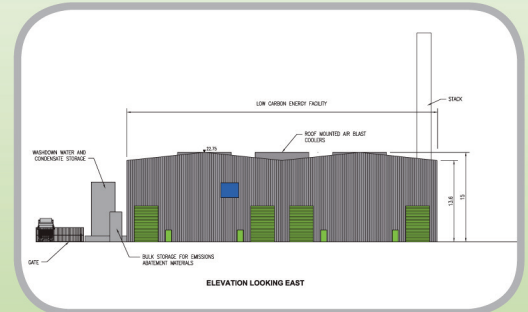
Renewable and low carbon energy facility



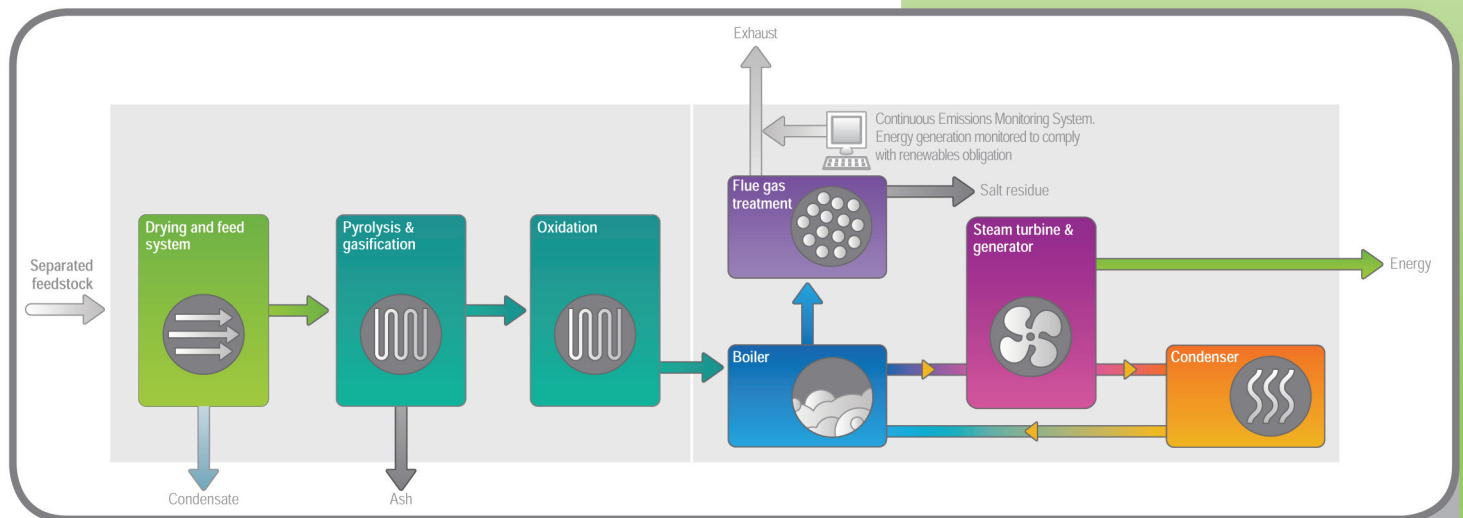
## The Technology

The proposed facility would use Advanced Thermal Conversion (ATC) technology in the form of pyrolysis and gasification units, to generate up to 7MW of renewable and low carbon electricity.

Prepared feedstock would be fed to the ATC units mechanically. The pyrolysis stage involves heating the incoming feedstock in the absence of oxygen, converting it into a High Energy Fuel Gas (HEFG) and carbon rich char. The char will then be gasified using high-temperature steam with the controlled addition of oxygen. This converts the char into HEFG, with a remaining particulate ash to be safely disposed.



Proposed energy facility elevation looking east



The HEFG produced from both the pyrolysis and gasification processes would be combined and fed through a thermal oxidiser operating at around 1,200°C. The high temperature gas from the thermal oxidiser would be recycled and used as the heating medium for both the pyrolysis stage and a steam boiler. High temperature gas from the thermal oxidiser would power a conventional boiler unit, with high pressure steam from within the boiler driving a steam turbine set to generate up to 7MW of electricity.

The facility could also export heat, although the balance between electricity generation and heat supply would depend on the availability of suitable and viable consumers for this heat.

### What is pyrolysis and gasification?

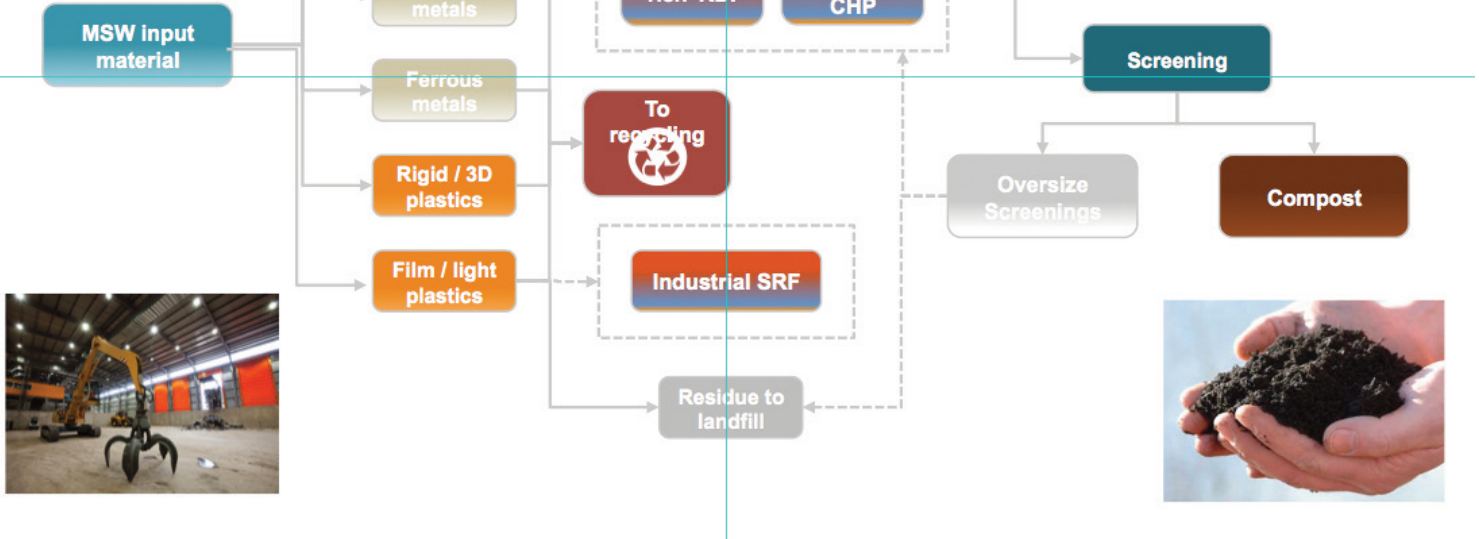
Pyrolysis and gasification are Advanced Thermal Conversion processes. These processes are fully contained and take place in zero or low oxygen environments, making them distinctly different from traditional incineration.

### Air Quality

The Environmental Impact Assessment (EIA) and Environmental Permit (EP) applications will address potential effects on air quality associated with the construction and operation of the facility. The initial study submitted to Bristol City Council concluded that the potential effects of dust during construction are likely to be negligible.

The design of the facility incorporates a number of measures to ensure that there will be no impact on air quality from the operation of the plant. The Fuel Gas will be cleaned and exhaust gases from the thermal process will pass through an emissions abatement system, which will remove particles, nitrogen gases and other trace elements. The boiler exhaust will be at a suitable height to comply with the Environment Agency's requirement to ensure emissions are harmless to the local and wider environment. Existing air quality currently meets national objectives with the exception of certain busy roadside locations. The facility will be designed and operated to ensure that it would not affect the future achievement of these air quality objectives.

# MBT process – material flows



## Residual waste treatment - Indicative outputs

