Introduction: waste treatment technologies

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Gasification & plasma
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Heating without burning

• Gasification is a process where the waste is heated in very low oxygen atmosphere. There is no combustion as there is not enough oxygen.

Production of a calorific gas

• Output is a raw syngas (CO/H2) carrying thermal energy. By using plasma torches the raw syngas is being purified and broke down into molecules. This creates a high calorific syngas.

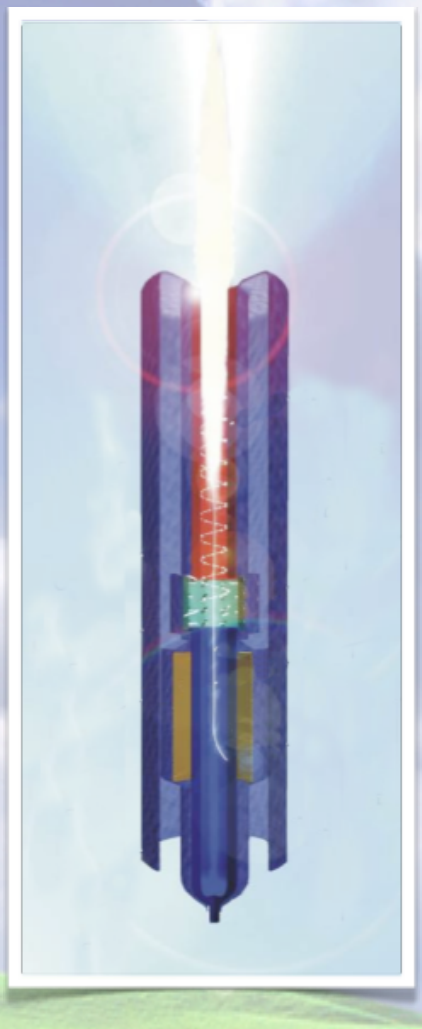
Gas cleaning

• The syngas is being cleaned to remove any remaining toxics.

Turbine and engines

• This gas feeds a gas engine to produce electricity, with an end-to-end electrical yield which may reach 40%.

The heat produced during the process can be delivered as such or can be converted to electricity as well.



It is assumed that gasification with plasma is too expensive and economically not viable. But several companies have proven that their technology can be as profitable as other technologies or even more profitable!

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Incineration
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Moving Grate furnace

Moving grates is generally chosen within Waste-to-Energy for Municipal Solid Waste.

This system enables the movement of the waste in the combustion chamber. It allows a more efficient and complete combustion of the waste.

Within the moving grates, there are air-cooled and water-cooled grates.

Rotary-Kiln furnace

Rotary-Kiln furnaces are generally chosen within Waste-to-Energy for medical or industrial waste (waste with a high calorific value). It can be used in combination with Municipal Solid Waste.

This system converts the waste into a poor pyrolytic gas. This gas is incinerated in the post-combustion chamber at a temperature of minimum 1,000 °C.

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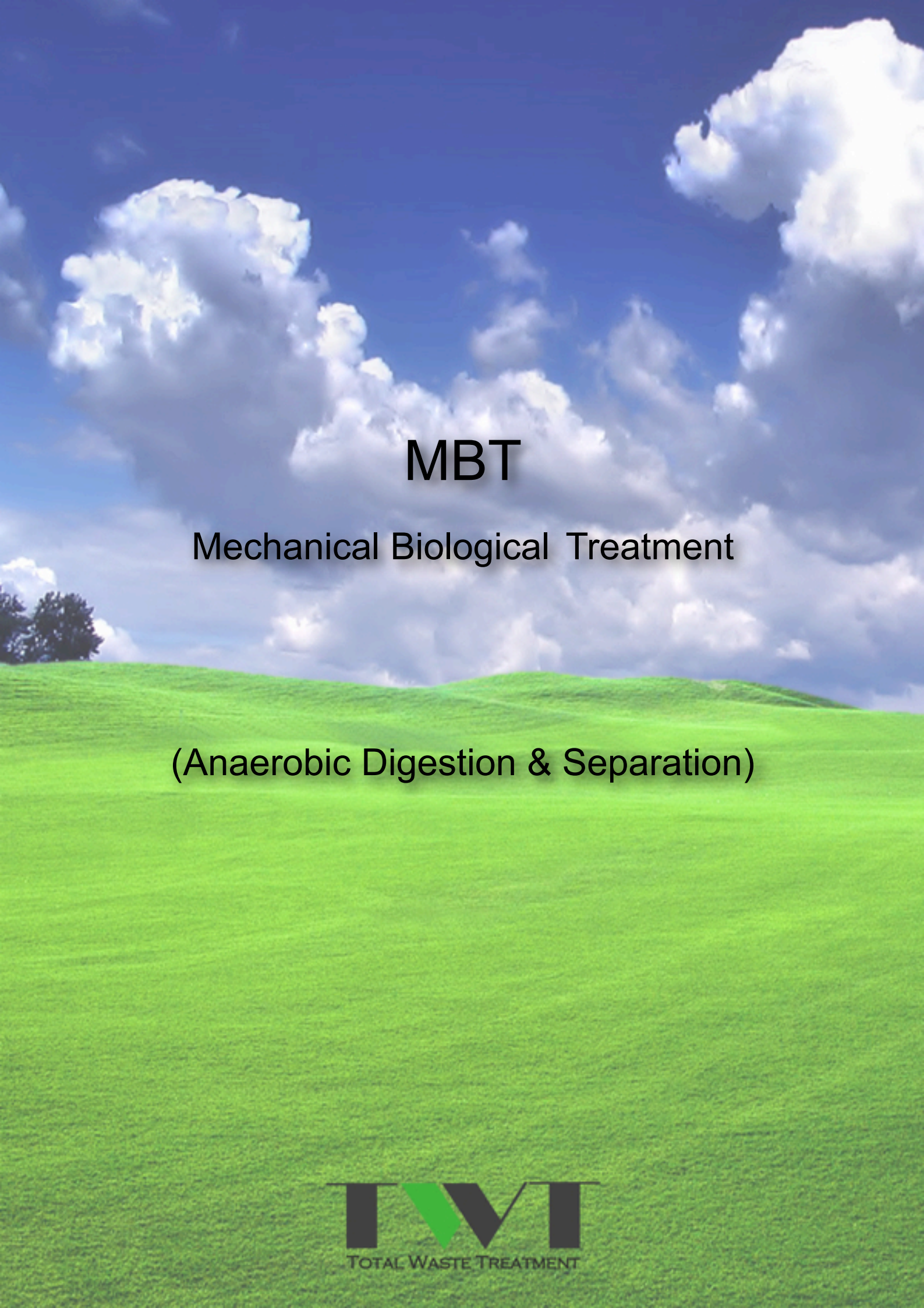
MBT
Mechanical Biological Treatment
(Anaerobic Digestion & Separation)
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Step 1
Wet fractions are removed and stored. These fractions are used for **anaerobic digestion*** to produce biogas.

Step 2
Separation of re-usable materials:

- metals: iron & aluminium (pressed into bales)
- inert materials: glass, sand, rocks,...
- plastics: PET, PE (pressed into bales)
- ...

There are several methods to separate re-usable materials, going from manual selection to complete automated systems.

Step 3
The remaining waste is pressed into bales and classified as RDF (Refuse Derived Fuel).
The RDF is to be sold to a powerstation or used in a thermal treatment plant.

* Anaerobic digestion

= breaking down bio-degradable fractions using micro-organisms in absence of oxygen which results in producing biogas.

The produced biogas can be used to generate electric energy.

The remaining fractions can be:

- converted to compost
- used in a thermal treatment plant
- sent to a landfill

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Landfill
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- Clean-up of old landfills which are not constructed according modern regulations (landfills that contaminate the soil, no control over landfillgas,…)

- Build new safe and monitored landfills with no damage to the environment.

It includes:

Control and monitoring

Monitoring the environmental factors is a fundamental activity for sustained landfill plants, be it in the operational or post-operational phase. In order to prevent any possible impact on the environment the most stringent measures for monitoring key parameters are implemented.

Landfill capping and restoration

After the depletion of the deposited waste volumes, interventions are carried out for landfill capping and environmental restoration for the final requalification of the site. This is executed by creating a protection layer and an insulation system over the waste materials, with a subsequent restoration layer of top soil, which may be landscaped.

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