



National Operational Guidance



NFCC
National Fire
Chiefs Council

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Information

Anaerobic digestion (AD) uses the natural breakdown of biomass feedstock (for example, food waste, animal slurries and energy crops) to produce renewable methane gas (biogas), which can then be used to produce electricity and heat, or upgraded for vehicle fuel and injection to the gas grid.

Feedstocks usually have a high moisture content, making them more suited to the AD process and may be stored on site in large tanks.

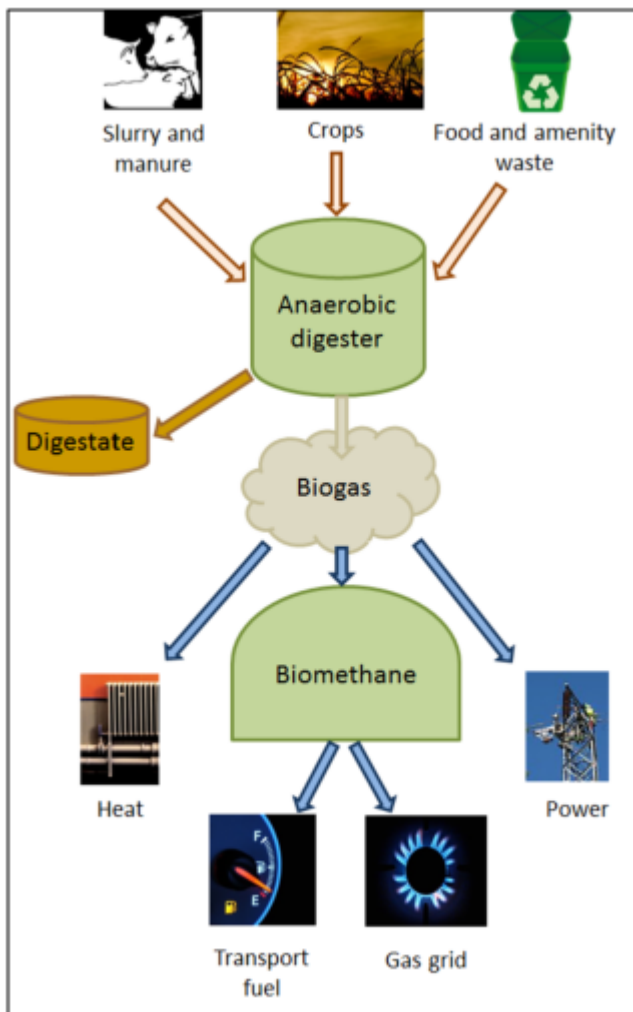


Figure 12: Anaerobic digestion process - diagram courtesy of London Fire Brigade

The largest component of an AD site is the digester, which is a large, well-insulated, airtight container into which the feedstock is loaded and heated. Microorganisms are used to aid the decomposition of the organic material at temperature of about 40 to 70oC. Mechanical agitators are used in the tank to stir the organic material, further helping decomposition.

The decomposition of the feedstock in the digester releases biogas, which is predominantly composed of methane and carbon dioxide. Biogas will exit the digester and probably enter a gas storage tank. This gas can be combusted, producing heat on site in a generator to produce electricity. This electricity will be fed into the national grid through a grid connection. Some of the contaminants in biogas, such as hydrogen sulphide and water, can cause maintenance issues with downstream equipment, so they will need to be removed before biogas burning.

Alternatively, the gas may be piped to a processing unit, or 'biogas upgrader', where a series of chemical processes are used to clean the biogas and separate out the methane and carbon dioxide. These reactions are exothermic, giving off heat.

The resulting clean gas from this process is biomethane, which can be injected into the national gas grid or compressed and transported for use as a gaseous transport fuel in vehicles.

A secondary product is also produced from the digester in the form of digestate, which is the remaining organic material after decomposition. This can be stored on site, and may be separated into a solid and liquid fraction, dried and used as a form of fertiliser or soil improver on farmland.

Hazards (for further information refer to National Operational Guidance: [Utilities and fuel](#))

- Flammable atmospheres
- Biohazards
- Confined space entry
- Asphyxia
- Hypoxic atmospheres (low oxygen levels)

References and further reading

www.r-e-a.net/renewable-technologies