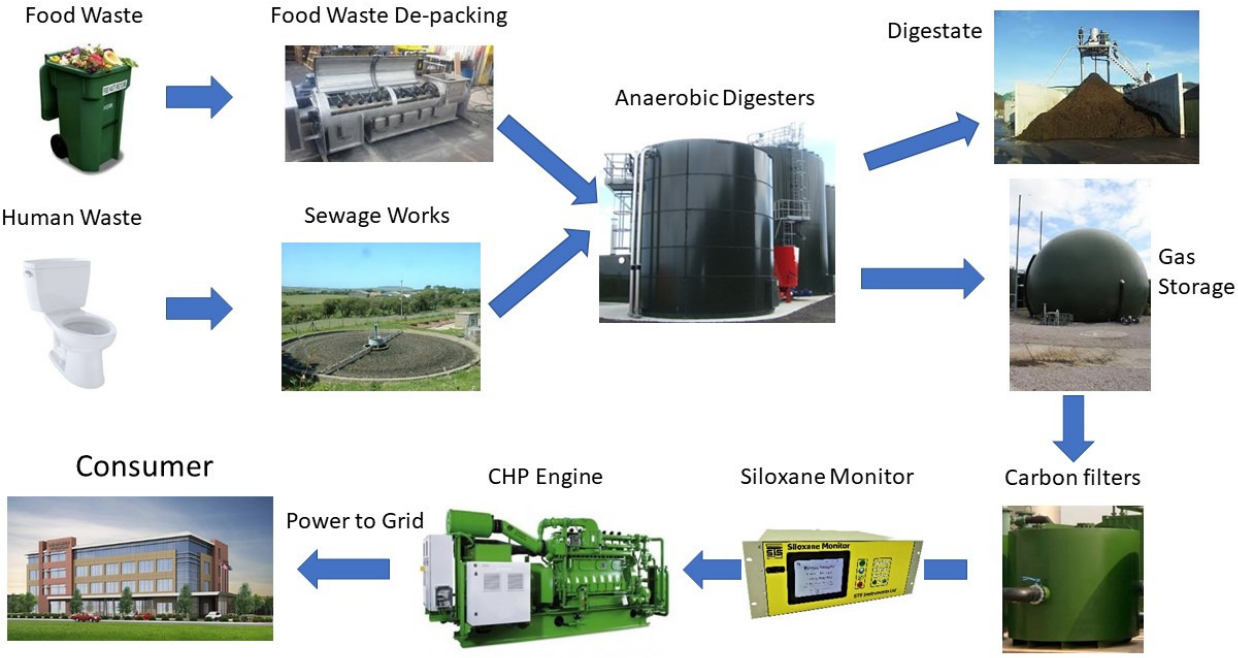
An overview of Anaerobic Digestion derived biogas.

Anaerobic digestion (AD) is a natural process in which micro-organisms, in the absence of oxygen, break down the organic matter in the supplied feedstock such as sewage, farm slurry and food waste, to produce biogas. The resulting gas is usually in excess of 50% methane with the remaining fractions being Carbon dioxide and minor contaminants including Hydrogen Sulphide and Siloxanes. As a by-product of the process a nitrogen rich digestate is produced which may be used as a fertiliser usually supplied in pellet form.

Gas from this process can be supplied either to combined heat and power (CHP) engines which produce energy outputs in the form of both electricity and heat or the gas can be upgraded to produce biomethane. CHP engines are popular on many Sewage works sites where the production of on site electricity can dramatically reduce the energy costs of running the works which have a very high electricity usage for running aeration plants.

Biomethane production is attractive as it removes the requirement to run and maintain CHP engines and the gas fuel produced can be directly injected into the grid following clean up by carbon filters and scrubbers. Biomethane is also becoming more widely used for powering transport fleets particularly in the haulage sectors where fuel costs are the largest overhead.



Heat Generation

Generation of heat only energy is a specialist field in the UK, small engines are used to produce heat for processes in industrial and horticultural use but only where these are conveniently situated close to the feedstock/engine. The transportation of heat is very inefficient and has not been adopted in the UK, some European countries however have adopted heat generation for district heating systems. Incentives for this type of generation are available but are likely to be phased out.

Electrical Power Generation

Electricity generation from AD is supported by government grants under the ROCS and FIT schemes due to its green credentials and carbon reduction capability. Large engines can be run on high gas volumes with methane content around 50% and significant return on investment can be achieved. Electrical output may be used either to power local assets such as waste water treatment plants or exported to the grid. Grid connection does not come cheaply but where logistics allow this can be an excellent income stream from a "waste" product.

CHP (Combined Heat and Power)

CHP is by far the most common application of energy generation from AD plants due to its highly efficient process. CHP is particularly suited to the AD process as the AD process itself requires heat and power to operate, on site generation plants can therefore supply this requirement direct to the works with the balance of energy generation being exported to the grid or to other applications. The ratio of power to heat generation will depend on the size and type of technology implemented as well as the methane % produced by the AD plant.

Biomethane production for Transport and direct injection.

The production of Biomethane has gained considerable momentum in recent years, driven by green policy and carbon reduction the production of Biomethane for transport offers many advantages to fleet operators. The renewable transport fuel obligation scheme supports the implementation of biomethane for transport which when added to the vastly reduced greenhouse gas emissions makes it a real contender for large vehicle operators. Many local authorities are adopting use of biomethane for fuelling bus transport where the low emissions are of particular benefit in cities and towns.

Upgrading to Biomethane from digester gas is however not straightforward, the gas must be cleaned and upgraded to a point where the methane content exceeds 95%. (and therefore has a much higher energy potential than biogas) This both a costly and energy intensive operation and so is normally only found on much larger AD operations. The supply of gas into the gas distribution network is strictly controlled, maximum levels are cited for various contaminants including siloxanes and failure to meet these will lead to immediate cessation of gas acceptance to the network.

The physical location of the site is also critical, the cost of adding additional infrastructure to transport gas to the closest network access is vast and will be a primary factor in the decision-making process when designing new plants.