

BIOGAS

Biogas is basically a mixture of methane and carbon dioxide. It is produced by the anaerobic decomposition of organic matter, both animal and vegetable. Biogas has always been used as a source of fuel in outlying areas, where very little infrastructure exists, but its use fell out of favour due to the availability of cheap piped gas and fuel oil. Now that fuel costs have increased dramatically, and there is increasing pressure not to just vent such gases to the atmosphere for ecological reasons, biogas is celebrating its come-back. This is not intended as a description of how to build a waste digester for the production of methane, it is more a short discussion of the uses that biogas can be put to economically and the problems that can occur with its usage.

Biogas may not cost anything to produce, but there is a certain science to producing it in a form that can be put to work simply. This science is naturally not free.

When organic matter decomposes it starts off by producing mainly carbon dioxide, which is not of any use at all. With time, and depending on the material, the gas composition will shift towards methane. A stable state should be reached, where about 80 % methane is being produced, which will endure for a lengthy period of time. Large landfill sites will carry on producing methane at a steady state for decades in some cases. This gas can be used for heating or power generation.



Naturally there are many drawbacks to the use of biogas. It is produced on a continuous basis, so some means of storage is needed. The level of methane and carbon dioxide must be monitored for power generation use, otherwise it is nearly impossible to produce an economically combustible mixture. On large-scale projects it is economically feasible to carry out such monitoring with appropriate infrared sensors and use an automatic mixing system, but a small-scale methane production plant will not be able to afford such luxuries. This limits the small plants to the production of gas for cooking and heating. It is not really of interest, how efficiently the flame on a gas cooker burns, so long as the combustion is stable and the flame does not go out. Using methane for vehicle power is theoretically possible, and is done in many cases, but requires an appropriate compressor capable of handling explosive gases and a reliably high concentration of methane in the gas.

The large plants operating from landfill sites have an easier life. The large quantity of gas allows other uses, although combustion for power generation and district heating is perhaps the simplest and most common. A landfill site will also produce its own heat and is largely insulated, enabling the gas production in winter to proceed without any need for extra warming of the digester. This is a common problem with small units designed to operate with farmyard waste in winter. The low temperature slows the activity of the anaerobic bacteria to a snail's pace and chokes off the supply of gas, just when some extra heating would be most pleasant!