APPLICATION NOTE

BIOMETHANE ANALYSIS

From Biogas to Biomethane

Biogas (fig 1) is the by-product of anaerobic digestion of organic material found in agricultural waste, municipal wastewater treatment and landfill waste. The biogas can be used to produce heat and electricity, but also can be upgraded to biomethane.

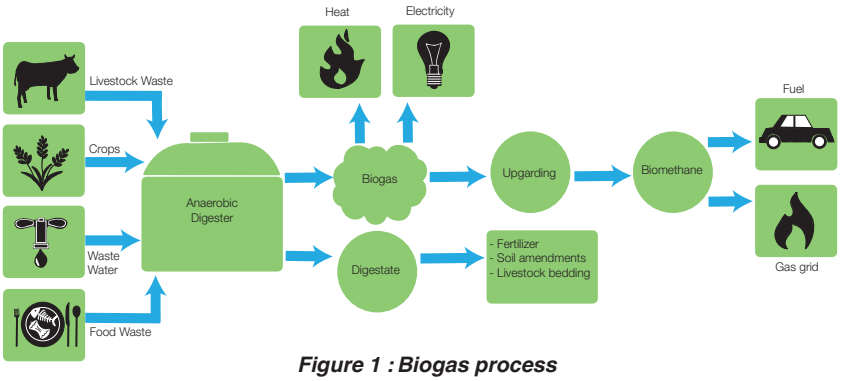

Figure 1 : Biogas process

Typical biomethane composition

The cleaning and upgrading processes (fig 2) remove unwanted components such as CO2, H2O, H2S…, enrich its methane content and adjust its calorific value to meet natural gas standards defined by countries. Methane concentration has to be kept from 96.5% to 99%.

Why using a Gas Chromatograph is not enough to secure biomethane quality?

The biggest danger when injecting processed biomethane into an existing pipeline is not detecting quickly a purification plant upset that results in a large slug of carbon dioxide or nitrogen flowing into the gas pipeline network lowering the heating value of the gas. If the slug is large enough the gas heating value will not support pilot lights. A typical gas chromatograph cycle time of 5-6 minutes is too slow to be used to divert gas from injection into a pipeline.

Adding a gas density meter increases responsiveness & security

The Wika Tech solution, combining our gas density meter with an pressure sensor, can be used to calculate the biogas mixture's molar mass or methane concentration at the outlet of the updgrading process. Since the gas density sensor has a very high response time, it could be used as a watchdog function. Northdome does not replace the gas chromatograph but supplements the composition detection function for early warning of a problem as illustrated in the case study next page.

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Figure 2 is composition data recorded at the biomethane injection point into an existing pipeline after the upgrading process. The treatment plant goes through process cycles that affect the gas molar mass. These are detected by the Northdome earlier than the gas chromatograph.
The NORTHDOME biogas watchdog can detect this sudden decrease in methane concentration allowing to stop the injection into the gas grid. See figure 3 for an example of installation.

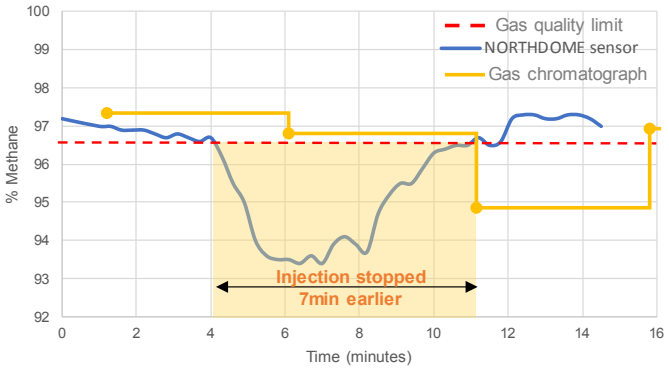

Figure 2 : Biomethane quality monitoring

Added value and customer benefits

- ✓ High quality monitoring: continuous measurement
- ✓ High response time: < 3s
- ✓ Rugged design: wetted parts in 316L stainless steel
- ✓ Cost effective solution

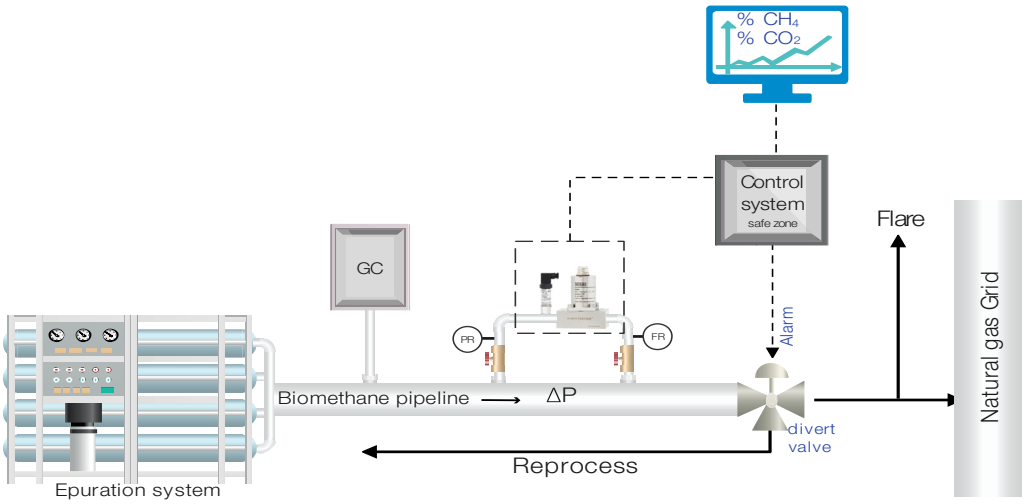

Figure 3 : Example of biomethane monitoring

Find more information about our NorthDome sensor on our website : www.avenisense.com

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