



# Monitoring & Measuring for Improved Performance

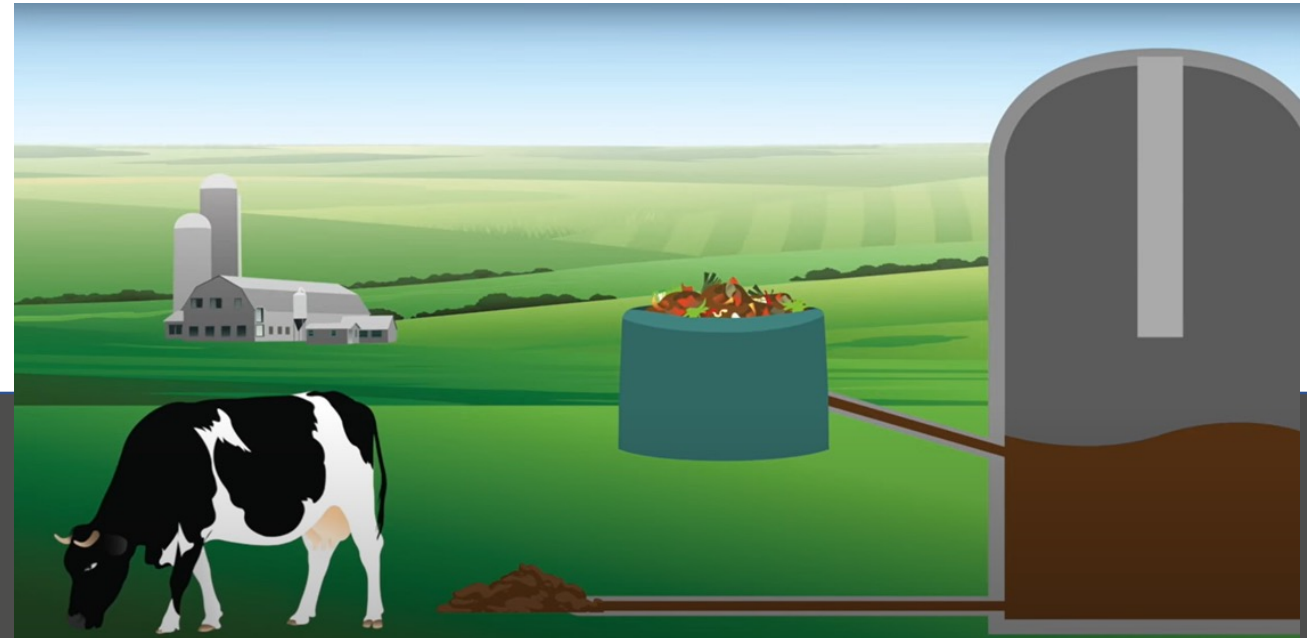
In AD Plant Operations

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# AD Process Optimisation

## Gas Monitoring & Measurement



- Importance of Measurement
- Reliable and Time-Critical Monitoring
- Maximising Efficiency
- Other Considerations

# Importance of Measurement

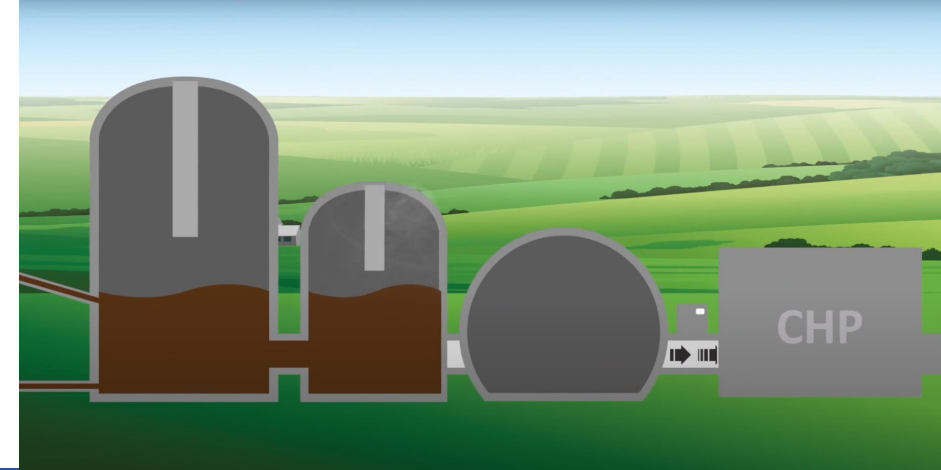
**Key to ensuring plant stability & efficiency.....**

## Gas Measurement

- Typically:  $\text{CH}_4$ ,  $\text{CO}_2$ ,  $\text{O}_2$ ,  $\text{H}_2\text{S}$
- Why is it important to measure these gases?
- Protecting your investment from damage
- Breakdowns can cost thousands in lost revenue
- Deliver maximum yield by optimising digester performance
- Confirmation of  $\text{CH}_4$  concentration in Biogas upgrading facilities
- Digester upset can be identified through total system monitoring
- Typical upset conditions
  - Reduction in  $\text{CH}_4$  %
  - Rise in  $\text{O}_2$  %
  - Increased levels of  $\text{H}_2\text{S}$
  - Lower pH
  - Lower Alkalinity
  - Rise in Volatile Fatty Acid Concentration

# Reliable & Time-Critical Monitoring

## Benefit in Integrating Gas Analysis Data.....



- Reliable, accurate and consistent monitoring of  $\text{CH}_4$ ,  $\text{CO}_2$ ,  $\text{O}_2$ ,  $\text{H}_2\text{S}$  levels allows for fine tuning of the digester, anaerobic digestion is a 24/7 process
- Continuous monitoring allows trends in gas composition and engine performance to be identified and feedstock adjusted to suit
- Process instability can affect efficiency of biogas production. Stability can be ensured if gas levels are monitored, understood and reacted to
- Integration of gas analysis data into plant controls systems can provide a quick reaction to significant events e.g. use of SCADA controls to pause/cease processes and flag for investigation
- Zero downtime of monitoring equipment to ensure plant upsets are avoided



# How to Maximise Efficiency Through Effective Monitoring.....

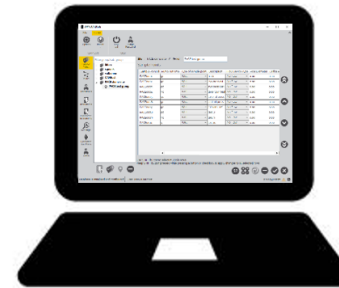
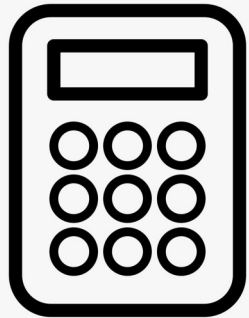
- Measuring varying levels of  $\text{CH}_4$  and  $\text{H}_2\text{S}$  can help to maximise the efficiency of the process, which is even more important when different/varied feedstock is being used
- Gas analysis is an essential part of maintaining & improving the gas quality and yield in AD plants
- $\text{O}_2$  levels can indicate leaks, fractures or fissures in the process infrastructure. Blockages can be identified through accurate gas flow measurement





## Other Considerations

### Gas Analysis



- Safety - Ex accreditation (ATEX, IECEx, etc.)
- Effective and timely service & technical support
- IoT - Remote connectivity

# Process Optimisation

## Gas Monitoring & Measurement



The importance of gas analysis equipment can be overlooked as "an added extra" however, this equipment is essential in improving the quality of the biogas produced, protecting against plant damage, making plants safe & ensuring optimal yield

- How do you future-proof your monitoring requirements?
- How can you ensure you don't have to send your instrument away for calibration?

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