

# 10 REASONS TO CHOOSE GM



## 1 ENVIRONMENTAL PROTECTION

Methane losses in Off-gas vented to atmosphere are lower than 0.1% of total methane in Biogas feed: no Off-gas post-treatment needed. GM-HPC (Hot Potassium Carbonate) technology is a BAT (Best Available Technique) thanks to the low level of pollutants emission and to the low consumption of feedstock, chemicals, water and energy.

## 2 METHANE RECOVERY >99.9%

Methane recovered from raw Biogas is higher than 99.9%. A higher methane yield by some percentage points increases significantly the profitability of the investment compared to other upgrading technologies.

## 3 ENVIRONMENTAL FRIENDLY PROCESS - NO CHEMICALS CONSUMPTION

The water based  $K_2CO_3$  solution is not volatile and does not degrade, unlike the amine based scrubbing solutions. GM process is a chemical absorption, with no chemicals consumption, unlike water scrubbing technology, which needs chemicals for process water conditioning.

## 4 MINIMUM ELECTRICITY CONSUMPTION

GM Biogas upgrade process requires minimal power: 0.15 to 0.2 kWh/Nm<sup>3</sup> of Biogas, depending on the requested Biomethane pressure at battery limits. Compared to membrane multi-stages process, no Biogas is recycled to compressor. Compared to water washing, GM process is not affected by weather condition and power consumption is less due to lower solution circulation and to negligible recycling to compressor of methane absorbed by washing solution.

## 5 PROVEN TECHNOLOGY

More than 360 worldwide applications in CO<sub>2</sub> removal.

## 6 SMALL-SIZED, SIMPLE AND RELIABLE PLANT

Due to high efficiency in CO<sub>2</sub> removal and reduced solution circulation, columns are smaller compared to water wash technology: typical height is lower than 12 m.

## 7 BEST SYSTEM AVAILABILITY: >99% STOP-START IN ONE MINUTE

Due to the simplicity of the process, GM plant run time is higher than 99%. GM plant is fully automated and can be quickly and easily stopped and restarted.

## 8 LOW MAINTENANCE COSTS

GM process for Biogas upgrading to Biomethane ensures low maintenance costs, thanks to unit's robust and simple design. Biogas compressor is the most critical item.

## 9 CO<sub>2</sub> CAN BE TOTALLY RECOVERED

CO<sub>2</sub> removed by the GM scrubbing process is available at high purity (>99.9%, dry basis) and can be used directly or liquefied and utilised in several applications.

## 10 BEST EFFICIENCY IN CO<sub>2</sub> REMOVAL

Residual CO<sub>2</sub> content in produced Biomethane is typically lower than 1%

### ...WHAT ABOUT DISADVANTAGES?

GM process requires a thermal energy input for absorbing solution regeneration. However...

#### THERMAL ENERGY BALANCE

Low consumption : ranging from 0.35 to 0.55 kWh/Nm<sup>3</sup> of Biogas (depending from CO<sub>2</sub> concentration in Biogas to be treated and required Biomethane pressure at BL)

Thermal energy can be sourced from CHP off-gas, typically as pressurized water superheated at 130-140 °C.

(If Biomethane is utilized as biofuel, it is convenient to install a CHP plant, fed with NG from network, for the electric power requirement of the whole site).

90 to 100% of overall thermal energy input will be recovered as heating water at 70-80 °C, which can be utilized as heating media for AD, for digestate drying or for other site needing

#### IN CONCLUSION:

### NO -OR NEGLIGIBLE- THERMAL ENERGY COST



Our certifications: UNI EN ISO 9001, UNI EN ISO 14001, BS OHSAS 18001.



Associated to: WBA

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