

GICON®



GICON® trickle bed process

CO₂-utilization + "green" natural gas + heat supply
via biological methanation

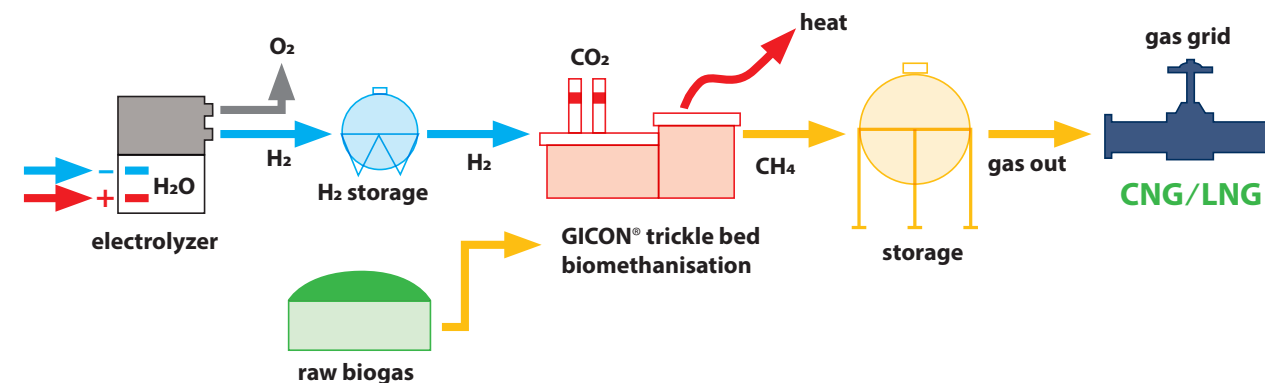
POWER TO GAS – RESEARCH AT GICON® LARGE SCALE LAB



GICON® TRICKLE BED PROCESS

Since 2015, engineers at GICON® large scale laboratory have been working on the production of biomethane from hydrogen and carbon dioxide. The developed trickle bed process aims storage of renewable energy at peak loads via the electrolysis of hydrogen and subsequent methanation. The “green” gas can be supplied into the natural gas grid or fuelled as CNG or LNG.

BIOLOGICAL METHANATION and SECTOR COUPLING



methane concentration	> 95% CH ₄
methane formation rate (from raw biogas)	7 Nm ³ CH ₄ /(m ³ ·d)
self energy demand (meth)	0,27 kWh/Nm ³ _{CH₄}
CAPEX (meth)	920 €/kW _{th,CH₄ (H₂)}
CAPEX (meth+electr)	6850 €/kW _{th,CH₄ (H₂)}
GHG reduction potential	86,5 % (2021)
gas production costs	9,2-12 ct/kWh _{CH₄}
efficiency(meth)	83%
efficiency(meth+electr)	63 - 78%

- demand oriented process control
- process stability by biofilm technology
- high product quality c_{CH₄}>95 vol%
- heat extraction and utilization possible
- tolerance against impurities (H₂S, NH₄)
- diverse CO₂-sources usable
- very low self energy demand
- mixed culture methanogenic archaea

- storage of renewable energy, CO₂ utilization
 - supply of „green“ natural gas and heat
 - add on for post EEG biogas and wind energy plants for doubling methane generation
- DE 10 2013 209 734.4
 - EP 14731164.1
- Engineering for process and plant design, system integration, economic and ecological assessment, consulting



10 m³ trickle bed reactor

Power to Gas – research at GICON® large-scale laboratory





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