

Project Fact Sheet

Project Title **Direct methanation for flexible operation of small and medium scale biogas powerplants (FlexBiomethane)**

Keywords biogas, energy storage, methanation, renewable energies

Project Details

Project Start	2020	Duration	3 Years
Grant Scheme	Fachagentur Nachwachsende Rohstoffe e.V. (FNR): Support program renewable resources	Project ID	2219NR279
Funding Authority	German federal ministry of food and agriculture		
Project Budget	245.005,20€		
Project Leader	Prof. Dr.-Ing. Markus Goldbrunner		
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Project Partners

- Chair of Energy Process Engineering, Friedrich Alexander-University Erlangen-Nuremberg
- regineering GmbH

Description

The enhancement of flexible operation of biogas power plants is one of the major targets of the German Energy Act (EEG from 2012 & 2014), regulating the extension of renewable energies. A possible solution to increase flexibility is the production of green hydrogen from excess electricity, e.g. from wind or solar energy. The concept "Power-to-Gas" uses biogas as CO₂-source for the additional methanation process to produce methane that can be stored in the existing gas grid. Due to the technological effort of CO₂ separation from the biogas, the established technology is limited for large-scale applications.

The project FlexBiomethane determines the direct catalytic reformation of biogas to methane to simplify the methanation process. With this approach, the majority of the 8000 existing biogas plants in Germany could run an electrolyses and methanation process during high electric peaks and store methane in their existing gas storages. In addition, the methane can be converted and used back again to generate electricity in the plant's engine whenever electricity is needed.

The suggested concept leads to a continuous flow of biogas from the digester to a methanation reactor. There the CO₂ fraction of the biogas is converted to methane. The product can then return to the plant's gas storage. Here the useable methane takes the space of the former waste gas CO₂ and increases the concentration of methane in the existing gas storage, which results in an additional storage effect for the plant, to enable flexible operation.