



IEA Bioenergy Task 37 Energy from Biogas

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Task 37



- Australia
- Austria
- Brazil
- Canada
- Denmark
- Estonia
- Finland
- France
- Germany
- Ireland (Lead)
- Norway
- Sweden
- Switzerland
- South Korea
- The Netherlands
- United Kingdom



Benefits of anaerobic digestion

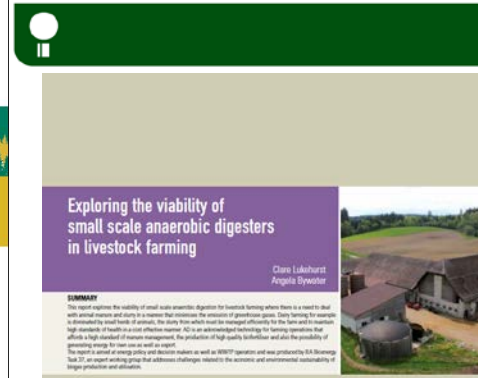


- Agriculture
- Industry
- Reduction of organic residues
- Power to gas
- Utilisation of digestate
- Recovery of nutrients
- Utilisation of CO₂



Implementation of biogas plants in agriculture

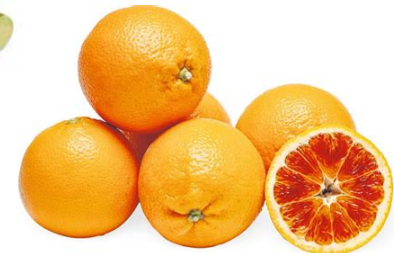
- Digestion of
 - Manure
 - Crops
 - Residues
- Recovery of nutrients
- Worldwide successful projects available



Industries



- Slaughterhouse / meat processing industry
- Dairy
- Brewery
- Olive processing
- Sugar factory (sugar beet pulp)
- Distilleries (bioethanol, rum, schnapps)
- Potato processing
- Winery
- Juice factory



Brewery Gösser Göss/Austria



Feedstock

- Brewers spent grains 17kt/a
- Yeast
- Kieselghur

Gas production

- ~2,000,000 Nm³

Energy utilisation

- Electricity production
- Gas to brewery

Specification

- Preacidification
- Digestate utilisation



Dairy Berglandmilch/Austria



Feedstock

- 360 t/d
- Whey
- Waste water

Gas production

- 5,500 m³/d

Energy utilisation

- 7.900 kWh/d electricity
- 9.900 kWh/d heat

Specification

- liquid treatment

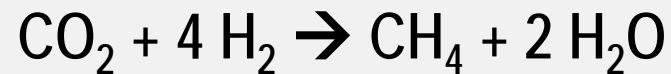


Biomethanation



- Methanogenic archaea convert CO₂ and H₂ to methane
- Ambient temperature and pressure
- Tolerant to impurities like H₂S
- Formation of H₂ from „surplus“ energy

IEA Bioenergy



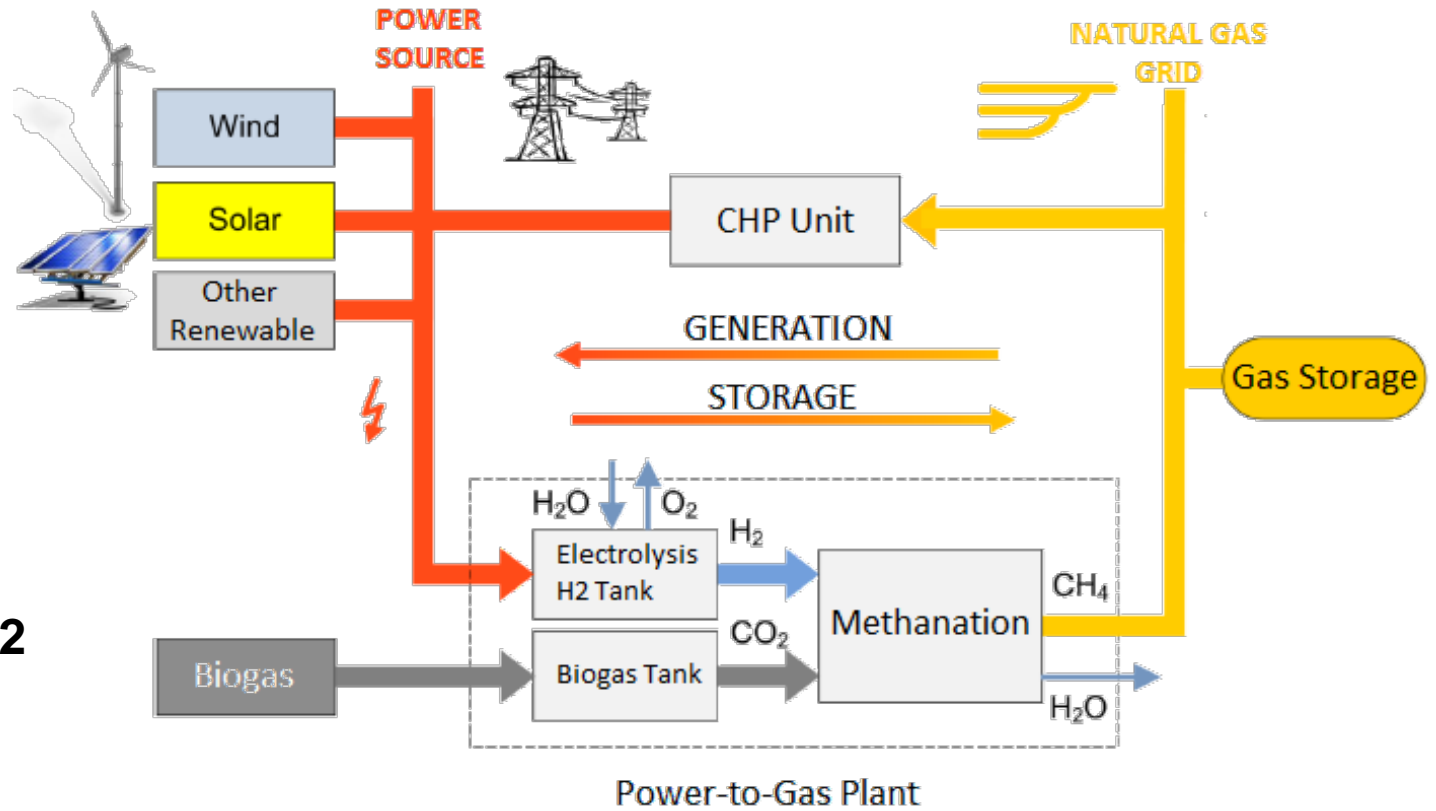
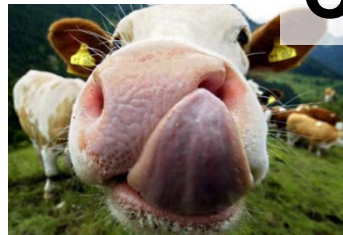
Power-to-Gas concept



H₂



CO₂



Source: Own elaboration based on data from Sterner, 2009 & Specht et al., 2010

International examples



Switzerland

- Natural gas user get automatically 10-20% of biomethane
- Requires activity to get 100% natural gas
- Increased demand of biomethane

France

- Depending on amount of organic residues AD treatment required
- Biomethane feed-in tariff
- Bonus for manure

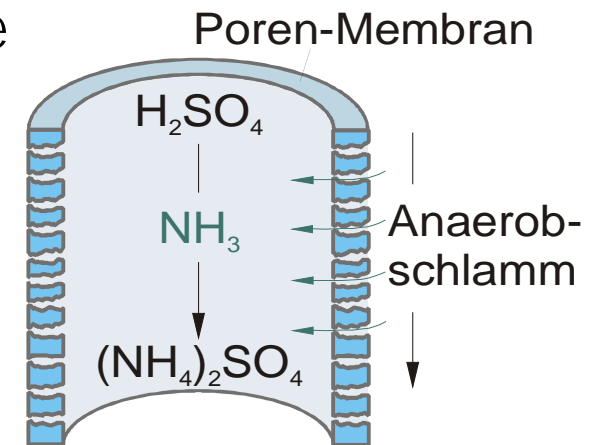


NiMEM

Development of a process for the combined energy and nutrient recycling by using membranes in a biogas process



- Integrated removal of nitrogen and sulfur
- Mono-digestion of nitrogen rich feedstock (chicken manure, slaughterhouse waste)
- Reduction of inhibiting effect
- Sulfur recovery by microbiological oxidation of H_2S to sulfuric acid
- Sulfuric acid is used as absorption liquid during nitrogen removal
- Production of marketable fertilizer – ammonium sulfate
- Innovative membrane technique



Outlook

- Huge variety of applications
 - Many examples for implementation of AD in industry
 - Power to gas technology
 - Utilisation of digestate
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- Support required!



Questions?



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