Power to Methane

WP1: State-of-the-art and future prospects of biological power-to-methane (bioP2M) approaches

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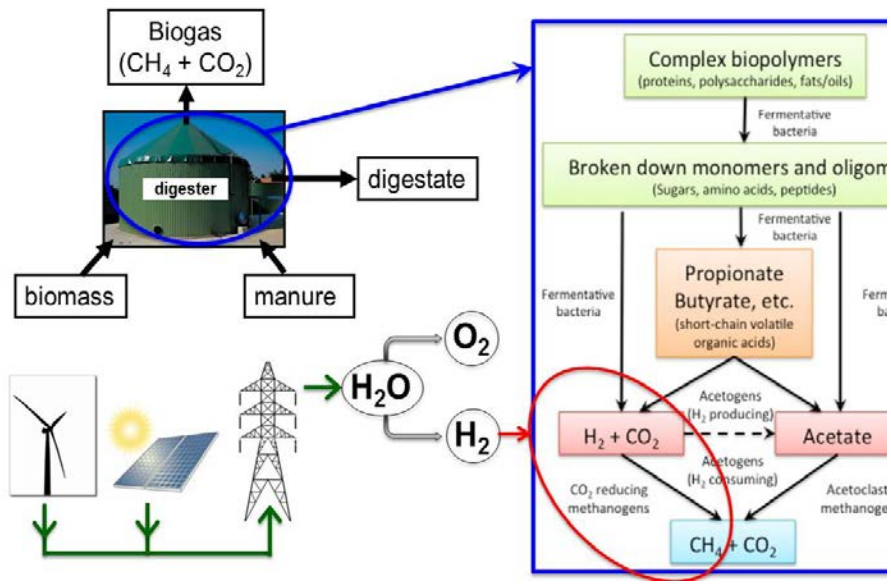
Power to Methane provides a solution to a couple of two problems: unbalanced production and demand of wind plus solar power electricity and the low methane content of biogas by storing electricity via hydrogen into methane gas using carbon dioxide from biogas and methanogenic bacteria. The four-year project is performed by a consortium of three research institutes and five companies. In WP1 the-state-of- the-art of scientific knowledge on P2M technology is reviewed and evaluated.

WP1 obtains the information regarding wind and solar power unbalance, the conversion of electricity into hydrogen and the microbial conversion of biogas –CO2 into methane from the scientific peer-reviewed literature.



Schematic overview of Power-to-Methane technology

Results

The main conclusions of WP1 are:

- The increasing production of wind and solar power leads to an increase in an unbalance.
- Storage of power as methane from hydrogen gas and carbon dioxide is interesting.
- Via methane, carbon dioxide could be the carbon feedstock for the future. Biogas from biomass can deliver that carbon dioxide.
- Addition of hydrogen to a dedicated biogas reactor optimizes the biomethanation conditions and gives most flexibility.
- The low water solubility of hydrogen gas limits the methane production rate. The use of hollow fibers, nano-bubbles or better-tailored methane-forming microorganisms may overcome this bottleneck.
- Currently biomethanation is not likely to be economically feasible, but this may be different in the energy systems of the future.

Future steps

Results will be presented in a comprehensive report and as scientific paper.
Results and recommendations from WP1 are used in the other Work Packages of this project.

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