

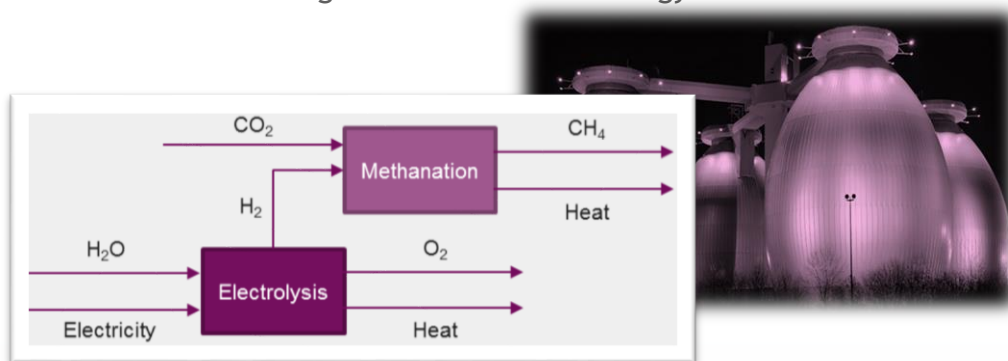
for a Master Thesis at the chair of Energy Network Technology

## Title:

„Exergy Analysis of power to gas plants integrated into municipal wastewater treatment plants“

## Background:

Assessing the material and energy flows of a Power-to-Gas (P2G) system and the technical and operational characteristics of the corresponding processes, wastewater treatment (WWT) plants are attractive sites for the integration of P2G technology.



Power-to-Gas is a technology that converts electrical power to a gas fuel. Water is split into oxygen and hydrogen by means of electrolysis. The hydrogen can be either directly used or it can be combined with carbon dioxide in order to produce methane. Having a closer look at the process, possible synergies to WWT plants can be examined. For instance, valuable by-products of the electrolytic process such as oxygen or heat can be used in the WWT process.

The goal of this Master Thesis is to carry out an Exergy Analysis of the integrated P2G-WWT-system, in order to examine the practicability. Exergy is a measure of the energy quality and not subject to any conservation law. Exergy analysis is a powerful tool in order to identify causes, locations and magnitudes of primary energy losses. It acknowledges that, although energy cannot be created or destroyed, it can be degraded in quality, eventually reaching a state in which it is in complete equilibrium with the surroundings and hence of no further use for performing tasks.

## Tasks to be completed

- Literature review on exergy analysis and power to gas
- Evaluation of possibilities of integration of power to gas plants into sewage plants
- Modelling of power to gas plants in sewage treatment plants
- Energetic and exergetic analysis of the modelled plants
- Scenario based analysis
- Written thesis

**Requirements:** Pleasure for science and research, team spirit

## Contact information:

DI Mag. Kerstin Schopf, phone: +43 3842 402 - 5408 mail: kerstin.schopf@unileoben.ac.at  
 DI Lukas Kriechbaum, phone: +43 3842 402 - 5408 mail: lukas.kriechbaum@unileoben.ac.at  
 Chair of Energy Network Technology, Montanuniversitaet Leoben,  
 Franz-Josef-Straße 18, 8700 Leoben