

Fuel

Running Projects



Solar thermochemical production of fuels from CO₂ and H₂O using ceria redox reactions (SOLAR FUELS)^[1]

This project is aimed at developing the science and technology required to efficiently produce liquid hydrocarbon fuels from H₂O, CO₂, and solar energy. In a parallel EU-project these results will be used to develop and optimize the solar reactor technology for producing syngas by simultaneously splitting H₂O and CO₂, and to further process the syngas to kerosene (jet fuel).

Show full project description^[2]



OPTimization of the use of Wood As a Renewable Energy Source (OPTIWARES)^[3]

Wood combustion and other biomass combustion represent renewable energy sources, and means to reduce global CO₂ emissions if the biomass stems from sustainable agriculture and forestry. OPTIWARES will i) improve the quantitative understanding of the impact of aerosols from wood combustion on air quality and climate and ii) develop improved strategies for encouraging the use of more appropriate wood combustion facilities.

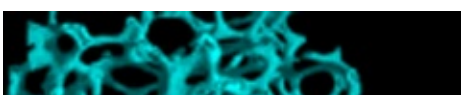
Show full project description^[4]



Attrition Resistant Reactive Bed Materials in Fluidised Beds (ARRMAT)^[5]

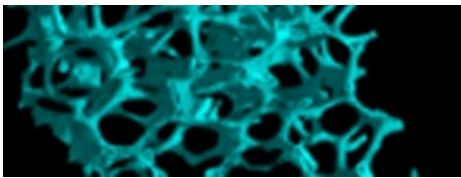
The ARRMAT project deals with the manufacturing of attrition resistant reactive bed materials (ARRMAT) with desired properties for the application in fluidised-beds, with the experimental testing of these materials to identify optimal operation conditions as well as with the in situ investigation of such materials to derive from such investigations design rules for improved bed materials. The aim of the project is to contribute to significant improvements along the process chain in the production of Synthetic Natural Gas (SNG) from dry biomass, the «SNG-from-wood» process which is already investigated within the CCEM project «2nd generation Biogas».

Show full project description^[6]



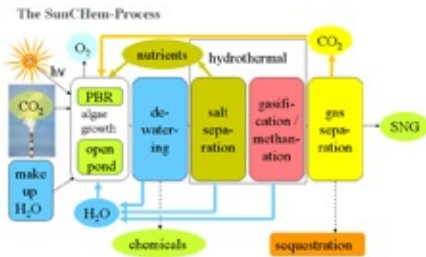
Sustainable Hydrogen Technologies (HyTech)^[7]

The development of a sustainable energy economy, based not on limited



fossil fuels, but on renewable, carbon neutral energy is a necessary and urgent task. Hydrogen (H_2) is a leading candidate for the storage and transportation of energy provided, it can be efficiently produced from renewable energy sources and effectively stored in a safe and concentrated manner. The HyTech project is focused on the realization of breakthroughs and advancing innovative technologies in the field of sustainable hydrogen utilization.

[Show full project description](#)^[8]



Bio-synthetic Natural Gas from Microalgae (SunChem)^[9]

There is consensus that bio-energy is one of the most cost-effective options of substituting fossil fuels and reducing the net emissions of CO_2 . However, cultivating plants for energy use has recently been criticized because its production is competing with resources needed for the food production. Critical resources are a) \square valuable agricultural soils, b) \square fertilizers, such as phosphorus, and c) \square in some regions water for irrigation.

We propose a novel process based on (micro)algae cultivation using the conversion of the algal biomass through a catalytic hydrothermal gasification process (SunChem process).

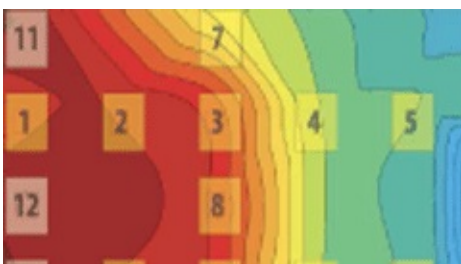
[Show full project description](#)^[10]



Online Process Diagnostics for Operation Performance of a Biomass Gasification Process (SYNGAS DIAGNOSIS)^[11]

The technological objective of this project is the development of a diagnostic system that allows the monitoring of different process units within biomass gasification related plants, i.e. plants which produce and/or use producer gas from biomass gasification for synthesis of fuels or for electricity production.

[Show full project description](#)^[12]



Integrated Biomass – Solid Oxide Fuel Cell Cogeneration (WoodGas-SOFC 2)^[13]

This proposal follows up on the project **WoodGas-SOFC^[14]** (2007-2010), where the following tasks were accomplished: establishment of a system model of the whole process chain (wood gasification – gas cleaning units – reformer units – solid oxide fuel cell) evaluating different configurations; methodology of trace analysis of real wood gas; set-up of test rigs for catalysis and single cells for individual studies of contaminants; demo runs of SOFC stacks with real wood gas treated with a cyclone filter and a partial oxidation cracker (CPO). From these results and others emerging elsewhere in parallel (e.g. coal gas contaminant studies), it has become evident that the gas cleaning section requires an in depth investigation. This is the subject of the WoodGas-SOFC 2.

[Show full project description](#)^[15]

Completed Projects



New Pathways to Efficient Use of Biomass for Power and Transportation (2nd Generation Biogas) [16]

Two main goals have been set for the project:

- Demonstrate the technical feasibility of new highly efficient process paths to pipeline-grade methane from a very broad range of biomass (wood, solid agricultural residues, manure, sludges etc).
- Assess the impact of such technologies in the complex environment of biomass resources, enduses and environmental performance, with the ultimate goal to draw a roadmap towards clean and eco-efficient use of biomass in Switzerland in 2030.

Show full project description [17]



Integrated Biomass – Solid Oxide Fuel Cell Cogeneration (WoodGas-SOFC) [18]

The strategic goal of this project is to prove the techno-economical feasibility of wood gas as representative case of a (renewable) fuel obtained by gasification fed to a temperature-compatible, emerging Combined Heat and Power (CHP) system like the solid oxide fuel cell (SOFC), and identify optimal scales of such integrated systems. The aim of the project is the development of competence (understanding) and technologies (methods, tools).

Show full project description [19]

URLs:

- [1] : <http://www.ccem.ch/.solar-fuels>
 - [2] : <http://www.ccem.ch/.solar-fuels>
 - [3] : <http://www.ccem.ch/.optiwares>
 - [4] : <http://www.ccem.ch/.optiwares>
 - [5] : <http://www.ccem.ch/.armat>
 - [6] : <http://www.ccem.ch/.armat>
 - [7] : <http://www.ccem.ch/.hytech>
 - [8] : <http://www.ccem.ch/.hytech>
 - [9] : <http://www.ccem.ch/.sunchem>
 - [10] : <http://www.ccem.ch/.sunchem>
 - [11] : <http://www.ccem.ch/.syngas-diagnosis>
 - [12] : <http://www.ccem.ch/.syngas-diagnosis>
 - [13] : <http://www.ccem.ch/.woodgas-sofc-2>
 - [14] : <http://www.ccem.ch/.woodgas-sofc>
 - [15] : <http://www.ccem.ch/.woodgas-sofc-2>
 - [16] : <http://www.ccem.ch/.2ndgenbiogas>
 - [17] : <http://www.ccem.ch/.2ndgenbiogas>
 - [18] : <http://www.ccem.ch/.woodgas-sofc>
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