

PROJECT TITLE: Advanced biomass CCHP based on gasification, SOFC and cooling machines

PROJECT ACRONYM: BIO-CCHP

ABSTRACT

The objective is to develop a novel trigeneration system, BIO-CCHP, including biomass gasification, a Solid Oxide Fuel Cell (SOFC) stack and a cooling machine with the aim to produce electricity, heat and cold (CCHP), maximizing the efficiency and flexibility of the system. This approach has a significant potential for the reduction of costs and offers a smart adaptation to energy demands, providing sustainable cold, which is in a growing demand. For this purpose, gasification systems will be optimized for the coupling with a SOFC, broadening the range of biomass feedstock which can be employed. A high temperature gas cleaning method will be developed and optimized with tests at different gasifiers. Long-term tests, coupled with CFD modelling, will allow to find low-degradation operation mode for the SOFC stack fed with a producer gas from different gasifier technologies. Finally, a techno-economic analysis and optimization and an industrialization plan of BIO-CCHP will be conducted, including alternative solutions for the integration of cold and heat production with the SOFC..

Start date: 04/2018

End date: 03/2021

Contact details: Graz University of Technology, Institute of Thermal Engineering, division: Sustainable, clean and bioenergy systems; Robert Scharler, email: robert.scharler@tugraz.at