Project acronym: **GreenSyngas**

Project title: **Advanced Cleaning Devices for Production of Green Syngas**

Scientific and technological objectives

1. To develop advanced characterization techniques for the measurement of emissions from biomass gasification processes in a real process environment
2. To develop high temperature particulate removal systems that have minimal impact of the overall process efficiency
3. To achieve valuable products of tar via tar cracking, in an air- or oxygen-blown tar cracker
4. To demonstrate process efficiencies by maximizing the integration of tar treatment in the process
5. To evaluate the impact of different reformer process options on system efficiency and durability. This includes the use of a novel and efficient "Regenerative Partial Oxidation (POX)" reactor
6. To develop sorbent materials to remove the target contaminants under optimal process conditions (the temperature and location being dependant on the choice of the reformer configuration)
7. To develop and demonstrate water gas shift catalysts that can deal with gasification bio-derived syngas
8. To quantify the environmental and economic improvements offered by the new materials and processes by demonstrating them in the stream of the Güssing gasification facility
9. To find a production route for pure syngas based on energy efficiency
10. To develop novel analytical methods those permit characterization of impurities (impurities in gas and particulate state) in product raw gas in real process environment (temperature, high pressure, corrosive environment, high tar concentration, etc.)
11. Development and assessment of high temperature particulate removal system based upon Porvair's combined high efficiency cyclone and blow back element technology**.** High efficiency cyclones overcome the issues of element blinding and cleaning and enable the use of finer membrane elements as a polishing filter. To evaluate a range of metal elements including those manufactured from metal meshes, fibres, and powders and those incorporating resistance surface coatings.

12. To remove impurities in gas to the required limit, downstream the catalytic reaction to minimise catalyst poisoning

Table1: *The following criteria are proposed as quantitative targets to assess progress towards the project objectives*

Demonstration of gas flow capacity of pilot plant's slipstream		**0.1 kg/s**
Purity of Syngas		
CO_2		< 10 %
Tar		< 0.1 mg/Nm^3
Hetero-atoms		< 0.1 mg/Nm^3
Inorganic compounds		< 0.01 mg/Nm^3
HCl		< 10 ppb
	HCN	< 20 ppb
	NH_3	
	H_2S	< 10 ppb
	COS	
Alkaline		< 10 ppb
99.98 % separation of particle		> 0.3 micron
95 % separation of particle		< 0.45 micron

13. To accomplish conditioning by catalytic high- and low-temperature water gas shift to tune the syngas (CO/H_2 ratio)
14. To verify the accuracy of the obtained data at laboratory scale in a pilot-scale testing