

## Synthetic gas, fuels and chemicals from biomass

Dr. Nicolaus Dahmen, Karlsruhe Institute of Technology (KIT)

Biomass is the only renewable carbon resource. Instead of its main use for heat and power production, biomass should increasingly be used for fuels and chemicals production on a long term. To maintain biodiversity and to avoid competition to food and feed production, the broad variety of biogenic residues from agriculture and forestry has to be used as feedstock. The two stage bioliq process has been developed to overcome the logistic problems arising from the use of a broad range of different feedstocks with usually low volumetric energy content. The combination of a de-central pre treatment by fast pyrolysis for energy densification producing an intermediate (biosyncrude), followed by central high pressure entrained flow gasification for synthesis gas generation, gas cleaning and conditioning as well as further chemical conversion allows for large scale production as required for fuels and chemical production. At KIT presently a pilot plant in the 2-5 MWth scale has been erected for process demonstration, further development and optimization. It provides also an infrastructure to test and verify new components and equipment under realistic process conditions. Along this process chain, manifold measuring techniques are utilized for process control and research & development purposes. Commercially available systems are in place, some of them adapted to the unconventional process conditions characterized by high temperatures, high pressures, multi-component systems in the presence of solid particles and undesired trace compounds. New measuring systems are to be developed in regard to online and real time characterization of the fast reactions taking place in the different reactors to improve the fundamental understanding of the processes and as a basis for further development and optimization.