

Extension of the bioliq[®] Pilot Plant at KIT

The Federal Republic of Germany and the State of Baden-Wuerttemberg are funding the Last Two Process Stages for synthetic fuel production from Straw and Wood Residues



The reactor producing bioliqSynCrude[®] on KIT Campus North – the first stage of the bioliq[®] process. (Photo by: Markus Breig)

By means of the bioliq[®] process developed by Karlsruhe Institute of Technology (KIT), fully synthetic diesel or gasoline can be produced from straw and other agricultural and forestal residues. After funds have been granted already for stages I and II of the pilot plant, the way is now free for KIT to add the remaining stages of gas purification and fuel synthesis. The Federal Republic of Germany and the state of Baden-Wuerttemberg have agreed to fund the extension of the pilot plant on KIT Campus North with a total amount of EUR 11 million.

Synthesis fuels, also called BtL fuels (Biomass to Liquid), are produced from residues like straw and waste wood. Such residues cannot be used as foodstuff or feedstuff, nor do they require additional cultivation areas. KIT applies the four-stage bioliq[®] process to produce a fuel, the quality of which will by far exceed that of conventional biofuels and even mineral oil products. For the construction of stages III and IV of the bioliq[®] process, namely, gas purification and fuel synthesis, Staatssekretär Gert Lindemann from the Federal Ministry of Nutrition, Agriculture, and Consumer Protection (BMELV) today handed over to the KIT Vice President for Research and Innovation, Dr. Peter Fritz, a grant of funds in the amount of EUR 10



KIT Energy Center: Having future in mind

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million. These funds are taken from the “Investitions- und Tilgungsfonds” (Investment and Redemption Funds) of the Federal Republic of Germany. It has been established within the framework of the economic stimulus package II to finance among others research and development in the field of mobility. “The bioliq[®] process developed by Karlsruhe Institute of Technology promises to have many advantages over other biomass-to-liquid processes. I am therefore very pleased that we can complete the construction of the pilot line”, said Gert Lindemann, Staatssekretär of the Federal Ministry of Nutrition, Agriculture, and Consumer Protection (BMELV) in Berlin today.

In addition, the Baden-Wuerttemberg Ministry of Economics has agreed to provide EUR 1 million from funds of the EU Structural Development Program “Regional Competitiveness and Occupation” – Section of European Funds for Regional Development.

In the first step of the bioliq[®] process, biomass is converted into a transportable liquid intermediate product of high energy density (bioliqSynCrude[®]) by a so-called flash pyrolysis at decentralized plants. Hence, the biomass of low energy density does not have to be transported over large distances and additional income sources are opened for agriculture and forestry. The pyrolysis pilot plant on KIT Campus North has already been completed and taken into operation successfully.

Stage II, gasification of the bioliqSynCrude[®] in a high-pressure entrained flow gasifier and the production of synthesis gas, is presently under construction on KIT Campus North. This gasification and the subsequent stages will take place at large central facilities later on.

“We are very pleased that we can now complete the bioliq[®] process with these funds“, underlines KIT Vice President Dr. Peter Fritz. “For the third and the fourth stages, gas purification and fuel synthesis, we will also choose new approaches rather than applying already established processes.” KIT researchers are planning a three-stage gas purification process. In contrast to deep temperature scrubbing, this gas purification process will have the advantage that the gas does not have to be cooled down and the system pressure does not have to be reduced.” Substantial amounts of energy will be saved, as subsequent fuel synthesis has to take place at higher temperatures and pressures again”, underlines Dr. Nicolaus Dahmen, who manages the bioliq[®] project.

For subsequent synthesis, KIT scientists have chosen a route via the intermediate product of dimethylether and conversion into hydrocarbons with gasoline, diesel, or kerosine properties. This comparatively simple synthesis process will be applied for the first time to biomass. It will allow for a much more inexpensive production of fuel than conventional processes. “As soon as we will have implemented all stages of the process, we will also provide a bioliq[®] fuel dispenser at KIT”, says Dr. Peter Fritz.

Karlsruhe Institute of Technology (KIT) is one of Europe's leading energy research establishments: The KIT Energy Center pools fundamental research with applied research into all relevant energy sources for industry, households, services, and mobility. Holistic assessment of the energy cycle also covers conversion processes and energy efficiency. The KIT Energy Center links excellent competences in engineering and science with know-how in economics, the humanities, and social science as well as law. The activities of the KIT Energy Center are organized in seven topics: Energy conversion, renewable energies, energy storage and distribution, efficient energy use, fusion technology, nuclear power and safety, and energy systems analysis.

Karlsruhe Institute of Technology (KIT) is a public corporation and state institution of Baden-Württemberg. It fulfills the mission of a university and the mission of a national research center of the Helmholtz Association. KIT focuses on a knowledge triangle that links the tasks of research, teaching, and innovation.

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