



AALBORG UNIVERSITY  
DENMARK

## **Postdoc Sustainable Biofuels – 2 projects**

A primary focus for BioEnergy activities at the Department of Energy Technology (ET) at Aalborg University is the sustainable production of 2G drop-in biofuels through hydrothermal liquefaction (HTL). As documented through literature as well as the work carried out at ET, HTL has proven to be a very interesting and promising alternative to other biofuel production routes. A major advantage of HTL is the high degree of feedstock flexibility, allowing it to convert feeds ranging from lignocellulosic biomass residues over dedicated energy crops to household and other organic waste streams. To significantly accelerate research in this topic, ET has invested more than €1 million in a new continuous HTL utility (the CBS1), which will be able to process biomass feedstock at a rate of around 25 kg/h at advanced process conditions. The unit will be installed at the ET labs in 2Q 2013. At the time of installation, it will represent the most advanced HTL research platform available for university research. To supplement this, feedstock preparation facilities as well as product analysis equipment is in place. Furthermore, full test of transport grade biofuels can be performed in engines and turbine test stands within the laboratory. The work carried out at ET is done in collaboration with both industrial entities and university partners in an international environment.

### [Research programme](#)

Common for both projects are that they have a duration of 1 year, to be completed in the period 2013-2016. They are offered on the condition that support is applied for and granted from the SWB. It is the intention that successful PostDocs will take leading roles on the topics, including the guiding of junior researchers and PhD students assigned to the topics. Furthermore, as the working language will be English, proficiency herof should be documented. Applicants may be selected for Skype interviews prior to being offered any position. All applicants should document academic qualifications at PhD level.

## **Projects**

### **Topic 1: Hydrothermal liquefaction of lignocellulosic feedstocks**

Probably the premier biomass resource on a global scale are lignocellulosic residues from forestry, agriculture and other sources, for example other biofuel processes. Understanding how different lignocellulosic materials react in a hydrothermal environment is fundamental to producing high yields at high quality in a consistent manner. This topic will focus not only on conversion of real lignocellulosic materials, but also on the major components individually and in mixtures. The effect of process conditions – temperature, pressure, dry matter content, reaction time, catalyst etc – will be studied using batch reactors as well as the continuous CBS1 HTL facility. Product streams – gas, water with solubles and insoluble heavy oil phase – will be analysed using a range of techniques including GC/MS, elemental analyses, FTIR, viscometers and bomb calorimeters.

Applicants with a chemical engineering background will be preferred, although a good mechanical and process understanding will also be positively evaluated. Applicants should document any experimental work they have carried out as part of their academic training or previous work experience.

## **Topic 2: Upgrading HTL oil to transport grade biofuel**

The focus of topic 4 is to take the final step towards producing a high quality, drop-in transport fuel on the basis of the oil produced through HTL. Drop-in properties are important in order to provide for full replacement of the original fossil fuel without requiring any modifications downstream from the drop-in point, including the end use technology. The primary targets are the heavy transport sectors – aviation, marine and heavy duty land – where a technological alternative are not likely to be developed within the next several decades, as it is for the light transport segment through electrical and hybrid vehicles. Optimized upgrading strategies will be designed and tested for HTL crude oil, to produce diesel or jet fuel as efficiently as possible. As a major focus point, engine and turbine testing of the produced fuels will be a priority for this topic. This includes full performance and emission maps for the individual fuels.

Applicants with a chemical or chemical engineering background will be preferred. Documented knowledge of oil refining technologies will be positively evaluated. Experimental experience should likewise be documented.

### **Duration**

12 months – within the period 2013-2016

### **Contact person**

Professor Lasse Rosendahl, [la@et.aau.dk](mailto:la@et.aau.dk) , (+45) 9940 9263

[To apply](#)