

## PARTNER PROFILE

### KTH, Sweden

The Transnational Access (TA) facilities offered in KTH are housed in laboratory halls at the Department of Energy Technology and the Department of Materials Science and Engineering. Each laboratory hall has about 300m<sup>2</sup> of floor space (excluding offices) with vertical clearances of up to 10m. Traversing cranes allow for the relocation or installation of heavy equipment. Fully equipped machine shops are located in each laboratory. There is a significant flux of guest researchers, students, and other visitors in these laboratories. This physical, intellectual, and collegial environment provides an excellent setting for creativity.

#### 1. High Temperature Air and Steam Gasification (HTAG)

This world-unique facility offers preheating gasification agent (air/steam) levels up to 1300°C; a very uncommon level for any type of gasification equipment. Fuels include woody biomass and organic wastes. Capacities range from as low as 20 kW up to 800 kW. This test rig is fully instrumented with an array of thermocouples along with micro-Gas Chromatograph (GC) and other gas analysis equipment.

#### 2. High Temperature Air Combustion semi-industrial test facility (HiTAC)

A unique large-scale HiTAC research furnace in Europe (500 kW), enabling users to conduct fundamental research in synthesis gas from biomass thermal conversion (gasification and/or pyrolysis) combustion tests with advanced combustion technology. It has extremely flexible operation; for instance four advanced burner systems are available. It is fully instrumented with, for example, 120 thermocouples, water-cooled suction pyrometer, water-cooled radiation heat flux probe, micro-GC, and an NO<sub>x</sub> chemiluminescence analyzer. An accompanying research-scale furnace is available for complementary studies such as optical measurements.

#### 3. High Pressure homo/heterogeneous, full/hybrid catalytic combustion and conversion test facility

Unusually high, industrially representative pressure levels (35 bars) for a catalytic tubular reactor test facility. The reactor is highly adaptive



Figure 1: 500 kW High Temperature Air and Steam Gasification (HTAG) test facility.



Figure 2: 200 kW High Temperature Air Combustion (HiTAC) test facility.

See [www.briskeu.com](http://www.briskeu.com)  
for further details  
about how to apply for  
BRISK Transnational  
Access.

*Continued on next page*

## PARTNER PROFILE

### KTH, Sweden



Figure 3: High Pressure Catalytic Combustion Reactor.

to the objectives of the research activities and could be used for catalytic combustion as well as in catalytic conversion and phase changes. Various catalyst configurations with mono- and multi-catalyst beds can be tested. The reactor can be readily equipped with a microwave generator, used for catalyst activation/reactivation. High pressure, microwave induced catalytic conversion is used to improve Fischer-Tropsch process, CO<sub>2</sub> reforming, and liquid fuel production. Integrated, unique one-pass tubular humidifier allows for absolute humidity levels up to 30%. A variety of synthesized and real fuel sources including gasified biomass, hydrogen, and methane can be used. The system can be pressurized with various media including air, N<sub>2</sub> and CO<sub>2</sub>.

#### 4. High Pressure Fluidized Bed Reactor facility

Extremely high pressure levels (3.0 MPa) in a relatively large-scale laboratory gasification facility. This unit consists of a fuel hopper (120 litres, fuel feed rate 15 kg/hr), a pressurized fluidized bed reactor followed by a high temperature filter and a secondary reactor, along with a steam generator. Air, steam and carbon dioxide may be employed, with operational temperatures of 900-950°C for the reactor and the secondary reactor, and 500°C for the Inconel filters. The secondary reactor enables reforming and/or cracking of product gas and tars thermally or catalytically. The auxiliary atmospheric fluidized bed gasifier is equipped for drop tube or screw feeding for investigations up to 900°C.

[www.briskeu.com](http://www.briskeu.com)



Figure 4: High Pressure Fluidized Bed Reactor.



ROYAL INSTITUTE  
OF TECHNOLOGY

#### Contact

For further details about how to apply to utilise KTH's facilities as part of the BRISK initiative contact:



**Andrew Martin**  
BRISK Project Manager

T: +46 8 790 7473  
E: [andrew.martin@energy.kth.se](mailto:andrew.martin@energy.kth.se)

W: [www.kth.se](http://www.kth.se)