Structure:

IEA Bioenergy Task 34 is run as the Biomass Pyrolysis Network PyNe - a global network of active researchers and developers of fast pyrolysis. It has been established to discuss and exchange information on scientific and technological developments on pyrolysis and related technologies for the production of liquid fuels, electricity and chemicals.
PyNe is co-ordinated by Aston University with Professor Tony Bridgwater as the Co-ordinator and Ms Emma Wylde providing the secretariat.
PyNe is sponsored by DG TREN of the European Commission through the Altener Programme and IEA Bioenergy.
PyNe was also part of the ThermalNet network. ThermalNet is a European Network for biomass pyrolysis, gasification and combustion (completed June 2008). ThermalNet consisted of three technology networks: pyrolysis (PyNe), gasification (GasNet) and combustion (CombNet) and is funded through Altener in the Intelligent Energy for Europe Programme operated by DG TREN.

PyNe Tasks and Task Leaders

JOANNEUM RESEARCH

Characterisation, analysis, norms and standards
Anja Oasmaa

Co-processing & co-firing
Gerrit Brem (CombNet)

Feedstocks & Standards
Michael Doran (GasNet)

Fouling, corrosion & erosion
Bill Livingston (GasNet)

Gas Treatment
Nader Padban (GasNet)

Science & Modelling
Colomba di Blasi

Transport Fuels
Harold Boerrigter (GasNet)

Biorefinery
Doug Elliott

Barriers
Patricia Thornley

Economics
Max Lauer

Education & Training
David Chiaramonti

Environment, health and safety
Phillipe Girard

PyNe
IEA Bioenergy

HIGHLIGHTS

www.pyne.co.uk

Task 34 Pyrolysis of Biomass

Pyrolysis Principles

Pyrolysis is thermal decomposition occurring in the absence of oxygen. It is always also the first step in combustion and gasification processes where it is followed by total or partial oxidation of the primary products. Lower process temperature and longer vapour residence times favour the production of charcoal. High temperature and longer residence time increase the biomass conversion to gas and moderate temperature and short vapour residence time are optimum for producing liquids. Fast pyrolysis for liquids production is of particular interest currently as the liquids are transportable and storage.

State of the art

Actual pyrolysis technologies use the flash pyrolysis principle in different reactor designs:

- Bubbling fluidized bed
- Circulating fluidized bed
- Transported bed
- Vacuum pyrolysis
- Ablative pyrolysis

For all of the listed reactor designs pilot plants are in operation. In some cases the technology is commercial (e.g. Dynamotive, CAN), in some cases scale up and further technical development is needed.

Project examples:

Biotox:

The aim of this project was to comprehensively assess toxicity and biodegradability of a representative bio-oil (pyrolysis oil) after preliminary screening of a wide range of bio-oils from different processes and temperatures and to provide regulations for safe transport and handling and storage.

Sponsor: European Commission DG TREN

Outcomes:

Bio-oil is in general easily bio-degradable, non toxic, but seems to be slightly mutagenic.

An MSDS Datasheet was produced and validated by an independent expert.

A guideline for safe transport and handling and storage was produced in compliance with all international modes of transport.

Round robin test

of bio-oil production (out of cellulose) and bio-oil analysis (ongoing)

Biorefineries analysis

Biorefinery concepts using biomass pyrolysis technology are discussed and the specific advantages and problems analyzed (ongoing).