Fast pyrolysis is emerging as an important technology in the development of integrated biorefineries

Potential of pyrolysis

The use of biomass as a fuel, or to produce heat and / or electricity is rapidly expanding but use on an industrial scale is still limited. This is in large part due to the low energy, density, structure, moisture and availability of biomass. To overcome this, various pretreatment options are available that will create a more uniform and dense product that is cheaper to transport.

Fast pyrolysis is a promising pretreatment technique, which is the thermal cracking of biomass at temperatures ranging from 400-600°C in the absence of air. It includes quickly heating the biomass (by using hot sand), followed by the rapid condensing of the vapours produced. Fast pyrolysis yields 70% bio-oil and the process takes only seconds.

The (oxygen containing) product liquid can be used as such (in boilers and turbines), be further upgraded to chemicals, or used in other processes (i.e. to produce biofuels).

The interest in bioliquids has grown rapidly in recent years, because:

- Liquid fuels can already be used to (co-)fire existing boilers and/ or power stations
- Use in turbines is already possible
- The biomass conversion process can be optimized and continuous,independently of the actual demand of heat and/or electricity
- Any biomass feedstock can be used
- The oil production plant can generate its own heat and/or electricity (no need for external energy sources).

First large scale biomass pyrolysis unit

The Netherlands-based pyrolysis technology provider BTG started by building the world's first commercial pyrolysis unit (50 tonnes/day) using empty fruit bunch (EFB), a material that is left over from palm oil mills, in Malaysia in 2005.

This success resulted in the development of a 120 tonne/day installation based on clean and demolished wood in the Netherlands, termed Empyro.

The project, which is the first large scale commercial biomass pyrolysis unit in Europe, will be financially supported by the EU and start up is anticipated for 2011.

The company's fast pyrolysis technology is simple, compact, and can work with relatively large particle sizes. It does not use any inert carrier gasses within the system, therefore no gas recycling or complex gas cleaning systems are necessary downstream.

The pyrolysis oil produced by Empyro will further prove the applications for heat and/or electricity through direct firing in boilers and gas turbines. The longterm vision is to focus more on the biorefinery concept where pyrolysis oil is the raw material for green chemicals (phenols, acids) and transport fuels.

For more information:
Dagmar Zwebe, dagmar.zwebe@btg-btl.com, www.btg-btl.com