

Torrefaction an alternative to pulverised coal combustion

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Torrefaction - the slow roasting of biomass material to improve its energy content - has been touted as part of a solution for the large-scale implementation of bioenergy. The industry says that torrefaction technology is working and is available but uptake has not been as quick as expected. Experts, researchers and manufacturers gathered in Brussels earlier this month to discuss progress and prospects for torrefaction at the recent European Biomass Association (AEBIOM) conference.

Torrefaction is still very much the bioenergy new kid on the block, emerging as the 'solid renewable fuel of the future' in 2007 or so. It is said to be an alternative to pulverised coal combustion and is also well-placed in mid-scale heating appliances.

Speaking at the AEBIOM conference, Michael Wild, President of the International Biomass Torrefaction Council (IBTC), was keen to emphasise that torrefaction is no longer a future technology. He noted, 'I'm pleased to say that in 2014, it is available now ... We can say today that torrefaction, torrefaction technology is available, and is working.' However, while Europe has a growing appetite for small-scale applications for torrefied products, progress is not going as fast as the industry had been expecting.

The torrefaction process involves heating biomass material such as wood, waste materials and crops at a temperature of 200-300 °C without oxygen. The slow heating process roasts biomass, releasing volatile compounds and breaking down hemicelluloses. The result is a dry, torrefied product which is stable, brittle, easier to grind than the parent biomass material and less liable to biological degradation in storage.

The process is not without its challenges. While the roasting and drying process improves energy/carbon content, the bulk density of torrefied material makes transport and storage economically challenging. One answer has been to 'densify' the material and make it into pellets.

Densification has brought with it its own challenges, as Mr Wild acknowledged, 'Many companies underestimated the problems which come along with densification... It's not so difficult to produce pellets ... But to make it a really efficient process with an acceptable energy consumption and acceptable wear and tear on the tools, that turned out to be more tricky.'

There is also room for improvement in terms of the outdoor storage of torrefied products. Berry Meuleman, of Vattenfall, noted that this was an important point for Vattenfall. He stated, '[Regarding torrefied products] we want to use the same logistics as in our coal power plants, that means that we have to be able to store it outside next to our coal piles ... This

means that it has to be hydrophobic and there has to be no issue of smelling'

The industry is confident that open issues like this are easily solved. Apart from the technical challenges, both Mr Meuleman and Rob Voncken of Topell Energy noted that support structures need to be put in place in Member States in order to allow torrefaction to thrive.

EU-funded project SECTOR ('Production of Solid Sustainable Energy Carriers from Biomass by Means of TORrefaction') is supporting the effort to bring torrefaction to the market. The project team is currently developing technologies for the production of solid bioenergy carriers. The ultimate aim is to shorten the time-to-market of torrefaction technology and promote market introduction within stringent sustainability boundary conditions.

More information: www.sector-project.eu/home.1.0.html

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