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## Press Release

Microwave amplifier from TMD helps research into second generation biofuels

A microwave amplifier from TMD Technologies is playing an important role in research into second generation biofuels. The company's PTC6441 travelling wave tube amplifier is helping to produce microwave plasmas to break down cellulose in a €1.1 million research project known as Micrograss.

Headed by Liverpool John Moores University, the EU funded project is looking into ways of breaking down cellulose in biomass from various types of grasses to release sugars for fermentation into ethanol.

Currently, the primary means for producing bio-ethanol from cellulose is biochemical conversion, which is expensive, slow and produces low yields.

The aim of the two year project is to develop a multipurpose prototype for the reaction of various types of cellulosic biomass on a continuous or batched basis using microwave plasma or combined microwave plasma and chemical/enzyme hydrolysis.

This technology has the potential to break down the cellulose with a 90% yield efficiency and rapidly release sugars for fermentation. In addition, use of microwave plasmas should consume 10 times less energy, chemicals, infrastructure accessories and solvents, making the process economically viable.

“The support provided by TMD through the use of their TWT amplifier will play an important role in the project and the industrial system,” said Professor Ahmed Al-Shamma'a, the project's technical manager and director of BEST, the Built Environment and Sustainable Technologies Research Centre at Liverpool John Moores University. “The amplifier provides an excellent level of power with good stability over its full frequency range of 2-8 GHz, unlike other instruments available.”

First generation biofuels use food crop feedstocks such as sugar cane, while second generation biofuels are made from cellulosic biomass.

Other partners in the project are the Fraunhofer Institute for Environmental, Safety and Energy Technology (Germany), Health and Environment Institute (UK), Dara Sistemas Electronicos (Spain), Uvox Microwaves (Sweden), Biofuels Wales Ltd (UK) and Dipolar AB (Sweden).

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Photo caption

Going green: TMD's travelling wave tube amplifiers are helping to produce microwave plasmas to break down cellulose for second generation biofuels.



## Notes for editors

TMD Technologies Ltd is one of the world's leading designers and manufacturers of specialised transmitters for radar and EW applications, high voltage power supplies and microwave tubes. The multiple Queen's Award winning company also produces a range of advanced commercial microwave amplifiers for EMC testing and scientific applications.

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