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Hydrothermal Biofuels Research Pilot Plant opens in Sydney

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The sound of the University of Sydney's Deputy Vice-Chancellor (Research) Professor Jill Trewhella clanging chains against stainless steel was a somewhat unconventionial but nonetheless appropriate way of symbolically marking the accomplishment of a major milestone in the development of biofuels research capabilities in Australia.

The last of five integrated biofuels facilities funded under the Commonwealth Government's National Collaborative Research Infrastructure Strategy (NCRIS) Program was officially opened on Friday 9 September 2010. Located at the University of Sydney's Darlington Campus, the NCRIS Hydrothermal Biofuels Research Pilot Plant will provide researchers an opportunity to improve biofuel production, taking it a step closer to becoming a commercially viable, sustainable energy source.

The NCRIS Biofuels Research Pilot Plant is the first semi-automated, continuous-flow kilo-scale research facility of its kind in Australia. The pilot plant will look at how biomass – particularly woody plant matter – can be used to produce biofuels and other chemicals more efficiently.

As Peak Oil approaches, demand for renewable liquid transport fuels is increasing but a cost-effective means to produce non-food based biofuels on a large scale is yet to be found. The pilot plant allows experimentation with the variables of production, with the aim of finding a viable processing method.

"Before biofuels become a viable alternative to petrol we need to improve many aspects of production," says Professor Brian Haynes from the School of Chemical and Biomolecular Engineering, where the plant is housed.

"So-called first generation biofuels such as biodiesel compete with food supplies," says Professor Thomas Maschmeyer from the School of Chemistry.

"We're looking at increasingly important methods that produce fuel from whole plants, including stems and leaves, and not just seeds. Sources might include sugarcane bagasse or forestry by-products.

"The energy required to produce biofuels also needs to be reduced. Our plant employs heat exchangers, able to recover and reuse the majority of the energy expended in the production process."

The plant converts biomass into fuels and chemicals under hydrothermal conditions, submersing them in hot water (up to 300°C) and subjecting them to high pressure (up to 250 atmospheres).

The plant will experiment with the variables of production, with the aim of finding an economical processing method. Australian academic and industrial researchers can now investigate turning fundamental discoveries into practical applications that employ the unique green processing environment offered by hot water at high pressure.

Construction of the facility has been funded through the NCRIS Program, with additional support from the NSW Science Leveraging Fund and the University.

AusBiotech is the Managing Agency for this project and is overseeing the allocation of $7.98M million of Federal funding to facilitate the development and utilisation of the biofuels facilities across Australia. When State government and host institution contributions are considered the overall project value is $15 million. Small Australian companies and collaborative arrangements involving industry and academia are eligible to receive substantial discounts on the commercial rate to access the technology and expertise provided at each of the NCRIS facilities.