

# Harper Adams develops a state-of- the-art generator



Centre for Rural Innovation  
at Harper Adams University College



## PROJECT SUMMARY

HARPER Adams University College has shown commitment to alternative energy through involvement in developing a state-of-the-art generator.

The BG100 biomass generator, developed by Stafford-based company Talbott's Heating Ltd after 10 years of research and development, began testing in December 2005 at Harper Adams. The Combined Heat and Power (CHP) generator is the first system in the world to incorporate an indirectly fired micro-air turbine and uses air rather than steam to power. The generator is capable of producing 100kW of renewable electricity and between 150kW and 250kW of heat from the combustion of biomass. It has an estimated biomass requirement of 2.5 tonnes a day and can be fuelled by forestry and agricultural residues, wood chips and pellets, and energy crops such as miscanthus and short rotation coppice. It can generate enough energy to provide 25% of Harper Adams' electrical demand and could provide 50% of heat needed for the students' union building, the conference building, students' union bar and two student halls of residence.

Installation of the generator led to Harper Adams receiving the Green Gown Award for renewable technologies and sustainable design. The university college is committed to the renewable agenda. It aims to be at the core of future energy development and provide a springboard for the delivery of rural community benefits.

The objective is to demonstrate a fully vertically integrated on-farm CHP system which includes the production, harvesting and utilisation of a range of biomass energy sources and the subsequent distribution of the thermal energy generated through an on-site heat network. This will create an exemplar reference system that identifies the positive attributes of this approach and the disadvantages that need to be addressed. The technology provides an opportunity to the agricultural community for diversification revenues and added value energy producers by selling green power to the grid.

It is estimated the annual CO<sub>2</sub> savings will be 600 tonnes a year assuming an operation time of 8000 hours a year. The generator is fuelled by the biomass and hot air from the combustion chamber enters a heat exchange system, which is a network of tubes. Clean air on the other side of the tubes is superheated to 800°C. As the air is heated it expands and the pressure increases. The superheated air is fired through the turbine before returning to the combustion chamber. Renewable heat from the generator is captured in a water jacket placed around the flue. The generator is designed for rural and urban settings and is ideal for installation on farms, large estates and public buildings.

Scott Kirby can be contacted on 01952 815465 or [skirby@harper-adams.ac.uk](mailto:skirby@harper-adams.ac.uk)

Further information on the generator is available from Talbotts website [www.talbotts.co.uk](http://www.talbotts.co.uk)



## KEY FACTS:

Lead Group: Sustainable Technologies Network

Key Theme: Sustainable Technology & Rural Economy

Contract Value: £500,000

Project Leader: Scott Kirby

Project Duration: Two years

Sponsor/Client: DTI/Talbott's Heating Ltd



## Centre for Rural Innovation

at Harper Adams University College

### **Accessing the research and consultancy work at Harper Adams University College**

The main purpose of the Centre is the sharing of knowledge to support innovation in the rural economy by:

- the provision of technical research services and business consultancy
- making our facilities available to support the needs of businesses
- supporting business networking
- the development of new technologies
- providing training programmes and work-based qualifications to businesses and individuals

### **www.cfri.co.uk**

The website is designed to allow you to interpret the range of research and consultancy work undertaken using seven key Themes:

- Rural Entrepreneurship and Social Enterprise
- Innovation for Sustainable Farming
- Food Chain Safety
- Linking Urban and Rural Economies and Communities
- Sustainable Technology and the Rural Economy
- Rural Advisors and Agencies
- Rural Professional Practice

### **General enquiries**

To enquire about research, consultancy and training services at Harper Adams University College please contact Dr Andy Brooks:

Email. [info@cfri.co.uk](mailto:info@cfri.co.uk)

Tel. 01952 815296 (Direct line)

Fax. 01952 814783