

Harper Adams University Bioenergy Installation

Development Plan Summary (Newport, West Midlands, UK)

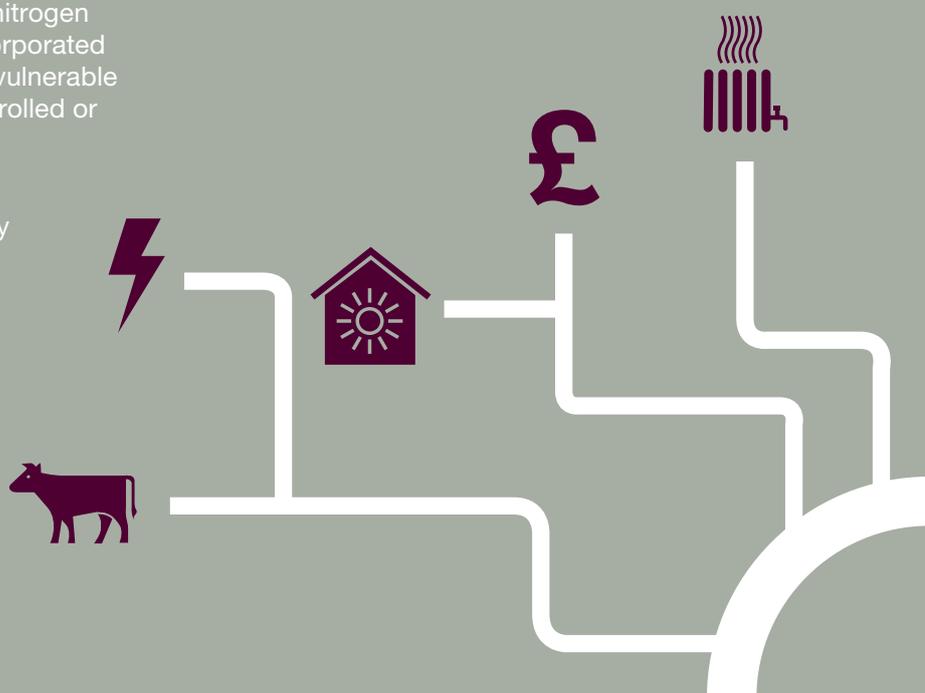
Overview: Harper Adams University (HAU) proposed to install a 0.5 MWe¹ demonstrator plant incorporating pyrolysis technology to produce electricity and heat from various feedstocks, including the residue from livestock manures. HAU received support through the BioenNW project to review the business case for installing novel technologies – such as a Pyroformer™ and a Bio-Activated Fuel reactor (BAF) on its campus site in Shropshire.

Project detail

The biomass feedstock for the pyrolysis-BAF plant would be the solid fraction of the livestock manures from the 400 cows and piggery facilities operated as part of the Harper Adams Farm. Currently the manures are passed through a rotating screen separator which partitions the nutrients, facilitating the liquid fraction to be spread to land as a nitrogen rich fertilizer and the solid fraction to be incorporated as a soil amendment. The site is in a nitrate vulnerable zone where the spreading of fertilizer is controlled or prohibited during certain times of the year.

Before the separated fibre can be used as a feedstock for the Pyroformer™ (developed by the European Bioenergy Research Institute (EBRI) at Aston University in Birmingham,

UK) it must be pre-treated by being dried and pelletized. The pellet size and moisture content can partly affect the performance of the Pyroformer™.



The input feedstock to the BAF reactor is glycerol. Glycerol is produced in various chemical processes including soap making and triglyceride processing into biodiesel. The bulk of new glycerol production in Europe is from the increased production of biodiesel as required by European directive for renewable fuels. The glycerol required for the BAF reactor is described as 'crude' glycerol which usually refers to >80% purity, technical glycerol would be >97% pure and refined glycerol >99.7% pure. Due to the rapid expansion of biodiesel production and the lack of alternative markets, the price of crude glycerol has dropped dramatically and even commands a waste gate-fee in some cases.

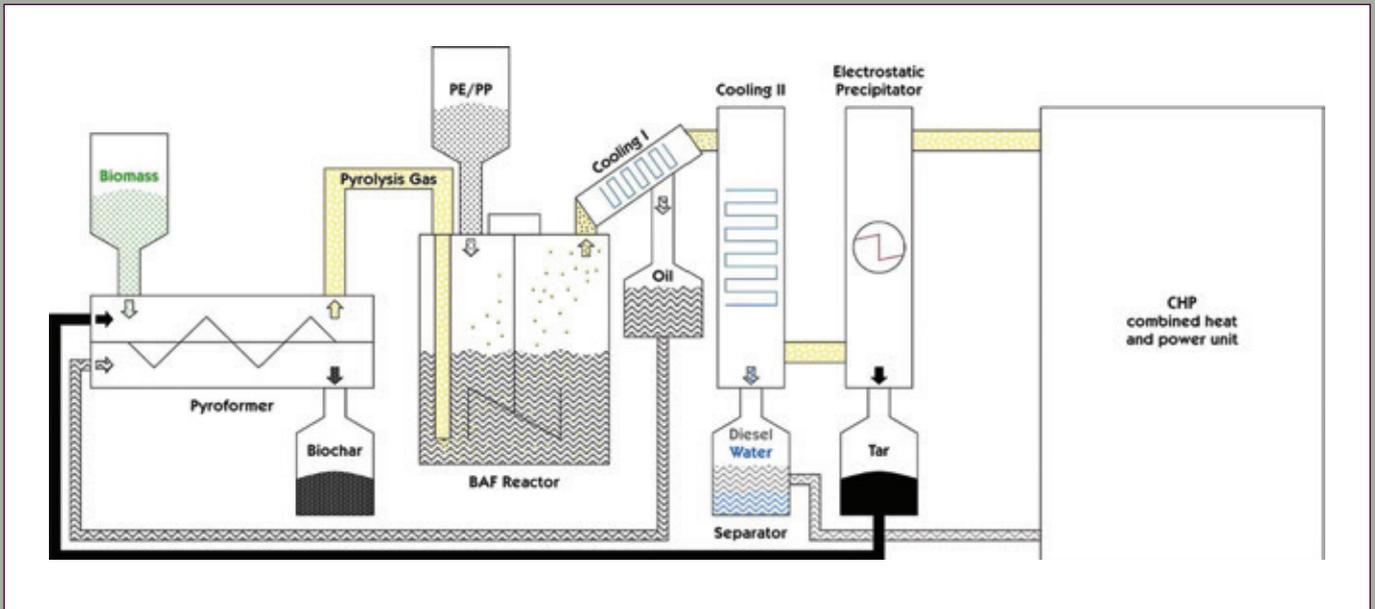


Outcome

A high level financial appraisal indicated a favourable payback period within 3 years and a project internal rate of return, over a 10 year debt term, greater than the investment hurdle rate set by HAU. However this must be read in conjunction with various assumptions that would require validation and further input from HAU and their technology partners. It should be recognised that the appraisal assumed that the building and Pyroformer™/BAF plant would be provided at minimal cost as a demonstrator.



This development plan is part of BioenNW, a €7.9m strategic initiative of the INTERREG IVB North West Europe Programme (2011-2015). BioenNW is led by the European Bioenergy Research Institute at Aston University, UK and sees 11 partners working together to deliver small-scale bioenergy schemes throughout North West Europe.



Report issued in May 2013

For further information contact the Bioenergy Support Network at EBRI:

Email: bioenergy@aston.ac.uk
 Web: www.bioenergy-nw.eu
 Tel: +44 (0) 121 204 5318

