

Investigation into Fuel Ethanol Production from Waste Paper in South Wales

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Summary

There is a vested interest in developing alternate sources of fuel to fossil-fuels, due to lowering stocks, increasing prices and the new EU impetus (Ryan et al, 2005) on reducing carbon emissions and resulting effects of global warming. One of the major alternatives to fossil fuels is the production and use of fuel grade bio-ethanol (Douvartzides et al, 2004). Waste paper represents a significant refined source of hemi-cellulose for the production of ethanol as fuel. Typically, ethanol can be blended to conventional fuel as an extender, where blends of up to 95% ethanol can be used. This paper investigates the use of waste paper as a raw material for ethanol production in South Wales using biological based processing, assessing costs, sizing and energy optimisation. A conceptual plant was designed and the scale of feedstock for three different cases, each producing 99% ethanol, was examined. It was found that a paper to ethanol plant was feasible, with around 80% of energy costs being removed by the on site burning of lignin waste. Each case was found to make a significant annual multi-million pound profit, with payback time being between 1 and 2 years. The thesis proves the feasibility of such a plant in the South Wales region.