

Seeing The Wood From The Trees

Updated, December 2, 2011

A fallen tree is removed from Bradford Dale, Youlgrave.

The valley of the River Bradford has a potential resource that currently is only partially tapped – woodland waste from thinnings. Elsewhere in the Peak District the resource is far greater.

Following a visit from the Peak District National Park Authority (PDNPA) Woodlands Conservation Officer and the regional Forestry Commission officer in 2007, we learnt that there is a potential average over 10 years of 4 tons/hectare of local wood waste available annually for use as fuel, if woodlands are managed properly. Having assured us this would be good for biodiversity and woodland life, they encouraged us to contact landowners. We began with PDNPA, who also spoke with Haddon and Stanton Estates on our behalf, and subsequently provided us with an area map showing woodland location, size and known ownership, which we checked. Subsequently, we approached the remaining private landowners, as well as local sawmills. Other wood-waste sources considered were joinery firms and a local community wood-pile of construction waste.



A survey carried out by the PDNPA Woodlands Officer for SY in 2009 suggested that out of a total number of 106 broadleaved and conifer woods in the Bradford Valley, covering a total area of 253 hectares (ha), 125 ha could produce a sustainable yield of fuel wood amounting to an estimated average annual yield of 710 tonnes (Te). Whilst he was unable to inspect a further 53 woods, they were mostly small broadleaved woods with a low potential for fuel production and a number with no easy access. The identified potential 125 ha would equate to nearly 500 kWh of electrical generation and just under 1 MWh of heat. This assumes the woodfuel would be converted to producer gas in a gasifier, to fuel in turn a gas engine generating both electricity and heat (CHP), for use in say a local district heating scheme (DHS) to offset existing energy supplies. However, developing gasification technology is not yet economically viable below say 1 MW capacity.

Also in 2009, PDNPA Sustainable Development Fund (SDF) commissioned a short study to examine the feasibility of establishing a woodchip supply chain from the much more extensive northern woodland plantations of the Peak Park Upper Derwent Valley across the district.

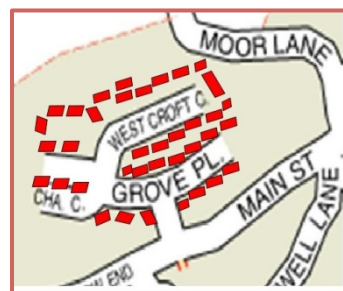
In the meantime SY were surveying potential sites (e.g. adjacent commercial buildings & residential homes) in Youlgrave for a mini-DHS that would not require the highway to be excavated for the heating mains.

Even though only a proportion of the potential wood waste will be recoverable (although local sawmill, joinery and community residues might swell that figure?) this could then displace conventional fuels and offset a significant part of our existing carbon footprint. A local sawmill have the necessary plant and equipment to undertake woodland management (thinning) for us if landowners agree and are co-operative.

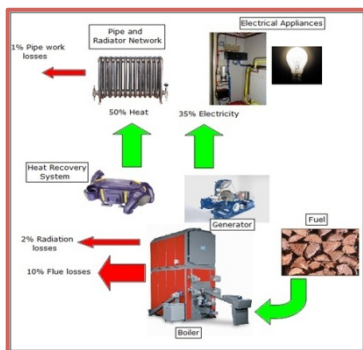
The Pre & Full-Feasibility Studies

Since 2008 we have had the support of the University of Sheffield, Masters & Doctorate research students. You will thus appreciate just how valuable it has been to SY when students have decided to undertake their mini-projects in association with our objectives and ourselves, including conducting an independent community opinion poll for us in 2009.

In his Masters year, James Williams, devoted a lot of time to a mini-project for us undertaking the initial part of his pre-feasibility study for the use of our woodlands and other such regional sources of wood by-products to fuel a mini combined heat & power (CHP) plant for estate district heating (DH) in our main village. He gave an introduction to CHP and DH, their benefits and barriers to implementation, the incentives and uncertainties, and listed other UK examples. He reviewed the various options for boilers, turbines and gasifiers and the associated thermal stores and reticulation. He examined the various wood waste sources, including those from some of the main species of broadleaved and conifer trees in our valley, establishing their calorific heating values and associated aspects, and estimated the heat loads and fuel quantities required for a housing estate in Youlgrave with the carbon footprints and offsets. Possible additional, national wood fuel suppliers were also included.



In his subsequent Doctorate course, he again devoted his first mini-project to expanding his previous dissertation into a full feasibility study to endeavour to complete the much more detailed and extensive investigation and techno-economic appraisal of the proposed fuel sources, together with the associated handling and storage of them, and the power plant and the distribution of electricity and heat to two adjacent estates then being considered. In this study he set out to examine each stage and process from fuel supply sources (including local industry and tree surgeons); the production and costs of fuel types e.g. chips, pellets, briquettes; fuel amounts annually and comparative costs and projected prices; storage requirements; the environmental, social and economic benefits of wood fuel; the economic appraisal of woodfuel against conventional dual fuel, electricity and gas; the legislative and regulatory requirements, including the planning and regulations of being located in the Peak District National Park (including building and chimney design and the Clean Air Act); Funding and grants sources (including Feed In Tariffs and the forthcoming Renewable Heat Incentives); CHP technologies, costs and specifications; the plant location and suggested reticulation layouts; and the overall appraisal.



Towards the end of his allotted time (some in his own 'free' time!) he was advised that the study could not qualify for his PhD award and so regretfully for him, and especially us, he had to move on to other research that would do so. The incompleting report now in our possession (and available online from the University) was similar to that which some professional consultants would have required us to find many thousands of pounds! This has not only been of enormous benefit to SY and our community but also in contributing towards the government's policy of fuel substitution to renewable sources in order to meet their climate change targets.

This year SY issued an enquiry to selected independent consultants with the expertise and track record to bring up to date and to complete the full feasibility study, but this time to not only cover all the estates of Youlgrave but also the adjacent small villages of Alport and Middleton. New technology could enable the possibility of micro-district heating for small groups of properties and the study will look at opportunities for these as well. In view of the escalating prices to consumers of energy, the study will also establish the 'tipping point' when conventional fuel prices reach a level that it will be more economic in the near or foreseeable future to switch to a wood-fuelled district heating scheme either by a heating boiler alone or coupled to a mini-CHP. The study will deliver as well a (DIY) 'Toolbox' report to be placed in the public domain for other communities to assess their own potential and possibilities as much as possible by themselves, to substantially reduce their funding needs for professional services.

When such wood-waste fuels are added to the potential from anaerobic digestion (and perhaps some energy crops?) biomass resources could well provide us with the means to approach carbon neutral.

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2/12/2011