

Demand for wood fuel

Building a successful business capable of passing on the benefits of wood fuel supply and use to local people in the South East of England

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Abstract

TV Energy, a regional 'SAVE' energy agency based in Berkshire, created a wholly owned subsidiary, TV Bioenergy in 2002 to facilitate the formation of a wood fuel supply chain in the Thames Valley area of the south east of England. This initiative has proven successful and continues to grow apace, providing some 20,000 tonnes of wood chip during the past year to local consumers. Success has not come easily, however, and many challenges lay ahead in growing the business still further to service the expanding number of local wood fuel users.

TV Energy has moved on to establish a short rotation coppice Producer Group (TV Bioenergy Coppice Ltd) which nurtures a growing group of local farmers wishing to diversify into the energy business. By this mechanism, TV Energy is able to directly pass back the financial benefits of working in the wood fuel area to primary suppliers whilst at the same time establishing a strategic, local and dedicated wood reserve. Most recently, TV Energy has embarked on a series of joint ventures to establish a series of 'Tree Stations' or aggregation sites. These will provide further security of supply to users and raise the standards of local wood fuel supply. They will also allow even more material to be utilised as fuel, redirecting it from landfill and other environmentally unfriendly destinations.

This paper explores the activities of TV Energy and TV Bioenergy to date in the context of the rapidly changing energy scene in the United Kingdom and goes on to show where future emphasis will lie to further grow the business enabling greater benefits to be retained within the local and regional economies.

1. Introduction

The development of a modern thriving wood fuel market supplied by a local and sustainable wood fuel resource has, until recently, alluded the United Kingdom. Only with changes in attitudes to the use of conventional fuels (fossil fuels in the main), due to their severe climate change implications coupled with a greater appreciation of the need for more efficient production and use of energy, has the opportunity for wood fuel re-emerged.

UK Government has of late published several papers and reports exhorting the population to embrace (local) renewable energy and to seek a 'low carbon economy'. In the latest White paper, issued in May 2007, the Government has reiterated its desire to see urgent change such that:

- Progressive targets have been set to increase the proportion of electricity produced from renewable energy from the current 4.4% up to 20% by 2020, with wood fuel playing a major part
- Incentivising certain 'emerging' renewables further by doubling the number of ROCs (Renewable Obligation Certificates) to 2 for each MWh generated from woody resources such as the dedicated burning of energy crops (with or without CHP) and dedicated regular biomass with CHP to bring schemes forward at a faster rate

Noted and welcomed that there will also be:

- Some examination of the source of the wood fuel that might be used by large co-firers (power stations) – with reference to the 'UK Woodland Assurance Standard' to make some attempt to utilise local, sustainable resources and not import biomass willy-nilly based on price alone
- Ongoing support for previous grant based initiatives aimed at boosting supply infrastructure, planting of energy crops and provision of capital grants for boilers

Even with this positive policy back-drop, it has taken individual organisations, dedicated to making a business out of renewable energy/ wood fuel, many years to become

established. Government schemes have often been at cross-purposes and there has been a lack of continuity in the area (e.g. on planting grants for energy crops). All of this has tended to undermine well meaning enterprises. Of late, local and regional support for facilitating organisations concerned with renewable energy has also been slashed which has not helped matters. A successful ‘community renewables’ programme having been axed altogether by DTI and DEFRA.

Of the several initiatives now taking root in England, each has its own set of unique circumstances that have allowed such an embryonic business to emerge. Not all have been successful, but increasingly, the prospects for such companies is improving in the commercial sector where public sector funding or support is not critical.

This paper will consider the progress being made by one such initiative, that of TV Bioenergy (TVB), supplying wood fuel and related services in the south east region of England.

2. Getting started

TV Energy (TVE) was set up in 2001 by the author with support from 16 Local Authorities, several private sector companies (including Waitrose) and others such as the Environment Agency and the Greenham Common Trust. European Commission support was requested and granted for establishment with the new company to be based in Newbury, Berkshire. The mission of the ‘public-private partnership’ was to educate, promote and deliver renewable energy solutions to the local area and to the region. A management board was created with partners and includes an NGO (Friends of the Earth), regional Governance bodies and a local university (based in Reading).

Very quickly, it became apparent that the major theme for TVE was going to be the supply and use of wood fuel for heat and power, as the area had an excess of supply that was being disposed of to landfill, or worse, burnt in fields and elsewhere. Other renewables options such as wind power, low head hydro and solar power all had a place but the resource was not as favourable nor on occasions was public opinion as supportive.

Hence, TVB was set up to trade in wood fuel and to begin the process of establishing a local industry.

However, it was not possible to create a supply infrastructure without a market for the fuel, nor was it possible to create a market without the fuel correctly prepared, to hand. TVE carried out a series of studies with both public and private sector partners and began the task of ‘wooing’ local environmental champions to take the risk of installing a small wood fuel based heating or CHP system.

Progress was extremely slow as the risks involved for users were seen to be almost insurmountable, given technical, commercial and supply side considerations. TVE and TVB are small companies and could only use persuasion! This most often was not enough.

During this period TVE was approached by Slough Heat and Power (SH&P) concerning interest in local wood fuel supply from ‘green’ sources. That is, supply of untreated wood obtained from arboricultural sources in the main although some material from clear fell and from ‘lop and top’.



Slough Heat and Power

Working with TVE was an advantage to SH&P since:

- TVE offered diversity of supply, increasing SH&Ps supplier network at a time when it was seeking to change to the predominant use of wood for commercial reasons
- TVE gave a local supply option drawing on a myriad of public and private sector organisations that SH&P could not hope to harness alone
- TVE used material that would otherwise be disposed of to landfill, providing good PR and fitting with the SH&P forward thinking on sustainability

SH&P is a wholly owned subsidiary of Slough Estates or 'SEGRO' as they have recently been rebranded. They operate a combined heat and power plant that currently supplies about 400 local commercial and industrial enterprises with electricity, hot water and or steam. The plant also supplies 2,500 homes with electricity.

The site uses a pioneering fluidised bed (FB) combustion system with a passout / condensing turbine alternator. Environmental and operational criteria were key to originally installing this system. Circulating fluidised bed boilers provided compliance with national emissions control regulations without the need for an extensive flue gas clean up system. The design enabled a range of fuels to be used, including coal, densified refuse derived fuel and dried sewage derivatives. These boilers use washed smalls coal rather than milled coal which is used in large centralised power plants in UK, avoiding the cost and space required for a mill. The plant was constructed in 1989 and was commissioned in 1991. Currently 95% of the input is wood, the remainder is coal. In order to be able to achieve this high percentage of wood, a new in-feed system was required (since wood fuel is very different to handling coal). Ultimately, a completely new in-feed system was constructed.



Wood chip handling at SH&P

SH&P use some 300,000 tonnes of wood chip per annum, the installed capacity of the converted plant is of the order of 40MWe making it the single largest green electricity provider in the UK.

TVB is now one of two main aggregators for SH&P drawing on green fuels. TVB also sources an increasing volume of chip from short rotation coppice (SRC) grown under contract by TV Bioenergy Coppice Ltd (TVBC), a producer group established and operated through TVE. TVB has agreed a 15 year supply contract with SH&P which has enabled back-to-back contracts to be placed with an increasing number of growers in the local area. Supply is currently drawn from the 250 hectares of *Salix* established in the Thames Valley and Hampshire.

3. Developing the supply chain

So, having a major market for wood fuel (chip) established with a strategic partner, TVB set about:

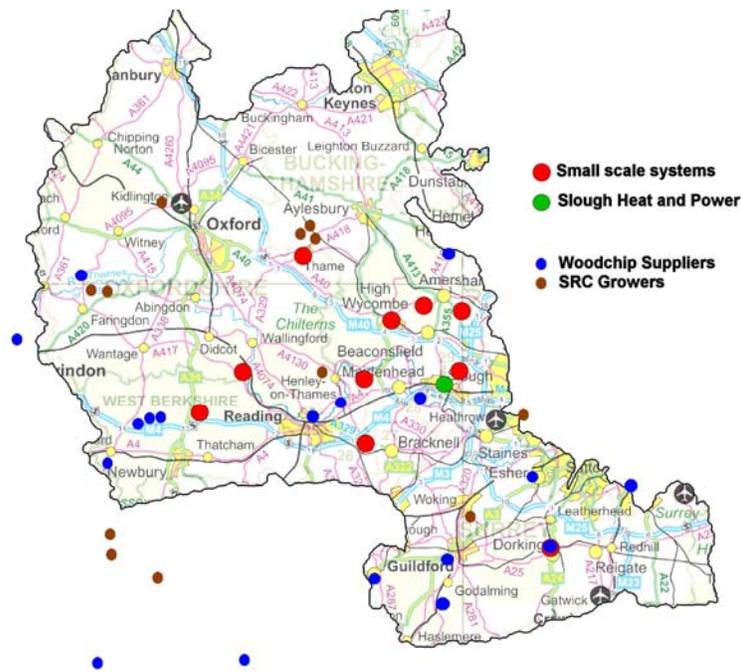
- Extending the supplier network of tree surgeons, local authorities and others
- Expanding the activities of TVBC to provide a ‘strategic’ local resource

This has been successful and currently some 30 – 40 suppliers actively work through TVB, supplying more than 20,000 tonnes of fuel to local users. Quality has been an issue in terms of:

- Ensuring a clean, uncontaminated supply
- Ensuring the size of chip specification has been achieved (we supply at two grades: G30 and G100 – Austrian standard)

Considerable effort has been expended in getting the suppliers to understand the need to work to specification and hold their chip over concrete floors (to avoid contamination). As time goes by, TVB is now tightening up on other quality issues such as the moisture content of the wood chip. This was not so important for SH&P in the past but is critical for the smaller users.

The overall strategy is to extend the wood fuel supply infrastructure so that any user can be supplied within the local area. The map below indicates the current area of activity.



Area of current TVB regular wood fuel production and supply

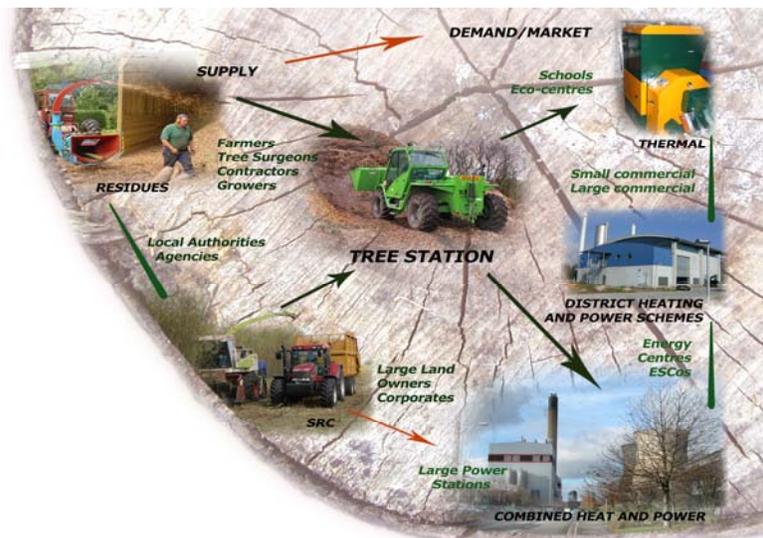
To ensure increasing quality and security of that supply, TVB is creating a series of ‘Tree Stations’ or aggregation points where wood can be chipped to specification. The first of these Tree Stations is due to open next month, in June 2007 at a site in south Buckinghamshire. The company concerned is called ‘TV Tree Station Ltd’.



Tree Station Main Building (Under Construction)

If all goes according to plan TVB will set up three such Tree Stations per County in the 5 counties that we operate in. These will likely be joint ventures with local organisations or farmers (as is the first Tree Station). This shares the risk of developments and later the benefits of success.

The overall concept of supply to the locals market can be seen in the diagram below.



TVB Concept of local wood fuel supply and use

4. Developing the market

In order to extend the supply of wood chip and to ‘mainstream’ wood fuel as a local and reliable source of fuel, TVE is seeking to develop the market for small and medium scale applications. Over the life of TVE the proportion of time spent on market development has far exceeded time spent on developing the supply base. Market development is the major challenge and poses the most difficult of the tasks before TVE.

TVE and TVB are working on a series of initiatives at different scales and degrees of complexity in order to increase the number of wood fuel schemes coming into place. We are seeking to address a range of non-technical barriers in the process, the most important of which is the concern that potential users have over changing from ‘tried and tested’ energy supply from a major utility type organisation to what many consider to be a novel fuel with a lack of track record in modern times.

Our current programme includes activities with social housing providers, Local Authorities (public buildings such as schools, village halls, own offices, district heating schemes), individual estates, volume house builders, corporates, business parks, Universities, research centres and hospitals. We are seeking to:

- ***Address concerns over being ‘the first’ to adopt what is perceived to be a risky technology***

This is being dealt with by showing proposed users local, UK and European schemes already in successful operation and through presentations, conferences, workshops, site tours, brochures etc. Most people in the UK do not understand that the use of wood as a fuel is already a mainstream activity in many European and OECD countries. Use of wood in the form of logs, mainly as a lifestyle choice in rural locations, is the predominant view held. Examples of projects featured in the ongoing education programme are shown below.



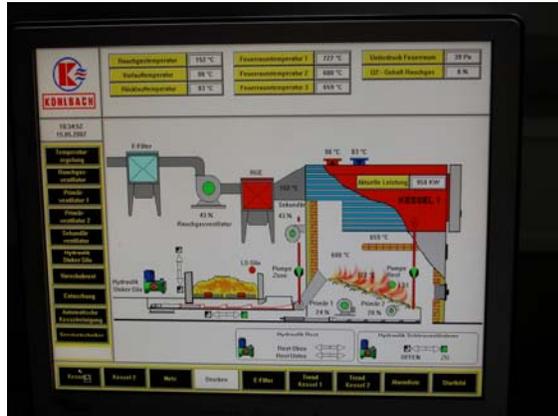
The Living Rainforest Boiler House, Newbury



Worcester County Hall System



Wood fired District Heating Scheme in Voralberg, Austria



- *Addressing the concerns about technical and commercial risk*

TVB carry out pre-feasibility and full feasibility studies for potential users that look at a site’s existing energy demand (heating, cooling and electricity). TVB also consider any proposed new buildings and the implications for energy use (we carry out SAP and Eco type accredited assessments for clients). After careful modelling using bespoke software systems such as ‘Energypro’ we look at the demand profile and provide advice on improved energy management and efficiency opportunities. Changes here can mostly lead to a ‘flatter’ energy profile removing or at least reducing costly ‘energy spikes’ and reducing overall energy take. This done, TVB will examine the most cost effective and technically viable sustainable energy solution using the full range of renewable energy technologies in conjunction with conventional energy supplies. This holistic and hybrid approach gives the potential user the option of full conversion to a renewable fuel

(perhaps with a fossil fuel such as natural gas as back-up using existing boilers) or part change, reducing conventional fuel use. Our assessments and action plans enable developers to meet the increasing requirements from our Local Authorities concerning sustainable construction, design and resource provision. In particular, meeting the ‘Merton 10%’ or greater on-site renewable energy provision requirement for new developments of more than 10 housing units or 1,000 metres cubed of commercial floor space.

TVB will then project manage the installation and organise contractors and suppliers. Finally, in the case of wood fuel, we will organise a wood fuel supply and agree a supply contract setting out quality and price.

Commercially, TVB can draw down on all relevant grants that may be available so easing the financial burden to a client. In certain circumstances, TVB can also arrange the purchase and ownership of the plant installed. In such cases, we are piloting the concept of a local ‘ESCO’ or Energy Services Company that would then supply heat (and electricity) under contract, the end user paying only for the energy consumed (under an ‘energy supply’ contract).

Given our background, we are keen to establish such ESCo’s with local organisations and the expectation is that companies will often be joint ventures sharing the costs and the benefits of projects. In train, are a series of possibilities with our partner Local Authorities. The most advanced of these is with our host authority in West Berkshire. Here a pilot ESCo is underway with a local school and we are in discussion with the Local Authority to roll out a ‘school boiler replacement programme’. Such a scheme would quickly multiply up the number of wood fuel projects in the local area giving financial and environmental benefits. The scheme is particularly prized by West Berkshire as a flagship within its ‘Cleaner, Greener’ campaign to reduce carbon emissions. Other initiatives are underway in Oxfordshire and Buckinghamshire with social housing and within public buildings.

- ***Addressing the concerns about a secure and predictable wood fuel supply***

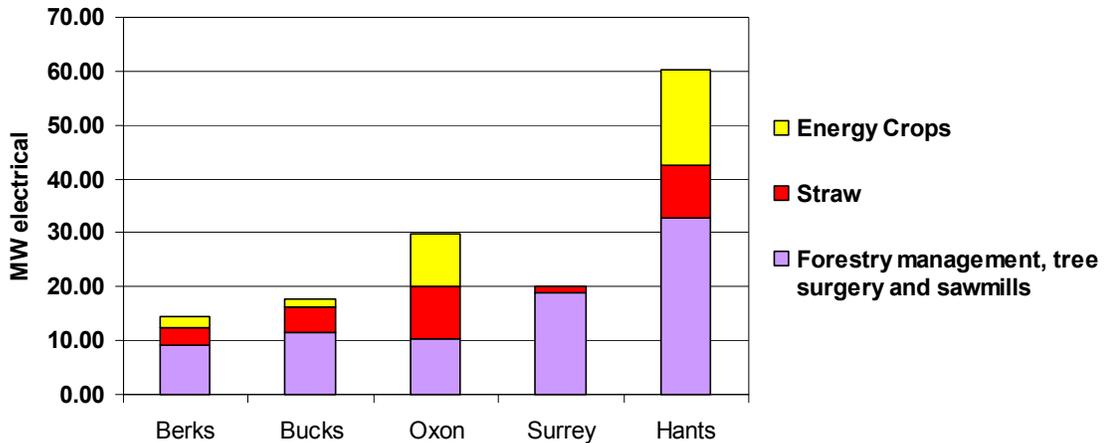
Much of this paper has set out our strategy for achieving this aim long term. Certainly, we would claim to already have a secure supply structure in place capable of delivering chipped fuel to any point in the 5 Counties of operation (and on occasions beyond that). We will also agree a short, medium or long term wood supply contract if that is required.

Achieving the set up of the Tree Stations is a priority to us, along with establishing further SRC (this to include further hectarage to be owned by TVE and TVB). Our producer group is well established and growers are on the increase. We will continue to invite further membership and growers will be able to hold a share of the company (TVBC) and benefit from added bonuses once sale of wood is concluded. In this way we are directly able to pass on the benefits of using wood fuel to our primary producers.



Harvesting SRC at one of the TVBC sites in Oxfordshire

Emphasis on SRC is important strategically as, although there is currently a reasonably abundant supply of wood to chip for the local market, this is nonetheless a finite resource. Our projections show that should local and regional targets set by Government be achieved then we will face a shortfall in wood fuel availability well before 2010. The following diagram illustrates the point by showing the resource available to meet just the electricity generation target for the 5 counties.



Note that only Surrey (the most wooded county in England) is barely able to meet this early and modest target from wood residues. In actuality, the heat market for wood will be much more important in the medium term at least and this is not recognised in these figures.

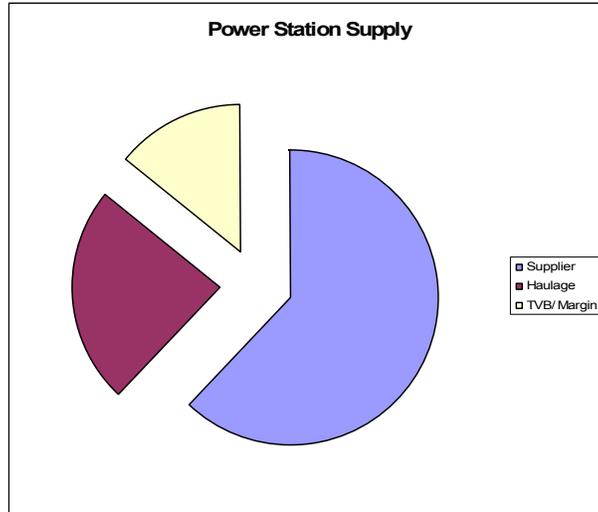
Growing energy crops, and for TVB that means SRC, is thus of immense importance. We wish to be able to guarantee our supply long term and this can only be achieved by one of two means; SRC grown under contract through TVBC or by importing. TVE and TVB have a policy of local supply for local users in order to maximise the sustainability and low carbon nature of our business. In addition, we are pledged to maximise the benefits for local people along the fuel supply chain. Importing would play against these commitments and undermine the local socio-economic benefits currently accruing.

- ***Addressing the concerns about the price of wood fuel longer term***

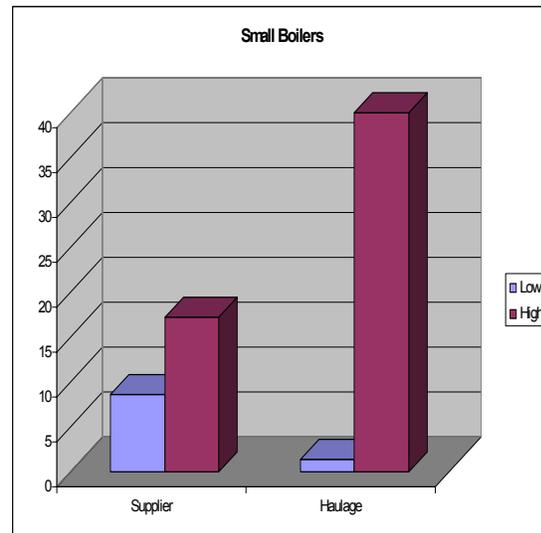
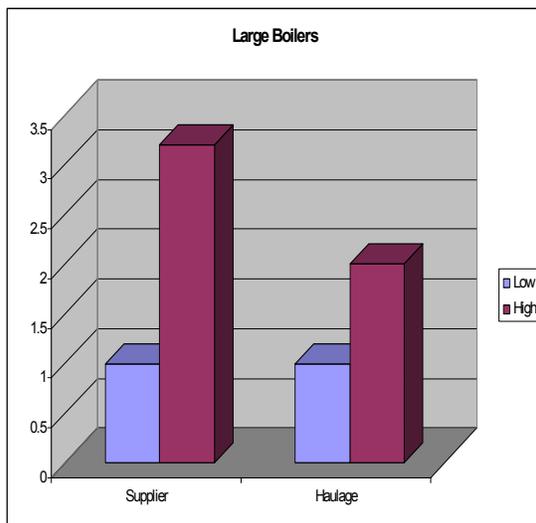
The best way that TVB can guarantee long term stability for users is to create a sustainable and long term viable business. That means creating a profitable business out of what will always be a low margin operation. The chart below illustrates how the proceeds of the sale of wood chip are split for large end users.

TVB became profitable in 2006 after being subsidised by TVE from a range of public and private sources of cash. Projections for 2007 and beyond are excellent and profitability is expected to increase so allowing greater investment in the infrastructure to

take place. This in turn will generate greater profits that can then be used to gear up the small to medium scale biomass boiler and CHP installation programme (through the use of ESCOs for example).



The margin made in supplying wood fuel is small



Variability in haulage costs is a key factor in the level of profitability generated

TVB pays suppliers on a consistent basis relative to quantity and quality, there is some variability here as illustrated above. However, haulage costs by comparison are less under our control and to supply small users infrequently has a massive impact on the price that must be charged per tonne to make even a modest margin. *The figures*

presented above are presented to illustrate the range of costs involved. They are factored to protect this commercially sensitive information and should be viewed as relative only.

5. Moving the company forward

TVE and TVB will both continue to open up the market for more wood fuel users based on comprehensive assessments of energy needs at individual sites. This will ensure maximum energy efficiency and use of resources. We will continue to promote wood chip use in small and medium scale systems and seek to supply from an ever increasing number of local Tree Stations and small suppliers. We will seek innovation in all aspects of the fuel supply chain including the use of ‘chip blowers’ enabling easier access and supply for small systems. This should help to reduce the variability seen in haulage and supply costs.



A chip blower in operation

We will also examine the prospect of distributing other sustainable fuels such as wood pellets through our Tree Station network.

Recognition

My thanks to the TVE partners and sponsors that have made this enterprise possible. Special thanks to both Dr Andrew Ellis, Director of Slough Heat & Power and TV Energy Ltd along with Jeremy Bolas of SEEDA.

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