

TV Energy

A South East Regional Study into Wood and Energy Crops as Sources of Bioenergy

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South East Farm Demo Programme

- One of a series of projects commissioned by the Rural Development Service
- Four Bioenergy Workshops, one in each sub-region of the south east
- To provide advice and information to facilitate and encourage the development of bioenergy in our region.
- Regional Study – provides the background

Objectives

- Collation of relevant information
- Review of bioenergy funding
- Assess the relationships between relevant schemes
- Assess current engineering and agronomic technologies
- (Re) Assess the technical and economic potentials of bioenergy
- Energy crop economic assessment
- Provide future market projections
- Carry out a market segmentation analysis
- Prepare a series of case studies.

Existing work

- Considerable amount of work has already been done
- Many organisations involved (Defra, dti, universities, research councils, companies)
- Consolidation process
- Over 200 sources of information collected
- Provided in table with both electronic and hard copy sources (where available)

Bioenergy Funding

- 26 possible sources of funding for:
 - Growing energy crops
 - Producing wood fuel
 - Diversifying business
 - Purchasing boilers etc.
- Each scheme has its own eligibility criteria and application process, so summaries and ways to find out more are provided.

Policies, legislation and subsidies

- Energy Crops Scheme
- Single Payment Scheme
(cross compliance, set aside, energy crop payment, ELS and HLS)
- Planning Regulations
- Waste Regulations
- Emissions Regulations
- Inheritance Tax and Energy Crops
- Nitrate Vulnerable Zones

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Energy Crops Scheme

- Scheme provides
 - Funding for producer groups
 - £1000 per hectare to establish short rotation coppice
 - £920 per hectare to establish Miscanthus
- TV Bioenergy Coppice was set up using the producer group funding
- Around 200 hectare of SRC will have been established in the SE using establishment grant funding by the end of this year

Single Payment Scheme and Bioenergy

- Cross Compliance Rules
- Set Aside Rules
- Energy Crop Area Payment
- ELS and HLS

Energy Crop Technologies



Step planter-Salix Maskiner



Step planter-Coppice Resources



Turton Engineering planter



Cutback harvester-Coppice Resources



Converted forage harvester-Coppice Resources



Sugar cane harvester (Austoft)

Photo: Forest Research

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Conversion Technologies

- Heat production with direct combustion
 - Log burning stoves and boilers
 - Chip, pellet and straw boilers
- Electricity generation with direct combustion
 - Co-firing
- Combined Heat and Power
 - Using direct combustion
 - Using advanced systems (gasification and pyrolysis)

Conversion Technologies



From logs to heat



From pellets to heat



From chips to heat



From straw to heat



From chips to heat and electricity by combustion



From chips to heat and electricity by gasification



From sawdust and other biomass to electricity

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Resource and Economics

Year	Target of Electricity Production by Bioenergy (MW)	Quantity of wood required to meet target (dry tonnes)	Quantity of wood available from existing woodland (dry tonnes)
2010	215	967,500	551,944
2015	347	1,561,500	551,944
2020	499	2,245,500	551,944

Notes: 2020 targets reflect governments 20% aspiration

Assumed tonnes biomass/MW 4,500. Biomass from existing sources assumed constant

Resource and Economics

Shortfall in resource could be met by:

1) **Imports**

But biomass is a low density fuel and transport costs and emissions are high

2) **Combustion of waste biomass**

Chicken litter and straw bioenergy exists but contamination can be a problem and the resource is finite

3) **Energy crops**

Resource and Economics

- **Meeting that shortfall with energy crops**
 - 21,000 hectares needed by 2010
 - About 1.7% of agricultural land in SE
 - Energy crops are currently economically competitive with alternatives for all grades of land (except grade 5)
 - Around £120 per ha per year is typical for SRC (harvested every 3 years)
 - Around £50 per ha per year is typical for Miscanthus (harvested every year)
- **Current level of grant funding must be maintained**

Markets

- Existing power stations
- New power stations for town centres and district heating schemes
- Business parks and private sector businesses
- Public buildings - regional and local government
- Community microgrids and district heating systems
- Farmer/owner use on-site
- Domestic use


Case studies in the region

- See-Stats database of renewable energy
- There are already 29 bioenergy installations in the region.
- Eight case studies have been developed as part of this study

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Wood-buffed heating – West Dean Estate

Status of Project:	EXISTING – Commissioned 1981
Location:	West Dean, West Sussex, PO18 0QZ (Grid ref: SU8372M)
Owner / Developer:	The Edward James Foundation
Description:	Woodchip fired boiler and district heating system



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Wood-buffed heating – West Dean Estate

Technology / Scope of Project:

Background: The Vötsch boiler was duly installed by Colgate Machinery UK Ltd, incorporated into a district heating system connecting the various buildings on-site to the central heat supply. The system can burn wood chips of up to 40% moisture content, though typically it is around 30-40%, allowing for a degree of variability between different storage conditions, weather and storage periods. The specification of the automated feed augers requires that chips be about one inch in diameter.

Nowadays about 1,200 tonnes of chips are used by the heating system per year. Current practice is to store one year's supply in strategic locations throughout the estate – this is stacked as roundwood, to maximize uniformity of exposure. However, there is also a chipped wood which can store two months' supply in chip form if required.

The boiler and its efficiency and direct coal's associated problems are not installed problems.

The study confirmed of fresh woodland creation was fairly vast.

Other reasons for woodland management benefits:

Importance to the South East:


The reasons originally stated by the management for opting for sustainable wood fuel in the days of 1970s oil crises and coal strikes are interesting for modern times, in view of the remaining applicability of the drivers, post cheap North Sea oil and gas. This means that for similar rural communities, farms, businesses and other organisations (particularly but not exclusively those of the gas network) facing major choice about their heating system, the medium to long-term security of fuel price and supply is once again appreciated making wood a viable option.

This is in spite of the extra demands of the technology, which are themselves sometimes exaggerated in people's preconceptions. Many target end users such as farmers, foresters and large estates owners already possess hardware and personnel systems similar or even identical to the preparatory, operational and demands of wood heating. The West Dean example serves to emphasize the local economic benefits that can arise from integrating resource management with conservation of resources.

With regard to the perceptions, in some ways the West Dean system can be set in contrast to the advancement of the technology over the following two or three decades. For instance, electronic output controls are now commonplace, following the lead of later imported products. However, in other ways this is an early example of progressive design, such as in its automatic stoking system.

The importance of ecological reasons and landscape conservation are now all the more evident than 25 years ago, perhaps especially in the South East with the pressures of its successful economy on land and wildlife. The carbon emissions arguments have never been so pressing, given the development in intervening years of scientific evidence and popular acceptance for man-made climate change.

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Where to go from here

- Obtaining a full copy of the report (website, CD or hard copy)
- Make use of the handouts here
- Speak to us or any of the speakers
- Call TV Energy for impartial advice
- Visit our websites

www.tvenergy.org

www.tvbioenergy.co.uk

www.tvbioenergy-coppice.co.uk