

UTILISATION OF ORGANIC WASTES FOR SUSTAINABLE ENERGY PRODUCTION (OWSEP)

**First Report February 2002
Green Waste Resource and Market Review
For the Thames Valley**

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Prepared by:

Charlotte Bruton
Bioenergy Advisor
TV Energy Ltd

Authorised by:

Keith Richards
Managing Director
TV Energy Ltd

Community Renewables Initiative

TV Energy
Renewable Energy for the Thames Valley

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EXECUTIVE SUMMARY

The OWSEP project commenced operation in January 2002. A first report is presented here and covers the resource and market review, a necessary prerequisite to the main business of the work, facilitating the development of hybrid green waste projects in the Thames Valley. The work was carried out through consultations with local authorities and where data was unavailable national averages or estimations have been used.

Resource investigations have shown that the projected green waste arisings in the Thames Valley over the next ten years will be approximately 2.3 million tonnes. This is inclusive of all green waste; garden and putrescible waste. The number of complete waste audits conducted in the Thames Valley is few and they do not show a trend enabling the estimation of the various components of green waste. The results obtained therefore contain a level of inaccuracy and will be updated as more accurate data is available.

Market investigations show a limited set of options for current use of green waste. Garden waste that has been separated at source is suitable for composting and, subject to quality tests, can be sold as a soil improver. Kitchen waste such as vegetable and fruit peelings is suitable for home composting but is not accepted at the majority of composting facilities due to possible contamination and the Animal By Product (Amendment) Order (2001). Other putrescible waste such as the dairy and meat portion is not suitable for composting and although it was collected in a trial by Wycombe District Council for a number of years, it is no longer seen as an acceptable feedstock.

At this early stage in the life of the work, progress is seen to be good and lines up with expectations. There are no major budgetary or time deviations to report.

The next steps are to examine the technologies available for energy generation from green waste drawing on best practice in the UK and abroad and to review the potential link with existing initiatives in the Thames Valley.

1. INTRODUCTION

1.1 Background

This study is a three year investigation into the utilisation of organic waste for sustainable energy production (OWSEP). The project is funded by the *shanks first fund*. The main aim of the project is:

'To facilitate the establishment of one or more flagship hybrid green waste recovery and energy production facilities in the Thames Valley'.

Such facilities, we believe offer the opportunity to make the most sustainable use of green wastes in the Thames Valley whilst also working in tandem with other biomass resources existing or planned.

There are two main political drivers that in combination work in favour of such a strategy:

1. *Landfill Directive (99/31/EC)[1]*

This states that by 2010 the biodegradable municipal waste to landfill must be reduced to 75% of that produced in 1995. In order to do this local authorities must find alternative methods of waste disposal, two possible options are recycling and recovery of energy from waste.

2. *The Renewables Obligation (DTI New and Renewable Energy Consultation)[2]*

This states that 10% of the UK electricity demand must be sourced from renewable fuels by 2010. In order to achieve this goal it is necessary to look at all types of renewable fuels, one of which is the 'green' fraction of municipal waste.

1.2 Project phasing

The project is divided into three phases roughly relating to each year of the project. *Phase one*, a feasibility study, commenced in January 2002 with a resource and market review of green waste arisings in the Thames Valley, *the results of which are presented in the following sections of this report*.

Phase two, concerns the development of a potential demonstration project in the Thames Valley and will include the detailed site analysis and site prioritisation based on social, economic and environmental criteria.

Phase three, concentrates on the facilitation of the uptake of the project and TV Energy will be working closely with the waste industry, project developers and financiers to finalise the project specification and will assist in obtaining permissions and public support through the TV Energy network and public consultations.

1.3 Project linkage

The work from the OWSEP project links closely with other work conducted by TV Energy, in particular, BIOCOGEN, a two year European thematic network project that commenced in December 2001, with the overall aim:

‘To provide technical and economic data and deal with the key issues in the implementation of biomass CHP in Europe, aiming to facilitate the establishment of projects generating the equivalent of 26 Mtoe biomass CHP installations by 2010’.

It is hoped that the two projects will dovetail in their second year particularly to produce a suitable project(s) that could utilise both green waste and biomass in the Thames Valley to generate energy. This conclusion will be in addition to other potential projects identified through OWSEP and will not detract from the work of OWSEP.

The minutes from the kick-off meeting of BIOCOGEN in Brussels are appended in Annex 1 to the report.

2. MANAGEMENT REPORT

2.1 Technical progress against programme targets

Phase I: 2002

Activity	J	F	M	A	M	J	J	A	S	O	N	D
1.1 Existing resource and markets		Report										
ACTVaR Meetings												
Technology Review												
Website pages												
1.2 – PHASE I INTERIM REPORT												
Various publications												
Workshop										Meeting		
1 st Thematic Network Meetings	Brussels											Greece
1.3 PHASE I FINAL REPORT											Draft	Final

2.2 Financial report

The first invoice for the sum of £10,000 falls due on presentation of this first report to EB Nationwide through Prof. Bill Radley.

No subcontractor effort has so far been used, however, it is anticipated that Dr. Druscilla Riddell-Black will be used to assist with the next section of the work covering a review of the technologies available for energy generation from waste drawing on best practice in the UK and abroad. Dr. Riddell-Black will be used instead of Dr Howes as previously considered.

Costs to date include: staff effort Charlotte Bruton and Dr. Keith Richards, travel and subsistence, purchase of reference documents, consumables. [Further detail can be supplied on request].

3. APPROACH

3.1 Information gathering

The resource and market review commenced in January 2002 with consultations with the local authorities in the Thames Valley area. The approach with the different councils varied considerably as some were very keen to meet and discuss the project, the development of their local waste strategies and their approach to the landfill directive and the subsequent recycling targets. Other local authorities were happier to provide the required information by e-mail or over the telephone.

The point of contact with the local authorities was either recycling officers or waste minimisation officers and in some cases both.

Green Waste for the purposes of this study is defined as the organic component of municipal solid waste that is derived from plant or animal matter of recent biological origin (biomass) that can potentially be collected uncontaminated from hazardous materials (e.g. heavy metals, CFCs, solvents).

The main information requested from the local authorities was to find out their municipal waste arisings for the year 2000/2001 (the base year used for the project), whether a local waste audit had been conducted in the past year and if not, what might be the estimated proportion of household waste that is classified as being 'green' (see definition above). In addition, the main objectives of their waste strategy and the potential for green waste collection strategies were also discussed. Finally, the quantities of green waste collected at civic amenity (CA) sites for composting or landfill were obtained.

3.2 ACTVaR waste forum

In addition to the individual consultations held with the local authorities, a presentation was given to the Thames Valley Waste Forum on OWSEP on 8th February 2002. This opportunity was particularly timely and allowed an increase in the profile of the project to be given to WASTE OFFICERS, COUNCILLORS and FOUR LOCAL LEADING WASTE COLLECTION AND DISPOSAL COMPANIES. The forum has been established and is run through ACTVaR (Association of Councils of the Thames Valley Region) and comprises of interested parties to the waste debate and management in the Thames Valley. The private companies represented include:

- Biffa Waste Services
- Shanks Waste Solutions
- Grundon Services
- Waste Recycling Group (Central) Ltd

The Thames Valley Waste Forum was formed as a result of a seminar held by ACTVaR and GOSE (Government Office of the South East) following the publication of “Waste Strategy 2000” [3]. The group aims to provide a mechanism across the three counties of Berkshire, Buckinghamshire and Oxfordshire for:

- Local authorities to engage in dialogue with a range of private sector interests;
- Examination of long-term strategic waste issues;
- Taking forward discussion on waste above the level of parochial local interests;
- Acting as an information exchange across the sub-region and between the public and private sectors;
- Providing a mechanism for lobbying at regional and national levels;
- Devising waste minimisation and educational programmes to cover the sub-region with consequent economies of scale and consistency of message;
- Identifying sources of funding for waste projects and activities.

The presentation to the Thames Valley Waste Forum provided an introduction to the project and openly invited forum members to participate in OWSEP through interaction with TV Energy and sharing of information and data. It was agreed that TV Energy would report back to the forum later in the year regarding the progress of the project.

4. RESOURCE REVIEW

4.1 National strategy back-drop

The “Waste Strategy 2000” describes the government’s vision for the better management of waste and resources. It is a result of the stringent targets set by the European Union to divert waste sent to landfill.

The strategy identifies that it is not enough just to divert waste but that waste minimisation programmes need to be instigated. In addition, challenging recycling targets have been introduced. Nationally these are:

- 25% of household waste by 2005
- 30% of household waste by 2010
- 33% of household waste by 2015

Local authorities recycling achievements will be monitored by statutory performance standards which will be part of the Best Value framework.

The Waste Strategy 2000 is very keen to promote composting as a method of recycling green waste. Many civic amenity (CA) sites accept green garden waste brought to the site however this is not always composted. Some sites do send this waste to composting facilities, however, others send this waste to landfill.

The strategy draws a definite line between recycling technologies and energy from waste. Energy recovery from waste is defined under four broad titles:

- direct waste incineration
- as a fuel substitute (direct or RDF)
- materials recovery, with energy as a by-product
- waste disposal with fuel recovered as a by-product

The strategy also puts a strong emphasis on combined heat and power (CHP), stating that “where energy recovery forms part of an integrated waste strategy, the potential for incorporating CHP technology should always be considered in order to maximise the energy which is recovered.” CHP is promoted in the strategy in conjunction with waste incineration, whether it’s mass burn or modular burn. However, other possible methods of generating energy from waste are highlighted as innovative technologies which could take a place alongside more traditional options. Some of these are:

- Pyrolysis
- Anaerobic digestion
- Gasification
- Fermentation

that are better suited to processing green wastes to produce energy rather than incineration.

Anaerobic digestion which produces both energy and a digestate which is a potential fertiliser is classed as energy from waste and the waste processed in this manner will not count towards the local authorities recycling targets.

Since the publication of the Waste Strategy 2000, many local authorities are in the process of producing or updating their local waste strategies. Several have also obtained

money from landfill tax to perform thorough waste surveys of their area. The following sections of the report begin to examine the green waste arisings in the area of the Thames Valley and how this waste is currently disposed of. In addition to overall quantification, where possible a distinction is drawn between arisings by way of origin/ specification; garden waste, compostable putrescibles and non-compostable putrescible waste.

The regional projections for waste growth are also introduced to enable a forecast into the potential energy production from green waste in the next ten years. This helps to set a baseline for OWSEPs study of potential.

4.2 Local strategies

The Thames Valley consists of three counties; Berkshire, Buckinghamshire and Oxfordshire. In Buckinghamshire and Oxfordshire, each have a County Council with five Districts Councils in Oxfordshire and four in Buckinghamshire, with Milton Keynes as a separate Unitary Authority. Berkshire is solely unitary and consists of six Local Authorities. Figure 1 shows the waste disposal authorities (WDA) i.e. the County Councils, and the Unitary Authorities who are responsible for both disposal and collection, and Figure 2 shows the waste collection authorities (WCA) i.e. the district councils.

Figure 1: Waste Disposal Authorities

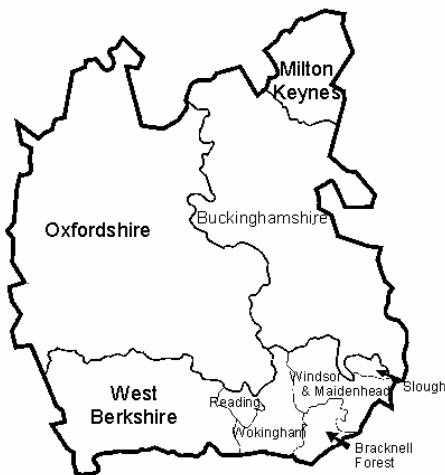
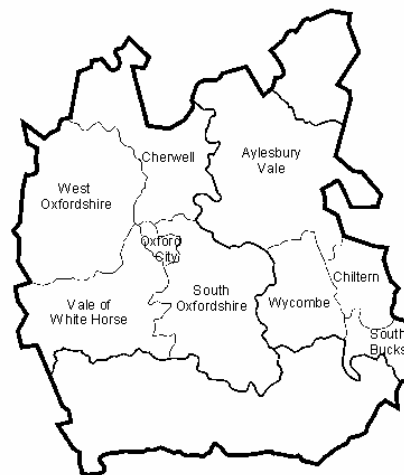


Figure 2: Waste Collection Authorities



The WCA's collect the waste from domestic properties in their specified district. The collection is usually contracted out and the waste will be collected along with any separated recyclables that are written into their contract. For example some local

authorities have kerbside collections of glass, tins and plastic bottles, though collection of these recyclables is very dependant on the availability of facilities to process them.

With the advent of the “Waste Strategy 2000” most local authorities are now in the process of producing new local waste strategies. Several LA’s such as Bucks County, Slough Borough and Milton Keynes have produced consultation drafts, others have not yet reached this stage.

The common theme emerging through discussions with the various LA’s was the need to divert waste from landfill and more importantly to them reach the recycling targets set by government in the “Waste Strategy 2000” from which the government has set statutory performance standards for each local authority. For example, the overall target identified for Buckinghamshire is 36% by 2005/06, whereas for Slough the target is 24% by 2005/06. These statutory targets are based on information supplied by individual councils to the Municipal Waste Survey 1999/2000 [4], regarding their recycling rates. For the Thames Valley local authorities the following statutory targets have been set:

Table 1: Statutory Recycling Targets in the Thames Valley (Guidance on Municipal Waste Management Strategies, DETR March 2001) [5]

Local Authority	1998/99 Recycling Rate %	2003/04 Standard %	2005/06 Standard %
Milton Keynes	16	33	36
Bucks County	16	33	36
Aylesbury Vale	13	26	36
Chiltern	24	33	40
South Bucks	20	33	40
Wycombe	10	20	30
Oxford County	10	20	30
Oxford City	7	14	21
Cherwell	6	12	18
West Oxfordshire	5	10	18
Vale of White Horse	11	22	33
South Oxfordshire	17	33	36
West Berks	10	20	30
Reading Borough	8	16	24
Wokingham	11	22	33
Bracknell-Forest	9	18	27
Windsor & Maidenhead	15	30	36
Slough	8	16	24

With these stringent recycling targets local authorities have made it their priority to **recycle as much waste as possible including green waste by means of composting** and to target waste minimisation strategies.

The local strategies are at various stages of completion and therefore the accuracy of the data obtained for this study is variable. Some authorities have completed waste audits that determine the proportion of household waste that is made up of various components e.g. paper/card, plastic, textiles, glass etc. For some of these, green waste is considered to

be a single category, for others it is broken down further into three categories; garden waste, compostable kitchen waste and non-compostable kitchen waste. Other councils have not conducted waste audits and for the purposes of their waste strategies they are using the national average of 20% of household waste is considered to be green waste. The average proportion of green waste from the waste audits conducted is shown in the table 2.

Table 2: Average Green Fraction in Household Waste

Authority	%
Wycombe DC	32
Milton Keynes	31
Slough	18
Windsor & Maidenhead	38
West Berks	28

4.3 Municipal waste

Table 3 shows the total municipal waste arising in the districts of the Thames Valley in 2000/01 and the proportion of this waste that is green waste. For the districts that have completed waste audits, the green waste breakdown is also shown.

Table 3: Total Municipal Waste and Green Waste Arisings across the Thames Valley
(all figures in tonnes unless otherwise stated) [6,7,8,9]

Authority	%	Total Municipal Waste	Green Waste	Garden Waste	Compostable Kitchen Waste	Non-Compostable Kitchen Waste
Milton Keynes	31	105,771	27,384	16,035	11,349	5,236
Aylesbury Vale	20*	56,561	11,312			
Wycombe	32	65,743	21,038	7,232		
Chiltern	20*	31,666	6,333			
South Bucks	20*	25,841	5,168			
Cherwell	20*	55,372	11,074			
Oxford City	20*	39,350	3,395			
West Oxfordshire	20*	37,133	7,427			
Vale of White Horse	30	35,336	10,601			
South Oxfordshire	20*	40,816	8,163			
West Berks	28	78,924	23,233	12,172		
Reading	20*	79,516	15,903			
Wokingham	20*	76,222	15,244			
Bracknell-Forest	20*	55,216	11,043			
Windsor & Maidenhead	38	84,321	32,792	14,765	10,127	7,901
Slough	18	63,233	11,679	1,998	3,351	6,330

* the national average of 20% of household waste is green waste.

From this table it is possible to see that the total municipal waste arisings in the Thames Valley for the year 2000/01 was 927,399 tonnes, of which 221,067 tonnes or approximately 24%, was green waste that was sent to landfill.

The results from the detailed waste audits are very varied and therefore do not give the opportunity to estimate the quantities of compostable and non-compostable putrescible waste.

4.4 Projected green waste arisings

In order to determine the green waste arisings over the next ten years it is necessary to project the rate of growth of municipal waste. The local authorities do this by estimating the increase in homes in the area. A standard calculation is used for this estimation:

$$\left(\frac{\text{This Year's projected Number of Households}}{\text{Last Year's Number of Households}} \times \text{Last Year's Quantity of Waste} \right) \times \text{Rate of Increase in Waste}$$

The overall predicted increase in waste usually ranges from 1% to a maximum of 3%. For councils that have made predictions, these have been used for those that have not; a standard value of 1% increase per year is used.

The following table shows the predicted increase in municipal waste for each of the councils in the Thames Valley and the total municipal waste and total green waste predicted for the next ten years; from 2001/02 to 2010/11.

Local Authority	Predicted Growth Rate %	Total Municipal Waste Over Next Ten Years	Total Green Waste Over Next Ten Years
Milton Keynes	1.03	1,253,791	325,986
Bucks County			
Aylesbury Vale	1.025	649,516	129,903
Chiltern	1.015	343,996	68,799
South Bucks	1.015	280,722	56,144
Wycombe	1.025	754,956	242,803
Oxford County			
Oxford City	1.01*	415,805	83,161
Cherwell	1.01*	546,834	109,367
West Oxfordshire	1.01*	392,378	85,902
Vale of White Horse	1.01*	373,390	122,618
South Oxfordshire	1.01*	431,296	94,422
West Berks	1.01*	833,977	233,514
Reading Borough	1.01*	840,232	183,950
Wokingham	1.01*	805,425	176,329
Bracknell-Forest	1.01*	583,458	127,735
Windsor & Maidenhead	1.03	995,645	410,387
Slough	1.01*	654,952	138,737
Total		10,156,373	2,589,758

** Assumed rate of growth of 1.01%*

This data shows that the total amount of green waste produced in the Thames Valley in the next ten years will be approximately 2.5 million tonnes. A total of 25.5% of the total municipal waste collected from households. This figure does not, however, take into consideration the possible increase in home composting. It is possible that home composting could have a significant effect on the total green waste fraction of household waste due its high level of promotion by the councils in the region. According to the Bucks Waste Strategy the take up for home composting in the four districts was:

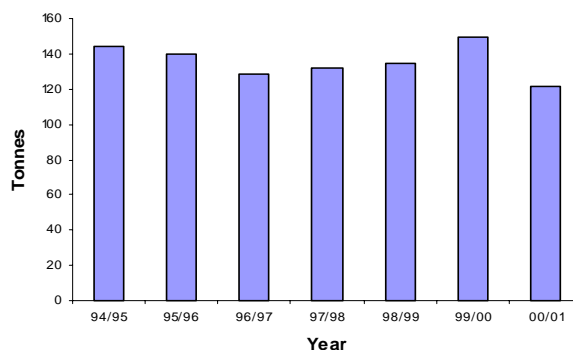
Local Authority	% Up Take
Aylesbury Vale	11.5
Chiltern	12.5
South Bucks	10.6
Wycombe	11.3
Total	11.5

The 'Household Waste Composition Study' for Milton Keynes [10] revealed that approximately 32% of people interviewed composted their kitchen and garden waste and according to their Municipal Waste Management Strategy, Slough Borough had an up take of approximately 9%. From this information it is possible to estimate that approximately 10% of households compost their kitchen and garden waste, assuming that the sample taken from Milton Keynes of just 120 households is not representative of the rest of the Thames Valley.

The estimated total green household waste produced in the next ten years is 2.3 million tonnes.

4.5 Kerbside collection

In terms of green waste, no authorities are currently collecting through kerbside schemes in the Thames Valley except in High Wycombe where a trial scheme is underway involving 650 homes. The trial was started in 1994 and was used to collect all types of green waste e.g. garden waste, compostable and non-compostable kitchen waste, until 2000 when non-compostable putrescible waste was no longer accepted by the waste disposal company. The quantities of green waste collected can be seen in the chart below:

Figure 3: Green Waste Collected through Wycombe DC Bio Trial

A similar trial was carried out in West Berks from 1994 to 1999. This trial was voluntary and expanded from 500 homes to over 1000 in the first year. The scheme accepted organic household waste such as vegetable and fruit waste which was composted at the Elm Farm Research Centre and the final product was used on site. The scheme was cancelled in 1999 due to a lack of funds, although it proved to be very popular with the participating local residents.

Collection strategies are a key factor in the potential for energy from green waste. In order to have an uncontaminated feedstock the waste must be separated at source which involves the implementation of new collection strategies and also the education of householders to separate this waste correctly.

5. MARKET REVIEW

5.1 Background

Green waste in the Thames Valley is currently dealt with in several ways. The majority that is collected as part of municipal waste goes to landfill, the figures for which are shown in table 3. Some green garden waste is collected at CA sites and is composted as discussed below in section 5.2.

A further possibility under discussion with some local authorities is the idea of utilising the excess capacity of local sewage treatment plants to anaerobically digest putrescible kitchen waste. This is a reasonably new concept for local authorities and is at an early stage in development.

5.2 Composting

Composting is included in the term ‘recycling’ in the document; Guidance on Municipal Waste Management Strategies. Local authorities are therefore aiming to compost green waste in addition to increasing collection and processing of other recyclables. **A potential barrier to the aims of the project was identified within the Waste Strategy**

2000; that is composting is classed as recycling whereas any technology used to generate energy is classed as energy from waste. This is inclusive of technologies such as anaerobic digestion where a usable digestate is produced in addition to energy. This unfortunately does not compliment the short-term priorities of most local authorities.

Some composting is already underway in most areas of the Thames Valley although it is on a small scale and the only feedstock is garden waste collected from civic amenity (CA) sites. The majority of local authorities have a facility at one or more of their CA sites where householders can bring their garden waste for disposal. Some of this waste is taken to composting sites in the area where it will be composted to make a fertiliser, at other sites this garden waste simply goes to landfill. Figure 4 shows the quantities of garden waste composted in the Thames Valley in 2000/2001.

Figure 4: Quantities of Garden Waste Composted

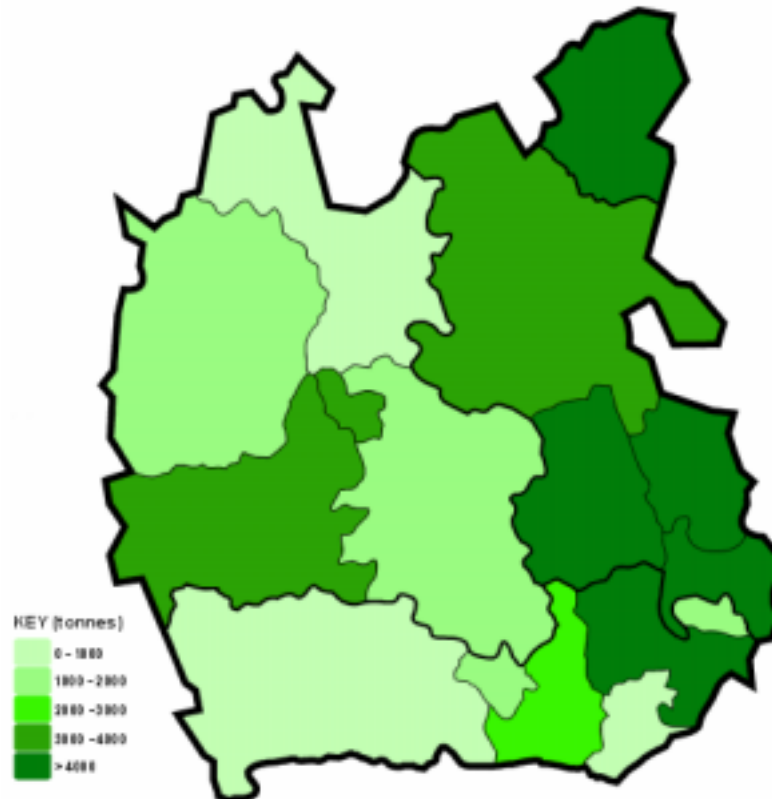
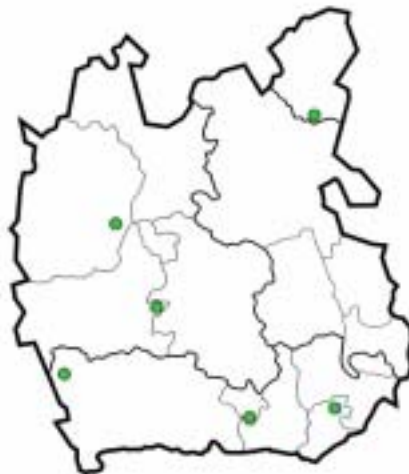


Figure 4 shows reasonably large quantities of garden waste composted across Buckinghamshire and East Berkshire and areas of Oxfordshire. The areas that appear to be lagging the most are Cherwell District, West Berkshire and Bracknell Forest. Figure 5 goes some way to explain this low level of composting in these areas; it shows the location of the composting facilities cross the Thames Valley.

Figure 5: Location of Composting Facilities in the Thames Valley



The majority of Buckinghamshire send their garden waste to be composted in Bletchley, Milton Keynes. Oxfordshire has two composting sites, one at Worton Farm which takes most of its green waste from the CA site in Oxfordshire and sells the compost as a peat free soil improver to the CA sites, public and landscapers; they also produce an agricultural blend for use on agricultural land. The second composting site is at the Sutton Courtney landfill site and takes most of its green waste from Drayton and Oakley Wood to save transportation over long distances. Berkshire has two composting sites in Reading and Bracknell Forest, with limited capacity, with a further potential on-farm site in West Berkshire. The site in Reading uses the compost on site as it has not undergone any composition or quality testing.

6. CONCLUSIONS AND NEXT STEPS

6.1 Conclusions

The results obtained through this initial research underline the need to find alternative methods of waste disposal in order to comply with the Landfill Directive and the subsequent recycling targets. In order to achieve these statutory targets, local authorities must look to recycle materials such as green waste in addition to increasing their recycling rate of glass, paper and plastics. The regulations regarding composting, however, are strict and currently only allow the composting of source separated garden waste unless the compost produced is not sold on to industry or public users. Home composting of organic kitchen waste is one solution to this problem although it has obvious limits in that it is not suitable for people without gardens and it still does not address the problem of non-compostable putrescible waste. The statutory recycling targets are the main obstruction to the production of energy from green waste due to the distinction drawn between recycling and energy production. These targets, however, are

only in place until 2005/06, after this date it is not clear how the legislation will affect the potential for energy production from waste.

The work has further illustrated the limits to which LAs currently operate with respect to waste disposal. Maximising energy on sustainability grounds is not always possible or desirable given the 'straight-jacket' of current legislation. TV Energy can have a major role in helping to explore options which on the one hand can help LAs meet their targets whilst on the other move towards even greater levels of sustainability. With this in mind, the key options available to TV Energy through the OWSEP project are seen to be:

1. CHP - The Waste Strategy 2000 encourages CHP which opens up the potential to establish a production facility for biomass and wood based green waste combining the projects BIOCOGEN and OWSEP.
2. Anaerobic Digestion - Non-compostable putrescible waste is not easily recycled and therefore presents a problem to local authorities. A solution in terms of energy production is to anaerobically digest this waste, taking a 'biogas' fraction followed by the aerobic treatment of digestate to reveal a much improved residue for compost.

Both of these options will be the subject of review in the next stage of the project work.

We believe that it is also advisable to lobby the government to alter the targets enabling the production of energy from green waste, benefiting both the Renewables Obligation and the Landfill Tax Directive.

It has been shown that a high percentage, 25.5%, of municipal waste arisings in the Thames Valley over the next ten years will be green waste, this amounts to approximately 2.3 million tonnes. Unfortunately, some of the data obtained or estimated is not precise and it is advisable to obtain more accurate data as part of site specific analysis when developing a project specification in close conjunction with local authorities and the waste industry.

6.2 Next Steps

The next stage of the project is to examine the technologies commercially available for energy production from green waste drawing on best practice from the UK and overseas. This will include an appreciation of their relative merits in terms of greenhouse gas abatement and local applicability. The potential link with existing initiatives in the Thames Valley will also be reviewed and potential sites for demonstration projects will start to be identified.

This work will be carried out by TV Energy staff; Charlotte Bruton, Calliope Panoutsou and Keith Richards, with additional specialist input from Drusilla Riddell-Black as a sub-contractor.

7. REFERENCES

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8. ANNEX 1: BIOCOGEN MEETING 31ST JANUARY 2002 IN BRUSSELS

Opening:

The kick-off meeting of the *ENK5-2001-80525: Biomass Cogeneration Network-BIOCOGEN* was called to order at 9.10 on 31st January 2002 in Brussels by *Ms Calliope Panoutsou*.

Present:

NAME	ORGANISATION	COUNTRY
GARBINE GUIU	European Commission	
CALLIOPE PANOUTSOU ELMA GYFTOPOULOU	CRES -Biomass Department	Greece
KEITH RICHARDS	TV Energy Limited	United Kingdom
EMMA FLOWER	Wycombe District Council	United Kingdom
MARIE-MAUD GERARD	ITEBE	France
BENGT HILLRING	SLU	Sweden
HANNES SCHWAIGER	Joanneum Research	Austria
MARTTI FLYKTMAN	VTT	Finland
NIKE KRAJNC	Slovenian Forestry Institute Department of Forest	Slovenia
NIKOLAI MIHAILOV	University of RUSE	Bulgaria
FEHMI AKGUN	TUBITAK-MARMARA RESEARCH CENTRE Dept. of Energy systems, Environmental Research Institute	Turkey
HENRIK ORTENBLAD	Energi Gruppen Jylland a/s Development dept.	Denmark

A. Approval of Agenda

The agenda was unanimously approved as distributed.

B. Open Issues

Dr Garbine Guiu: The European Research Area (ERA) on biomass is likely to be established relating to a number of relevant topics so that both the European Commission and the Member States understand what is going on in the field of bioenergy and be able to plan their future activities synergistically

Biomass CHP is certainly an interesting area. This project allows a briefing for the European Commission to make a start and to understand what is happening around Europe.

Ms Calliope Panoutsou presented the main aim of the project and the structure of each work package in terms of duration and tasks. Emphasis was given in WP2: National and International activities on biomass CHP.

Mr Hannes Schwaiger presented the data collection tables to the partners.

Dr Bengt Hillring mentioned that the consortium should define the number of CHP plants which would be assessed. In Sweden, for example, they have approximately 100 CHP plants from which 40 use biomass as a fuel. That, along with the fact that due to the electricity market deregulation most of the industries will consider the required data confidential will create problems in completing properly the work for WP2.

Dr Keith Richards added that in the UK the situation is roughly the same so it would help to define a certain number of biomass CHP plants to evaluate within a country.

Dr Bengt Hillring added that links with biomass standardization procedures of CEN and the EC should be made to ensure compatibility of our efforts with these.

ACTIONS: By 8th February 2002: *Mr Hannes Schwaiger* will send the tables to partners and *Ms Calliope Panoutsou* will send the minutes for comments.

Dr Keith Richards noted that by the end of the meeting the consortium should set a number of criteria with which the partners will choose the biomass CHP projects to be evaluated in their countries. These criteria should be linked with WP5 criteria for final ‘flagship’ project selection that TV Energy will lead on.

Eventually the consortium decided to consider 5–10 biomass CHP plants. The suggested criteria, on which the selection of the 5-10 CHP plants will be based, are listed below:

- Scale
- Degree of Innovation
- Technology combination
- Fuel type, including co-firing
- Ownership (potential community involvement)

- Chain (whether it concerns only conversion to energy or it includes the whole production-supply- conversion chain).

Afterwards, the presentations on National Activities took place.

Ms Elma Gyftopoulou presented the situation in Greece.

Key points:

- Biogas from sewage plants and a landfill site is exploited for CHP.
- 21.9MWe installed capacity, potential for 83.2 MWe (i.e. the power production permit has been acquired from the Regulatory Authority of Energy).
- About 187MWe installed capacity in total for CHP, with a further 182MWe potential.
- District heating a key theme through Public Power Corporation, 117MWth installed capacity with a further 130 MWth potential.

In addition, 23 RTD projects on CHP were identified, using the CORDIS website (www.cordis.lu). Among them there were 9 biomass CHP, and 4 Greek coordination.

Ms Marie Maude Gerard presented the situation in France.

Key points:

- EDF is the dominant operator in power generation.
- Greater interest since 1995 when embedded generation opened up.
- 670 installations with 5,000MWe now in place (3 – 4% of electricity nationally).
- On biomass, 2 sawmills (500 and 150kW) plus others around 10 in pulp and paper industry total 100MWe.
- Sugar cane/ bagasse in ‘territories’ around 190MWe co-firing bagasse/ coal.
- Biogas from sewage under 1MWe in total.
- Many district heating projects with a new 2MWe wood chip project under construction. Co-firing activities here too.
-

Dr Bengt Hillring presented the situation in Sweden.

Key points:

- Current biofuel market is competitive and transparent.
- Main fuel types include wood residues (chips, bark, sawdust, etc.), peat fuelwood and refined fuels such as briquettes, pellets and powder.
- Indicative prices range from \$1.9/GJ for recycled wood to \$ 4.8/GJ for pellets/briquettes for district heating.

- 53 biofuel companies operate on the market.
- These companies are associated with forest enterprises, forest owners' cooperatives, or they are independent biofuel companies, or international (American) suppliers.
- Concerning CHP, there are 45 municipalities with CHP, 2,300 MW and 500 MW for biofuels.
- There are 50 CHP units in industry, 850 MW, 475 MW for biofuels.
- The total power production in 1998 was 9.5 TWh (50% in district heating and 50% in industry).
- Since 1997, the investment subsidies provide motivation to replace nuclear power with renewables.
- Subsidies of \$ 307 per kW capacity, and $\leq 25\%$ of total investment are some of them.
- However, biomass and other new power projects have difficulties to compete with existing capacity and cheapest technology.

Mr Marti Flyktman presented the situation in Finland.

Key points:

- About 20% primary energy from wood fuels (6.4Mtoe of which 1.1 from domestic firewood), 4% hydro, 5% peat.
- Cogeneration 32%, particularly strong with paper and pulp industries.
- Total 4,200MWe capacity. Almost every municipality has district heating – providing economic.
- On scale for biomass CHP, use of Stirling or s.i. engines at smaller scales, turbines at above 5MWe threshold.
- Largest newcomer – 280MWe project (550MWth). Fuelled by wood, peat, RDF and coal (Alholmens Kraft/ Kavaener).
- Favorable tax regime for green electricity production – but not heat.

Ms Nike Kranj presented the situation for Slovenia

Key points:

- Total CHP 3,870GWh (30% of all electricity production).
- Wood and wood waste used in 133 projects in the wood industry. Used internally not exported.
- A single biogas project.
- PHARE demonstration district heating project.
- 5 biomass CHP projects in total – all 15 to 20 years old and in the wood industry area.

- Used to be 8 (8.5MWe) and soon there will be only 4 as another will close.
- Looking to try and double the use of bioenergy, investing in 6 new cogeneration projects by 2010.

Prof. Nikolai Michailov presented the situation for Bulgaria.

Key points:

- Biomass resources in Bulgaria consist of animal wastes (65%), agricultural wastes (15%), wood processing residues (12%) and urban wastes (8%).
- Two CHP plants are at the final stage of construction (in Aprilci and Varna).
- Concerning legislation and support mechanisms, a National Plan for energy saving was accepted on 28th June 2001 providing favorable financial support.

ACTION: Prof. Michailov agreed to check for more technical details on CHP in Bulgaria.

Dr Fehmi Ackgun presented the situation for Turkey.

Key points:

- Turkey has a significant CHP stock with an increasing share expected in the future.
- Scale varies from a few kW to MWs.
- 20.1GWh from biomass and waste fuelled projects.
- Landfill gas 2.5MWe project coming on-stream in 2003.
- Seen to have potential to do much more but natural gas is the economic choice and this prevents exploitation.
- Natural gas is cheaper than biomass so there is need of governmental subsidies to further increase bioenergy implementation. As things stand now, commercial companies do not have interest on biomass since it is costly.

Dr Henrik Ortenblad presented the situation in Denmark.

Key points:

- Fossil fuel is heavily taxed while biomass is not and there is a number of subsidies and long term fixed prices, facts that favor rapid bioenergy/ renewables development.
- RES use is about 11% at the moment and rising a percentage point a year (no growth in overall energy need).
- 6.5cents€/ kWh paid for green energy but this is set to become free market.
- 16% electricity from wind power currently.

- Change from straw to wood pellets taking place.
- 32 incineration plants, combustible wastes not allowed to go to landfill anymore (last 10 years).
- Considerable district heating, greater than 50% of total demand. 80% of this is derived from CHP and renewables provide some 40% of fuel – and growing.
- Waste water has 50 biogas plants operational with many CHP projects. Mostly steam turbines. Some plants owned by power companies.
- Some projects are multifuel including straw, natural gas. 2% of animal manures are now used to generate biogas.
- A range of wood waste and wood fired projects at community scale to industrial sizes. Also, waste incineration of course.

Mr Hannes Schwaiger presented the situation in Austria.

Key points:

- Approximately 13 PJ are generated from biomass (ca. 8 PJ heat, ca. 4 PJ power).
- Several biomass CHP demonstration projects exist (Guessing, Admont STIA/Styria, TUGraz/Styria, Johanneum research/Graz).
- Two large co-firing CHP plants were shut down, due to the deregulation of the electricity market.

Mr Hannes Schwaiger presented the links of BIOCOGEN with IEA Bioenergy Task 38.

Dr Keith Richards presented the situation in UK.

Key points:

Current UK policy scheme

- Government target of 10,000MWe by 2010
- In line with push for RE (10% of electricity by 2010, 5% by 2003: currently 2.5%)
- No RE heat targets
- Only 6,600MWe expected by the industry
- £50M (80M€) ‘Community Energy Scheme’ to stimulate new and refurbish old CHP plant – to reach “1 million homes”

Biomass CHP: *Why very low and declining RE fuelled CHP?*

- Government fixation on large scale centralised electricity generation e.g. NFFO support
- Due to little history/ culture of district heating schemes

- Result – key biomass projects electricity conversion efficiency fixated e.g. project ARBRE, large scale, gasification
- Community and distributed projects penalised
- Undue emphasis on natural gas making ‘easy’ GHG gains

Dr Keith Richards presented the links of BIOCOGEN and IEA Bioenergy Task 29 (www.eihp.hr/task29.htm)

Key points of Task 29 which can be linked with BIOCOGEN:

- Use the report on Methodologies of socio-economic assessment on biomass to form the questionnaires for surveying the main actors in WP4, Task 4.2.
- Use their expertise to identify factors that foster or hinder biomass CHP in Europe, in WP5.

Dr Christiane Fricke made a short presentation on HIAL project, which the EC advised to keep close links with BIOCOGEN. The project started on December 2001. Its main focus is on combustion of high alkali biofuels, especially straw, and respective effect on emissions.

C. TIMETABLE FOR ACTIONS

Item	Description	Deadline
Minutes	Minutes and criteria	8 th February 2002
Data tables	Tables for data collection in WP2	8 th February 2002
Minutes	Comments from partners	28 th February 2002
Data for WP2	5 – 10 plants in detail Data collection tables for the selected plants will be in Excel, while the rest of the information concerning current situation, RTD projects, legislation, etc will be in Word files.	15 th March 2002
Meetings	Send <i>Ms Calliope Panoutsou</i> a list of dates of meetings where we might be able to convene part of the team (e.g. Austria joint IEA task meeting)	As soon as possible
Exchanges	Ideas for exchange e.g. Bulgaria and Austria with UK – student projects	Bids by 30 th April to <i>Ms Calliope Panoutsou</i>

D. Next Meeting

The second meeting is anticipated in Greece, in December 2002 (probably in the first two weeks). The date is to be confirmed later this year.