SUSTAINABLE ENERGY IRELAND
Renewable Energy Information Office

PLANNING UPDATE
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IRISH WOOD PELLETS TAKE OFF

Balcas, a wood processing company, with operations in both Northern Ireland and the Republic, has recently invested in building an integrated wood-fuelled combined heat and power (CHP) and wood pellet production plant at its facility in Enniskillen, Co. Fermanagh.

At 50,000 tonnes per year, this will be the largest pellet production capacity in the British Isles and one of the largest single plants in Europe. The locally available wood pellets will be marketed to industrial, commercial and domestic customers throughout Ireland and the UK.

The plant will use local sawmill by-products and forestry residues, with the potential use of energy crops.

Aine Carr, SEI, Minister of State John Browne, T.D. Dept. of Agriculture and Food and Peter Kernohan, Balcas at Wood Energy 2004

Balcas processes 600,000 logs a year, resulting in 175,000 tonnes of wood offcuts and sawdust. Balcas managing director Ernest Kidney said business had increased by 40 per cent with no reciprocal increase in the market for wood chippings, which until now have had to be sent to Scandinavia by lorry. The company will now be able to use these wood chips in its 2.7MWe CHP plant which will provide heat and electricity for the pellet production.

At the recent Wood Energy 2004 conference, Peter Kernohan of Balcas announced wood pellet heating demonstration projects that will be funded under INTERREG IIIa. Funding of €44,000 (50%) was granted for 13 demonstration installations in counties Tyrone, Fermanagh, Antrim, Sligo, Louth, Donegal and Cavan.

Having a secure supply of quality pellets in the Irish market will ensure that the wood heating sector will continue to grow. Companies offering wood heating equipment and services can now confidently enter into long-term contracts with business customers.

Developments in the harvesting technology for forest fuels have included demonstrations of bundling and whole tree terrain chipper machinery. The National Council for Forestry Research and Development (COFORD) has also commissioned a study into how this equipment can be adapted to the Irish situation. (See page 6)

The emerging Irish wood heating market has seen several new entrants over the past year. Irish companies offering full wood heating services from fuel supply to boiler installation and maintenance are now in a position to offer a complete solution. European boiler manufacturers such as Binder, Kunzel, KWB, Froling and Windhager have established partnerships with Irish agents. At the Wood Energy 2004 conference, delegates heard from many such companies who were showcasing recent wood heating installations at Coillte in Wicklow, Camphill in Kilkenny and Natural Power Supply in Waterford. These companies are particularly targeting the commercial and industrial heating customers in both the retrofit and new build markets.

Highlights

Inchydoney Island Lodge and Spa, Co. Cork plan to install a 500kW wood pellet boiler in 2005. This will be the largest wood-fuelled space heating installation in Ireland to date.

Wood Energy 2004

The 3rd annual Wood Energy conference presented international expertise as well as recent Irish wood energy developments.

The conference which was jointly organised by Sustainable Energy Ireland (SEI) and the Council for Forest Research and Development (COFORD) took place in Cork and included a site visit to Ireland's first Biomass Combined Heat and Power Plant, situated at Graingers Sawmill, Enniskeane, Co. Cork.

Delegates at Wood Energy 2004 are pictured viewing the fuel store at the Biomass CHP plant located at Graingers Sawmill, Co. Cork.

On the day prior to the conference, COFORD organised a demonstration of a residue bundler from forest machinery company, Timberjack.

The specialist equipment for baling forest residues was demonstrated on a Coillte site near Fermoy, Co Cork. Manufactured by Timberjack the machines produces 500 kg bales of forest residues. On average 200 bales are produced per hectare, each bale containing about 1.2 MWh of energy – about the same as 100 litres of oil. COFORD estimates that this machine could easily operate on 20% of all clearfell sites in Ireland – equivalent to about 1,700 hectares per year, yielding a total energy content equal to 34,000 tonnes of oil.

Timberjack bundler in operation at a Coillte site, Fermoy, Co. Cork

Mr. John Browne, T.D., Minister for State at the Department of Agriculture and Food, with responsibility for forestry, opened Wood Energy 2004 and commented: "In an Irish context, biomass currently accounts for only 1% of energy through domestic and industrial wood heating. While this is low by international standards, I am heartened to learn that our native biomass resource has the potential to supply up to 10% of Ireland's energy needs by the year 2020".

The opening session focused on Wood Biomass – Opportunities, Targets and Potential and began with a presentation from Mr. Loic Blanchard of the European Renewable Energy Council (EREC). Mr. Blanchard outlined how domestic wood bioenergy can ensure that economies are less exposed to international energy prices. He also highlighted the business opportunities for wood energy companies in the heating and energy markets. However, he concluded that renewable energy development depends on a coherent, predictable, supportive political and legal framework.

His presentation reviewed the EU directives that are driving bioenergy policy. Figures from Eurostat showed that heat generation from biomass is the main use, surpassing transport fuels and electricity generation. While Ireland is bottom of the league in bioenergy use, the potential is enormous.

The EREC presentation highlighted that the EU can be far from complacent when it comes to bioenergy development. While wind has already surpassed the EU White paper's 2010 target, biomass has not even achieved half of its target of 135 Mtoe. EREC states that biomass development rates are below expectation and calls for strong support measures at both a national and EU level.

For countries like Ireland who are just beginning to develop bioenergy, EREC recommended the following actions:

- Promotion and awareness raising
- Capital subsidies - national, regional, local
- Environmental State Aid and regional funding
- Local policies to encourage the use of local biomass
- Promotion of solid fuel standards

Mr. Blanchard concluded by announcing that the EU is launching a Biomass Action Plan in 2005 which will bring about co-operation on public policy in the fields of energy, agricultural, waste, forestry, industry, rural development, environment and trade policy. This joined-up thinking helps to overcome barriers to bioenergy deployment. Developing bioenergy is a win-win situation for Ireland as it makes a compelling case for job creation, local investment, environmental impact and compliance with regulations and directives.

Agri Sector Leads the Way in Bioenergy in Austria

The conference heard about the situation in Austria from Dr. Gottfried Lamers (Austrian Department of Agriculture and Environment) where biomass accounts for 15% of the domestic heating market. Local government funding amounts to €1.74 billion and includes subsidies for new and renovated buildings that implement renewable energy and energy efficiency.

In addition to ensuring that they install renewable energy in their own government buildings, local authorities are actually investing in local biomass heating plants.

Dr. Lamers outlined a funding programme for wood heating for private households, farmers, private companies, community projects and agricultural co-operatives. The programme is co-financed by the EU and regional governments.

In Austria a total of €3 million funding has been allocated to over 480 farmer-operated projects in 2002. They have also provided €8 million to agri co-operative biomass heating plants.

Part of the learning process has been to insist on quality standards in fuel production and boiler technology. The department has produced a handbook of quality standards and ensure only quality projects are supported.

Nadja Richler from the Upper Austrian Energy Agency presented an example of a successful wood heating plant operated by a farmer co-operative. The 2MW wood chip plant heats 50 residential and commercial buildings and involved a €1.5 million investment.

Energy Crops in Northern Ireland

Dr. Malcolm Dawson of the Department of Agriculture & Rural Development in Northern Ireland shared his experience of promoting willow for energy use. With the changes in land use in a post-CAP era, the growing of willow for energy production is a feasible alternative. Willow is most suitable for Ireland because it is a native species and has the advantage of easy coppicing. An estimate of 10,000 hectares of willow is given by the UK Department of Enterprise, Trade and Industry as a possible target for the Republic of Ireland. This would contribute 1% to the green electricity target.

Dr. Dawson gave an overview of the production cycle of short rotation crops and outlined the bioremediation element of willow plantations. Londonderry Sewage Treatment Works, for example, operates sewage sludge recycling on a 100 tonne per hectare basis

The recently launched Energy Challenge, where a funding programme for short rotation crops, makes the growing of willow for energy an attractive option for farmers in Northern Ireland. At least three hectares must be planted and the crops must be used for heat or power. The grower must secure a contract for the energy use of the crop. The fund is open for application until June 2006.

Wood Energy is key to bioenergy development reports the Bioenergy Strategy Group

SEI's Mr. Pearse Buckley, presented the current findings of the Bioenergy Strategy Group (BSG) on the available and practicable wood energy resource in Ireland. The BSG was set up by the Department of Communications, Marine and Natural Resources to make recommendations on the development of bioenergy in Ireland.

Wood residues from industrial, forest and recycled sources make up the most significant part of Ireland's bioenergy resource mix, accounting for 0.5 million tonnes (practical resource) and growing to 1.4 million tonnes by 2010. This does not include energy crops. Mr. Buckley outlined the heat and power options for this resource. The scenario envisaged by the BSG in 2010 for wood heating (based on the draft report) was 350,000 tonnes of wood chips and 80,000 tonnes of wood pellets. This heralds a positive vision for wood heating in Ireland.

German Investment Company Buys into Bioenergy

While renewable energy is still new to investment management companies in Ireland, delegates heard a different story from Germany. Dr. Peter Heller from German Investment Management company, PerEnergy, has invested in a biomass combined heat and power plant (CHP). Interestingly, the CHP plants in which he has invested do not own any biomass resources but buy in wood residues from agriculture and industrial wood processing. He outlined the financial status of a CHP and 50,000 tonne pelleting plant (CHPP) with a net profit of €600,000 annually. The plant involved a €15 million investment and €5 million equity which generates 12% annual return.

The key criteria for investing in biomass plants according to Dr. Heller are:

- Short implementation phase (18 months)
- Long term contracts for fuel procurement (>10 years)
- Must get the transport of biofuel right
- Don't get involved in contaminated wood

Biomass Power in Burlington, USA - No one is left in the dark

We don't usually think of the US for examples of biomass energy plants so it was interesting to hear from a local authority owned biomass power plant located in Burlington, Vermont. Since its start-up in 1984, the McNeil plant has generated $172 million for the local economy in term of jobs, wood fuel purchasing, contracting and sales taxes. The plant employs 34 directly and another 90 staff in support, transport and harvesting.

While forest chips are the main fuel, the plant also takes 6,000 tonnes of waste wood such as hedge trimmings from homeowners and wooden pallets from local business. This helps to reduce the amount going to landfill.

Some initial opposition to the plant was based on the fear that the region would become deforested. However, through good forest management, the area now has a higher forest cover.

The biomass plant has been a success story from an economic and environmental point of view. When the rest of the US was left in the dark during the electrical blackouts of Summer 2003, the people of Burlington, Vermont had their lights on thanks to their biomass power plant.

A USA night lights cloud-free composite image taken by the US Defence Meteorological Satellite Program courtesy of the US National Oceanic & Atmospheric Administration ((www.noaa.gov) who posted online satellite images taken before and after the historic blackout of the Northeastern United States in August 2003, which plunged millions of people into darkness.

Ireland's 1st Biomass Combined Heat and Power

Mr. Tim Cowhig of Independent Biomass Systems presented on his company's experience of developing Ireland's first Biomass CHP Plant.

Independent Biomass Systems is a joint venture enterprise between Grainger Sawmills Ltd and SWS Group. Mr. Cowhig outlined the project development from feasibility study through to plant scaling, permits and fuel and location analysis. The next phase involved securing a Power Purchase Agreement, grid connection and fuel contracts. The final phase before project start-up, included financing from Bank of Ireland and risk assessment.

The plant generates 3.5 MW of heat for the sawmill and 1.83 MW of electricity which is entirely exported to the grid. The fuels used are bark, saw dust and forest residues.

The plant consists of:

- A fuel conveying system
- Fuel handling equipment
- Fuel storage area, a steam boiler coupled to a steam turbine and generator set
- Electrostatic precipitator and ash disposal equipment

It was critical that the boiler could handle wet fuels and the chosen Wartsila Biograte is designed for fuels with up to 65% moisture.

Independent Biomass Systems see great potential for similar small scale and modular CHP technology in Irish industry. Applications outside the wood processing sectors include the agri-food as well as those companies limited to emissions levels by the Emission Trading system.
This project was supported by SEI's RE RD&D programme

Wood heating takes on the commercial and industrial heat

Wood heating offers the best economical argument when it is applied to industrial and commercial heating. The sectors are the large buildings market (eg. hotel, hospitals etc) and process heat (eg. agri-food, animal feed, wood processing and other steam processes).

Conor Casey, Managing Director with Casey Technology, explained that industrial and commercial heating makes up 27% of the Total Final Energy Consumption. This equates to 2.6 million tonnes of oil equivalent or €600 million in market value. If wood energy can compete in this market, gaining just 10%, this is a sizeable, profitable market. Mr. Casey indicated that wood energy providers could compete for the oil and coal markets initially, which make up 68% of the commercial and industrial sector.

Nearly one third of all energy consumed by industry is still based on solid fuel so the move to solid biomass is not such a big step. Industries using

coal or peat are set up to deal with fuel handling, delivery and storage. Within commercial heating, Mr. Casey focused on the hospitality sector as a key year round heat consumer.

Wood Pellet Technology

Peter Lange, European Sales Manager for wood pellet plant equipment manufacturer, California Pellet Mill explored why we pelletise biomass. Mr. Lange's presentation outlined the pellet process from transport, grinding, pelleting, cooling, bagging and delivery.

Pellets are dust-free, offer dense energy storage in a uniform size. He highlighted the criteria in deciding on the optimum production which included:

- Investment per tonne per hour
- Operating cost per tonne
- Labour cost
- Technical & practical limitations

CPM Mills at Balcas, Enniskillen

Economies of scale come into play in relation to operating costs. In fact energy costs remain almost static between the production of 1 tonne and 30 tonne per hour. An important consideration for wood pelleting is the drying of the wood resource. Where the raw material has moisture levels of 50-60%, this needs to be reduced to 15% on average for pelleting.

Claes Munter of GEA Exergy presented the Exergy steam drying technology for biofuels. The advantages include high energy recovery, no emissions, no risk of fire/explosion, high exact dryness and a small footprint.

While it is clear why drying is important for pelletising, Mr. Munter posed the question 'why dry when we are going to burn it anyway?' The advantage is that you can considerably increase the boiler capacity, there is less air and water vapour from the furnace and less combustible material left in the ash. Mr. Munter related his experience of a dryer integration at the Energy E2 wood pellet plant in Denmark where 50 tonne/hour of sawdust is dried.

Some initial challenges included:

- Dry chips in summer give a very fine and dusty product
- Oily fatty acids and other Volatile Organic Compounds (VOCs) in condensate

The solutions were to change the screens in the hammer mills and to introduce a mechanical separation of VOCs after the cooling of the condensate.

Oats, Straw and other Biomass for Heating

Lee Jan Seberbrink formerly of Ecotec wood burner manufacturer and currently heading up Scandinavian Bioheating presented biomass heating but not as we know it.

Oats are an excellent small-scale renewable heat source with a short growing period. Oat burners up to 70kW in range are a feasible option for converting oil or coal boilers. The best use is to combust the oats close to where the oats are harvested. At €128 per tonne in Sweden, oats are one third of the cost of oil. With even lower oat prices in Ireland, oat burners are attractive for on-farm heating. One consideration for biomass is the storage area needed. While oil and pellets need relatively small storage space, oats, wood chips and straw have a larger storage requirement. This makes these biomass sources ideal for agricultural applications.

Another advantage for farmers of using a locally available oat fuel is that the ash can be disposed of on the land as a natural fertiliser. In addition, no new equipment for cultivating, harvesting or storage is needed.

Proceedings from the conference are available (cost €5) on a compilation CD that includes all previous Wood Energy conferences & study tour: http://www.sei.ie/reio/reiobookshop.html

Retrofitting Industry with Wood Burners

Today, investing in a wood boiler future-proofs Irish industry against rising oil prices. However, for some companies, replacing their existing oil boiler may not be an option since it may have been a relatively recent large outlay. Wood burners offer a solution for retrofitting Irish commercial and industrial heating for wood heating. The original boiler is retained, only replacing the burner and adding fuel and ash handling systems. Start up and continuous operation is fully automated.

Commercial operation of burners

Swedish manufacturer TPS' first demonstration of its medium scale wood burner was at a school which had a number of large buildings centrally heated by hot water in a district heating net. Energy consumption is 1.75 GWh annually. A 500kW grate fired boiler (wood briquettes), two 1200 kW 20 year-old three-stoke oil boilers and one 200KW electrical boiler supply the heat.

One of the oil boilers was converted to fire wood pellets. A TPS Bioswirl burner was designed for a maximum load of 800kW and was commissioned in 2001. The installation included automatic fuel feed from a silo, a modulated screw-feed via a disc mill and a rotary valve leading to a pneumatic conveying system. The disc mill crushes the pellets to 2-4mm. The disc mill has a low energy consumption (6kWh/tonne) and the sound level is low which is important in a commercial or residential setting.

The burner contributed 56% of the heat production in the first year. By spring 2002 a remarkable 98% availability was achieved. Electricity consumption was measured to be less than 3%.

Other medium scale commercial burner installations followed where a complete off-the-shelf system was ordered including boiler and burner. These 1-3MW units have low operational costs as their control system allows for remote monitoring and reduces the need for on-site supervision.

In May 2004, Mr. Bengt Erik Logfren of AFAB consultancy, Sweden, presented on the different types of pellet burners at SEI's Energy Show 2004.

A pellet burner connected to an existing boiler can be a short cut to economic wood pellet heating. Sweden is the champion of wood burners

where 25,000 home owners use pellet burners. Over 8,000 domestic burners are installed annually with 300 annually in the large building sector of up to 300kW.

Burner technology is similar to traditional oil burners and classification is based on:

- Fuel Storage-this can be external or an integrated fuel hopper
- Flame Direction –this can be up-draught, if the flame leaves the burner head upwards or it can be horizontal
- Fuel Supply-pellet supply can be over-fed, under-fed or horizontal

Regardless of burner classification, burners offer automatic start and stop. Ensuring a quality heating system is achieved through the P-mark quality system in Sweden.

You can use your existing boiler or invest in a single burner-boiler unit. Systems with optimum conversion efficiency, with flue gas emissions below the limit value are commercially available.

While you may compromise on the maintenance convenience of a fully automatic boiler, wood burners still offer a solution that can be easily controlled and regulated. Control feature regulate temperature, monitor flue gas temperature and boiler. Safety and alarm features that be remotely accessed from a mobile phone are also available.

For ease of cleaning, burner manufacturers offer a special ash vacuum. This minimises shutdown periods for ash removal and maintenance.

Advantages of Wood Burners

- Commercially available for small scale domestic, commercial and industrial applications up to 25MW
- Applicable for retrofit and new installations
- Burner operates at a high combustion efficiency and availability
- Control and monitoring features
- Automatic start up and continuous operation
- Ash handling and fuel feed systems can be fully integrated

Manufacturers:

Swedish company EcoTec manufactures pellet burners from 7 kW to 300 kW. They also offer 2 x 250 kW, i.e. 500 kW in a single boiler. www.ecotec.net

Bioswirl burners from TPS Termiska Processer AB, Sweden have developed wood pellet burners for the scale 1-25MW. www.tps.se

Biojet burners from Arimax are available up to 500kw www.thermia.fi

'Plug and Play' Wood Heating

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Figure 1

Figure 2

Figure 1 - The loading of the silo with wood chips using normal farm vehicles.
Figure 2 –The biocompact is a mobile structure encompassing boiler and storage in one single unit.

The installation of small wood chip-fired heating plants is often obstructed by high initial costs. Biocompact is a new way of supplying heat energy produced from wood chips. Flexible and cheap, it is particularly suitable to the sale of heat by an energy service company (ESCO). This is a model that could be offered to Irish commercial and industrial heat customers, in particular to sectors such as the pharma-chem sector where outsourced facility management is common.

Limits to the small-scale use of wood chips (40-150 kW)

The small-scale use of chips may present the following challenges:

- the need to modify existing structures or construct entirely new ones to obtain a boiler room and chip silo;
- high costs for the design and construction of the boiler room and silo;
- adaptability to the location of a plant;

The Biocompact-plug and play wood heating

The Biocompact is a small, mobile heating plant. Many parts are factory-assembled which means that on-site the buyer needs only to organise water and electricity connections. The Biocompact is made up of a boiler room which constitutes the complete pre-assembled heating plant, and an adjacent depot for chips and/or pellets (Figure 1).

The shape, materials used and technical characteristics make it suitable for all types of uses including: the heating of greenhouses, housing developments or small industries.

Operation

This plant is low maintenance, practical, simple in design and function. Loading the silo with wood chips is easy and can be done by normal farm vehicles such as tractors with a front shovel, loading equipment or dumper trucks.

The remote control system means an automatic call is sent to technical support if the plant is out of order or not working properly, and to the fuel supplier when the chip supply drops below a set minimum level.

Operational and economic characteristics and opportunities for use

- The cost of 350 per kW covers the complete system. It is worth bearing in mind the avoided costs of plant design, building structure, water and electrical plant engineering
- Operational guarantee is delegated to a single supplier
- A non-binding mobile structure which can be moved to accommodate new buildings, or, if rented, placed elsewhere
- From a fire safety point of view, the possible source of danger (fire) is located away from the building
- The Biocompact system can be adapted to new requirements, increasing power or changing the fuel load
- The system can also be purchased by two different customers to be used at different times of the year. For example, use during winter months, for the heating of a school building and for the rest of the year,

for the production of hot water for a summer camp or swimming pool.

Technical characteristics

The Biocompact lends itself well to being pre-assembled, before delivery, into two or three sections which can then be connected on site.

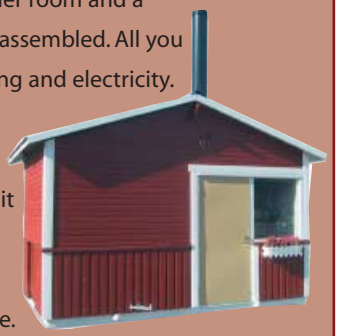
- Heating plant section
- Silo section
- Cooling section

Irish energy services companies could find this type of system useful as an economical entry level to wood heating for Irish business.

This article was originally published in 'Wood Energy Revue' and is produced here by kind permission of the European Institute for Wood Energy (ITEBE). The full article is available online at www.itebe.org

Finnish Plug and Play Wood-Heating

Finnish company, Ala-Talkkari Oy produce wood heating containers that consist of a boiler room and a fuel silo that is entirely factory-assembled. All you need to do is connect the piping and electricity. The flexible system means that the location of the heating container can be changed and it can be replaced or re-sold. The Ala Talkkari products are available in the 80-640kW range. Further information www.ala-talkkari.fi



Harvesting Wood for Energy in Ireland

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Wood for energy in Ireland is close to becoming a reality. Already Graingers sawmill has installed a combined heat and power plant, while Balcas has gone a step further and installed a combined heat, power and wood pellet plant. However, these two plants run for the major part on waste from their mills. What has yet to happen is the development of a supply chain of wood from the forest to dedicated installations that convert that wood to either heat, electricity or a combination of both.

The logistics of harvesting, transportation and storage of wood for energy are not well known in Ireland yet. For this reason COFORD initiated a knowledge-transfer programme for Irish third level institutions.

I was contracted by Waterford Institute of Technology to lecture on the topic of wood for energy. The visit consisted of two main parts: a tour of Ireland to meet with the industry and share the knowledge by giving presentations and the organization of a week-long demonstration of a Danish Silvatec whole tree terrain chipper.

Figure 1: Silvatec Whole Tree Terrain Chipper

Five private stands in total were found through the help of forester, Adrian Booth, of the Forestry Development Association. Tree species varied from Norway spruce to Sitka spruce and also one stand of ash. All stands were given a first thinning, where one line in 7 (or 8) was removed. In several cases also a selective thinning was carried out.

After travelling for several weeks through Ireland, it became clear that it would be difficult to transplant harvesting systems developed outside Ireland directly to the country. Most of the methods are normally used on terrain with a good bearing capacity, which is not always the case in Ireland.

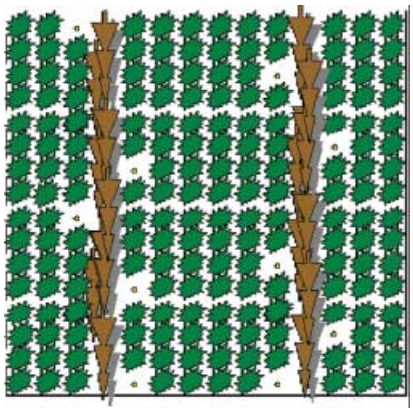

Figure 2: Whole tree harvesting system in first thinnings.

The demonstration of the Silvatec terrain chipper was therefore changed to a demonstration of alternative harvesting methods for early thinnings for energy.

To get brash on the ground, two alternative methods to the whole tree chipping method were developed and tried in praxis:

- a whole stem method
- an integrated system of harvesting boxwood together with an energy assortment

Whole stem method

In the whole tree method, the trees are felled by chainsaw in a roof tile manner, but that does not allow the production of brash. The felling for the

whole stem method was done by a harvester, that felled the trees and did a very crude delimbing of the stem, without cross cutting at all. The trees ran through the delimbing head until the feed rollers lost grip because the stem was too thin to handle. The stems of the row thinning were placed parallel alongside the machine. Once the extraction rack was established, the machine reversed through it and carried out a selective thinning. The stems were left in the extraction rack, with the butt ends facing in the same direction as the ones in the thinned row.

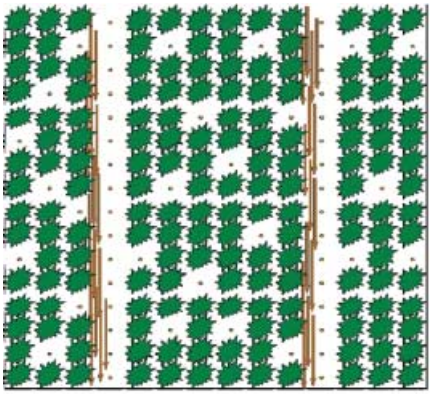

Figure 3. Whole stem harvesting system in first thinnings, adapted for Irish conditions.

The chipper comminuted the stems in the extraction rack to chips. During the chipping operation, the loose brash would fall off the stems and in front of the wheels of the chipper, which then was travelling on a brash mat. Once a full load was achieved, it would reverse out of the stand to a place where the chips could be tipped into a tractor-trailer combination. In Denmark, the chips forwarder would come to the chipper, but here the chipper had to back to the road to unload, since the tractor-trailer combinations were not suited to travel in the stand. This lowered the productivity of the chipper by more than 50% compared to Danish circumstances.

Integrated harvesting

The custom in Ireland is to wait for the first thinning until a fair amount of boxwood and or stakes can be harvested. At the same time, pulpwood is being harvested from the portions of the trees that are not suited for the higher value assortments. In many cases, this pulpwood is produced at a cost, which is lower than the sales price. The costs of this assortment could be reduced if one could produce a crudely delimbed assortment of falling lengths for energy (length requirement between 3 and 6 metres, no top diameter requirement). The reduction in costs would come for an increased delimbing speed, fewer cross cutting and reduced delimbing quality. The costs of forwarding of this new assortment would also be reduced because of the longer length of the assortment and because neat stacking is not required. The face of the pile should not be flush.

The energy assortment would be forwarded to the roadside like any other assortment and piled there in high piles. The pile of energy wood would then remain in the forest until August for a period of natural drying. By leaving the wood in the forest, the moisture content can easily be reduced from 55-60% in the fresh wood to 40-45% after one summer. This reduction in moisture content would mean an increase of 100% in heating value per tonne, but only 50% of extra volume is needed for each tonne of wood. Also it would mean a much more efficient road transportation, where the loading volume of the trucks can be used to the maximum. Normally the restricting factor in road transportation is the gross weight of the vehicle.

The energy assortment can be chipped at the roadside by a larger and more efficient chipper than the terrain chipper. This chipper would be

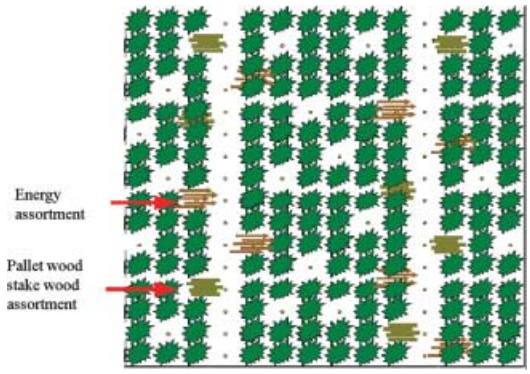

Figure 4: Integrated harvesting in first thinnings.

mounted on a trailer behind a timber truck. The crane of the timber truck feeds the chipper and the chips are blown directly into a curtainsider.

Using curtainsiders to transport the chips from the forest to the consumer is also more efficient than the use of timber trucks. A timber truck has a dead weight, which exceeds that of a curtainsider by at least 3-4 tonnes, because of the crane and the bolsters.

The price of wood for energy depends largely on the moisture content, so as dry wood as possible should be produced. Even under Irish conditions a natural drying can be obtained. At the chipping demonstration, one stand had been felled to waste in October 2003. The moisture content of these trees was well below 40%, even though the weeks before the demonstration had been very wet. An advantage of chipping brown trees is that all the needles remain in the forest. The needles of a tree contain up to 80% of all nutrients of a tree. Needles also create a lot of ash in the boilers.

Figure 5: Energywood stack stored in the forest until next summer.

During the demonstration week, one stand of brown whole trees was harvested as well as one with green whole trees. The same volume of chips on the tractor-trailer combination of 28 m3 loose volume, would weigh 7 tonne for brown chips and 9 tonne for green chip. At 40% moisture content for the brown chip and 57% for the green, that would still mean that a load of brown chips contains 23% more energy.

Conclusion

Harvesting methods for wood for energy are being developed for the Irish situation. In all cases the energy wood will have to be dried in the forest before transportation in order to increase the energy content and to reduce the road transportation costs. Green chips do not store, do not pay and do not burn.

Bioenergy and Agriculture

Michael Doran, Irish BioEnergy Association, and Rural Generation Ltd., Londonderry, Northern Ireland

Review of Current Policy Approaches Towards Bioenergy Production from Agriculture in Northern Ireland and the Republic of Ireland: a Perspective from the Irish BioEnergy Association

(This paper was delivered at an OECD conference in Vienna, 2003)

Bioenergy from agriculture has the potential to deliver considerable benefits. These include security of supply, diversity of supply from a range of sources including short rotation crops, chicken litter, spent mushroom compost and anaerobic digesters, etc. It can also have the added benefit of using a waste stream to produce energy.

The creation of bioenergy from agriculture necessarily involves the co-ordination of different government departments, primarily those involved in agriculture, waste management and energy production. To date, there has been no "joined up" or long-term strategy to exploit this market. Bioenergy from agriculture is generally considered to be a component part of "renewable energy", but little support is given to provide holistic solutions, which can solve environmental problems, create employment opportunities and provide energy at the same time.

Basic requirements for agricultural bioenergy strategies in Ireland

1) Pro-active education and communication of the delivery mechanism to the target audience.

2) Stress the environmental creditability of the policy both as a waste management exercise and as an energy generating activity.

3) Plan long-term. Predictability and continuity of policy is particularly important, (a) because of the relatively long time required to produce energy crops and (b) to ensure that the initial capital investment is protected by a mid-term commitment.

4) The policy should ensure that the eventual outcome secures a sustainable position, either for waste management or for income generation from energy crops.

5) With respect to financial incentives they should show a decreasing characteristic over time i.e. pump priming may be required at an early stage but this should reduce to an economically viable position over time.

6) Benefit from international experience from more advanced and developed markets and commercially available technology.

7) Dissipate the current focus on electricity markets that currently predominate the energy sector.

No.	Targets	Target Action by
1	Co-ordinate strategy between government departments in Northern Ireland	Set up cross-departmental group with policy focus in Northern Ireland Cross-departmental co-ordination between the departments of Environment, Agriculture, Finance, Communications, Marine and Natural Resources on an all-island basis
2.	Co-ordinate strategy between government departments in the Republic of Ireland	Set up cross-departmental group with policy focus in the Republic of Ireland Cross-border strategy group
3.	Co-ordinate bioenergy from agriculture policy between Northern Ireland and the Republic of Ireland	Establishment of a cross-border strategy group to co-ordinate Ministers
4.	Develop vision for bioenergy from agriculture across Ireland. Develop long-term plan i.e. 10/15 years with reviews at 3 or 5 year intervals	Cross-border strategy group
5.	Identify realistic targets for bioenergy production from agriculture Set specific targets, monitor and review Quantify sectoral contribution from biomass, AD, agricultural wastes etc. Assess extent of market development/technology for each bioenergy source	Cross-border strategy group
6.	Identify the most appropriate delivery mechanisms to assist bioenergy production from agriculture Set target dates for production Educate financial institutions and incorporate them in delivery mechanisms Develop appropriate government support mechanisms	Cross border strategy group
7.	Make bioenergy from agriculture financially sustainable Identify "critical mass" that is required to achieve sustainability for each market/technology. Enact legislation compatible with appropriate market development	Cross-border strategy group, green banks, financial institutions
8.	Ensure market structures are robust for bioenergy production from agriculture Encourage appropriate technologies Allocate resources to R&D	
9.	Provide range of proven production and conversion technologies Draw up codes of best practice, controlled by legislation, encouraged by financial support	Cross-border strategy group, research institutes, educational establishments, industry

Update on developments by the Department of Communications, Marine and Natural Resources since the delivery of this paper in 2003

All Island Energy Market

On November 22nd 2004 Minster Noel Dempsey and Minister Brian Gardiner, jointly launched ŒAll Island Energy Market ˆ A development Framework, . This development framework, which was the subject of public consultation over the summer of 2004, sets out the commitment of governments north and south, to move towards an All Island Energy Market as a means of meeting the challenges of delivering a competitive market, reduced energy process and security of supply. One significant step forward in this regard was the publication, in August 2004, of a Memorandum of Understanding between NIAER and CER setting out how the two regulatory authorities will co-operate on implementation of the All Island Electricity Market.

Bioenergy Strategy Group

The Bioenergy Strategy Group was set up in late 2003. Its primary objective is to consider the policy options and support mechanisms available to Government to stimulate increased use of biomass for energy conversion, and to make specific recommendations for action to increase the penetration of bioenergy in Ireland.

Renewable Energy Development Group

In May 2004, a Renewable Energy Development Group, chaired by DCMNR, was established. The Group comprises relevant experts from the administrative, industrial and scientific sector. The Group will advise on future options on policies, targets, programmes and support measures to develop the increased use of renewable energy to 2010 and beyond, and will consider the outcome of the renewables consultation process, and the findings of the Bio-energy and CHP Strategy Groups. This Group's report is due before the end of 2004 and will inform future policy development.

Quality Management for Wood Pellets

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Quality is defined by the consumer, it must meet consumers needs and fulfil their expectations. To guarantee market competitiveness of pellets and to compete with the convenience of non-renewable fuels it is important to meet these requirements. High quality is essential along the whole supply chain, from the production of pellets and the heating equipment right down to the marketing. The definition of quality (according to ISO 9000:2000) refers not only to the quality of the products (pellets and boilers) but also the quality of processes along the entire supply chain including distribution, transport, storage, installation and after-sales services.

The dominance of domestic pellet heating in Austria with its complexity of the involved market players (most of them small and medium enterprises) and the high technical standard of the Austrian pellet heating systems themselves, led to the development of quality standards for pellet logistics. The main criteria of this pellet logistic standard are summarised as follows:

- Traders or transporters of Austrian standard (Önorm) pellets have to make sure that only quality pellets achieving ÖNORM M7135 standard are delivered. Quality standard pellets cannot be mixed up with pellets of lower quality or pollutants.
- Pellets have to be protected against moisture and pollution during storage and transport, therefore storage only is allowed in closed halls.
- Before delivery of pellets to the (private) final consumer fines must be separated up to a maximum content of 1 % fines
- Transport lorries (over 8000 kg payload) must be equipped with an adjusted on-board-weighing system
- Tank lorries must be equipped with an efficient suction technique and dust bags to avoid high pressure in the storage room and dust emissions during filling.
- Tank lorries must be equipped with pipes at least 30 metres long.
- Traders and transporters have to develop working instructions for delivery of pellets and train their staff accordingly.
- Each filling of a storage area at the end-consumer must be documented. A check list must record the following minimum information - whether the heating has been shut off during filling, whether the storage room is closed, if there are old pellets remaining in the storage room, length of pipes needed for filling and other special remarks concerning the storage room or the filling procedure.

Another Austrian standard for pellets storage at the end consumer (Önorm M7137) defines quality criteria for storage areas - Cellars, Silos, Free-standing Containers, Underfloor Containers- to ensure storage conditions at the end consumer do not affect pellet quality. Another purpose of the standard is to harmonize storage equipment and the storage's filling couplings with the equipment of the pellet truck and filling operations.

Some of main criteria of the storage standard include:

- The storage must be damp-proof and dust-proof
- The filling couplings of the storage have to be accessible to a 30m filling pipe.
- There should be no electricity, water or waste water installations in the storage room

Full article available online at www.sei.ie/reio.htm under Reference Section.

STORAGE OPTIONS IN THE IRISH MARKET

Irish company, Kingspan, well-known for its insulation business, is also involved in fuel storage manufacturing. Kingspan has a successful wood pellet storage business in several European markets. Kingspan developed a storage container for biomass /wood pellets called the 'Pelletmaster'.

Kingspan Pelletmaster storage

It comes in 350 and 800 litre sizes, made of rotationally moulded medium density polyethylene.

It can be fitted with a fixed or flexible augur and a sliding trap at the base. It has a lid which can be fitted with a cam-lock fitting for blowing the pellets from a truck into the Pelletmaster, or simply by lifting a smaller lid to pour pellets from bags. The company is in the process of designing a 900 litre version which will be targeted at the larger domestic and small industrial users.

Kingspan Pelletmaster storage

The product was initially developed for their businesses in Scandinavia where it has now been specified for all new installations by Statoil in Denmark for their Scandinavian business through their recently acquired 'Econordic' business - the largest user of wood pellets in Denmark. The product is now sold in Denmark, Sweden and Norway. The price is in the region of €250.

German storage manufacturer, Steinecke Silobau recently established a partnership agreement with Irish company Darionti Energy Ireland and co-exhibited at this year's wood energy conference.

The storage silos are designed specifically for wood pellets. They are made from KoSa high tenacity polyester yarn. This fabric is breathable which allows the silo which is enclosed at the top, to be filled with pressurized air and pellets quickly, and without dust.

Further information: www.kingspan.com www.silobau-steinecke.de

Wooden-clad Silobau Steinecke wood pellet storage container

Interior storage solutions from Silobau Steinecke

Bioheat II – New Technical Brochure on Wood Heating in Large Buildings

A new brochure entitled Heating Large Buildings with Wood Fuels - Basic Information for Project Planners has recently been published under the Bioheat II programme. This is the third publication for Bioheat since the project began in January 2003. The Bioheat II Project is funded by the EU Commission within the Altener Programme and is dedicated to developing high quality wood heating projects. The brochure contains basic technical information to assist with the preparation and planning of wood-fired heating systems in large buildings. Typical projects where wood heating represents an attractive alternative include: residential blocks, hotels, commercial premises or public buildings such as schools, hospitals, old people's homes, town halls and other large buildings with a heat rating of between 50kW and 500kW. For a copy of the new brochure or advice on availability and costs of wood fuels, service providers, equipment suppliers and pilot projects, contact Ann McCarthy on (023) 29171 or log onto the website: http://www.bioheat.info/handbook/index_en-ie.html .

Bioheat CD

A Bioheat CD is also available and features recent footage from RTE's "Eco Eye" Programme which looks exclusively at wood pellet production and the benefits to wood heating. Also included on the CD are the three Bioheat brochures, RETScreen software and a heat cost calculator.

For a free cd contact: Ann McCarthy on the Bioheat Hotline – (023) 29171

A Kerrygold Model for the Irish Wood Energy Market?

Why do companies co-operate to compete? Joint marketing can help individual companies develop a new market where they each can operate successfully.

The dairy sector recognised this when they set up the Irish Dairy Board (IDB), originally known as Bord Bainne, in 1961 to market Irish dairy produce to export markets. It provides a vitally important marketing and distribution capacity to Irish processors, particularly, to the smaller to mid-sized processors. Kerrygold, its main brand, has been developed over the last 40 years into a major international dairy brand, which is now sold in over 60 countries.

To develop wood heating markets, the providers of biomass heating in various European markets, co-ordinate the marketing of wood heating. The joint activity includes marketing, lobbying and standards promotion.

The French-based Association for Bioenergy Professionals, ITEBE, has created a Pellet Club. Its aim is to promote the quality of fuels and has established a quality label. It offers technical training to ensure high quality heating installations and after-sales service.

In the absence of national standards (European wood fuel standards are in development), domestic and commercial consumers face problems in identifying quality fuels and equipment. Low quality fuels or technology could have a disastrous effect on a developing market such as Ireland. Market players have an important role to ensure quality.

The ITEBE quality charter for pellet manufacturers does more than simply outline the various wood pellet standards that exist in Europe, it gives specific advice on determining a quality pellet for various uses - stoves, boilers, large scale heat or power plants.

The Austrian Pellet Association brings together pellet manufacturers, suppliers and storage providers. The members co-operate on joint marketing initiatives - the dissemination of pellet heating information packs, attendance at trade fairs, training for heating technicians and plumbers, architects and consultants.

The German and Austrian pellet manufacturers' associations operate a quality control element. A coded particle is included in the bag or bulk delivery that guarantees high quality and identifies the manufacturer and batch. The manufacturers sign up to unannounced inspections carried out by a national inspection agency.

Pellsam, the Swedish wood pellet trade body, was set up by manufacturers and suppliers of pellet heating equipment. Pellsam offers its member companies a competitive advantage because of a unique insurance scheme. The insurance gives customers a 6-year full cover for unexpected break-down or damage to the pellet equipment. The insurance is packaged as part of the pellet heating cost and a commission goes to Pellsam to fund their marketing activity.

Irish companies offering wood energy services have recently announced the launch of a Wood Energy Association. Contact association secretary Peter Kernohan of Balcas at peter.kernohan@balcas.com tel +44 2866 323003.

Further information:

Austrian Pellet Association www.pelletsverband.at

Swedish Association for Pellet Producers www.pelletsindustrin.org

Association for Bioenergy Professionals www.itebe.org

French Pellet Club quality label

BIOMASS RESOURCE PACK

A comprehensive information pack on biomass technology including:

- A "Best of Biomass" resource CD on all biomass covering anaerobic digestion, landfill gas recovery, liquid biofuels and wood energy. Includes case studies and overviews of each biomass area. Easily searchable web format.
- A compilation CD from the SEI/COFORD Wood Energy conferences 2002-2004 and Study Tours 2001-2003. A wealth of information from experts on wood fuel development. Easily searchable web format.
- Wood Fuels Basic Information Pack – a publication from the BENET Bioenergy Network, Finland – covering all aspects of wood fuel production and combustion. (Retail value €38)
- Wood Pellet Production Study-full colour printed copy of a study conducted by SEI REIO on wood pellet production in Ireland. Full overview of pellet production technology.
- Wood Energy Revue magazine from the European Institute for Wood Energy (ITEBE). Latest issue on developments in wood energy and market reviews.

•Biomass Co-firing and Combustion-IEA publication on combustion technology and fuel supply chains, for biomass-to- energy applications ranging in size from domestic to industrial scale. (Retail value €39)

The resource pack is available online at www.sei.ie/reio/reiobookshop.html
Cost: €75

Renewable Energy in Ireland Trends and Issues 1990 –2002

This SEI study presents a comprehensive dataset and accompanying analysis of renewable energy in Ireland. Renewable energy is assessed both generally and in terms of individual sources and technologies. The study finds that renewable energy accounted for 1.9% of Ireland's primary energy requirement in 2002. Just over half of Ireland's renewable energy (54%) is used to produce heat while the remainder is accounted for by electricity generation from wind, hydro and landfill gas. The report finds that, through the energy supplied from renewable sources in 2002, Ireland avoided the emission of 1.5 million tonnes of carbon dioxide (CO_2), up 44% on 1990.

Available from www.sei.ie/publications

BEST OF BIOMASS CD

A resource CD on all biomass covering anaerobic digestion, landfill gas recovery, liquid biofuels and wood energy. (Cost €5)

New Wood Energy Portal Site

Woodenergy.ie is a new website dedicated to bringing you factual information on using wood biomass as energy source. The site is sponsored by COFORD, the National Council for Forest Research and Development.

Co-firing with Biomass

SEI commissioned Electrowatt-Ekono to investigate co-firing with biomass in existing coal fired and new generation peat fired power stations – Moneypoint, Edenderry, Lough Ree and West Offaly. The study was completed in May 2004. The key finding was that co-firing was technically feasible in all cases without modifications, particularly for the peat plants. The availability of wood residues at economic cost was more problematic, although a 10% level of co-firing in the peat plants was viable under existing cost regimes. Applying notional CO_2 costs up to €30 / tonne indicated that greater levels of co-firing were realistic. The study can be downloaded from the SEI website: www.sei.ie/reio.htm

All the above publications are available from our office (see below) or by visiting our online bookshop at www.sei.ie/reio/reiobookshop.html

Recommended Events 2005

March 2-4
European Pellets Conference & REIO Study Tour
Wels, Austria
www.esv.or.at

September 12-15
Bioenergy in the Wood Industry 2005
Jyvaskyla, Finland
www.finbioenergy.fi/bioenergy2005

September 22-25
IHE Wood Energy 2005
Augsburg, Germany
www.ihe-woodenergy.com

The Renewable Energy Information Office

Planning Update is published by the Renewable Energy Information Office
Contact SEI REIO:

Sustainable Energy Ireland, Renewable Energy Information Office, Shinagh House, Bandon, Co.Cork.

Tel: 023 29145/46 Fax: 023 29154

Email: renewables@reio.ie

Web: http://www.sei.ie/reio.htm

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Regular renewable energy information updates are now available by email from SEI REIO. The aim is to speed up the relay of information on topics such as events, policy and funding. To join the list send an email to renewables@reio.ie with "email subscriber" in the subject line.