

Renewables Are Heating Up!

This issue of Planning Update is dedicated to the topic of heating using renewable energy sources as developing renewable heat can have a major impact on achieving renewable energy targets. Heating accounts for one third of Europe's final energy consumption. Mature technologies using geothermal, solar and biomass resources offer solutions for space and water heating as well as process heat.

At EU level, Directive 2002/91/EC on the energy performance of buildings requires renewable heating to be considered for new and existing buildings over 1000m². This requires owners to carry out a technical, environmental and economic feasibility on renewable heating. The legislation will have a positive impact on Irish policy and practice in the development of renewable heat.

Many organizations including the European Solar Thermal Industry Federation, are now lobbying for legislation that focuses specifically on renewable heat. This would be modelled on the electricity directive, covering targets, support

measures and certification. This would further drive market development of the technologies presented in this issue: solar thermal, geothermal heat pumps, wood chip and wood pellet heating.

In this issue, read about the potential and current developments of renewable heating in Ireland.

To learn more about how you can implement renewable heating, download the presentations from Sustainable Energy Ireland's annual conferences and study tours for Solar Energy and Wood Energy at www.sei.ie/reio.htm

Check out our free downloadable renewable heating cost calculator to see how you can save by switching to renewable heat.



Offaly County Council's Aras an Chontae has won Best Sustainable Building 2003 awards from An Taisce and the Royal Institute of Architects of Ireland for its headquarter building incorporating ground source heating.

Passive Houses: A Revolutionary Standard in Sustainability and Comfort

The concept of 'Passive Houses' was first introduced to an Irish audience by Hans Eek, a Swedish architect speaking at REIO's first solar conference "See the Light 2002" (see Planning Update - Winter 2002). Hans presented his contribution to demonstrating passive houses in his country: 20 terraced houses with no heating system offering a comfortable living environment, even at extreme temperatures, at an affordable cost.



Mairéad O'Leary, Klaus Schweitzer and Xavier Dubuisson at the Passive Offices of Wagner-Solartechnik (German solar equipment manufacturer)

The enthusiasm was such among delegates that REIO invited Helmut Krapmeier (Vorarlberg Energy Institute), a champion of the passive house concept in Austria, to speak at this year's solar conference. Helmut made a truly colourful presentation, convincing all of us that passive houses are based on robust principles: highly insulated fabric, heat recovery ventilation, excellent air-tightness, optimised solar and internal heat gains; to provide a high level of thermal comfort and air quality for the occupants.

Passive houses are sometimes called "one litre houses" because they are so efficient that their annual heating requirement is equivalent to 1 litre of oil per square meter. This means a heating bill of less than €150 per year for a 2,000 square foot house. The remaining heat demand can be easily supplied from a renewable energy source (a small heat pump, wood heater, etc.) and distributed within the building with the fresh air provided by the ventilation system.

Having heard Hans Eek and then Helmut

Krapmeier at both REIO's solar conferences, Irish architect Tomás O'Leary is determined to build his future family home as a passive house. Having bought a site in Co. Wicklow and with a lot of research behind him, he painstakingly prepared house plans. "Our family and friends thought we had completely lost the plot – designing a spanking new house with no central heating. We too were a little worried. We concluded that the only way to progress with confidence was to visit some existing passive houses to see how (if?) they work in practice"

Tomás and his wife Mairéad decided to join Xavier Dubuisson, solar engineer at REIO, on a study visit to Dr. Wolfgang Feist, director and founder of the Passive House Institute in Darmstadt (Germany). Dr. Feist took them to his own passive house (built in 1992) and 3 other sites (a three storey apartment development, a multi-storey social housing project and an office block). As Tomás put it "I was still full of scepticism and was going to be difficult to convince. Would the buildings look like bunkers with small peep-holes for windows? Would we be ushered in before heat flows down the street?"

continued on page 2:

Would there be drafts and noise from the ventilation system? And, most critically, would the houses feel cold in winter?"

The answer to these and other worries was a resounding Nein! The houses were aesthetically expressive, bright and airy, practical to manage and quiet as a mouse. In fact, each of the passive houses went about their business of providing comfortable working and living environments with no fuss whatsoever.

We also learned that Passive Houses are only marginally more expensive to build initially than conventional houses and that, with much

lower heating bills, their yearly costs (including mortgage) are similar or lower.

Tomás concludes: "The last house visited in Frankfurt best summed up the overall experience. While the day had now gone quite chilly, our host opened the front door beaming with pride and wearing shorts and a t-shirt. He told us how earlier on in the morning he had to scrape ice off his windscreen while all the time his house was a balmy 22 degrees Celsius. We left Darmstadt and Dr. Feist totally convinced that we too could build a Passive House in Ireland. We will keep you posted on our progress..."

For further information on passive houses, Xavier Dubuisson recommends "CEPHEUS – Living Comfort without Heating", a beautifully illustrated and comprehensive book written by Helmut Krapmeier and Eckart Drössler (Springer-Verlag, 2001). This book is available on REIO's online bookshop:

www.sei.ie/reio/reiobookshop.html.

- Passive House Institute in Darmstadt: www.passivehouse.com
- Vorarlberg Energy Institute: www.energieinstitut.at (comprehensive resource on passive houses, in German).
- CEPHEUS: www.cepheus.de (European project demonstrating passive houses).

Solar heating: A Growing Niche Market in Ireland

Active solar thermal energy refers to the transformation of solar radiation into heat using solar panels. Solar thermal can be successfully applied to a broad range of heat demands, including domestic water heating, space heating and drying. New exciting applications are also being developed, in particular solar assisted cooling.

Solar heating is not a new idea though. At the beginning of the 20th century, it was widely used in the United States as a substitute for solid fuels to produce hot water. However the technology was shelved when the oil industry took over the heating sector and it was only after the first oil crisis in 1973 that active solar thermal made it back into the energy scene. The market has grown continuously since then (+13.6% during the last decade) and by 2002 Europe was able to boast 12.8 million square meters of solar collectors installed (34 m² per 1,000 inhabitants).

According to Ole Pilgaard, president of the European Solar Thermal Industry Federation (ESTIF), "the potential for further growth is huge. Very big markets like France, the UK and other Southern countries are only opening up, following the example of Austria, Germany, Denmark and Greece. The good news for Ireland is that your climate is as appropriate as the German one for solar thermal, and generally better than Scandinavian countries where the level of penetration is much higher."



Flat plate collectors 5m² on an unusual domestic application in Dublin due to the low roof line

Sun in Action II, a recent report published by ESTIF estimates the technical potential of solar thermal at 1.4 billion m² of collector area. The resulting annual solar yield (682TWh/y or 58,7Mtoe) would correspond to 4 times Ireland's total energy consumption, or 30% of the EU oil imports from the Middle East in 1999. The report goes on to propose an action plan for the development of solar thermal in Europe, with a mix of measures to be undertaken by public authorities (regulations, incentives, promotion) and the solar industry (R&D, standardisation, market structure improvement).

In Ireland, we still have a long way to go with only 1.1 m² per 1,000 inhabitants. However sales are picking up with 875 m² of solar collectors sold last year (3 times more than the year before), the equivalent of close to one installation per day. The supply and install capability has increased substantially too with twenty companies active in the Irish market, compared to less than five three years ago.

Alan Hogan from Precision Heating is one entrepreneur who was very keen to integrate solar thermal as part of his range of modern heating systems. Speaking at See the Light 2003, he explained how successful he was with introducing solar thermal as a clean energy concept to his clients both in self-build and commercial housing developments. "Solar is mad this year! By Christmas, we will have installed 800 m² ... definitely our fastest growing product."

Sustainable Energy Ireland's funding programmes have supported a number of demonstration projects involving active solar thermal systems in the residential sector as well as in public and commercial buildings. The House of Tomorrow programme for example has supported the installation of 213 solar systems in houses so far. Sustainable Energy Ireland has also commissioned the Danish Energy



30 m² of solar evacuated tube collectors for a new office development in Belfast

Authority to carry out a study on policy options for the development of active solar thermal energy in Ireland. Jens Windeleff and Ejvin Beuse, both involved in the implementation of the Danish solar energy programme for close to 20 years, will be presenting the results of their study to Sustainable Energy Ireland at the end of January 2004.

Recommended resources in solar thermal energy:

- "Solar Thermal Systems – Successful Planning and Construction" published by Solarpraxis in 2002. Available on REIO's online bookshop: www.sei.ie/reio/reiobookshop.html
- T*SOL, a comprehensive design software for solar thermal systems (domestic and large-scale). Also available on REIO's online bookshop;

Websites:

- European Solar Thermal Industry Federation: www.estif.org (Sun in Action II report available to download)
- International Energy Agency's Solar Heating and Cooling Programme: www.iea-shc.org;
- International Solar Energy Society: www.ises.org

Public Authorities Go Solar

Across Europe, public authorities at local and national level have been embracing the use of solar energy in buildings under their jurisdiction: offices, schools, social housing, swimming pools, etc.

Their motivations can be various but would generally include:

- showing leadership and serving as an example in the implementation of innovative and clean energy technologies;
- satisfying a growing demand from their citizens to show a responsible attitude towards energy related concerns (climate change, air pollution, security of supply, etc.);
- reducing their energy bills and safeguarding the public purse against inflating fuel prices;
- ensuring the comfort of the users of public facilities (tenants, employees, students, etc.);
- eliminating fuel poverty.

At the See the Light 2003 conference, Luc Stijnen from Zonnige Kempen, a social housing company near Antwerp (Belgium), presented a number of successful social housing projects involving both passive solar design and active solar thermal systems. The renovation of five apartment blocks (11 units each) undertaken in Vorselaar was particularly exemplary. It achieved an annual primary energy saving of 70%, reducing energy consumption for heating and domestic hot water from 250 kWh/m²,year to 80 kWh/m²,year.

The main measures implemented included: external wall insulation + high performance glazing, glazed balconies, ventilation heat recovery and a high efficiency boiler. The installation of a solar water heating system



Renovated apartment block for social housing in Vorselaar, Belgium. The roof of the central staircase supports the solar water heating panels

brought a further reduction in heating demand by covering around 40% of the hot water production. The project is a win-win situation: tenants have an increased quality of life by better thermal comfort and a higher disposable income, the housing company was able to increase rents by 40%.

In Ireland, Sustainable Energy Ireland funded a significant number of public building projects in the framework of its Public Sector Programme: 12 projects involving ground source heat pumps, 13 projects involving solar water heating and 15 projects including passive solar elements. One of these projects, Gaelscoil An Eiscir Riada in Tullamore has already attracted a lot of attention for its very progressive approach to building design and its low energy standards. The design team aimed to create a building with energy consumption approaching 20% of the energy used by similar “good practice” schools in Ireland, which would generate zero CO₂ in the operation of its services.

The school building has been planned to take maximum advantage of early morning sun for pre-heating, insulated at twice the current

Building Regulations level and particular attention was given to air-tightness of the school. Natural ventilation and daylighting also play an important role in providing a comfortable and healthy environment for the pupils. A ground source heat pump system is used to heat the building in conjunction with underfloor heating, which has been designed to achieve a coefficient of performance of about four during peak demand conditions. The whole building is monitored with a BEMS (Building Energy Management System) to assess its performance and assist its occupants in adjusting the controls for maximum comfort and energy efficiency. A touch screen display is linked to the BEMS to provide the children and visitors to the school with energy and environmental information relating to the building. Overall the school is an ideal tool for the students to learn about the responsible building technologies that will shape their future.

For further information on sustainable energy in public buildings:

- read SEI’s collection of Good Practice Case Studies: www.sei.ie (Info Centre);
- discover SEI’s funding opportunities: www.sei.ie (Funded Programmes);

Relevant websites:

- Network of over 2000 local and regional authorities working towards sustainability: www.sustainable-cities.org ;
- Internet based Monitoring System for local authorities in the area of renewable energies: www.aim-solarcity.net ;
- European network of local authorities to promote sustainable energy policies at local level: www.energie-cites.org.



Gaelscoil An Eiscir Riada, Tullamore. First low-energy school in Ireland (Photography - Gerry O’Leary)

Wood pellets - current developments in Europe



Wood pellets first appeared in the United States during the energy crises of the 1970s as an emergency fuel. By and by the emergency fuel became established and slowly grew to a market of one million tonnes of pellets that are used almost exclusively in small pellets stoves for domestic heating. Except for a few isolated cases, pellets did not become widely used in Europe until much later. The largest European pellet markets developed in 1990s in Sweden and Denmark. In the mid 1990s Austria, and since 2000 Germany and Italy have become dynamically growing pellet markets.

In Sweden pellets were primarily produced for use in large power plants, while Austria is the first European country where pellets are produced exclusively for the domestic heating sector. In the last few years, pellets for residential heating have also started to grow rapidly in Sweden and Denmark.

What were the reasons for the successful development of pellet markets in Europe? Pellet markets in Sweden and Denmark are clearly related to energy taxation in these countries. High taxes on fossil fuels created a direct economic incentive to use wood fuels in large municipal district heating plants with heat or combined heat and power production.

The boom of domestic heating with wood pellets in Austria cannot be attributed to energy taxes. Which factors were the main driving forces for the development of Austrian pellet market? Firstly wood pellets seem to be an attractive fuel for consumers. They have a

pleasant appearance, a nice smell and everybody likes to dig their hands into pellets.

In addition, a considerable number of dedicated wood chip boiler producers existed in Austria and they introduced high quality pellet boilers into the market soon after pellets were introduced. Another important factor for market success in Austria are subsidies which are available for households that switch to wood fuels. These subsidies cover up to 30% of the investment costs.

Success of domestic heating with pellets in Sweden is based much more on economic considerations than in Austria. Heating with pellets is clearly cheaper than with oil in Sweden, especially because the technical approach to install pellet-burners on existing oil boilers requires very low investment. The disadvantage of this solution is that it offers significantly less comfort. These boilers need to be cleaned manually rather frequently to avoid ash build up and decreasing efficiency. While Austrian pellet boilers have automatic cleaning devices and need virtually no maintenance except removing the ash container two or three times a year.

What about the economics of pellet production? Production costs for pellets can vary considerably between €60 to €90 per tonne. Factors that affect pellet production costs are costs for raw material, capacity of the plant, equipment availability, heat demand for drying and specific heat costs as well as operating hours and investment costs. Market prices for pellets in Austria and Germany are around €170 per tonne for small consumers and approximately €120 per tonne for larger customers using several hundred tonnes a year.

To estimate the competitiveness of pellets a simple rule of the thumb is that two kilos of pellets have almost the same amount of energy as one litre of fuel oil. Consequently a kilo of pellets must cost less than half of a litre of fuel oil to be competitive. In fact, given the higher costs for pellet boilers in comparison with conventional oil boilers, pellets need to be

reasonably cheaper than fuel oil to motivate the consumer to change. The higher the heat demand of a building is, the less important are higher investment costs of the boilers if the fuel is cheaper. For this reason large buildings are economically particularly attractive as consumers of wood energy.

What are the key factors for successful market introduction? First of all a supply of pellets and a demand for pellets must be developed simultaneously. In Austria entrepreneurs started the market by first importing pellets and then, as demand started to grow, established production facilities. Of course it is also possible to develop the market the other way around, produce pellets for export while developing the local market. In considering the viability of both options it is necessary to distinguish the opportunities of large scale bulk markets that offer high volumes at low prices and small scale domestic markets that develop more slowly but offer significantly higher prices.

In the bulk market for power plants, pellet quality is less significant. If a decision is taken to address the domestic heating market, quality issues become fundamental for market success. Domestic markets need pellets of very high quality, low dust content and high mechanical stability. Not only that, successful development of domestic markets needs highly reliable consumer products on the market and excellent fuel delivery services.

Introducing a new energy carrier into the market is a rather complex management task. It needs dedicated actors taking responsibility for this task. It also needs co-operation within the timber sector, between the timber sector and other sectors and public entities which have a critical role in offering financial incentives and beneficial framework conditions for market development.

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New Commercial Bioenergy Developments



From left, Mr. Kieran Calnan - CEO SWS Group, Mr. Bill Grainger - Graingers Sawmills, Minister Joe Walsh, T.D., Ms. Majella Kelleher - SEI, Mr. Denis Lehane - Chairman SWS Group.

Launch of Ireland's 1st Biomass Combined Heat and Power (CHP) Plant

Independent Biomass Systems, a joint venture between the SWS Group and Grainger Sawmills Limited, is constructing an €8 million wood fired Biomass CHP plant to generate green energy at Grainger's wood processing facility at Enniskeane in West Cork.

The new CHP plant will use wood processing co-products such as sawdust, bark and woodchips together with forest thinnings to generate heat for Grainger Sawmill's extensive timber drying operations. The CHP plant will also produce 2MW of green electricity, which will be sold to the national grid. This development was part funded by Sustainable Energy Ireland's RD&D Programme.

Further information is available from info@graingersawmills.ie

Biomass Developments 2003

- ✓ 1st Combined Heat and Power Plant (CHP) Graingers Sawmill, Enniskeane, Co. Cork
- ✓ 1st CHP and Pelleting Plant Balcas, Enniskillen, Co. Fermanagh
- ✓ 1st Wood Pellet Stove Distributor
- ✓ 1st Wood Pellet Heating in Commercial setting (Laois Sawmills)
- ✓ Pellet Importer – Galtee Fuels Wood Pellet & Briquette Importer- Czech Direct
(Contact REIO for full supplier list)



From left, Mr. Paul Kellett, REIO, Mr. Karl Heinz Lesch, Conness, Austria, supplier of KWB wood pellet boiler, pictured with Dr. Christian Rakos, Austrian Energy Agency, and Mr. Jim McNamara, Laois Sawmills

Bioheat II

The Bioheat Programme is a two-year project funded by the EU Commission, within the Altener Programme dedicated to developing high quality wood heating projects and promoting the benefits of modern wood boilers.

The Irish Wood Heat Market is currently at an embryonic stage of development. Unlike her European counterparts Ireland does not have the same cultural attitude or structures in place where wood usage is concerned. Wood heating is the second largest renewable energy market in the EU. Developing this market will reduce the dependency of the Community on oil and natural gas imports significantly.

Currently just 1% of the Total Primary Energy Requirement in this country is supplied from wood fuel. There is, however, a growing and significant interest in the promotion of biomass heating systems.

The project looks specifically at heating in large buildings and through the course of the programme has devised steps that will contribute to market kick-off in this country.

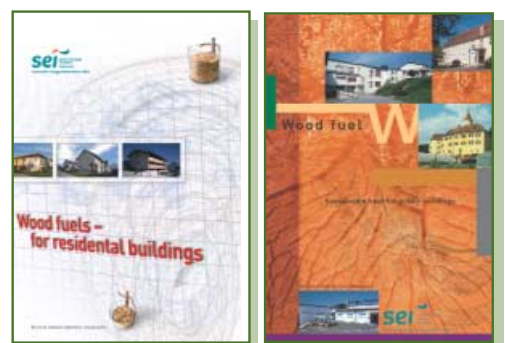
A variety of approaches that include the production and dissemination of brochures, financial support for feasibility studies, part-funded field trips and seminars will be held throughout the project.

For a Bioheat brochure or advice on areas such as availability and costs of wood fuel, service providers, equipment suppliers and pilot projects please contact Ann McCarthy on (023) 29171 or log on to the website; www.bioheat.info.

New Wood Energy Publications from REIO

Copies of REIO's two wood heating brochures :-
(i) Sustainable Heat for Public Buildings and
(ii) Wood Fuels for Residential Buildings, produced as a result of the EU Bioheat project and based on Austrian experiences and practices.

Print and electronic copies can be ordered free of charge from REIO.



REIO Annual Wood Energy Tour 2003

Irish delegates learn how wood energy success in Finland could work in Ireland.

In September 2003, SEI's Renewable Energy Information Office held its annual wood energy study tour in Jyväskylä, Finland. The study group comprised of 20 representatives from agricultural co-ops, the sawmill sector and consultants. The study included attendance at the Bioenergy 2003 conference. Finland boasts 20 million hectares of forest, is home to the largest bio-energy firms in the world, as well as having the world's largest biomass CHP plant. Finland is an outstanding example in the use of renewable energy, 23% of its electricity comes from renewable sources and 20% of its total primary energy supply comes from bioenergy.

The conference programme offered a wide selection of bioenergy topics including bioenergy legislation, strategies, technologies and best practice.

Christian Rakos of the Austrian Energy Agency (EVA) presented on the need for EU legislation on renewable heat. Dr. Rakos claimed that the renewable energy goals of the EU white paper will not be met by renewable electricity alone but renewable heat could make a significant contribution. The heat market is the largest energy market in the EU, larger than electricity or transport fuel markets.

A wide range of mature heating technologies are available: solar thermal, geothermal, ambient heat as well as biomass heating.

Dr. Rakos identified the potential of heating large buildings where investment costs of larger boiler sizes are more competitive. Market penetration is not necessarily determined by economic competitiveness. Other factors such as availability of technology, fuel supply, image and supportive policies lead to dynamic market take-off.

The presentation identified barriers to wood heating market development which included:

- Lack of knowledge of wood heating and technology
- Lack of a developed supply chain
- Poor image of wood as fuel
- Lack of skilled professionals-architects, consultants, installers
- Higher upfront investment costs
- Strong competition from oil and gas companies

The presentation was useful in identifying areas that need to be addressed in the Irish market. A novel presentation from Swedish company, Sweden Power Chippers, introduced mobile pellet production. This involves a small-scale pellet production system,



mounted on a truck. It has a capacity of 250-350kg per hour and produces an 8mm pellet.

This innovation is suitable for small scale production, located at disperse locations. It could work on a partnership basis with small sawmills, joineries and wood workshops.

REIO WOOD ENERGY STUDY TOUR SEPTEMBER 2003 Wood Pellet Production at a Sawmill

The first site visit was to a small sawmill at Keurak. Its annual timber processing produces 50,000 m³ of sawdust and shavings which provide the raw material for 5,000 tonnes of pellets per year.



The two-pellet press, from German manufacturer, Munch, allows a 2,000kg per hour capacity over a 10 hour single shift, managed by one person. The investment cost was €300,000 for the two pellet presses and €55,000 for the pellet mill and cooler.

A 500kW steam boiler is used to produce heat for drying the wet raw material so that the final pellet is dried to 10% moisture content.

The customer base is local and this keeps transport costs low. Its largest customer is a chicken hatchery which runs a 500kW boiler for it's all year round heat demand. This type of wood pellet customer could be readily found in Ireland where indoor animal housing is common.

This visit was followed by a demonstration of 200kW wood pellet burners in action at a hardware retail outlet and an engineering workshop. The pellet burner manufacturer, HT Laser, is a partner in a pellet village project where boiler manufacturers, fuel suppliers, transport companies and installers co-operate to market wood pellet heating systems on a local level.

Pellets sell at €120 /tonne ex factory and compete well with oil. Our final meeting was with VAPO, the main Finnish solid fuel producer. Vapo is one of the largest fuel producers in the world, producing more than 7 million tonnes each year of peat, wood chips, wood briquettes and wood pellets. Janne Nalkki of the VAPO Biotech division gave a short presentation on the company's wood pellet production. Vapo produces 150,000 tonnes of wood pellets. It plans to increase this to 400,000 tonnes in 2004. Currently 85% of pellets are exported. It has 15 wood pellet production facilities in Finland, Estonia and Sweden. Proximity to the raw material is critical in the location of the production site.

Only one of its pellet factories is located at a sawmill, the others take the raw material from multiple sources. The pellet business fits well with Vapo's other business since it has a network of fuel retailers and experience of fuel handling and sales.

VAPO has extended its use of pellets to peat and reed canary grass. VAPO are investing in a 20 MW wood chip power plant to provide heat for its new drying facilities. The availability of dry sawdust is decreasing and VAPO are looking at damp sawdust for pellet production.

VAPO partners with other companies to provide commercial customers with heating contracts as is the case in its 10 year heat contract with a Vocational Education Institute at Tarvaala. Vapo sells pellet heat (2,500 MWh/a (530 t/a)) and is responsible for heat plant investment, supply of pellets, heat production and boiler operation & maintenance. The customer invests in the heat network (pipeline) and pays for heat consumed.

Further information

HT Laser, Pellet burner manufacturer www.htlaser.fi
VAPO, wood pellet producer, www.vapo.fi
Sweden Power Chippers, mobile pelleting plant www.pelletpress.com
See www.sei.ie/reio.htm for
Wood Energy 2003 Conference papers and
<http://www.sei.ie/reio/reiobookshop.html>
Further reading
www.bioenergyinternational.com
www.itebe.org

Local networking - biomass heating entrepreneurship in Finland

Local networking - biomass heating entrepreneurship in Finland

Finland is known for large-scale biomass plants, but nearly 200 small-scale biomass heating plants are operated by entrepreneurs. These plants are either converted from oil to biomass or are new plants. Entrepreneurs are supplying heat mainly for medium-sized industrial buildings, municipal heating, or public buildings such as schools and nursing homes. The heating entrepreneur can be an individual entrepreneur, a co-op, a limited company or a group of companies, who sell heat. The heating enterprise typically operates locally and the main fuel is wood chips or pellets from forestry or sawmill by-products. The heating entrepreneur manages the fuel supply and the heating plant and earns an income per unit of produced heat.

The entrepreneur is paid for generated heat

The entrepreneur is responsible for the heating system as well as the wood fuel supply. The heating entrepreneur produces the fuel or buys it and carries out the heating, operation and maintenance work at the heating plant. The entrepreneur is paid on the basis of the amount of heat generated.

Local wood as a fuel

Output of the biomass boiler varies from 500–5000 kW, the average boiler is 550 kW. The plants are mainly fuelled with forest chips coming from the thinning of young stands and from forest harvesting. Sawmill residues are also used, as well as wood pellets. In 1992 the first three plants started operations, by the end of 2002 there were 175 plants operating on the wood heat entrepreneurship model. Almost 50 of the plants are heating plants with an average output of 1 MWth.

Improving employment in rural areas

1MW=2 jobs

The plants use 300 000 loose-m³ wood fuels annually. The employment effect of the plants is 140 man-years annually. Every megawatt employs two people. Total potential of the plants will be 900 and total output of 300 MWth in 2005. In 2002 a nation-wide project "Heating Entrepreneurship Finland", was started which brings all the actors together. The target is to create 50 new plants annually.

Advantages of Heat Entrepreneurship

- 1) increased use of local labour and creation of new business opportunities in rural areas;
- 2) supply of local raw material for energy and decreased CO₂ emissions;
- 3) increased energy security and supply;
- 4) cost savings in energy production and protection of the environment.

Furthermore, money previously spent on oil now circulates locally promoting local livelihoods. It is estimated that about 45–55 % of the production and transportation costs will be circulated back to the community.

Promoting Heat Entrepreneurship

The Ministry of Agriculture and Forestry and the Ministry of Trade and Industry promote heat entrepreneurship by offering forest improvement grants to support the harvesting of small-size trees from young stands. There are also investment grants for wood fuel harvesting equipment and the establishment of new enterprises. Technology research and follow-up studies of existing sites are funded by government.

The Annual Competition

The annual competition promotes heating entrepreneurship. Among the promoters and organisers of the competition are the Finnish Ministry of Trade and Industry, VTT, Motiva Oy, the Forestry Development Centre Tapio and The Central Union of Agricultural Producers and Forest Owners.

Participants in the competition from 2000 to 2002 included

- 39 heat entrepreneurs;
- The total output of boilers was 26.8 MWth
- Heat generation was close to 69,200 MWh, i.e. equal to heating 35,000 homes
- All plants used forest chips and 7 also used industrial wood residues
- Total wood fuel consumption amounted to 99 700 m³ loose/a
- Reduction in CO₂ emissions was in total 20,600 tons/a
- Average price of heat was €28 per MWh
- Fuel supply employed 228 and the plants 115 part-time workers
- Total annual turnover of the plants was €2.15 million

Besides annual competitions, information material has also been produced, e.g. a brochure of how to establish a co-operative, guidebooks for heat entrepreneurs and wood heating, leaflets of best practice projects. Also training courses and seminars have been organised.

Additional information

Alakangas, E. EUBIONET Biomass Heat Entrepreneurship in Finland, VTT Processes, 2003 (<http://eubionet.vtt.fi>)
Eijja Alakangas, VTT Processes



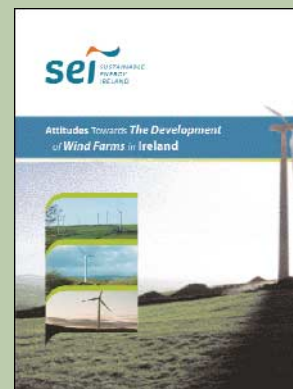
Farmenergi, a company set up by three farmers, manages the wood chip heating for a school. The company produces fuel and designs and installs heating plants

New Tools for Planners, Policy Makers and Developers

Attitudes Towards The Development of Wind Farms in Ireland

Sustainable Energy Ireland have recently completed an innovative series of surveys to identify what the Irish public's attitude to wind farms is and how future energy policy as well as planning and design guidance might be directed. Results of the surveys are presented in detail in SEI's publication entitled *Attitudes Towards The Development of Wind Farms in Ireland* (2003), now available from the Renewable Energy Information Office. It reveals that Irish people are generally positively disposed to the introduction of wind farms but that some concerns do exist which decision makers and developers alike must take into account when considering future projects.

The survey provides realistic insights for planners, policy makers and developers to assist in the planning and deployment of future wind energy projects.



REIO's Solar CD

REIO has recently published its Solar Energy CD-Rom. This CD-Rom compiles a "Best Of" selection of presentations and other information material (papers, leaflets, etc.) emerging from REIO's activities in the field of solar energy over the last three years. The Solar CD will be an invaluable source of knowledge for professionals, decision-makers and students on:

- solar technologies and their application in Ireland and Europe;
- policies, regulations and other measures supporting the development of solar energy;
- tools for the implementation of solar energy in buildings projects.

To order your free copy of REIO's Solar CD, please send an email to renewables@reio.ie with all your contact details and with the mention "Solar CD" in the 'Subject' field. Alternatively, send a fax to 023/29154.

Biomass Co-firing- An Efficient Way to Reduce Greenhouse Gas Emissions

Co-firing or the co-combustion of different fuels, provides one option for emission reduction.

This study promotes biomass as a fossil fuel replacement and reviews the combustion technology, fuel handling and planning implications for power production.

The study was produced by the European Bioenergy Networks (EUBIONET) and is available to download from <http://eubionet.vtt.fi>. Copies may be ordered through SEI REIO. €5 cost includes p&p.



Wind Atlas for Ireland

Accurate wind mapping for the entire country is now available from the Renewable Energy Information Office following the completion of the Wind Atlas for Ireland by ESBI and Truewind Solutions.

The Atlas is presented both in hard copy and as GIS data files depicting mean wind speed and power at heights of 50m, 75m, and 100m above ground level, typical of current and future hub heights for wind turbines.



The maps identify the unconstrained wind resource for the entire country and constrained resources which rule out areas below 7.5m/s (considered technically unfeasibly under current pricing regimes). The constrained resource maps include grid location data, urban areas and water bodies such as lakes and rivers.

It is anticipated that the Wind Atlas for Ireland will be a vital tool as counties designate areas for wind energy deployment for their county development plans. Available on SEI's website and in CD format from the REIO office.

The Renewable Energy Information Office

Planning Update is published by the Renewable Energy Information Office

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