


Wood Energy Market Development through Community Enterprise Models



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Abbreviations

CHP	Combined Heat and Power
CO ₂	Carbon Dioxide
ESCO	Energy Services Company/Contract
kW _e	Kilowatts of electrical power
kW _{th}	Kilowatts of thermal heat
LPG	Liquid Petroleum Gas
MC	Moisture Content
MW _e	Megawatts of electrical power
MWh	Megawatt hour
MW _{th}	Megawatts of thermal heat
ODT	Oven Dried Tonne
SEI	Sustainable Energy Ireland
WDC	Western Development Commission

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What is a community enterprise?

Community enterprise refers to enterprises that are community owned and controlled legal entities, e.g. co-operatives and companies limited by guarantee. Typically these enterprises aim to support their community members to develop new initiatives, manage commercial and social projects, and run local commercial businesses. There is no one form or function that community enterprise takes, rather it is better described as a particular approach and ethos for getting things done with typical core aims being: to create and hold wealth for the community; to create social and economic benefit for the community; to empower and create confidence of members and to provide resources to the community members in order that they may establish their own activities and gain benefit.

SOME EXPLANATIONS

What is biomass energy?

Biomass fuels provide 'bioenergy' and refer to fuel sources such as:

- wastes streams including residues from forestry and related industries
- recycled wood
- agricultural residues and manures
- agrifood effluents
- the organic fraction of municipal solid waste
- separated household waste and sewage sludge
- purpose grown energy crops including short rotation forestry, miscanthus grass, etc

What is a kW or MW?

The kilowatt-hour (kWh) is the amount of energy used by a 1,000 watt appliance in one hour. 1,000 watt-hours = 1 kilowatt-hour (kWh); 1,000 kilowatt-hours = 1 megawatt-hour (MWh). For example a 2.5 kW appliance e.g. electric fire operating for two hours will consume 5 kWh.

Executive Summary

The Western Development Commission and Údarás na Gaeltachta commissioned this study to assess and develop the wood energy enterprise opportunities for community co-operatives in the Western Region and the Gaeltacht area.

The report presents the findings of consultations with 16 community co-operatives undertaken during August and September 2008, and a review of European wood energy markets where community enterprise played a role in market development. The project established that community enterprises have the potential to act as significant drivers of development in the sector.

Wood energy in context

Approximately 3% of Ireland's energy needs are met from renewable energy. The government's *White Paper on Energy* (2007) is based on the three key objectives of security of supply, environmental sustainability and economic competitiveness. The renewable energy sector has a significant role to play in meeting all three objectives. The national energy targets include 12% renewable share in heating sector by 2020 and 30% co-firing in peat stations by 2015.

At present, most renewable energy in the EU is derived from wood fuels and wood also dominates the provision of renewable energy in Ireland, providing 55% of the total. In terms of wood fuel, the Western Region contains a large, sustainable and expanding resource of wood in its large private forest estate, containing 40% of Ireland's forestry. This forestry material has limited existing markets and the emergence of a wood energy market would be beneficial to the forest sector.

Increased local, sustainable energy supply creates new enterprise opportunities for the agriculture and forestry sectors, and generates a range of environmental, economic and social benefits. The economic benefits of the sector are retained in local communities as wood fuel systems are based on local loops of fuel demand and supply. The *WDC Wood Energy Strategy and Action Plan*¹ estimated that if wood fuel supplied 11% of the regional heat market by 2020, this would create over 900 jobs, add €15 million per annum to the regional economy and reduce CO₂ emissions by over 600,000 tonnes per annum.

The wood energy sector presents development opportunities for community enterprises for four reasons.

- The wood energy sector is currently the most widely deployed renewable energy in the EU and Ireland. This is significant as it indicates that the technology and its commercial viability are already well established in other countries. If community enterprises in the Western Region were to develop wood energy projects they would be operating within the trend of EU market growth and developing markets that are already responsive to the technology.
- The policy framework for wood energy is well developed and has established clear and ambitious EU and national targets. This suggests that if community enterprises in the region developed wood energy projects they would be working within a secure and supportive policy framework.
- The Western Region contains an untapped resource of wood fuel in its large private forest estate that could be used as a resource for local energy use.
- The development of the sector would bring significant economic, social and environmental benefits to local communities in the region.

¹ The report *Wood Energy Strategy and Action Plan* is available for download at www.wdc.ie.

Wood energy markets

There are four identifiable wood energy market sectors.

1. Power generation for renewable electricity

Straight power generation from biomass involves very large scale investment and is almost always in the form of using waste streams as the fuel input, although wood can be part of the fuel mix. The community enterprise sector is not suited to develop such large scale projects due to a range of factors, including the high capital costs, financial and technical complexity.

2. Co-firing

Wood fuel can be mixed with peat or coal and used in existing power stations; this is termed co-firing. There would not appear to be any scope for community enterprises to become involved in fuel supply in this area as, typically, the stations will require significantly large volumes that would be challenging for community based developers.

3. Combined Heat and Power (CHP)

CHP remains financially challenging and the limited availability of commercialised technology under 5MW_e is evidence that this sector has not been well developed to date in Ireland. There are some indications that policy and prices are creating opportunities for smaller scale CHP and this may be an area where community enterprises could play a role in the longer term.

4. Wood heating – an opportunity for community enterprise

The supply of woodchip fuel and the installation of technology to commercial/industrial heat users are relevant markets for community enterprises to engage with. The opportunities presented by the wood heat sector are the most appropriate market for community enterprise for five reasons.

- Power generation, CHP and the co-firing market require large scale capital investment, deal with high volumes of wood fuel and are typically complex in terms of technology, financial package and project management. These markets are more suited to large scale developers and energy utilities.
- The commercial/industrial heat market is the **most economically viable market segment** at present, i.e. boilers > 50kW. This market is readily suited to the use of woodchip based heating systems.
- The economic viability of the heat market is based on **local demand and supply loops**; typically woodchip fuel is not transported more than 40km from source to end user.
- The fuel volumes of the commercial/industrial heat market are of a **scale** more suited to local enterprise development where the investment and technical requirements are more readily accessible to community enterprises.
- Woodchip fuel derived from forestry resources is a more readily **accessible fuel stream** for community enterprises and requires moderate levels of investment. Wood pellet production is a more capital intensive production process and typically requires access to sawdust feed stocks.

Community enterprise options

The main opportunities for community enterprise in the wood energy sector are presented below.

A. Support service enterprise

Across the supply chain, community enterprises are positioned to provide a range of support services to assist in the development of the local wood energy sector. These services could include: market awareness actions with potential end users/fuel producers; delivery of training programmes; provision of business development and marketing services to the players along the supply chain. The potential target groups for such support services include: farmers; foresters; hauliers; engineers and plumbers.

B. Wood energy supply opportunities

The wood energy sector presents five enterprise options to communities.

- Community enterprises as wood fuel suppliers: a community enterprise/co-operative could set up a wood fuel production and supply business. Each company or co-operative considering such an idea would need to evaluate the local market opportunities to sell and supply wood fuel, carry out an in-depth feasibility study and progress to a full business plan. The proposal to set up a business to supply wood fuel can act as a catalyst for local demand to emerge.
- Wood fuel supply producer groups: a community enterprise may have the necessary skills and experience to develop a wood fuel supply business. Wood fuel producers' groups have proved an effective model in other areas, e.g. NEWfuels project (www.newfuels.org.uk). Local producer groups can be established with the aim of becoming fuel supply companies. A community enterprise/co-operative can be well placed to establish long term relationships with local private forest owners given their typical links and visibility within local communities.
- Community enterprises as ESCO providers: this model is used in many countries and is currently starting to be more widely used in Ireland. Within Europe there are examples of community enterprises that offer an ESCO contract to energy users who are 'predisposed' to working with a community company, e.g. public sector.
- Community enterprises as district heating entrepreneurs: this is a distinct idea that is somewhat different from a community enterprise/co-operative developing an ESCO. However, it may well encompass the ESCO model. The main idea is that local people would co-operate to supply heat energy to a communal heating plant. The heating plant would probably be developed by a public body such as a county council, to provide heat energy to public buildings.
- Community enterprises as combined heat and power (CHP) entrepreneurs: until recently, CHP projects have not been viable at the regional and local scale that would be relevant to community enterprises. However, the rise in energy prices and the direction of policy support indicates that smaller scale CHP is becoming viable.

Next Steps

Across Europe, community enterprise has been a significant player in the wood energy sector. This project established that there are definite opportunities for and advantages to supporting community based enterprise in the wood energy sector. Community groups and enterprises typically have the required community network and expertise to bring potential wood fuel producers and heat users together, e.g. private forest owners and local industries, and thereby progress the development of wood energy projects.

However, barriers to development were evident, including:

- lack of market awareness, information and confidence
- limited capacity, skills and expertise in market and supply chain development
- limited capacity and expertise of forestry sector to enter the sector, e.g. small plantation size, market access
- limited development of a supportive local policy and regulation framework

Communities will need an appropriate framework of support to realise the enterprise opportunities and enter the wood energy sector. Within Europe, the **public sector** e.g. local authorities, has played a significant role in actively supporting community enterprise. The *WDC Wood Energy Strategy and Action Plan* presents a framework through which to support community enterprise development to progress the wood energy sector.

1.0 Introduction



1.1 Background to report

The WDC and Údarás na Gaeltachta commissioned this project to assess and develop the wood energy enterprise opportunities of community co-operatives in the Gaeltacht area. The project was recommended under the *WDC Wood Energy Strategy and Action Plan*². The project aims were to:

- identify, select, profile and actively engage with community co-operatives in the Gaeltacht area interested in participating in the wood energy sector
- identify the main opportunities and challenges for community ownership and enterprise models in the sector
- inform and advise on how to promote and support community ownership and enterprise models, including producer groups, in the sector

The main opportunities for community enterprises will be to develop wood energy projects to provide energy for their own use or for sale to other users. There may also be opportunities to become involved in wood fuel supply. This study examines these opportunities through consultations with 16 community co-operatives undertaken during August and September 2008, and by review of wood energy markets where community enterprises played a role in market development.

Western Development Commission

The WDC was established as a statutory agency in 1999 and has responsibility for promoting economic and social development in the Western Region defined as the seven western counties of Donegal, Sligo, Leitrim, Roscommon, Mayo, Galway and Clare.

The WDC leads and supports the development of sustainable strategic initiatives in the region by acting as a catalyst and facilitator in the development process. The approach involves establishing a knowledge base for a

² The report *Wood Energy Strategy and Action Plan* is available for download at www.wdc.ie.

sector of activity and then, along with partners, working to develop a strategy and action plan. The WDC is applying this approach to its wood energy development work and this study forms part of a wider set of activities to help promote and develop the sector as detailed in the *Wood Energy Strategy and Action Plan*.

Údarás na Gaeltachta

Údarás na Gaeltachta is the regional authority responsible for the economic, social and cultural development of the Gaeltacht. The overall objective of Údarás na Gaeltachta is to ensure Irish remains the main language of the region and is passed on to future generations.

Údarás encourages investment in the Gaeltacht through a range of incentives for new enterprises, and through support and assistance for existing businesses. Údarás facilitates community co-operatives and community development companies in the Gaeltacht. It also encourages the voluntary organisations, which provide the advice, assistance and financial support, that support these community groups.

1.2 Structure of report

Sections two and three of the report present a review of the wood energy sector and the relevant technologies, market applications, price factors and supply chain issues. This provides the background and context for the consultation process as described in section four. Section four outlines the main findings of the consultation process carried out with the community co-operatives. Section five gives an overview of the potential opportunities for community enterprises, together with relevant examples from other countries. Section six presents a detailed analysis of a district heating system. The main project conclusions are summarised in section seven.

2.0 Wood energy sector

2.1 Wood energy in context

This section provides a brief review of wood energy growth and establishes the context in which community enterprises might be able to develop wood energy projects in Western Ireland. This section briefly reviews renewable energy technologies and how wood energy fits within the sector.

Wood energy is one of the main components of the renewable energy sector worldwide, in Europe and in Ireland and to a lesser extent the Western Region itself. Eurostat³, which records the main renewable technologies and their relative importance in terms of use worldwide, shows that 65.8% of all renewable energy used is derived from biomass and waste. The biomass and waste sector is dominated by the use of wood fuels. Worldwide the next most important renewable energy by use is hydropower at 24%. Geothermal, wind and solar technologies combined, only represent 10.2% of worldwide renewable energy use. Wood energy therefore dominates the worldwide provision of renewable energy.

In terms of the different renewable energy technologies deployed in Ireland the following table⁴ illustrates the role played by each technology (2004 figures).

Technology	Tonnes of oil equivalent
solid biomass	184,000
wind	58,000
hydro	54,000
landfill gas	30,000
biogas	10,000
solar thermal	300
geothermal	51
total	336,351

Biomass fuels provide the majority of the renewable energy used in Ireland, which is approximately 68% of the total. Solid biomass⁵ dominates the provision of renewable energy in Ireland, providing 55% of the total. Wind and hydro are of equal importance and each contribute approximately 15% of the total. Solar thermal and geothermal technologies make virtually no contribution to the total.

In terms of how this energy is converted and used, 192,000 tonnes of oil equivalent is used for heating and 119,000 tonnes of oil equivalent is used to generate electricity. The rest of the energy is lost in transformation⁶. Therefore, the most important source and use of renewable energy in Ireland is wood for heating.

³ Source: Eurostat 2006.

⁴ Data sourced from SEI for 2004.

⁵ Solid biomass is a term for wood energy.

⁶ The process of converting fuels results in energy loss through generation or transmission.

2.2 Policy context

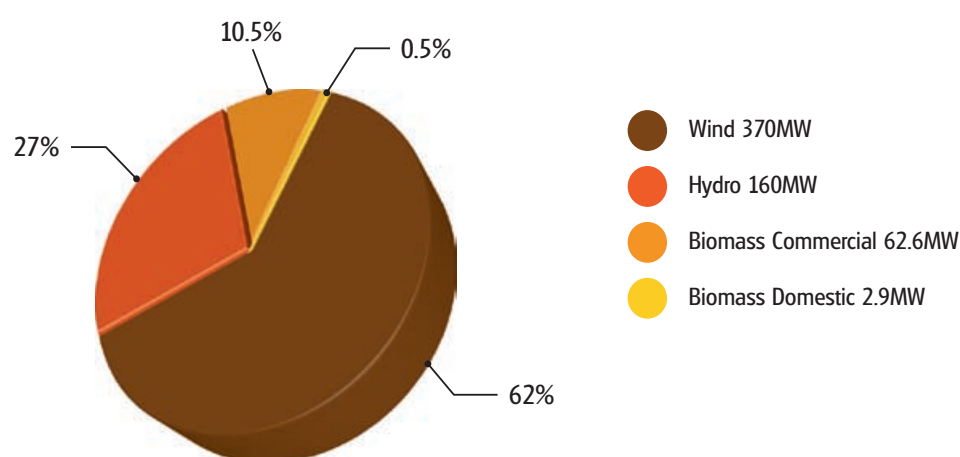
In 2007, the Department of Communications, Energy and Natural Resources published the *White Paper on Energy* and the *Bioenergy Action Plan for Ireland*. These policies highlighted the potential of bioenergy to contribute towards: security of energy supply and fuel diversity objectives; climate change; rural development and renewable energy targets. The *Bioenergy Action Plan* for Ireland established the following national targets (in line with the White Paper):

- 12% renewable share in heating sector by 2020
- 30% co-firing in peat stations by 2015
- 10MWe to 15MWe of biomass CHP (2007 to 2013)

The *Bioenergy Action Plan* does not explicitly state the technologies and fuels that will deliver these targets. Clearly solar and geothermal technologies can provide renewable heat and may experience market growth in Ireland and the Western Region. Currently 96% of the EU's renewable heat is provided by biomass⁷. Based upon the trends of more developed EU markets, biomass fuels will be the main contributor to the national targets going forward.

2.3 Renewable energy in the Western Region

The pie chart below⁸ illustrates the present installed capacity (in MWs) for various renewable technologies (for heat and electricity markets) in the Western Region.



In the Western Region, wind generated renewable electricity dominates the provision of renewable energy and much of this capacity has been developed in recent years in the form of large scale wind farms. Hydro is the second most important sector and this is based upon capacity that has been in place for 50 years or more⁹. Most of the biomass capacity is located in the forest processing sector and small scale commercial heat sector.

It is significant that in the Western Region the use of wind energy is far higher than is the current market situation for Ireland and the EU. Conversely the use of biomass energy is far lower than is the current market situation for Ireland and the EU. This means market development will be from a relatively low base in the region.

⁷ Source: Eurostat.

⁸ Source: Wind Energy: Irish Wind Energy Association, www.iwea.com. Hydro Power: ESB – Generation, www.esb.ie. Micro Hydro La Tene Maps. Biomass project research conducted on behalf of the WDC by the authors. Installers were asked to provide details of units installed and those contracted for installation during 2007. The sawmills and board mills were contacted and asked for details of their biomass plant and fuel usage.

⁹ Ardnacrusha Hydro Scheme - 85MW

2.4 Wood fuel resources of the Western Region

All wood fuel is ultimately derived from the forest resource. The Western Region has 40% of Ireland's forestry with 11.5% of the region's area afforested. The estimated rate of afforestation is 3,000 hectares per annum. There is three times as much forestry per capita than in Ireland as a whole (the region has 18% of national population). The potential wood fuel resource streams include:

- co-products (by-products of the sawmill industry that increase if more wood is produced in forests)
- harvesting residues (currently un-harvested materials of the forestry estate)
- public sector forest resource (166,500 hectares owned and managed by Coillte)
- private sector forest resource (113,400 hectares in multiple private ownership)
- post consumer wood waste (recycled wood)
- purpose grown energy crops (for example fast growing willow trees)

The *Wood Energy Strategy and Action Plan*¹⁰ concluded that for the Western Region, only wood produced from *private sector* forestry and co-products could presently be identified as available and suitable for wood fuel production. This was mainly because the other sources of wood fuel were very limited or the resources they did produce were already being consumed in other markets.

The strategy noted that over the next 20 years the main harvesting activity will be thinning of private sector forestry because the woodlands are young. Traditionally, market opportunities for this harvest have been limited as the price paid by the existing wood markets results in a loss. This material is ideally suited for energy use as it low value and small in diameter (thus suitable for chipping). The production forecast for this material (combined with sawmill co-products) was an **estimated 210,500 tonnes per annum by 2010, rising year-on-year, to an estimated 516,000 tonnes per annum by 2020.**

The principal that underpins these production forecasts is that each year the total amount of biomass in a forest increases as a result of natural growth. This is called the 'annual increment' and the overall annual harvest must equal the overall annual increment. This means the forecast harvest figures are sustainable.

An important issue for the development of wood energy community enterprises is that wood fuel is a low value commodity, disproportionately affected by transport costs. It must be grown and consumed within a restricted geographical distance if it is to be commercially viable.

It can be concluded that wood fuels are locally and sustainably available, growing rapidly and additional to any current market demand and could be supplied into a wood energy market without displacement implications affecting the supply of wood for other markets in the region and beyond.

2.5 Conclusion

There are three main conclusions in regard to the development of wood energy community enterprise.

- The wood energy sector is already the most widely deployed renewable energy worldwide, in the EU and across Ireland. This is significant as it indicates that the technology and its commercial viability are already well established in EU countries. If community enterprises in the Western Region were to develop wood energy projects they would operate within the trend of market growth and developing markets that are already responsive to the technology. The relative lack of development in the Western Region is an additional advantage as it means that undeveloped markets must be available.

¹⁰ The full report *Wood Energy Strategy and Action Plan* is available for download at www.wdc.ie.

- The national policy framework for wood energy is well developed and has established, clear and ambitious, targets. If community enterprises in the region developed wood energy projects they would be working within a secure and supportive policy framework.
- The Western Region contains a sustainable and growing resource of wood fuel in its large private forest estate. This material has limited existing markets and the emergence of a wood energy market would be beneficial to the forest sector and use a local resource for local energy use.

3.0 Wood energy development issues

This section reviews the main wood energy market technologies and provides basic information for assessing the viability and development of wood energy projects. It is intended as an introductory overview of the key issues for the installation of wood fuel systems and the supply of woodchip fuel. The review establishes that the main focus for community enterprises is the commercial/industrial and public sector heat markets, and the supply of woodchip fuel.

3.1 Potential markets

The four market sectors for wood fuel are presented below.

1. Power generation for renewable electricity

Straight power generation from biomass involves very large scale investment and is almost always in the form of using waste streams as the fuel input although wood can be part of the fuel mix. These are commonly referred to as 'waste to energy' projects. Domestic and commercial refuse, animal and food wastes¹¹ are all used as fuel for power generation. Such projects are typically developed by very large companies and energy utilities. The community enterprise sector is typically not suited to develop such large scale projects due to a range of factors including the high capital costs, financial and technical complexity.

2. Combined Heat and Power (CHP)

In conventional electricity generation heat is produced as a by-product and usually released into the atmosphere as a waste. CHP systems channel this extra heat to useful purposes so that usable heat and electricity are generated in a single process. CHP usually involves the burning of fossil fuels, but heat and electricity are also produced from wood biomass (including biogas and waste). Like power generation most CHP projects are large in scale and cost.

Small scale biomass CHP appears to be as yet commercially challenging and the limited availability of commercialised technology under 5MW_e is evidence that this sector has not been well developed to date in Ireland. There are some indications that policy and prices are creating opportunities for smaller scale CHP and this may be an area where community co-operatives could play a role in the longer term.

3. Co-firing

The national target for co-firing biomass fuels in peat fired power stations is set at 30% of fuel input by 2015¹². There are no peat plants in the region. There would not appear to be any scope for community enterprises to become involved in fuel supply in this area as typically the stations will require significantly large volumes that would be challenging for community based developers.

4. Wood heating: an opportunity for community enterprise

The heating of buildings and heat for industry is the largest single use of energy in Ireland. The scale and characteristics of the wood heat market would suggest that it is suitable for community enterprises to engage with for five reasons.

- As explained above, the power generation, CHP and co-firing market require large scale capital investment, deal with high volumes of wood fuel and are typically complex in terms of technology, financial package and project management. These markets are more suited to large scale developers and energy utilities.

¹¹ Often mixed with fossil fuels such as coal.

¹² This target appears to be based upon the technical capacity of the plants to accommodate biomass fuels without significant investment.

- The commercial/industrial heat market is the **most economically viable market segment** at present, i.e. boilers > 50kW. This market is readily suited to the use of woodchip based heating systems. The domestic market using log and pellets is presently not as economically attractive as the commercial/industrial user.
- The economic viability of the heat market is based on **local demand and supply loops**; typically woodchip fuel is not transported more than 40km from source to end user.
- The fuel volumes of the commercial/industrial heat market are of a **scale** more suited to local enterprise development where the investment and technical requirements are more readily accessible to community enterprises.
- Woodchip fuel derived from forestry resources is a more readily **accessible fuel stream** for community enterprises and requires moderate levels of investment. Wood pellet production is a more capital intensive production process and requires access to sawdust feed stocks.

The wood heat market opportunities are focused on in the rest of this report.

3.2 Wood heating technology

Wood fuel heating systems have been developed as an alternative to either oil, liquid petroleum gas (LPG), coal or gas fired heating systems. They can be operated as independent boilers or can be installed in series with fossil fuelled boilers. Most of the boilers are fully controllable and can be seamlessly integrated into existing or new buildings. Wood heating systems are much more expensive to install than fossil heating systems, however they are much cheaper to operate. This means the existing energy bill to be replaced must be large enough to justify the capital investment. Therefore, it would be appropriate for larger heat users such as hospitals, leisure centres, schools, offices, retail, industrial and commercial sites. These users could include residential users where homes are connected to and heated by one central boiler through an underground piping network, i.e. a district heating scheme.

Wood heat technology can be categorised based on the fuel used, scale of heat generated and market application. The main categories are:

- log boilers: domestic and small scale applications with a range of approximately 10kW to 60kW
- pellet central heating boilers: generally for single buildings such as large houses or small offices with some potential to serve mini-district heating systems, with a range of approximately 10kW to 150kW
- woodchip boilers for larger applications: all commercial/industrial and large scale public sector applications in the range of 50kW to 5000kW

These options are discussed in more detail in the following section.

3.2.1 Log boiler systems

The high quality, modern, European-made log boilers are recommended for larger domestic and smaller commercial installations. They produce hot water that circulates round a heat network to the buildings. Log boilers are typically used in conjunction with a heat store tank or accumulator that helps to provide fast response to changing heat demands and reduces fuel use at times of low demand. The most advanced boilers use gasification technology, and have a large log chamber that closely controls combustion by using lambda sensors to monitor flue gas oxygen levels and thereby optimise the supply of combustion air.

Modern log boilers operate in a sophisticated manner, however, logs need to be manually loaded and the boiler lit one to three times a day depending on usage. This does limit their appeal and market share, which is mostly confined to domestic heating applications. Logs, though bulky, are a fuel similar to any other in that they have to be prepared properly for use and, provided this is done, very high levels of performance are normal. Typically,

boilers only work efficiently with logs that are below 25% moisture content. It is vital to have confidence in the quality of the fuel supply, whereby the logs are typically seasoned for at least one year for softwoods and two for hardwoods.

Log boilers can be fully installed for prices starting at approximately €8,000 to €10,000. The most expensive and sophisticated systems may cost €20,000 to €25,000 fully installed. There is presently a SEI grant available for capital costs of installations. In domestic and small scale commercial heat applications the payback on log boilers can be less than five years, and even lower if the user can supply their own logs at low or zero cost.

3.2.2 Pellet systems and fuel

Pellet fired systems are available for domestic and commercial applications. For domestic situations, the level of refinement of the latest generation of boilers means that they can now provide a degree of utility or 'user-friendliness' almost similar to a conventional oil boiler. They usually have sophisticated combustion controls to give high efficiency (>90%) and very clean emissions. Most systems come with automatic ignition and thereby respond to the heating demand without user intervention. Automatic cleaning and de-ashing means minimal maintenance requirements (emptying of the ash bin fortnightly or even monthly and an annual service).

The boilers can be simple 'heaters' blowing hot air into a large space or they can be connected to a hot water tank and provide central heating. The fuel can be manually loaded into the boilers and for the smaller domestic boilers and heaters this is done simply, using pellets supplied typically in 15kg bags.

Larger commercial pellet boilers receive bulk blown deliveries and silos are needed to store the fuel (silos can start in size from 20m³). Overall wood pellet systems tend to be less costly to install than woodchip systems as the pellet storage silos are simpler and smaller than woodchip silos. However, as the fuel is more costly, the paybacks can be less attractive compared to woodchip systems.

Pellet production

Pellets are produced by extruding raw sawdust through a die. The energy produced in the process causes the natural lignin in the wood to melt forming a solid shiny outer coating. Some manufacturers also add starch or other lingo-based materials. To manufacture pellets successfully, the raw sawdust has to have the correct particle size distribution, usually 3 to 5mm. This is achieved by passing the raw material through a hammer mill and recycling the heavier fractions. Pellets can be manufactured from wood sources, including:

- virgin sawdust from the core of trees or from processing untreated timber
- whole tree chippings, including bark
- recycled wood
- other biomass material, including straw, coppiced wood, and other recycled material

Generally, however, most pellets are manufactured direct from sawdust produced as a by-product of the sawmilling industry. Pellets have less than 10% moisture content and contain more energy per tonne than woodchips or logs. They are more expensive to produce than woodchips and therefore the delivered energy cost is greater than woodchips.

The successful production and supply of pellets is a large capital intensive operation requiring ideally the supply of sawdust from the sawmilling sector. These issues may preclude direct community enterprise involvement in the production of pellets.

3.2.3 Woodchip systems

Woodchip systems are expensive to install compared to fossil fuel boilers. For example, a 500kW oil fired system costs an estimated €30,000 to install, whereas a similar sized wood system could potentially cost over €200,000 to install¹³. The low cost of wood fuel compared to fossil fuels can justify this high investment. Therefore, installations are typically commercial viable for large heat users such as:

- large hotels
- care homes
- hospitals
- leisure centres
- secondary schools
- shopping centres
- airports
- commercial glasshouses
- cement and chemical works
- large offices

In these markets woodchip systems can have paybacks as low as two years and currently typical paybacks are in the range of three to four years.

System components

A typical woodchip energy system comprises a boiler, accumulator tank, controls and a fuel store containing a mechanical device, usually a stirrer, to move the chips to the feed auger. The woodchips are conveyed to the boiler by the auger completely automatically. The larger the fuel store, the less reloading is involved and a fully automated system would typically need a fuel store of at least twice the size of the delivery vehicle (delivery sizes typically range from approximately six to 20 tonnes). This will give the fuel supplier reasonable flexibility in timing of fuel deliveries and ensures the supplier can deliver full loads. Automated woodchip boilers are generally only available in sizes >40kW, i.e. most applications are in the commercial and public sector heat sectors.

Woodchip systems up to approximately 500kW can be purchased pre-fabricated and fully installed in shipping containers. They come with all the components and include a fuel silo. All that is required is that they are placed onto a concrete plinth, plumbed up and connected with mains power. Such systems tend to be less expensive than those constructed on site as most of the works can be completed in factory conditions. However, they do not provide the optimum solution in terms of the fuel silo as fuel must be dropped into the silo from above and this must be achieved by a blower, conveyor, clam-grab arm or other arrangement. This is time consuming and less efficient than direct tipping of fuel into an underground silo.

Sizing a boiler – heat load

Well specified woodchip systems will operate automatically and with the same degree of usability as fossil fuel boilers. However, because they use a solid fuel, their operation and design are slightly different to oil or gas systems. Fossil fuel boilers can respond quickly to changes in demand for heating. Wood boilers cannot reach full output quickly and operate less efficiently if the heating load has frequent peaks and troughs, i.e. frequent swings between high and low heat demand. If woodchip boilers operate less efficiently, due to a variable load, they will use more wood fuel, reducing the operational costs saved by switching fuels.

¹³ A 500kW woodchip boiler will cost approximately €80,000 to €100,000. The rest of the installed cost relates to the fuel storage, extraction system and associated mechanical services works.

To overcome the factor of variable loads, woodchip boilers are fitted with a large hot water storage tank. This allows the wood boiler to charge the hot water tank and provide hot water to smooth the load on the boiler. This has the further advantage of allowing the sizing of the wood boiler to be based on the average annual heat load and not the peak load, i.e. maximum heat demand possible. This means the boiler will be smaller and less expensive to install. This characteristic of woodchip boilers means that buildings with high, stable heat loads, e.g. swimming pools, tend to show a quicker return on the investment.

Types of boilers and fuel characteristics

There is a wide variety of wood boilers on the market¹⁴. Most are fully automated and have sophisticated controls. Specifying the correct mix of features and selecting the best supplier is a specialist task. In principal there are two basic choices: an underfed hearth system and a moving grate system.

Underfed hearth systems tend to be smaller and less expensive. They can only use wood fuel up to 35% moisture content as there is no system of pre-drying prior to combustion. For most systems under approximately 500kW it is usually more cost effective to select underfed hearth boilers.

Moving grate designs shunt wood fuel along the combustion chamber and allow it to be dried prior to combustion. This means the boilers are larger and more expensive. However this allows the use of 'wet' fuels up to 55% moisture content in some cases. It is important to investigate the availability of fuels locally before selecting a system. Moving grate designs allow greater choice of fuel suppliers but this comes at a higher capital cost.

3.3 Woodchip production costs and price comparisons

Wood energy projects are commercially viable because the price of wood fuel is lower than fossil fuels.

Production costs

The price of wood fuel is based on a series of costs. These comprise: the costs of harvesting, chipping, haulage and the need for forest owners and contractors, involved in harvesting and chipping, to secure a reasonable profit. The following range of prices for pulpwood would allow the first thinning to be undertaken on a commercially attractive basis in the region.

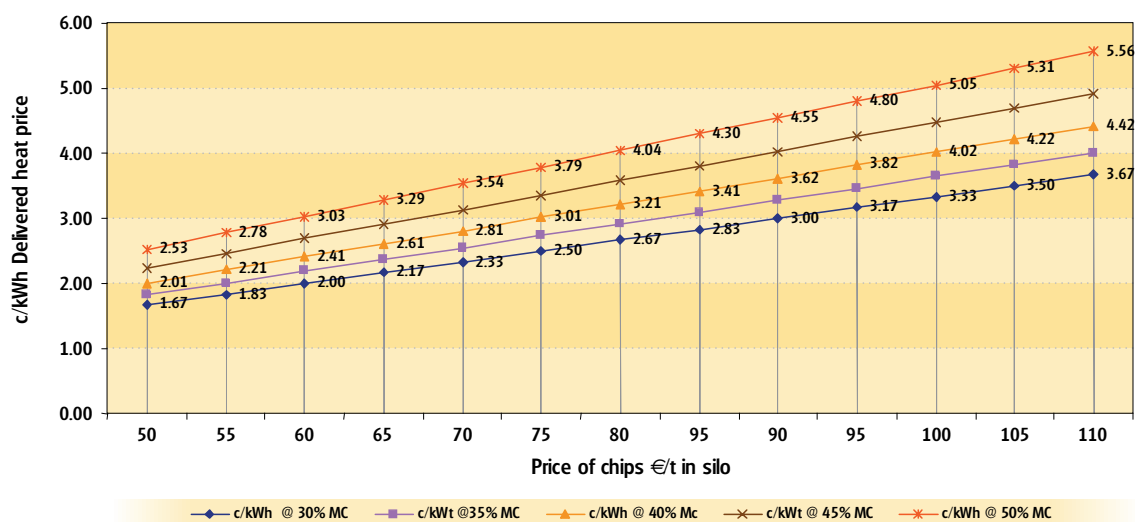
price to grower	= €1.5 to €5 per tonne at 50% MC
harvesting costs	= €23 to €34 per tonne at 50% MC
haulage to wood fuel process depot	= €6 to €10 per tonne at 50% MC
chipping into energy fuel	= €7 to €10 per tonne at 50% MC
haulage to boiler	= €6 to €10 per tonne at 50% MC
overheads and admin costs	= €8 to €10 per tonne at 50% MC

Overall it is possible to conclude that a price for delivered woodchip fuel in the range of €51.50 to €79.00 per tonne would make it commercially viable to undertake harvesting¹⁵. The actual price of delivered woodchip fuel would always need to be estimated on a case-by-case basis. The specification of the required fuel, the volumes required, the term of the supply contract and the delivery distance will all have significant impacts on the actual contract price.

¹⁴ Lists of installers are available on such websites as www.sei.ie, www.ccwep.ie.

¹⁵ These price estimates were based on market conditions in September 2008.

In terms of the selling price, moisture content of woodchip is a critical factor. The drier the wood fuel the greater its energy content. The following table illustrates the cost of heat for differing wood fuel moisture contents at differing prices per tonne of woodchips¹⁶.



As moisture content is a key factor, the purchase of woodchips is typically based on what is termed 'oven dried tonne' (ODT). This means that fuel is purchased based on its energy content. For instance, one tonne of woodchips at 60% moisture content contains much less energy than one tonne of woodchips at 30% moisture content. Therefore, and as shown by the table above, the lower the moisture content, the higher the energy content and the higher the price. While woodchip fuel will always have some level of moisture, fuel buyers agree to a woodchip fuel price based upon the weight of fuel as if it was being supplied with no moisture content, i.e. ODT.

Market prices

A further price factor is the cost of competing fuels. The table below shows the prices of different fuels¹⁷.

Comparative fuel costs 2007 Fossil fuel prices: Fuel Cost Analysis Report by Enercomm International Consultants Ltd. for WDC (October 2007)	
Fuel	Cost of delivered heat in cent/kWh
electricity	6.8 to 14 cent
LPG	7.8 to 8 cent
oil at 54 cents litre	5.3 cent
gas	3.4 to 4.6 cent
wood at €55.5/tonne	2.8 cent
wood at €75/tonne	3.8 cent
wood (typical market price)	3.2 cent

¹⁶ The analysis is based on market information compiled by DARE Ltd from tenders during 2007 and 2008.

¹⁷ This table is based upon the *Fuel Cost Analysis Report* by Enercomm International Consultants Ltd for WDC, October 2007. The prices shown are based upon commercial and industrial purchasers of oil, gas, LPG and electricity. It is likely that the price for smaller commercial and domestic energy users will be higher.

During 2007 and 2008 there have been significant increases in oil and gas prices. For a reasonably large oil user in County Kerry, with oil delivered in bulk, the following price rises were experienced¹⁸:

- end of 2005 – 47 cent per litre
- end of 2006 – 50 cent per litre
- end of 2007 – 60 cent per litre
- spring 2008 – 70 cent per litre
- summer 2008 – 80 cent per litre
- late summer 2008 – 65 cent per litre

There are some commentators that suggest we may see a lower oil price driven by recession over the next few years. However, OPEC proposes to reduce output to increase prices and other commentators suggest we will see rises in the oil price. Overall it is widely agreed we will see a decline in the availability of oil and gas as readily available fields are exhausted (further information is available at www.peakoil.net). If demand falls due to recession this may have a short term impact on prices, however, over the medium and long term the economic advantages of oil over wood for heating will almost certainly remain.

For a community enterprise seeking to enter the wood energy market, volatility in the oil price does not necessarily create an exact market impact. Some energy users will be attracted to the price stability afforded by wood fuels; however, some energy users may feel unable to invest in wood energy until they feel they can predict the longer term cost of staying with oil (as this affects the payback they would achieve).

Ultimately however, if the price of oil heating is high, the market for wood energy will be strong. Higher oil prices do create better conditions for a community enterprise entering the market as a supplier of fuel or equipment.

3.4 Fuel supply options

There are three basic models for the production and sale of wood fuels. These are the options to consider when reviewing potential community enterprises in the wood energy sector.

1. A simple woodchip supply contract

In this model the customer owns and maintains the wood fired boiler plant and purchases wood fuel similar to how they would purchase oil. As described earlier, woodchips are bought by per oven dried tonne (ODT) at a fixed price per ODT. The fuel would need to comply with the boiler's warranties in terms of chip dimensions, moisture content and being free from contamination. Generally, wood fuel purchasers seek supply contracts where the supplier delivers fuel to an agreed price per ODT over a 12 to 36 month period. Presently the market seems able to offer a fuel index of approximately 4% to 5% per annum over a typical three year supply contract.

2. A wood heat supply agreement

In this model, the customer owns and maintains the wood fired boiler plant and a wood heat supplier provides the fuel. In this case, the customer pays for heat used (heat tariff in € per kWh is measured at the heat meter). In some cases there is also a standing charge for the fuel supplier to maintain the plant.

This model can be varied to suit the customers' needs in regard to the term of the contract and the extent to which maintenance is carried out. Typically one to three year deals are offered and this appears to be the most attractive option for both suppliers and users. For energy users, the main advantage is that the purchase of fuel is simplified as they see what they are paying for, the energy used, and avoid the need to monitor the volume, weight and moisture content of the fuel loads. For suppliers, it creates an incentive to deliver good quality and

¹⁸ Figures are based on a project carried out by consultants during 2008.

consistent fuel, as this maximises the energy the fuel provides through the boiler. It also gives the supplier the choice of how to prepare and deliver their fuel.

3. An Energy Services Contract (ESCO)

This model is different from the two other options as the fuel supplier also supplies the woodchip boiler. The supplier finances, owns and operates a wood fuel boiler plant on behalf of the energy customer. There is a higher heat tariff (or a separate fixed finance charge) to allow for payback of the capital cost of the boiler plant. In this model, the customer avoids any upfront capital cost. This model typically suits customers who cannot finance the heating plant and where operational savings are a lower priority. This model requires great confidence on behalf of the supplier that the wood heat customer is reliable, long term and will still be purchasing heat in five to 10 years.

3.5 Issues in fuel supply

This section highlights the key issues to consider at each stage in the supply chain and identifies the main equipment and infrastructural requirements. Section 3.3 outlined the current price structure at each of these stages in the supply chain.

The fuel supply chain involves a process of:

- harvesting round wood from woodlands
- storage and drying of round wood
- chipping
- delivery

It is critical to state that wood fuel quality and standards underpin each stage in the process¹⁹. This is a specialist area of expertise in the wood energy sector and fuel suppliers must design and implement processes to best suit their particular conditions and markets. A woodchip fuel supply process operated by a community enterprise must be capable of producing the high standard of woodchip fuel required for small to medium scale woodchip heating systems.

3.5.1 Harvesting, chipping and ancillary equipment

Firstly, a wood fuel production and supply business requires investment to provide a drying shed. Secondly, a detailed business plan is required to organise a series of sub-contractors to undertake the main elements of the supply chain: harvesting, chipping and the delivery of woodchips. If the business expands and the economies of scale allow, then chipping and delivery equipment can be purchased. At set-up phase the main requirement is a dry ventilated shed. A fuel supplier can hire equipment and contractors to minimise the initial capital investment.

Forest harvesting is carried out by specialist contractors on behalf of forest owners. Private forest owners can sell the timber into a number of markets, including pulpwood, thinnings, sawlog, palletwood and stakewood. As noted in Section 2, woodchip fuel is generally produced from the low value small diameter wood by processing it in a purpose made fuel woodchipper and selling it to local energy customers. Any dead standing timber or seasoned windblown material sourced during forestry operations can also be used in the woodchip supply chain.

Key factors affecting the economic viability of carrying out harvesting operations include the market price available for timber and the plantation size. A local wood energy market avoids transport of wood to distant markets, and if forest owners work together to bring smaller plantations into clusters, the costs of harvesting and production can be reduced.

¹⁹ Additional information on wood fuel standards and specifications is available at www.woodenergy.ie.

The fuel production process requires a high output chipper capable of screening to the appropriate particle size. Initially it is viable for a supplier to hire a contractor to chip at periodic intervals. The cost of contract chipping depends on a number of factors, including: the volume of logs to be chipped, access to the logs and the size of the chipper. Currently, costs range from €8 to €12 per tonne of chips based on an eight hour hire. For example, a chipper can be hired in and produce 150 tonnes of chips per day. This means a business producing 1,500 tonnes of woodchip per year could hire a chipper for 10 days a year. A chipper of the required specifications (namely sufficient output, in-feed diameter, consistent chipping quality and screening ability) has an estimated cost of €75,000, including engine and crane feed.

The critical operating capacity for a woodchip storage facility/depot is approximately 5,000 tonnes per annum. At this scale of operation, typically a tele-handler with front end loader, or equivalent machinery, is required permanently onsite for the handling of the fuel in the shed and the loading of delivery vehicles, etc.

3.5.2 Drying methods²⁰

Generally, the required moisture content of the woodchip fuel can be achieved by air drying timber in anticipation of chipping. A planned programme of sourcing and stacking wood fuel in advance will ensure a continual supply of seasoned woodchip fuel. Ideally logs must be down to 35% moisture content before chipping and this can take between 12 and 18 months to achieve. The drying process used will aim to minimise the labour and energy input required.

In the drying process, round logs are usually hauled to and stacked outside a wood fuel depot. The log piles are then covered with a reinforced paper or other appropriate material to prevent rain wetting the logs. The logs are stored in the round until the required moisture content is achieved. There are a range of storage methods possible. The fuel supplier must research and implement the optimum method based on the characteristics of the depot site, facility and fuel standards required for the market.

Typically, small to medium scale boiler systems accept moisture content of between 25% and 35%, with some larger commercial boilers being able to tolerate moisture content of 50%. A typical production target is a maximum of 35% and an average of 30%, ensuring that as wide a range of boilers as possible can be supplied.

3.5.3 Monitoring and grading equipment

Suppliers of woodchips must be able to demonstrate that the woodchips supplied meet the standards set by the boiler manufacturers. To provide a fuel quality guarantee to the market, monitoring of the drying timber is necessary. The following equipment is required:

- round wood moisture meter: to determine and monitor the moisture content of round logs during the drying process prior to chipping
- woodchip moisture meter: to measure and record the moisture content of woodchips at the time of delivery. (This meter can be linked to a printer and/or downloaded to a software package that can then be used for invoicing. It provides a hardcopy record of the moisture content for both supplier and end user.)
- woodchip grader: to monitor the particle size of the chips and ensure that the chips comply with the boiler requirements. (Sampling is used to ensure that the contractor is chipping to the correct standard at the time of chipping.)

²⁰ More information is available at www.woodenergy.ie and www.coford.ie.

3.5.4 Fuel storage and yard

A large, well ventilated dry shed is required by a fuel supplier. Fuel storage issues are similar for both the fuel supplier's depot and large commercial users. Factors to consider in the design and operation of a depot include: maintaining moisture content and quality of fuel; fuel handling and transportation issues; inventory and delivery patterns; and the prevention of overheating/corruption/damage of the fuel. Each fuel supplier must design a storage facility based on such issues as the depot site, fuel quality and fuel volumes delivered. Specialist expertise and assessment is necessary to design effective, efficient facilities.

For example, a commercial heat user's storage sheds are approximately 15 metres by 30 metres with partial block side walls to a height of two metres. Storage sheds are generally enclosed by a weatherproof screen that can be opened to enable the chips to be blown directly from the timber pile into the shed, thus reducing the handling costs and allow for ventilation. The gables should be fitted with doors of sufficient size to allow access for loaders and trailers. The shed should have a storage capacity of approximately 1,500m³ loose volume (approximately 400 tonnes of woodchips at 35% moisture content). At this moisture content the woodchips must be stored to a depth not exceeding 3.5 metres to prevent heating.

To enable indoor loading during wet weather an area of 150m² should be kept clear of woodchips to allow a loader and trailer access to the shed. This would reduce the storage capacity of the shed to approximately 275 tonnes of woodchip and also allow the woodchips to be turned should heating be detected.

3.5.5 Delivery of fuel

The method of delivery of the woodchip fuel to the customers will be determined by the nature of onsite storage and reception system available. The most simple and efficient means of delivery is to bulk tip the fuel into an underground woodchip storage bunker, as this may be carried out by a standard bulk tipper. However, the difficulty with this system is the increased cost to the client for installation of the underground bunker.

For above-ground storage silos, where gravity filling is not possible, alternative means of delivery include: bulk bagged delivery using a vehicle with a crane, loading with a clam-grab bucket or using a woodchip blower vehicle.

Delivering the woodchip fuel in bulk bags involves using a standard flatbed lorry with a crane, which may be co-opted for other uses, however, the significant increased handling and equipment required for bagging the fuel, and loading and unloading the delivery vehicle will impact on the delivered cost of fuel to the client.

The decision on how to plan and achieve delivery of woodchips to boilers must be based on specification of actual contracts. It is viable to contract hire haulage vehicles at the start of a business.

3.6 Overview of the supply chain

Supply Chain Stages ~ Some issues to consider

Harvesting

- generally a fuel supplier would purchase round wood from an existing forestry company/owners
- specialist contractors carry out the harvesting
- no equipment is required
- suppliers to manage buying and market prices
- must ensure a sustainable availability of round wood
- drying process is critical as harvested logs can be 60% wet

Round wood storage

- a large yard is required to stockpile round wood
- need access to a tractor and forwarding trailer to move and handle stockpiled logs
- estimated cost of equipment (new) is tractor €75,000 and trailer €20,000
- drying and monitoring process are critical, equipment is required
- basic manual handling and ability to operate a tractor is needed
- as the scale of production may grow over time, space to expand must be considered

Chipping

- chipping can be carried out by a contractor. Currently costs are in the range of €8 to €12 per tonne of chips based on an eight hour hire
- estimated cost of a chipper is €75,000
- ideally logs must be down to 35% moisture content, which can take from 12 to 18 months, before chipping

Chip storage

- a tractor and bucket is required to move and load chipped fuel from the shed into delivery wagons
- a large ventilated dry shed is required for storage
- basic manual handling and ability to operate a tractor is needed

Haulage/delivery

- generally a fuel supplier contracts a haulage firm to deliver woodchips
- woodchips are normally delivered in loads of 6 to 7.5 tonnes using a tractor and modified grain trailer
- loads are either tipped directly into underground silos or into a reception bin from where the chips are either conveyed or blown into above-ground silos
- for large deliveries articulated trucks with curtain-siders equipped with walking floors are used
- supplier must be effective business manager with awareness of market prices
- investment in delivery wagon is dependent upon the volume of sales

4.0 Community consultations

4.1 Introduction

This section describes the consultative process undertaken with the community co-operatives in the Gaeltacht to determine their capacity and opportunities to participate in the wood energy sector. The process consists of four steps:

1. design and circulation of a project introduction and questionnaire to a targeted group of co-operatives (see Appendix 1)
2. an information evening with presentations and discussions with community enterprises
3. face-to-face interviews with selected co-operatives
4. a written assessment for each client in the context of participating in the wood energy market

4.2 Methodology

During June 2008, a questionnaire was prepared by the consultants and circulated to the community co-operatives by Údarás na Gaeltachta. The purpose of the questionnaire was to determine the level of interest of the co-operatives in becoming involved in the wood energy sector. The completed questionnaire provided the baseline information that informed the next stage of the process.

An information session was also held in the Claregalway Hotel on 19th June, 2008. The format for the session consisted of an introductory talk by Údarás na Gaeltachta, presentations on wood energy sector by the project consultants, followed by a Q&A session. The purpose of the session was to provide background information about the project to interested co-operative members, meet the clients face-to-face and answer any questions that arose in the completion of the circulated questionnaires.

The session was well attended with approximately 25 representatives from co-operatives. A total of 12 completed questionnaires were submitted. These were assessed by the consultants and Údarás na Gaeltachta representatives. Ten co-operatives were selected on the basis of their capacity and potential opportunities to be involved in the wood energy sector. It was agreed to combine Comhlacht Forbartha an Spidéil Teo., Comharchumann Shailearna Teo and Tearmann Éanna Teo., as one grouping, and Comharchumann Forbartha an Leith-Triuigh Teo. and Comharchumann Forbartha Chorca Dhuibhne Teo., as another, due to their proximity and possible limited resources. This gave a final selection of seven groupings involving 10 co-operatives.

During July, August and September 2008, the consultants met with the representatives of these 10 co-operatives. These sessions ranged from 20 minutes in length to two hours depending on the interest of the co-operative in being part of the process and the resources available to them. The purpose of the interviews was to gather in-depth information with regard to:

- the co-operatives activities and future plans
- the clients expertise in project development
- the human, structural and financial resources available to the co-operatives

The key purpose was to assess the potential of the co-operatives to become involved in wood energy opportunities and structures. In several cases the interviews took on the format of information workshops as the co-operative personnel were generally unfamiliar with the wood energy sector, its process and economics.

Appendix 3 lists the co-operatives who returned questionnaires and Appendix 4 outlines the main results and findings for each of the in-depth interviews with the 10 co-operatives.

4.3 Main findings

Three co-operatives did not at that time possess the opportunities or resources to be involved in a wood energy development chain either as end users or supply chain operators. These co-operatives were:

- Comharchumann Shailearna Teo.
- Comharchumann Forbartha Ghaoth Dobhair
- Comharchumann Forbartha Chorca Dhuibhne Teo.

Comharchumann Shailearna Teo. already has a renewable energy system installed in its premises (heat pump) and had little interest in being an end user for wood energy. Comharchumann Forbartha Ghaoth Dobhair lack space on site for the installation of a fuel silo. There was no current potential for these groups to be involved in the supply chain for wood energy, due to their current focus of activities and a lack of wood supply in the area around Gweedore and Ballyferriter. However, the planned development by NUI Galway and Údarás na Gaeltachta in Ballyferriter may be a potential end user, but this planning does not directly involve Comharchumann Forbartha Chorca Dhuibhne Teo.

The remaining seven groups are divided into potential end users and potential supply chain operators.

Potential wood supply chain operators

1. Lar Chomhairle Páiríste Ghleann Cholm Cille Teo. had a strong human resource element and a proven track record in project development. They were eager to go forward and have been exploring the possibilities for the development of a woodchipping yard in their area. They are well positioned in terms of possible end users within Glencolmcille and Killybegs.
2. Comharchumann Dhúiche Sheoigeach Corr na Móna was well placed for the development of both a wood supply and an installation/service business, in terms of wood resource, structural resources and human resources, however, they lacked financial resources.
3. Comharchumann Forbartha an Leith-Tríúigh Teo. demonstrated strong human resources and the ability to plan, manage and develop projects to a successful commercial end. However the wood supply resource was limited due to high elevations and poor ground conditions in that area.

The co-operative that demonstrated the potential for access to high volumes of timber was Comharchumann Dhúiche Sheoigeach, Corr na Mona in co-operation with EEC Teo. The timber supplies available to Comharchumann Forbartha an Leith-Tríúigh Teo in Kerry and Lar Chomhairle Páiríste Ghleann Cholm Cille Teo in Donegal from the private sector were limited due to ground conditions and site exposure in the area available. Therefore the supplies from private sector woodlands were not at that time, and are still not, large enough to support a woodchipping enterprise. Further research into the availability of timber from the public sector is required before either of these co-operatives could proceed with development of a chipping enterprise. Potential to develop a wood supply chain will also be dependent on the location of a chipping yard/depot as this will dictate distance to market and end users.

Potential end users

1. Comhlacht Forbartha Aitiuil Acla Teo. had some limited potential to be end users and providers of skills training. The planned building programme at Bunnacurry provides the opportunity to explore the possibilities for the installation of a woodchip boiler to heat the buildings. A district heating system would be the best suited option, but if a biomass system is to be installed it would have to run on wood pellets until a future woodchip supply emerges. Due to the insufficiency of a local wood supply and the distance from existing markets, this co-operative had no foreseeable role in the supply chain.

2. The premises of Forbairt na Dromoda Teo. had a constant load all year round. The existence of a local chipping contractor in Caherciveen (Kerry Wood Energy Project) and a potential local wood supply supports the possibility of the installation of a district heating system for this community organisation.
3. Tearmann Éanna Teo. had a cluster of buildings that may be suitable for the installation of a district heating system. The final section of this report provides a worked business example for a district heating scheme based on similar specifications.
4. Comhlacht Forbartha an Spidéil Teoranta could be a potential end user **if** a biomass system is installed in the planned Aras an Phiarsaigh.

The highest potential for developing a 'local loop' of woodchip supply and use was identified for three clusters in:

- Donegal (Glencolmcille)
- Galway (Corr na Mona Termann Éanna, Spidéal)
- Kerry (Brandon)

The capacity to realise potential enterprises was limited by the lack of knowledge and expertise of the co-operatives on how the wood energy market operates and the requirements necessary to develop a wood energy business and financial resources.

4.4 Main conclusions

This section details the issues that community enterprises must consider in regard to wood energy projects based on the experience with the community co-operatives in the Gaeltacht area. The consultation process demonstrated that there are four main areas in which the community co-operatives can participate in the wood fuel sector, namely:

- fuel supply of woodchips
- consumers of heat
- support services such as provision of training, market promotion
- developers of ESCO or district heating schemes

The characteristics of community co-operatives best positioned to enter the sector are outlined below.

In terms of the **supply side** they should have four main characteristics.

- Access to a sustainable supply of raw material, i.e. pulpwood, within a catchment area of approximately 45km. If this distance is exceeded, the costs of haulage will reduce the profitability of the enterprise. The size of the supply required is dependent on the anticipated market demand. Experience has shown that a minimum annual demand of approximately 3,000 tonnes of conditioned woodchips is required to sustain a woodchip business and that this demand can be built up over a period of time. To meet this annual demand the enterprise must have access to between 150ha and 225ha of forestry thinnings annually.
- The second element that must be available to the community organisation is suitable harvesting equipment and haulage trucks for delivering round logs and woodchips. This is available to Comharchumann Dhúiche Sheoigeach Corr na Mona through their links with the sawmills EEC Teo.
- The third critical element in the supply chain is access to a storage yard and drying sheds. An area of approximately 0.5ha is required so that fresh timber can be hauled in and stacked during the drying process, which may take up to 18 months depending on required moisture content of the woodchips. A storage shed capable of storing a minimum of three to four weeks' chips is required. It is now common practice to carry out the chipping by contract, i.e. a chipper is brought to the storage yard for a day to fill the storage shed.

Comharchumann Dhúiche Sheoigeach, Corr na Mona have identified a suitable site.

- Access to working capital is required to build sufficient pulpwood stocks. The chipping enterprise must be able to demonstrate to an end user that it has sufficient stocks to meet current demand and access to standing timber to meet demand in later years. Based on the prices in this report, the working capital requirement for 1,000 tonnes of round logs to set up a storage yard would be in the region of €38,000, which would have to be financed for a period of up to 18 months while the timber dries.

In terms of **end users** they should have two main characteristics.

- There must be sufficient potential and opportunities to develop a woodchip based heat market within the community organisation's catchment area. These opportunities can be the co-operatives' own buildings, leased buildings or third party buildings. It is critical that any potential building has sufficient space to construct the boiler and silo, and ideally should have a steady heat demand. Examples of such potential projects are the district heating scheme detailed later in this report.
- As with any new business, the key players and staff must be open to new ideas and possibilities. The management board must identify the business opportunities best suited to them and potential partners with requirements that can be met. During this study, the potential for Comharchumann Dhúiche Sheoigeach, Corr na Mona as suppliers and Tearmann Eanna as end users has been identified.

In terms of the provision of **training and promotion** they should have the following characteristic.

- If local employment is to benefit, foresters, farmers, plumbers and engineers will need training in wood based biomass supply methods and technologies. Specifying, installing and maintaining wood burning systems is a specialised skill and requires training. Many of the co-operatives interviewed felt that they could deliver such training programmes. The availability of suitably qualified, locally based fitters and engineers would be a confidence building measure for potential end users.

5.0 Community enterprise models

5.1 Introduction

The main aim of the project consultation process was to assess the wood energy enterprise opportunities of community co-operatives in the Gaeltacht area. The consultants carried out a review of the experience of EU markets to identify relevant projects to further inform on potential community enterprises. The section includes examples of projects that illustrate the potential opportunities open to communities in the Western Region, and indeed nationally.

Based on the consultations and review, a range of options were identified that have relevance to the Gaeltacht area, communities across the Western Region and nationally. The main supply chain enterprise opportunities identified were:

- 1. community enterprises as wood fuel suppliers**
- 2. community enterprises as wood fuel producer groups**
- 3. community enterprises as ESCO providers**
- 4. community enterprises as district heating entrepreneurs**
- 5. community enterprises as CHP entrepreneurs**

These opportunities are the general options that any community can use to examine the potential of a wood energy supply or installation project in their locality. In addition, community groups are positioned to provide a range of support services to assist in the development of the local wood energy sector, e.g. market awareness initiatives, provision of business development services, delivery of industry training. These options are explored in the following section.

5.2 Community enterprises as wood fuel suppliers

A community enterprise could set up a wood fuel production and supply business. Each enterprise considering such a proposal would need to carefully evaluate the local market opportunities to sell and supply wood fuel. It is common that the proposal to set up a business to supply wood fuel can act as a catalyst for local demand to emerge.

Section 3 outlined the main issues associated with the wood fuel supply and production. A community enterprise must examine these issues in the context of their own circumstances when developing a project proposal.

As proposed in this report the most appropriate target market for community enterprise is woodchip fuel supplied to the heating market, i.e. small to medium scale woodchip heating systems for large single buildings, district heating schemes and industrial applications in the region of 60kW to 1MW.

5.2.1 Example of co-operative wood fuel supply: NEWFuels

Section 3 detailed the scope of work required to establish a wood fuel supply chain business. A community enterprise, and the individuals that make it up, may well have some of the range of skills and experience to develop a wood fuel supply business. However, the development of a new business to produce and sell wood fuel is a challenging and relatively risky process. This process can be made less risky and more widely encouraged through the establishment of a wood fuel producer group. A producer group allows suppliers on a regional basis to co-operate; equipment and skills can be shared when needed. Such a group provides confidence to purchasers that there is a *network* of suppliers so they know that if one supplier fails they can turn to others in the producer group.

An example of this is being evolved in the North East of England. This project is of relevance because it addresses the barriers to development faced by the community co-operatives, including: lack of market awareness and confidence; lack of expertise in establishing a fuel supply chain; need for a co-ordination to bring the supply chain together, e.g. grow fuel supply and fuel demand in tandem.

NEWFuels Project

North East Wood Fuels, or NEWFuels, is the wood fuel producer group for North East England. They were successful in applying for funding from Defra's Bioenergy Infrastructure Grant Scheme. Since 2006 they have worked to establish the business, recruit members and grow customer confidence in wood as a fuel. It was originally established by the regional development agency One North East with the help of the Forestry Commission.

The first two supply contracts were tendered in early 2008, with the first (1,000 tonnes for Hexham swimming pool) being awarded to Waste-not-Green of Shotleyfield. The second contract was awarded in May 2008 and is for the supply of 350 tonnes to NaREC's high-voltage testing laboratory at Hebburn, Tyneside.

Further contracts are in preparation for tender, with many more coming through from the **NEWheat** (www.newheat.org) **Market Acceleration Project**. NEWheat is a sister programme that provides free and impartial support to energy users in the North East of England. The programme provides detailed help in design, cost, tendering and paybacks on wood energy investment. It stimulates investment by resolving market barriers and creates ongoing demand for commercially supplied wood fuels.

NEWFuels is legally established as a not-for-profit company and a 'Memorandum of Association and Articles of Association' have been agreed. A board of directors has been appointed that meets regularly to review progress.

The stated aims of NEWfuels are to:

- facilitate the supply and delivery of all types of wood fuel across the North East of England
- provide a networking facility which connects wood fuel consumers with wood fuel producers and removes the barrier of lack of access to good quality fuels
- provide independent advice concerning all aspects of wood fuel heating and wood fuel supply
- provide a quality assurance service to members, ensuring the delivery of good quality wood fuels across the North East
- organise and assist with the availability of suitable equipment for processing and delivering wood fuel to members of NEWFuels
- co-ordinate training for wood fuel suppliers, disseminate industry developments and best working practice amongst NEWFuels members
- represent wood fuel growers, producers and merchants across the North East by ensuring co-operation and liaison with other projects with similar objectives
- promote and publicise to members high standards of fuel quality, equipment performance and emissions limits

- encourage the development of a market for wood fuel by working alongside those who have or are planning to install wood fuel systems
- promote and encourage the development of NEWFuels by promoting group services to a broad range of potential members including wood fuel consumers and producers

NEWFuels operates in the following way:

- NEWFuels act as a broker by putting wood fuel producers in touch with consumers
- all members with the capacity to supply wood fuel are invited to submit tenders that meet the requirements of the consumer
- all of the submitted tenders are given directly to the consumer to evaluate and make a decision based on the information presented
- contracts are drawn up between the wood fuel consumer and the successful wood fuel producer
- quality control procedures are in place to ensure the correct specification fuels will be delivered to each of the projects; NEWFuels provide a monitoring service, advice and information
- add security and confidence to potential consumers by taking out bonds to the value of one month's supply of fuel; should the producer fail to deliver fuel according to the terms of the contract, the bond is used to facilitate the supply of fuel to the consumer from another member; the bond is fully refundable when the contract expires
- operates a website for those who want to supply and buy wood fuel

There are two levels of membership: full membership for potential wood fuel suppliers and associate membership for wood fuel consumers, who wish to show their support for the development of NEWFuels. It was agreed that the membership fee for 'wood fuel suppliers' would be £50 per year, and £25 per year for 'associate members'. These fees combined with a levy for every tonne of wood fuel supplied provides the operational income for NEWFuels. Currently the estimated number of full and associates members is between 40 and 50.

The key benefit that NEWfuels provides is that it gives a degree of confidence to wood fuel consumers. NEWfuels was created with the support and funding of the regional development agency and has developed a coherent brand image. Its strength is that it offers wood fuel consumers confidence that they will be able to purchase wood fuel from a reliable source. Consumers know that if their particular local supplier fails to fulfil its obligations there is a wider network of suppliers capable of providing wood fuel. From the wood fuel suppliers perspective it allows them to enter the market with confidence that they can market their product under the umbrella of an established brand. This has particular advantages for smaller fuel producers who are less able to establish a brand image and develop effective marketing.

5.3 Community enterprises as ESCO providers

An interesting model that could be developed by a community co-operative is the Energy Services Contract (ESCO) model. This model is used in many countries and is starting to be more widely used in Ireland. Appendix 5 of this report contains a model form of ESCO contract. The basic idea of the contract is that an energy services company, in this case the community enterprise or co-operative, designs, installs, owns and operates a wood fired heating plant at a customer's site. The customer simply buys energy in the form of metered heat. The main attraction is that the customer avoids any upfront capital charge as this is financed by the ESCO provider. This opens up a large market to community enterprises because the main restraint on many energy users is the high capital costs of wood boilers.

Recent prices for commercial ESCOs in the Western Region show that for energy users spending in excess of approximately €140,000 on oil for heating the ESCO will represent an attractive option. The table below shows a typical set of figures, based upon tender prices in 2008²¹.

Breakdown of items	Costs
existing annual spend on oil (210,000 litres example)	€140,000
capital cost of 400 kW woodchip boiler in purpose built plant room	€200,000
approximate annual cost of ESCO over 7 years (capital and fuel)	€100,000
annual energy savings of ESCO at year 1.	€40,000
cumulative savings over 7 years ESCO v oil	€400,000 +

This table simply highlights that for certain energy users an ESCO contract would offer annual savings on oil bills with no capital outlay. Generally ESCO contracts work at the larger commercial scale of heat use such as hospitals, care homes, major leisure centres and hotels.

A community enterprise/co-operative would need to address a number of key actions if it was to successfully deliver an ESCO contract, namely:

- obtain capital finance in the form of a commercial loan
- obtain the technology to design and install the heating plant equipment
- undertake servicing and maintenance of the equipment
- supply and deliver the wood fuel

For a community enterprise to bring together these types of skills it would need to consider developing sub-contracts. This would almost certainly mean obtaining the equipment direct from specialist biomass companies. This should be possible however it does highlight the risk and challenge faced if a community co-operative was to offer an ESCO. Clearly the design and installation of the equipment is crucial and an inexperienced ESCO provider would be at a large disadvantage compared to the existing ESCO providers who fully understand the equipment they are providing.

From an energy customer's perspective the supply of an ESCO from a community enterprise may be perceived as relatively high risk. For example, a large hospital may prefer to contract with an established biomass company that is already offering ESCO contracts. The consequence of this is that a community enterprise might not be well placed to become an ESCO provider in the normal commercial sense. Therefore a community enterprise would need to offer an ESCO contract to energy users who are 'predisposed' to use a community option. This situation might arise if the community enterprise owned some or all of the buildings to be supplied; in effect it could become an ESCO provider to itself.

²¹ This information has been sourced by the authors through related project work.

5.4 Community enterprises as district heating entrepreneurs

This is a distinct model that is somewhat different from a community enterprise developing an ESCO, however it may well encompass the ESCO model. The main proposal is that local people would co-operate to supply heat energy to a communal heating plant. The heating plant would probably be developed by a county council or other public body to provide heat energy to public buildings. The following section presents examples from Finland and Austria where this market has already emerged.

Finland

Finland has the highest per capita use of wood for energy in the EU. This example focuses on the small scale heating market, which began to emerge on the early 1990s, and is most relevant to community enterprises. At the end of 2005, Finland had 300 heating plants with an installed capacity of 150 MW_{th}. The average size plant size was 500 kW. The largest plants were between 2.5 MW_{th} and 3.5 MW_{th}, and were mainly heating networks or industrial sites. During the early 2000s, the average cost of wood heat was approximately 5 cent/kWh and woodchip suppliers were paid approximately the equivalent of 2 cent/kWh ²² for delivered woodchips. It was estimated that the costs of oil heating was approximately 7 cent/kWh.

Many of the heat plants were owned and operated by rural co-operatives and were partly or originally financed by the local municipality. **The emergence of rural heat businesses supported by the public sector was a significant driver of market development.** These plants were typically set up and owned by a group of local farmers and foresters to produce and sell woodchips to heating plants that they also own.

From 1992 to 1995 most of the district heating plants were owned by the municipalities (local authorities). However, by 2006, 150 heat entrepreneurs had emerged who owned and operated the plants. The average plant required approximately 1,000 m³ of solid wood per annum. Typically half the farmer's income was generated from a plant; in Finland, farmers with two heat plants can make a viable living as a heat entrepreneur. Also, in Finland 1MW installed equals approximately one new job.

An overview of the Riistavesi municipal heating centre²³ highlights the profile of a typical Finnish wood heating plant:

- heating plant was set up in September 2002
- woodchip boiler of 1MW with old oil boiler as reserve
- one farmer owns the heating plant, Mr Rissanen, and he is a typically farmer who previously had a dairy herd but now lives on heat entrepreneurship and chipping contracting, and he also has approximately 40 ha in crop production
- annual produce of heat 3000 MWh all with woodchips (1% oil)
- heat price is approximately €50/MWh + VAT, including pumping costs to the heating network
- there is a 15 year contract with Kuopio town
- 30% of the woodchip price is tied to light fuel oil and 70 % is tied to price of sod peat
- all the wood is bought beside the road, mainly direct from forest owners but also from the Private Forest Owner Association

²² This equals approximately €40 per solid cubic metre

²³ Riistavesi is one part of Kuopio town in central Finland.

Austria

A similar type of market development to Finland occurred in Austria. The following example highlights some relevant issues.

A 1MW district heating plant provides district heating to Hitzendorf, a small town located in the Styria region of Austria (population of approximately 3,600). It is connected to a number of public buildings (school, library, council office) and numerous individual homes. **It was set up by local farmers in close co-operation with the local municipality.** The basic economics are that the heating plant and heat network are financed through the sale of heat. Buildings that join a network are required to pay a joining fee that helps finance the capital investment. The farmer co-operative that operates the plant provides part time input to supply wood fuel.

This type of model is widely deployed across Austria. Typically plants are partly or fully owned and operated by farmers and foresters, and supply heat to nearby towns via a heat network.

Lessons from Finland and Austria

The lessons for community enterprise in Ireland are that local people can be encouraged into the wood energy sector with the right framework of support and help. This framework usually includes county councils or other appropriate public sector agency support in actively deciding to purchase energy for a network of buildings.

The framework also includes the development of heat entrepreneurs, which overcomes a basic impediment to market development, i.e. lack of demand for wood fuel. At the moment, the development opportunities to produce and sell wood fuel are quite limited in the Western Region. Even if market demand does emerge it would need to be highly specific to allow new community enterprises to be created. This is because small demands for wood fuel, (e.g. less than 500 tonnes per annum) make it quite difficult to set up a commercial operation to produce wood fuel. No single heat user, such as a small hospital or large school with a wood fired boiler, would typically create a sufficiently large demand for wood fuel on which to base a viable business.

Heat entrepreneurs overcome this by creating demand and supply in a single business proposition. They finance, install and operate a heating plant and district heating system that is connected to a variety of energy users and they also produce and supply the wood fuel. The scale of business that worked in Austria and Finland was 500kW to approximately 3MW plants. One useful effect of this model is that wood fuel producers become 'price makers' and not 'price takers'. In effect it forces suppliers to operate 'further up the supply chain' and not merely accept prices at the end of the supply chain.

5.4.1 Example of a 1.5MW_{th} plant

The estimated capital and operating costs of a typical plant of approximately 1.5MW_{th} are presented below. In this model the users are assumed to be a cluster of large buildings in a town and some nearby residential properties.

Breakdown of items	Costs
1.5MW woodchip boiler in purpose built plant room	€450,000
150 cubic metre fuel silo and auger to plant room	€50,000
2000 metres of district heating network	€125,000
100 no. heat meters	€50,000
total estimated capital costs of system ex grant	€675,000
estimated total capital costs of system inc 30% grant	€472,500
if the network connects to new buildings it avoids fossil systems (estimate)	- €50,000
extra over for wood fired DH system	€422,500

This table shows that an estimated €422,500 is required to finance a complete heating plant and network.

The cost of operating the plant

The estimated costs of heating with woodchips are 1,700 tonnes x €75 per tonne = €127,500. The annual costs of operating and maintaining the system (including billing) are estimated at €22,500. This results in a total annual operating cost of €150,000.

1,700 tonnes of wood fuel provides 5,500,000 kWhs of energy. With a mix of replacing gas and oil use at an estimated 4 cent/kWh this means the costs with oil/gas might be €220,000. (This is an estimate used to illustrate the likely level of savings.)

The estimated annual saving is €70,000 by using wood fuel rather than gas/oil.

The simple payback period is six years to cover the €422,500 capital cost. In some European countries heat users pay a joining fee to be connected to the network and this would reduce the payback period. This example illustrates that a viable business could be established at this scale.

To operate at this scale requires relatively high heat loads, for example a small town centre with a swimming pool, an industrial heat user such as a food processor or commercial greenhouse, a large garden centre or residential housing.

5.5 Community enterprises as CHP entrepreneurs

A final area that may be worth exploring are combined heat and power plants. In the past, CHP projects have not been viable at a scale that would be relevant to a community enterprise. However, the rise in energy prices and the trend of policy support is indicating that smaller scale CHP is becoming increasingly commercially viable. Therefore, a community enterprise might be capable of developing a CHP project.

CHP project development is typically complex as there can be many heat and power users involved. Ideally the energy user is a single large consumer of heat and power, however, for community enterprises the market is most likely to be a complex of heat and power users including residential. Large single customers will typically progress their own onsite developments, whereas the main opportunity for communities is potential in the use of district heating systems.

In order to develop a CHP project *each* of the individual energy users on a district heating site would need to commit to buy their heat and power from the CHP project. It is likely that a community enterprise would need to bring these energy users together on behalf of a CHP provider before any commercial project could emerge. Indeed this might be the most useful ‘added value’ activity of community enterprise; they may well be the best placed entity to draw together a group of local energy users.

It should be noted that the planning, development, implementation and operation of a CHP project would be a major undertaking and require significant time and effort to deliver.

It should also be noted the import/export capacity of the local grid must be adequate. During any future project development this issue should be explored at an early stage in case it represents a critical risk at any given site.

5.5.1 How CHP works

In conventional electricity generation, heat is produced as a by-product and usually released as a waste into the atmosphere. CHP systems channel this extra heat to useful purposes so that usable heat and electricity are generated in a single process. CHP can be incorporated into a tri-generation scheme to provide heating, power and cooling from the same source. Tri-generation is sometimes referred to as CCHP (combined cooling, heating, and power generation) and is when some excess heat produced is cooled by ‘absorption chillers’ linked to the CHP system. This produces chilled water for cooling, which is particularly useful for schemes involving a large level of air conditioning.

However, the ideal CHP/tri-generation heat loads come from *continuous process industries*, where steady heat and power supplies are needed throughout the year. If the process shuts down at nights, at weekends or even for annual plant maintenance, the tri-generation benefits can diminish greatly. This would be the case in terms of a community enterprise market where the heat and cooling loads are likely to be highly variable.

The other main challenge with all CHP projects is that there is a fixed ratio of heat and power output. This means that for every unit of electricity that a CHP engine provides it also provides at least two or three times the units of heat, i.e. electricity to heat ratio of approximately 1:3. If the heat is not needed on-site it is wasted, however the fuel used to provide it is still being used to generate the power.

It is normal that CHP projects are provided on an ESCO basis. This means a specialist third party would design, build, finance, own and operate the CHP project. In return the community enterprise (and all other site energy users) would purchase energy from the ESCO provider over a 10 or 15 year period. Sometimes the energy user takes a financial stake in the CHP ESCO as well. For a householder this might be viewed as a ‘joining fee’ to benefit from cheaper stable energy. For a community enterprise this might be as a joint venture with the CHP provider.

On that basis we can conclude the development of a CHP project based on a community enterprise model is marginal, but possible. The first step for a community enterprise would be to scope out a network of suitable energy users and determine a suitably scaled project. Following this, the most practical way forward for the development of CHP project would be to secure outline commercial offers through a formal tender process. This would be a significant undertaking with no certainty of success. It is recommended that the first step would be to develop a ‘prospectus’ that could be taken to a number of possible ESCO providers; this would establish if there was commercial interest and if a more formal tender process was worthwhile and under what terms it could be developed.

One example of how this was progressed is described below, based upon a project in Scotland.

5.5.2 Example of CHP project: Tomintoul, Scotland

Kirkmichael and Tomintoul Community Association in North Scotland received funding to assist with the cost of a feasibility study into a CHP for the Tomintoul and Kirkmichael area from the Energy Savings Trust. This is equivalent to Sustainable Energy Ireland offering a grant for a feasibility study.

The initial study looked at the environmental, economic and market conditions for a bioenergy plant in the area. The findings were promising and resulted in a more extensive study being commissioned by the Cairngorm Partnership, Moray Council, Badenoch and Strathspey Enterprise (a local economic development agency) and the Energy Savings Trust to produce a detailed business plan for a plant.

The proposed plant was to be owned by the local community and would have the following benefits:

- generate income to assist with economic and social development
- create local employment
- supply heat and electricity to a local distillery where it would be based
- utilise draff (a distillery bi-product)

The feasibility study concluded that the plant would need to be 20MW to achieve commercial viability and secure the required loan finance. The plant would demand 130,000 oven dried tonnes of timber and involve approximately 40 lorry loads a day. The estimated overall cost of the project was £32 million.

It was advised that further investment and an environmental assessment were required before planning permission could be considered. As a result, the funding parties reviewed the project and, although seeing many positive sides, foresaw problems with the displacement issues surrounding the timber supply chain and the impacts on other timber consuming industries in the area. These issues together with the fact that the project required a large amount of public investment resulted in the project being put on hold.

Moray Council, and Badenoch and Strathspey Enterprise have since agreed that a biomass strategy should be developed for the area and that it should include a review of all possible sites for a plant of this kind before any further investment is made into this particular project.

This was one of the first large scale community enterprise projects to be taken forward and resulted in a number of learning experiences that will be incorporated into future projects of this type.

5.6 Support service enterprises

In addition to fuel supply and installation enterprise options, community enterprises are typically positioned to deliver other functions to support the development of the sector such as business management skills and delivery of training courses. The potential target groups for such support services include:

- farmers and foresters: who may require business skills and basic training in the supply chain including chipping, drying schedules and simple boiler maintenance
- hauliers: who may require support to develop a greater level of knowledge in terms of fuel handling and delivery systems
- engineers and plumbers: who will require skills in terms of design, installation and system operational and running

Across the supply chain, community enterprises are positioned to provide a range of support services to assist in the development of the local wood energy sector. These services could include: market awareness actions with potential end users/fuel producers; delivery of training programmes; provision of business development and marketing services to the players along the supply chain. Typically, community groups and co-operatives have the visibility and network within the community to link to potential fuel producers, e.g. private forest owners, and end users, e.g. local industries, local hotels.

5.7 Actions to support community enterprise

The consultations with the Gaeltacht co-operatives highlighted the barriers to development of the wood energy sector, namely:

- lack of market awareness, information and confidence
- limited capacity, skills and expertise in market and supply chain development
- limited capacity and expertise of forestry sector to enter the sector, e.g. small plantation size, market access
- limited development of a supportive local policy and regulation framework

The WDC *Wood Energy Strategy and Action Plan* sets out a comprehensive set of actions that would impact on and positively support community enterprise development. The four themes for action include: getting the message across; growing the market; developing an integrated wood supply chain and providing a supportive policy, finance and regulation environment.

The NEWfuel project actively addresses the barriers to development that were identified through the community consultations, and previously in the *Wood Energy Strategy & Action Plan*. Údarás na Gaeltachta, the WDC and other relevant stakeholders, e.g. LEADER companies and Teagasc, could work together to facilitate and support community co-operatives to develop a similar not-for-profit producer group, and promote membership to existing community co-operatives and other individuals and businesses wishing to set up as wood fuel suppliers. Such a development process would support the growth of wood fuel supply companies by the co-operatives and help others do the same.

A structured review of the heat market opportunities would be a very useful research study to identify suitable development opportunities for community groups and provide practical market information.

Supply chain development offers enterprise options for communities. It would be helpful to review the existing capacity to provide the services required e.g. harvesting, chipping, haulage. Specific commercial opportunities for farmers and others to enter the wood fuel supply chain are hampered by lack of knowledge, skills and access to start-up capital. It would be worthwhile to review these issues to determine what actions are required to support supply chain development.

A key aspect for market promotion is to allow end users and fuel producers to 'learn by seeing'. The concept of a learning journey is well established as a highly effective market information method. Groups of farmers, foresters, investors and energy users from the region should be taken to see best practice heating plants in Europe. These visits are a reliable way of promoting the business concept as demonstrated by such projects as the County Clare Wood Energy Project (www.ccwep.ie) and the Forest Link Project in County Donegal (www.forest-link.com).

As we have shown, co-operative rural heat energy companies have emerged in Austria and Finland. A commercial model only works if appropriate suppliers, producers and energy users can be brought together through supported actions. A key action could be to facilitate these stakeholders in a business development process that is delivered through community co-operatives.

6.0 Example of district heating plant

6.1 Background

This part of the report has been prepared to provide an appraisal of the feasibility of installing a wood energy district heating system to provide space heating and hot water to a sheltered housing scheme called Forbairt at an Dtullach. It has been produced to demonstrate the 'nuts and bolts' of a business plan and how a community enterprise can plan a wood energy project.

It is important to recognise that the costs of installing a district heating schemes are very difficult to estimate without the completion of a full mechanical and electrical design that takes account of all the site issues, and market tendering to secure fixed prices. However, the following example seeks to offer a guide to the investment costs and illustrate the issues affecting the viability of providing wood fired district heating. A community enterprise would require the services of an expert to complete such a feasibility study.

6.2 Energy use on the site

The site contains 16 semi-detached single storey homes and four detached single storey homes. These are heated with electric storage heaters and a solid fuel stove connected to a radiator. To effectively replace this system of heating with a wood fired district heating scheme it would be necessary to retrofit a system of radiators in each house. Whilst this would be costly and disruptive it would be a considerably more effective means of heating these homes. It would both reduce heating and hot water costs, and offer a much greater level of control and comfort for each user.

The site also contains a two storey sheltered housing apartment block and a Health Service Executive operated building over two floors. Finally, the site contains a single storey building used for day care and offices. Each of these three buildings is heated with individual oil boilers connected to radiators.

On the site there is a redundant oil boiler that was intended to provide district heating to the three day care/office buildings.

6.2.1 Estimating energy use

A 'rule of thumb' to determine how much energy is needed is to calculate the volume of a building (in M³) and multiply by **0.035** to give an approximate heat load in kW²⁴.

We have used a 1:200 scale layout plan to estimate the internal volume of each building as follows:

- semi-detached homes – $75\text{m} \times 79\text{m} \times 2.7\text{m} = 160\text{m}^3 \times 16 \text{ properties} = 2,560\text{m}^3$
- detached homes – $75\text{m} \times 79\text{m} \times 2.7\text{m} = 160\text{m}^3 \times 4 \text{ properties} = 640\text{m}^3$
- two storey apartments – $408\text{m}^2 \times 5\text{m} = 2,040\text{m}^3$
- two storey office – $225\text{m}^2 \times 5\text{m} = 1125\text{m}^3$
- single storey office – $269\text{m}^2 \times 3\text{m} = 807\text{m}^3$

²⁴ This method is fairly crude and does not take into account U values or the actual occupation pattern. It can only provide an indication of heat use and is only useful to help **guide** boiler size and paybacks.

The total heated space is estimated at 7,172m³. If this is multiplied by 0.035 this equals 251.02kW of required installed boiler capacity (this may not reflect the final size of the boiler for reasons outlined below).

An installed boiler system of this size provides 251.02kW of energy if it is run at full load for one hour. Clearly the buildings will not need to be heated at full load every hour, all day and every day. Experience shows the following full load hours (FLHE) equivalent:

- school = 800-1000 FLHE
- office = 1000-1400 FLHE
- retirement home = 2500-3000 FLHE

We can therefore base our estimate on 2,000 hours, representing a reasonable compromise between offices and retirement homes. 2000 hours x 251.02kW equals 502,040kWh of energy used per year.

District heating schemes are of course not 100% efficient in their use of energy. There will be some small losses from the district heating pipes as a result of conversion efficiencies in the boiler. These can add 15% to the heat load. Thus the energy purchased, as opposed to used, would be approximately 575,000kWh. We can convert this amount of energy into different fuels as follows:

- oil – 52,272 litres per year
- woodchips at 35% moisture content – 174 tonnes per year
- wood pellets – 133 tonnes per year

We can also convert these fuel use figures into annual costs using 2008 supply prices as follows:

- oil - €33,977 at €0.65\litre
- woodchips at 35% moisture content – €14,790 at €85\tonne
- wood pellets - €24,605 at €185\tonne

This confirms that the whole site could be heated with woodchips for less than half the cost of using oil. It should be noted that as the housing uses a combination of storage heaters and solid fuel we do not know what they are actually spending individually on heating and hot water.

6.3 Design of a wood fired district heating scheme

The heat load of this site is approximately 575,000kWh and a boiler must be specified that can meet this overall annual demand. The size of a wood boiler (and hence its cost) is also partly dictated by the peak loads. For example, the heating and hot water needs of the site will be significantly higher during periods of full occupancy in winter and at times of day when heating and hot water needs are at their greatest. It is usually not commercially sensible to size a wood boiler for the occasional peak loads as this means the boiler is over capacity for most of the year. In addition, wood fired boilers are less able to modulate down to meet demands considerably lower than maximum output and operate less efficiently in situations of low demand relative to possible output. In effect they need more fuel if that happens.

The most viable approach is therefore to size the wood boiler on overall annual loads and install an auxiliary boiler to meet infrequent peak loads. This has the further advantage of providing a back up boiler in the event of wood boiler outage. In the case of this site, there are four existing oil boilers that can perform that function. Three of these are located in the existing office/day care buildings and apartment block. The fourth boiler is redundant and we do not know if it could be used. These oil boilers do not need to be physically adjacent to the wood boiler to act as seamless auxiliary options.

A further issue is the accumulator tank. This is a purpose designed tank containing hot water provided directly by the wood boiler. The total heating and hot water needs of the site are delivered from this tank, thus in part, ironing out peaks and troughs of daily demand in a manageable way. A rule of thumb for sizing is that for every installed kW of capacity, 20 litres of hot water capacity is required.

Taking all this into account the site heating and hot water needs could be supplied from a 175kW rated boiler connected to a 3,500 litre accumulator tank.

In terms of fuel supply we have already estimated an annual consumption of 174 tonnes of woodchip (35% MC). Each tonne of wood fuel will typically occupy approximately 5m³. A typical delivery load will be approximately seven tonnes, however it is unlikely a delivery would occur into a completely empty silo. In addition, the silo cannot be filled completely to allow for air circulation. This means the silo should be sized as follows:

- 35m³ to allow for seven tonne delivery
- assume 10m³ already filled
- assume 5m³ for air

Therefore the silo should be at least 50m³ and this will contain approximately nine tonnes of fuel. For the coldest months (December to February) it can be assumed weekly usage will be approximately five to six tonnes. This means the most frequent deliveries will be once every 10 days or so and that the silo would hold over 10 days supply at the coldest time of year. The cost of installing a system like this will depend mostly on the type of silo design. There are three basic options:

- underground: this is the most expensive approach, but allows the most rapid delivery of fuel from a wide variety of tipping vehicles; in the longer term the costs of fuel supply could be lower by this method
- hook bins: these bins are readily available and contain approximately seven tonnes of fuel each: they are filled off site and contain a walking floor to move fuel down to the auger
- above ground: there is variety of different above ground options including a trough and blower to allow tipping fuel delivery as shown below
- an additional option would be where the fuel is also tipped into a trough then blown or conveyed into the silo

In considering these fuel handling options the most cost effective approach is likely to be hook lift bins. We have used this approach to develop the cost plan.

6.4 District heating network

The district heating network will have two basic elements: pre-insulated heat mains and heat exchangers in each property. The heat mains will need to be retrofitted into the site and connect each building to the wood boiler plant room.

The heat exchangers in each building allow the heat mains water to be separately circulated at a suitable pressure and temperature. A heat exchanger then transfers the thermal energy (but not the water) in the heat mains to a different heating system in each building or house. The heat exchanger also allows the building to fully control the heating in terms of time and temperature on an instantaneous basis. Finally, the device can be used to meter heat used and administer a method of payment via top up cards if required.

There are 23 buildings that require the installation of heat meters. This excludes the fact that the apartments will contain a variety of dwellings. However, heat meters are costly items and it is desirable to reduce the number of them if possible. Within the apartments, heat could still be fully controllable via thermostatic controls on the radiators. The main drawback is that heat cannot be individually metered in each apartment.

We have estimated that 311 metres of heating mains is required. This is based upon locating the wood fired boiler plant room at the east end of the site in a grass area to the right of the site entrance road.

The heating centre will need to be built to house the boiler. It is also possible to obtain the boiler prefabricated in a steel shipping container. We have based our costings on a shipping container as this is the least costly and can be priced with a degree of certainty unlike a bespoke building.

6.5 Costs and finances

The table below illustrates a budget cost estimate for the whole scheme.

Cost items (budget costs plus/minus 30%)	Totals ex vat
150kW woodchip boiler, 3,500 litre accumulator tank, flue, fuel feed mechanism and all associated items of equipment	€65,000
double hook bins, frame and auger (as fuel silo)	€35,000
civil works to create foundations and prefabricated in a steel shipping container	€25,000
mechanical connections, power, water etc.	€15,000
311 metres of pre-insulated district heating supplied and fitted inc trenching	€62,200
23 domestic heat exchangers installed and fitted	€46,000
design, planning and commissioning	€32,000
installation of wet radiators in 20 homes (estimate)	€30,000
contingencies (10%)	€31,020
total budget estimate cost	€341,220

Options for funding, management and operation of the district heating scheme are reviewed below. The cost difference between wood fuel and fossil fuel is usually the means by which the capital costs of the wood energy system are financed, and in this case the high capital costs of installing the energy system suggest that the energy users who connect to the district heating network should not secure all the energy savings that arise.

The following shows an estimate of the running costs of the whole system:

purchase of wood fuel – €14,790

cleaning\maintenance – €5,000²⁵

repairs and renewals – €7,500

insurance €2,000

running costs €29,290

These costs must be contrasted with the current situation – which we have estimated as follows:

purchase of oil – €33,977

cleaning\maintenance – €5,000²⁶

repairs and renewals – €7,500

running costs €46,477

This analysis demonstrates that the overall cost difference between the current situation and a district heating scheme would be approximately €17,187 per annum. This can be regarded as an income to the district heating scheme if the users do not secure any cost savings on energy (until the capital cost is repaid).

In continental Europe when existing homes are connected to a wood fired district heating network they pay a 'joining fee', often of several thousand euros. They do this because they know the energy being provided will be cheaper than fossil fuel heating and the long term price will be more stable. For this site, payment of joining fees by the residents does not appear possible. However it may be possible that public sector users would pay a joining fee to demonstrate their support for the deployment of renewable energy based on community enterprise models.

The capital costs are €341,220 for the scheme. The SEI grant can offset a proportion of the boiler installation costs, but the costs of district heating and radiators are not eligible for support. The estimated SEI grant is €75,000. The resulting capital costs of €266,200 would then be paid back over 15.5 years using the €17,187 per annum 'income'. If public users, e.g. Údarás na Gaeltachta, HSE, were willing to pay a joining fee, the 15.5 years could be reduced to a point where a commercial partner would be willing to fund and operate the scheme on an ESCO basis.

We would estimate that a scheme that paid back over five to seven years could attract some commercial interest. This suggests that public sector users should be contributing in the order of €150,000. The outcome of that contribution can be summarised as:

- much more effective and controllable heat for every user
- heat at 2008 prices but will rise in price in a predictable stable way, insulated from oil prices
- after five to seven years the price of heat can massively reduced and be should at least half the cost of oil

²⁵ This assumes a local part time job to clean and maintain the boiler, with a specialist annual service.

²⁶ This assumes the 20 solid fuel systems\storage heaters and the three oil boilers will all need some degree of maintenance and should not be any larger than the district heating scheme.

After this review was completed it was suggested that the adjacent industrial estate might be included in a larger single district heating scheme and this may have financial benefits to the smaller scheme reviewed above.

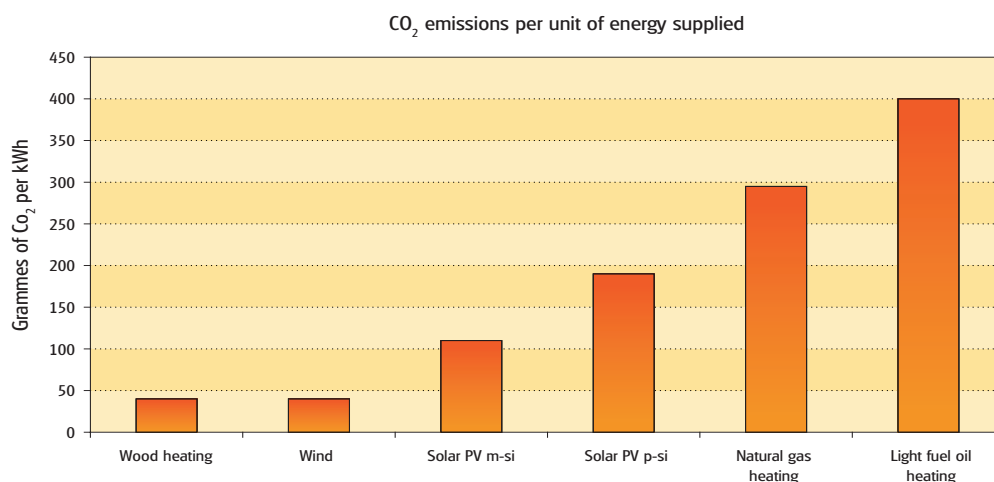
The industrial estate contains six buildings over one and two storeys with a mix of office and light industrial uses. Each of these buildings relies upon oil for space heating. We have used a 1:2500 scale site plan to develop an estimate of the internal volume of the six buildings combined. This comes to an approximate 10,000m³ and suggests 350,000kWhs of energy are required for space heating. The estimated fuel saving implications of this are outlined below.

- An estimated 33,175 litres of oil will be used to heat all six buildings. This will cost €21,500 per annum. The equivalent wood fuel cost would be approximately €9,000. Therefore if these six buildings were added to the district heating scheme they would generate a net extra income of €12,500.
- An estimated additional 255 metres of district heating network is required to connect the six buildings. Installed and connected this means approximately €60,000 is needed to pay for the network. In addition, the boiler and fuel silo would need to be a little larger and this may add a further €40,000. This indicates a payback of 12.2 years is achieved with a larger scheme. This is marginally better than the 15.5 years achieved with the smaller scheme.

We can conclude that by adding these six buildings the proposed district heating network would probably have a small overall financial benefit with a minimal impact on the simple 15.5 year payback. It would not avoid the need for public sector capital contributions to achieve a viable scheme; however it may reduce such contributions marginally. It would also offer stable renewable heat to the six buildings and further reduce CO₂ emissions. Overall it would certainly be worth exploring this larger scheme in more detail, subject to agreement of public sector capital contributions already outlined to help make the scheme viable.

6.6 Carbon savings

All energy generation emits a proportion of CO₂, including renewable and non renewable energy sources. The table below²⁷ illustrates how wood heating compares to some of the main alternatives.



This table shows the average amount of CO₂ that is emitted when generating energy from each of these sources.

²⁷ Sources: *Scottish Enterprise Forest Industries Cluster Wood Fuel Report 2005* and *GaBE Project: Comprehensive Assessment of Energy Systems*; Dr Thomas Heck, Paul Scherrer Institute, Switzerland, March 2002.; <http://gabe.web.psi.ch/lca.html>.
Greenhouse Gas Balance of Bioenergy Systems - A Comparison of Bioenergy with Fossil Energy Systems; G Jungmeier, Joanneum Research, University of Graz, Austria, 1999.; Gerfried.jungmeier@joanneum.ac.at.

In practice the amount of CO₂ generated by an oil or gas boiler for heating will vary according to specific circumstances such as the efficiency of the boiler.

The reason wood energy heating emits CO₂ is that during the production and transport of the wood fuel, fossil fuel energy is emitted and the manufacturing of the boiler equipment requires an energy input that is accounted for in the overall level of CO₂ that such systems generate.

That is also why wind generated (or PV generated) renewable electricity emits CO₂ as the manufacturing of the turbines requires an energy input that must be accounted for in the lifetime of its operation.

Assessing CO₂ savings cannot be undertaken in isolation, and they require an understanding of the existing carbon emissions and what would be the carbon savings that result from conversion to wood energy on a site by site basis.

We have assumed that for each kWh of energy supplied from a wood fired system that 47 grammes of CO₂ are emitted. We have assumed that for each kWh of energy supplied from an oil (or LPG) boiler that 400 grammes of CO₂ are emitted. In this case we have taken oil emissions as proxy for heating with solid fuel and electricity. This means a wood boiler would result in the saving of 353 grammes of CO₂ per kWh of energy used.

As the scheme would provide 575,000kWhs of energy it will save 202 tonnes of CO₂ per annum.

This would be achieved with a capital spend of €266,200 (including grants). This suggests a cost of €1,317 per tonne of CO₂ saved. This cost per tonne can be compared with other technologies/options:

- solar thermal panels – €1800/tonne
- solar PV panels – €3500/tonne
- energy efficiency measures – €300/tonne to €1600/tonne

7.0 Conclusions

Wood fuel as an energy source has considerable potential in the Western Region. This project established that community enterprises have the potential to act as significant drivers of development in the sector. Community groups and enterprises typically have the required community network and expertise to bring potential wood fuel producers and heat users together, e.g. private forest owners and local industries, and thereby progress the development of wood energy installations.

In the wood energy sector the main community enterprise opportunities are in the supply of woodchip fuel to commercial, industrial and public sector heat users. In simple terms, community enterprises could produce and sell wood fuel or organise the installation and operation of woodchip boiler systems. They could also do both at the same time and this may well offer the most practical approach, especially if they can identify local partners who are willing to consider conversion to wood fuel heating.

Wood heat market

The market opportunities presented by the wood heat sector are the most appropriate market for community enterprise due to the following five reasons.

- Power generation, CHP and the co-firing market require large scale capital investment, deal with high volumes of wood fuel and are typically complex in terms of technology, financial package and project management. These markets are more suited to large scale developers and energy utilities.
- The commercial/industrial heat market is the **most economically viable market segment** at present, i.e. boilers > 50kW. This market is readily suited to the use of woodchip based heating systems.
- The economic viability of the heat market is based on **local demand and supply loops**; typically woodchip fuel is not transported more than 40km from source to end user.
- The fuel volumes of the commercial/industrial heat market are of a **scale** more suited to local enterprise development where the investment and technical requirements are more readily accessible to community enterprises.
- Woodchip fuel derived from forestry resources is a more readily **accessible fuel stream** for community enterprises and requires moderate levels of investment. Wood pellet production is a more capital intensive production process and requires access to sawdust feed stocks.

Community enterprise options

The development of a wood energy business by a community company or co-operative will not follow a single model and the opportunities are dependent on a set of factors specific to that community, including: the potential local fuel resource; profile of the local heat market; and capacity of the group itself to progress with enterprise development. Each community will have to identify and design an enterprise suitable to their conditions and profile.

The main opportunities identified for community enterprise are outlined below.

Support service enterprises

Community enterprises are positioned to provide a range of support services including: market awareness actions with potential end users/fuel producers; delivery of training programmes; provision of business development and marketing services to the players along the supply chain.

Community enterprises as wood fuel suppliers

The most appropriate target market for a woodchip fuel supply enterprise is the small to medium scale heating market for large single buildings, district heating schemes and industrial applications (in the region of 60 kW to 1MW). The commercial opportunities for farmers and others to enter the wood fuel supply chain are currently limited by lack of knowledge and skills, and access to start up capital. It would be worthwhile to review these issues to determine what actions are required to support supply chain development.

Wood fuel supply producer group

The establishment of a wood fuel producer group can reduce the risks of the business start up and encourage local membership. A producer group allows suppliers on a regional basis to co-operate, and equipment and skills can be shared when needed. Such a group provides confidence to purchasers that there is a *network* of suppliers so they know that if one supplier fails they can turn to others in the producer group. A producer group addresses the barriers to development faced by the community co-operatives including: lack of market awareness and confidence; lack of expertise in establishing a fuel supply chain; need for co-ordination to bring the supply chain together, e.g. grow fuel supply and fuel demand in tandem.

Community enterprises as ESCO providers

A community co-operative would need to have in place a number of abilities if it was to successfully deliver an ESCO contract, including: capital finance in the form of a commercial loan; technology, design and installation of the heating plant equipment; undertaking of servicing and maintenance of the equipment, and supply and delivery of the wood fuel. This study shows a community co-operative would need to offer an ESCO contract to energy users who are 'predisposed' to use a community co-operative. This situation might arise if the community co-operative owned some or all of the buildings. In effect it can become an ESCO provider to itself. It may also arise if a public body decided to stimulate a community co-operative by entering into an ESCO with them.

Community enterprises as district heating entrepreneurs

This is a widely used development model in Europe and is typically a woodchip fired heating plant providing district heating to a small town. This approach overcomes a basic impediment to market development, i.e. lack of demand for wood fuel. Heat entrepreneurs create demand and supply in a single business proposition. They finance, install and operate a heating plant and district heating system that is connected to a variety of energy users, and they also produce and supply the wood fuel. The scale of business that worked in Austria and Finland was 500kW to approximately 3MW plants. In this model, wood fuel producers become 'price makers' and not 'price takers'. In effect it forces suppliers to operate 'further up the supply chain' and not merely accept prices at the end of the supply chain.

Community enterprises as CHP entrepreneurs

the rise in energy prices and the thrust of policy support indicate that smaller scale CHP is becoming viable. This means a community co-operative might be capable of developing projects like this. The first step would be for a community co-operative to scope out a network of suitable energy users and determine a suitably scaled project. Then the most practical way forward for the development of the CHP project would be to secure outline commercial offers via a formal tender process.

Next steps

Across Europe, community enterprise has been a significant player in the wood energy sector. Community enterprise has resulted in not just increased renewable energy usage, but also significant economic, social and environmental benefits for the individual community. The WDC *Wood Energy Strategy and Action Plan* estimated that if wood fuel supplied 11% of the regional heat market by 2020 it would create over 900 jobs, add €15 million per annum to the regional economy and reduce CO₂ emissions by over 600,000 tonnes per annum.

This project established that there are definite opportunities and advantages to supporting community based enterprise in the wood energy sector. However, barriers to development were evident, including:

- lack of market awareness, information and confidence
- limited capacity, skills and expertise in market and supply chain development
- limited capacity and expertise of forestry sector to enter the sector, e.g. small plantation size, market access
- limited development of a supportive local policy and regulation framework

At present, the development opportunities to produce and sell wood fuel are quite limited in the Western Region. Even if market demand does emerge it would need to be highly specific to allow new community enterprises to be created. This is because small demands for wood fuel, (e.g. less than 500 tonnes per annum) make it quite difficult to set up a commercial operation to produce wood fuel. No single heat user, such as a small hospital or large school with a wood fired boiler, would typically create a sufficiently large demand for wood fuel on which to base a viable business.

Communities will need an appropriate framework of support to realise the enterprise opportunities and enter the wood energy sector. Within Europe, **the public sector**, i.e. local authorities and county councils, has played a significant role in actively supporting community enterprise.

This project proposes that relevant stakeholders such as Údarás na Gaeltachta, WDC, LEADER companies and Teagasc, could work together to facilitate and support community co-operatives to develop producer groups. A structured review of the heat market opportunities would be a very useful research study to identify suitable development opportunities for community groups and provide practical market information. In addition a review of the existing capacity to provide the supply chain services would support and inform on potential development interventions.

The WDC *Wood Energy Strategy and Action Plan* presents a framework through which to support community enterprise development to progress the wood energy sector. The four themes for action include: getting the message across; growing the market; developing an integrated wood supply chain; and providing a supportive policy, finance and regulation environment. This project serves to highlight the need for and the potential benefits of delivering on the regional action plan.

Appendix 1: Expression of interest questionnaire

Údarás na Gaeltachta and Western Development Commission

WOOD ENERGY MARKET DEVELOPMENT THROUGH COMMUNITY ENTERPRISE MODELS

**Checklist for assessment of suitable groups
to be involved in the pilot study**

If you are interested in taking part in the WDC/Údarás Wood Energy Market Development Study please fill in the following questionnaire. This questionnaire will act as a checklist against which interested co-operatives will be assessed for inclusion in this pilot project.

SECTION ONE: CONTACT DETAILS

Name of co-operative	
What business sector is the co-operative involved in?	
Address of business premises	
Name of contact person	
Telephone number	
Mobile number	
Email address	

SECTION TWO: RESOURCES

(A) COMMERCIAL PREMISES

Yes

No

Do you own or lease a commercial building(s)?

☐
☐

If so, please provide details of the size of the building(s) and the ownership status.

(B) STAFFING

Yes

No

Does your co-operative employ staff?

☐
☐

If yes, how many staff are employed?

How many are full time employees?

How many are part time employees?

Please give details of employed staff titles (e.g. manager, secretary etc.) and their responsibilities

Title of staff member	Responsibilities	Please tick if full time employed	Please tick if part time employed

(C) LEGAL STATUS

Yes

No

Is your co-operative a registered business?

☐
☐

If yes, what is its legal status (e.g. limited company)?

Yes

No

Do you employ the services of a financial auditor?

☐
☐

(D) MARKETING

Yes

No

Do you produce marketing tools for your business?

☐
☐

If yes, please list them below (e.g. brochures, leaflets, website)

Yes

No

Are these marketing tools produced in-house?

☐
☐

Yes

No

Are these marketing tools produced by an outside marketing firm?

☐
☐

SECTION THREE: CO-OPERATIVE MEMBERS' INTERESTS

Please list below the number of your co-operative members involved in the following activities:

Activity	Number of members involved in this activity	Numbers involved as self-employed or employees of this activity	
		self-employed	employee
farming			
forestry			
road haulage			
heating installations			
plumbing			
engineering works			

Please provide the reasons why your co-operative is interested in being involved in this wood energy market development project.

What role do you see for your co-operative in the wood energy sector?

Appendix 2: List of co-operatives selected and interviewed

	Co-operative	Area	Personnel interviewed
1	Comhlacht Forbartha Aitiuil Acla Teo.	Achill, Mayo	Terence Dever, Roisin Lavelle
2	Comharchumann Forbartha Ghaoth Dobhair	Gweedore, Donegal	Pat O'Donnell
3	Lar Chomhairle Paroiste Ghleann Cholm Cille Teo.	Glencolmcille, Donegal	Aoibhann Ni Churraighin, Barney Cunningham, Roger Curran
4	Comhchoiste Ghaeltacht Uibh Rathaiigh	Caherciveen, Kerry	
5	Comharchumann Forbartha an Leith-Triúigh Teo.	Brandon, Kerry	Mairin Ui Chonchubhair
6	Comharchumann Forbartha Chorca Dhuibhne Teo.	Ballyferriter, Kerry	Gearoid O Brosnachain
7	Forbairt an Dromoda Teo.	Waterville, Kerry	Cait Ui Chonaill
8	Comharchumamm Duiche Sheoigeach Corr na Mona	Cornamona, Galway	Tomás Ó Flaithearta, Marcus O'Flynn
9	Comharchumann Shailearna Teo.	Inverin, Galway	Morgan Ó Concubhair
10	Comhlacht Forbartha an Spideil Teo.	An Spideal, Galway	Aodán Mac Donncha
11	Comhairle Ceantar na nOilean Teo.	Lettermore, Galway	
12	Tearmann Eanna Teo.	Baile na hAbhainn, Galway	Peigí Uí Chéidigh



Appendix 3: Contact details of co-operatives assessed

1. Comhlacht Forbartha Aitiuil Acla Teo.
Telephone: (098) 43292
Email: terencedever@eircom.net, roisin@acaill.com
2. Lar Chomhairle Paroiste Ghleann Cholm Cille Teo. (LCPG)
Telephone: (074) 9730893
Email: aoibheannlcp@gmail.com
3. Comharchumann Forbartha Ghaoth, Dobhair
Telephone: 074-9532208
Email: cfdg@eircom.net
4. Comharchumann Forbartha an Leith-Tríúigh Teo.
Telephone: (066) 7138137
Email: eolas@cft.ie
5. Comharchumann Forbartha Chorca, Dhuibhne Teo.
Telephone: (066) 9156100
Email: gb@cfcd.ie
6. Forbairt na Dromoda Teo.
Telephone: (066) 9474782
Email: maistirgaoithe@eircom.net
7. Comharchumann Shailearna Teo.
Telephone: (091) 593017
Email: cst@eircom.net
8. Comhlacht Forbartha an Spidéil Teoranta
Telephone: (091) 553666
Email: forpobal@iolfree.ie
9. Tearmann Éanna Teo.
Telephone: (091) 505540
Email: tearmannéanna@eircom.net
10. Comharchumann Dhúiche Sheoigeach
Telephone: (094) 9548031
Email: cdsteo@eircom.net

Appendix 4: Assessment of selected co-operatives

1. Co-operative: Comhlacht Forbartha Aitiuil Acla Teo., Aras Forbairt Acla, Caol. Acaill, Co. Mhaigh Eo.

Background:

Comhlacht Forbartha Aitiuil Acla (CFAA), Achill's Local Development Company evolved from attempts in the early 1990s to address the lack of cohesion in community development in the parish. Two representatives from each of the six GAA Scanlon Cup areas formed a committee. In 2000, the committee was incorporated as a company limited by guarantee. The community representation remains the same with statutory agencies and social partners also represented on the board of directors.

Functions of the co-operative:

The aims of the CFAA are to develop the social, cultural and economic activities in the Parish of Achill. One of the Comhlacht's main functions is to deliver the Local Development Social Inclusion Programme in co-operation with Meitheal Mhaigh Eo Teo (MFG).

The other activities in which CFAA is involved are:

- administration of the Rural Transport Scheme
- co-ordination of two rural social schemes
- promotion of the Irish language and culture

Facilities:

Arás Forbartha Acla, previously the old Crumpaun School, was renovated and extended through community effort over the past 16 years. It now houses:

- CFAA
- Keel Community Playgroup
- Achill Northwest Community Development
- Keel Community Alert
- community IT facility (operated by Cumarsáid Acla)

The Arás also acts as a community centre with the facilities in use by several local voluntary groups, including Achill Women's Group. The demo/kitchen/classroom two and the board room are often in use for meetings, courses, seminars, classes and gatherings by these various groups.

Cumarsaid Acla (Achill Community IT Centre) provides IT and non-IT skills training. It also provides public access to IT equipment, photocopying, fax, internet and email for both the local community and holiday makers.

Coiste Bainistíochta Seanscoil na Chrompain (a representative group of all tenants), a sub-committee of CFAA, is the management committee for the building.

Aras Forbartha Acla is a 370 m² building, which is oil fuelled and in constant use on a year round basis.

Future plans:

A development project is being planned for a 68 acre site at Bunnacurry. This site will be divided up as follows:

- St. Colmans Day Care Centre will obtain 8.8 acres on which a day centre (phase one) and a respite care centre (phase two) will be built
- a fish farm will occupy 5 acres
- the remaining, approximately 50 acres, will be leased to CFAA

At present CFAA are considering the following development for the site (approximately 50 acres):

- a social housing scheme of 21 houses to provide sheltered housing for low dependency elderly residents
- a language and culture centre, which will include a 100 seat auditorium, education and training rooms, a library, a youth drop-in centre and a childcare unit
- a multi-use all weather activity facility for visitors, local people and Achill's activity product providers; the indoor facility will be designed to aid training, fitness preparation, sports and entertainment
- enterprise units with the potential to provide incubation space, food innovation and production units, artisan units and offices; these buildings will have an adaptable design to allow for expansion, e.g. to accommodate a large call centre operation
- CFAA office from which some community services will be provided including the management of the sheltered housing development

Progress to date:

- It has been agreed to lease the site to CFAA.
- CFAA have undertaken a study of the tourism industry in Achill and the results of this study indicate the potential of developing a multi-use all weather activity facility. An application for funding to proceed with this project has been made by Údarás to Fáilte Ireland. Mayo VEC (that operates the Achill Outdoor Education Centre) has also been involved in the planning of the facility and is considering developing a new outdoor pursuits centre close to the planned indoor facility at Bunnacurry.
- It is hoped that architectural plans for the buildings will be drawn up, in conjunction with Údarás, by October 2008, after which planning permission of the development will be sought.

Comments from CFAA Management:

CFAA's main concern if considering the inclusion of woodchip boilers in their future development plans is the continuity of supply. The nearest major forestry is at Ballycroy, approximately 50km distant.

CFAA sees a role for the Comlacht in the provision of information and education to the public with regards to alternative energy development and in the provision of skills training where required to service any such development that may take place, e.g. in the areas of boiler maintenance and servicing.

Comments from consultants:

CFAA are potential end users and providers of skills training. There is an insufficient local wood supply based on this author's knowledge of the private sector forestry resources in the locality and its hinterland.

2. Co-operative: Lar Chomhairle Paroiste Ghleann Cholm Cille Teo. (LCPG)

Background:

Glencolmcille has a history of community development going back to the 1960s. The parish of Glencolmcille comprises of five separate communities:

- Teelin
- Carrick
- The Mintes
- Glen
- The Malins (Glenmalin, Malinmore and Malinbeg)

Until recently each area worked in isolation in terms of community development. LCPG was formed in 2003 with the aim of streamlining this process and uniting all five areas under one development strategy. Three voluntary representatives from each of the five areas are elected to the committee. The 15 person committee operates on a four year cycle. The current committee is coming to the end of its second year in operation. The committee works to promote a five year development plan (2005-2009) for the parish.

LCPG offices are located in Malinmore, where two full time staff are employed. LCPG Teo. is a company limited by guarantee.

Functions of the co-operative:

- to implement a five year development plan for Glencolmcille Parish (available to download at www.westbic.ie)
- to promote a language plan and to revive the Irish language

Facilities:

LCPG are based in an Údarás owned building at Malinmore. It is approximately 370m² and contains two units. LCPG occupies one unit (100m²) while the other (270m²) is unoccupied at present.

Facilities at Carrick include a national school, a second level school, a day care centre and sheltered housing and a disused factory. The village of Carrick is very compact.

The main tourist facilities are located at Glen and consist of Oideas Gael premises at Foras Cultuir Uladh, Fr McDyer Folk Park and Glencolmcille Hotel, (which is currently closed). A housing development is planned.

The town of Killybegs is located approximately 12 miles from Glencolmcille. Here the SW Donegal Community Partnership plans to renovate an old building that they have leased. Included in the plans are a crèche and training units. The proposed building will be two storeys with each floor approximately 1200 m² per floor.

In close proximity to this proposed development is a national school, community hospital, training college and secondary school.

Future plans:

Wood Energy Research

LCPG have conducted some research into wood energy where a deputation from LCPG went to 'Rural Generation Ltd' in Derry to review the operation. The deputation took a tour of the site and discussed the possibilities with Michael Doran who subsequently carried out a survey in Glencolmcille to determine the feasibility of establishing a project there.

Sheltered Housing Project

LCPG have recently purchased a 0.8 acre property (old school and site) with the view of developing a sheltered housing project in Cashel, Gleann Cholm Cille. It is anticipated that the facility will include the following:

- eight to 10 fully equipped, self sustainable residential units
- a day room
- kitchen/dining room
- toilets
- multi-purpose room
- office

Meetings have also been held with the Health Service Executive with regard to the proposed re-location of the Health Centre in Gannew to the more centrally located proposed sheltered housing units in Cashel.

LCPG are in the process of obtaining housing body status and preparing an application for the county council in order to further the application to the Department of the Environment, Heritage and Local Government. Meetings will also be held with the architect in relation to the design of the proposed project and it is anticipated that an application for planning permission will be submitted before the end of 2008.

Wind Energy Project

Meetings have been held with local landowners in relation to locating a community windfarm on their land. To date, most of the sites in question are in special areas of conservation so options are very limited. Other more suitable sites have been identified and the committee must now approach the relevant landowners to obtain permission to proceed with the project. Planners from Donegal County Council must also survey the proposed sites.

Comments from LCPG Management:

LCPG would play a central role in any wood energy development project from the start. They envisage that a sub-company of the central council would be established to supervise and manage the project. It would be very much a community based project.

LCPG sees a demand for a wood energy project in Carrick, Killybegs and the proposed housing development at Glen.

In terms of supply they see possibilities of setting up a chipping yard (there are several suitable farmyards with sheds in the area and the disused factory at Carrick) and harvesting the forests in the immediate surrounding area, many of which are at thinning age.

They would be interested in setting up a training programme to 'up-skill' local people to service and maintain woodchip boilers.

Comments from consultants:

This interview lasted for two hours and took the format of an information workshop with regard to wood energy and wind energy. It was a very positive session and this group were very eager to go forward. They left the meeting with the intention of exploring the possibilities for the development of a chipping yard in their area.

The wood supply resource, the structural resource in terms of end users and the capacity of this organisation to undertake a wood energy project are all very strong.

3. Co-operative: Comharchumann Forbartha Ghaoth, Dobhair

Background:

The Comharchumann is a company limited by guarantee. They employ three full time staff and five part time.

Functions of the co-operative:

- operates a community enterprise centre
- co-ordinates the Rural Social Scheme
- promotes the Irish Language.
- supplies services to the Údarás enterprise centre

Facilities:

The Comharchumann bought a disused school from the VEC. They have renovated the old section and added a new building. The old section is approximately 400m² while the new building has a space of 800m². The new section was opened in October 2004 and houses an enterprise centre comprising 14 units each approximately 45 to 50m² in size. The building has an oil fired heating system with a heating bill of €15,000 to €17,000 per annum.

Approximately two miles from the Comharchumann centre is an Údarás industrial estate with approximately 1,000 in employment in nine to ten small firm units.

Also in Gweedore is a secondary school with approximately 500 students, a retirement home and day care centre and a sheltered housing development, which was built in phases between 25 to 10 years ago.

Private forestry is limited, with Coillte owned forestry around Dungloe.

Approximately 50 of the co-operatives members are involved in farming and there are plumbers and road haulage firms in the area. One road haulage firm has 20 trucks.

Future plans:

The Comharchumann has no major plans at the moment.

Comments from LCPG Management:

LCPG are interested in the supply end of the market and see possibilities of developing a chipping yard and drying sheds. They are also interested in the possibilities of providing skills training for local plumbers for boiler servicing and maintenance purposes.

Comments from consultants:

Wood sourcing in this area is limited to Coillte estate. This is a major limiting factor in the setting up of a wood supply chain. There is a good potential for supply chain skills training. The CFGD building is unsuitable for installation of a woodchip boiler due to a lack of space for a fuel silo, thus preventing the CFGD becoming an end user.

4. Co-operative: Comharchumann Forbartha an Leith-Triúigh Teo.

Background:

The Comharchumann was incorporated in 1972 and is registered under the Registrar of Friendly Societies. A board of directors manages the Comharchumann and employs a full time manager. Fifteen people are employed between full time, part time, RSS and CE schemes. The Comharchumann is currently the largest employer in the local area.

The Comharchumann established a recycling and community rubbish collection scheme and provide services into Tralee. They won the 'Eco-Label' title in the 1980s.

Functions of the co-operative:

- implementation of 2006-2010 Development Plan
- operation of a recycling and community rubbish collection scheme
- delivery of child care services including pre-school, after school service, parent and toddler group, and summer camps
- provision of meals to the elderly, emergency alarms and personal visits
- provision of defibrillator scheme and emergency response
- delivery of community broadband scheme
- provision of community hall (see below, Halla Le Chéile)
- tourist information centre
- youth club
- developing and maintaining walking trails
- start up business support service
- support to issue based local community groups, including capacity building, administration, funding, advice and guidance

To date the Comharchumann has been largely involved in the provision of social services. Its current focus is to expand its economic activities and provide local employment opportunities.

Facilities:

The building in An Clochán is on lease to the Comharchumann with the option to buy should it be put on the market. Known as Halla Le Chéile, it acts as a community centre and facilities provided are:

- doctors' visiting room
- community welfare officer
- Teagasc
- counselling room
- office space rented to companies
- community hall
- handball, squash, basketball alley
- games room
- computer room
- large and small meeting rooms

- community playground
- enterprise/training room

Future plans:

In 2005 the Comharchumann approached Údarás to secure agreement for the development of a 2.8 acre site in An Clochán. The purpose of this was to free up the community centre (Halla Le Chéile) for community use and to provide extra space that would allow the Comharchumann to attract companies into the area. Today 'Páirc Teicneolaíochta Clocháin Bréanainn' is designed, and phase one is in the latter stages of full planning permission (commencement of construction is planned for the end of 2008) with stages two and three at outline stage. This development, which is being funded by Údarás will provide 10 offices of different sizes with phase two consisting of six manufacturing units along with additional space, which can be developed by the Comharchumann as needs are identified.

The Comharchumann are currently exploring possible uses for the land surrounding Halla Le Chéile. There is an agreement between the Comharchumann and the landowner that it can be purchased for €50,000 should a suitable use be proposed. A current suggestion is the development of a sports centre.

Development work has also been undertaken with Brandon Fishermen to develop a seaweed farm in Brandon Bay. The Comharchumann is currently awaiting approval from the Department of Communications, Energy and Natural Resources for a trial license. Land has been sourced in An Clochán that may be leased or purchased for a marine based project.

Comments from CFLT Management:

CFLT envisages a role in the provision of the wood supply chain initially and later the supply of boilers. They feel they are in a good position to service the local area including Tralee.

The strengths of the Comharchumann to develop a wood energy project are:

- land and buildings could be provided
- good working relationship with local farmers and IFA
- possibility of woodchip heating system in new Údarás funded enterprise development
- enterprise development expertise and experienced work force
- training facilities

Comments from consultants:

The human resources in this co-operative are very strong. The manager is extremely interested in the development of wood energy and is willing to put a lot of effort into exploring its potential for the Dingle Peninsula. The co-operative has been involved in several successful projects and has the capacity to undertake this project.

The wood supply resource however, is limited in this area due to high elevations and poor ground conditions. There are some local private plantations.

(Note: further verification of the potential of this wood resource is subject to access to the Forest Service/Teagasc inventory by DARE Ltd.)

5. Co-operative: Comharchumann Forbartha Chorca, Dhuibhne Teo.

Background:

Comharchumann Forbartha Chorca Dhuibhne Teo. was founded in 1967 to promote the social, cultural and economic aspects of the locality. Its headquarters are in Ballyferriter, eight miles from An Daingean. In 1969 the Comharchumann began the provision of Irish language courses and these have gone from strength to strength with an Irish college now operating in the village. In the 1970s the Comharchumann explored various schemes to strengthen the fishing and farming industries in the area. A horticultural business was established with tomatoes being grown in greenhouses. This business was not commercially successful. Oidreacht Chorca Dhuibhne was established in 1980 and today a successful heritage centre and museum is open to the public in Ballyferriter providing heritage courses and an important tourism visitor centre. Dóvinia Teo., a film production company, was founded in 1993 and the Comharchumann leases a TV studio to house this company.

Functions of the co-operative:

- summer colleges
- Irish courses for adults
- language assistant and home language visitors
- television shows
- community employment schemes

Facilities:

The Comharchumann owns the offices it occupies in Ballyferriter. This is a prefabricated building that is approximately 30 years old. Other buildings include:

- Colaisti Chorca Dhuibhne - the Irish College is rented from Údarás
- the heritage centre and museum is leased from St Brendan's Trust
- the TV studio is leased from Údarás

Future plans:

A 10 acre site has been purchased by Údarás and is being developed in conjunction with NUI Galway and the Comharchumann. Outline planning permission has been obtained to erect two buildings on the site. One will be occupied by NUI Galway as an outreach language training and research centre, the other will be occupied by the Comharchumann and will become their office headquarters, and a language and community facilities centre. The Comharchumann building will occupy 1800 m².

Woodchip has been discussed as a possible heating system.

A project officer is currently being recruited to oversee the development. The expected date for completion is 2011.

Comments from CFCD Management:

There is very little forestry in the area. The manager does not see any major role for the Comharchumann in the development of a wood energy scheme and filled in the questionnaire because he was asked to. The co-operative members are mainly teachers and housewives; there are no farmers involved.

John Kennedy, a co-operative member, who now owns the former Glasshouses site, has a yard that he may be interested in developing.

Comments from consultants:

There is no obvious potential to develop wood energy with this co-operative as there is an inadequate wood supply. The planned development by NUI Galway and Údarás may be a potential end user.

6. Co-operative: Forbairt na Dromoda Teo.

Background:

This co-operative was founded to enhance a sense of place and to address the desire of the community to cater for the lack of community facilities, employment and accommodation.

A community hall, three enterprise units and a hostel were built on a green field site between 1996 and 2001. Training courses provided at the centre have included computers, carer's course, Irish language, and health and safety

Three full time staff are employed: manager, assistant manager and secretary. Seven part time staff are employed: two under a FAS CE scheme and five through the RSS.

Functions of the co-operative:

Provision of social, economic and cultural opportunities for the local community:

- community hall facilities
- hostel
- provision of three enterprise units
- child care facility: crèche, pre-school, after school service and summer camps
- six senior houses
- day care centre
- provision of meals for the elderly
- laundry service
- co-ordination of RSS and CE schemes
- provision of radio na Gaeltachta studio

Facilities:

Lonad na Dromoda is on a 99 year lease from Údarás. The complex consists of a child care facility, a community hall (manager's office, radio studio, shower room, reception area and the hall), a hostel, laundry, a day centre (with large kitchen), hair dressing salon and six houses for the elderly. The complex also contains three enterprise units, each of which is 100m². The complex is open all year round.

An energy audit of the buildings (with the exception of the enterprise units, laundry and the six houses for the elderly) has been completed by OES Consulting.

Future plans:

Currently the co-operative are exploring the feasibility of developing a respite centre and increasing the number of sheltered housing units from six to 12.

Comments from FDT Management:

FDT see scope for provision of skills training and as a potential end user. However, they do not see any potential as suppliers as this organisation is a company not a co-operative.

Comments from consultants:

There is a constant load all year round as the centre is used as a training centre for outdoor pursuits (September to June). There is a local chipping contractor in Caherciveen and a potential local wood supply. Currently each unit has a separate boiler. There are eight boilers on site, all oil fired. The annual oil bill for one of these boilers, located in the main office building is €12,000 to €13,000.

7. Co-operative: Comharchumann Shailearna Teo., Co. an Gaillimhe

Background:

Comharchumann Shailearna Teo. is a limited company with charitable status. It employs six full time staff and one part time.

Functions of the co-operative:

The main activities of the company are in community development and the promotion of the Irish language.

Facilities:

Comharchumann Shailearna Teo. occupy office space in a renovated schoolhouse. Another section of this building is occupied by a preschool. All of the building is owned by the Comharchumann Shailearna Teo. A geothermal heating system is currently being used to heat the building.

Future plans:

The company are exploring the installation of a micro wind turbine to power the geothermal heating system, as this system is currently proving very expensive to operate. Comharchumann Shailearna Teo. has made an application to Údarás for assistance with a windfarm application on a 250 acre site and they have had a pre-planning meeting with Galway County Council.

Comments from FDT Management:

Comharchumann Shailearna Teo. has already installed a geothermal heating system and has an application with Údarás to develop a wind turbine to underpin this system. The management would like to concentrate on this development rather than becoming involved in the wood energy sector. However, it would act as an information disseminator to the local community for any renewable energy developments.

Comments from consultants:

This company already has a renewable energy system installed in its premises and has little interest in being an end user for wood energy. There is no potential for this group to be involved in the supply chain for wood energy.

8. Co-operative: Comhlacht Forbartha an Spidéil Teoranta, Co. an Gaillimhe

Background:

This organisation was formerly a co-operative but is now a limited company with a board of management. It employs one full time employee and one part time.

Functions of the co-operative:

To promote the Irish language and develop facilities and services for the public in order to promote the social and economic development of the Spidéil area. The company is currently working on a website, newsletter and language plan, encouraging local business to use the Irish language.

Facilities:

The company is currently housed in a rented building of 40m².

Future plans:

The company are to avail of office facilities in Arás an Phiarsaigh, a new public building within the village that is currently being planned. The manager stated that the possibility of including a biomass heating system within this new building has already been considered by Údarás and plans have been drawn up.

Comments from FDT Management:

The co-operative is interested in wood energy development as a means of creating local employment. Management envisage the co-operative acting as facilitators and information disseminators to the local community in the development of a local wood energy structure.

Comments from consultants:

The co-operative could be a potential end user if a biomass system was installed in the planned Aras an Phiarsaigh.

9. Co-operative: Tearmann Éanna Teo. Co. na Gaillimhe

Background:

Tearmann Éanna Teo. is a limited company with charitable status.

Functions of the co-operative:

Supplying services to the public, including a social housing scheme for the elderly.

Facilities:

The Tearmann Éanna Teo. office is housed within a recently developed cluster of buildings in Baile an hAbhainn. Buildings within the complex include:

- Tearmann Éanna offices and a day care centre (under Tearmann Éanna ownership)
- social housing scheme of 20 houses (under Tearmann Éanna ownership)
- health centre (Under HSE ownership)
- nine apartments for disadvantaged people

A further 12 social houses, owned by Tearmann Éanna are located at Knock, approximately three miles distant. The Tearmann Éanna office adjoins an Údarás industrial estate.

Future plans:

There are no plans at the moment.

Comments from FDT Management:

The co-operative envisages itself as an end user in a possible district heating system. However they would be heavily reliant on Údarás for monies to develop such a system.

Comments from consultants:

This cluster of buildings would be a good demonstration model for a district heating system. There is adequate space on site for a single boiler. Access is good for demonstration purposes. However, this co-operative has very limited funds and if the project were to proceed all funding would have to be sourced elsewhere.

10. Co-operative: Comharchumann Dhúiche Sheoigeach, Corr na Móna, Co. na Gaillimhe

Background:

Comharchumann Dhúiche Sheoigeach (CDS) is a co-operative with over 250 members. It employs five full time and two part time staff. The origins of this co-operative stretch back to 1974 when they were responsible for the setting up of a very successful timber mill at Corr na Mona. The timber mill business (EEC Teo) has since been sold and is currently operated successfully by a private owner offering a major source of local community employment.

The co-operative has been involved in several other successful projects over the years including:

- the setting up of Irish colleges (now independently run by Spleodar)
- the setting up of starter businesses, among which is horticultural mulch business, Crann na Mona
- development of a farmers co-operative and hardware shop
- development of a co-operative producer group for the production of Connemara Hill Lamb

Functions of the co-operative:

CDS acts as a social, cultural and economic advisor, facilitator and developer for the social and economic benefit of the local community.

Facilities:

CDS owns the premises that it currently occupies, covering 670m².

Future plans:

CDS have been exploring the wind energy sector with the idea of developing a community owned wind farm.

Comments from FDT Management:

The co-operative members are very interested in exploring the possibilities of developing a wood energy business. They believe they have an advantage in organising themselves in the supply end of the market due to their past development of the EEC Teo timber mill and its central location within the community and adjacent to the co-operative's offices. They also see a role for themselves in the skills training sector and the development of an installation and maintenance business to service woodchip boilers.

The two representatives of the co-operative who were interviewed by the consultants were eager to discuss the proposal with their board and to look at all the options. This board meeting took place in early September and the outcomes were as follows.

The board would be in favour of becoming involved in the development of a wood energy supply chain and ancillary service industry if funding was made available and access to one of the Údarás units in Clonbur as a storage depot was agreed.

They see three possible options for joint management structures:

- Údarás and CDS
- Údarás and CDS plus a private investor
- Údarás and private investor

Comments from consultants:

This co-operative is well placed for the development of both a wood supply and an installation/service business. However, funding is an issue and a management structure would have to be agreed.

Example

ESCO Contract

Xxx 2008

Community Co-operative Heat Supply

DATE:**PARTIES:**

- (1) Community Co-operative Heat Supply Company Ltd (CCHSC) (which expression shall include its successors and assigns); and
- (2) Client ("Customer" which expression shall include its successors and assigns),
.....

INTRODUCTION:

- (A) Customer owns and operates a.....
and agrees to enter into Agreement with CCHSC to provide energy heat energy for his premises,.....
- (B) Customer agrees to allow CCHSC to install the Equipment necessary to supply heat.
- (C) CCHSC will provide heat on the basis of:
 - a fixed monthly fee to be paid monthly in advance by direct debit
 - a per kWh charge based on the metered heat provided on a monthly basis for the biomass heat. A quarterly payment based on a predicted annual consumption. Heat meter will be installed to monitor the heat used and will be reconciled on an annual basis. The cost per kWh will be indexed linked based on an agreed index and conditions laid out in paragraph 7.4
- (D) The Term of this Agreement is years from the date of issuance of the Certificate of Working Order.
- (E) CCHSC maintain ownership of the Equipment during and after the life of the project.
- (F) CCHSC will operate the heat supply facility, however, the client will provide on site assistance when practical.

AGREEMENT:**1. Interpretation**

Agreement: this Customer Agreement

Assumptions: those Assumptions and estimates set out in Schedule 2 to this Agreement (and which are non-binding on the parties)

Capital Costs: the sum of €..... to include the Capital Costs of designing, purchasing, installing and testing the Equipment

Equipment: any goods agreed in the Contract to be supplied to the Customer by CCHSC (including any part or parts of them)

Expert: an Expert appointed in accordance with this Contract

Premises: the building and ancillary premises of the Customer at the delivery point

Maintenance: Maintenance and the provision of spare parts in accordance with clause X

2. Description

- 2.1 The quantity and description of the Equipment and the fuel shall be as set out in Schedule 1.

3. Risk/Title

- 3.1 The Equipment shall be at the risk of the Customer from the date of issuance of the Certificate of Working Order. The Customer undertakes to keep the Equipment safe, in good condition and free from damage, alteration or deterioration pending the issuance of the Certificate of Working Order.
- 3.2 Ownership of the Equipment shall not pass to the Customer until completion of the Contract term.
- 3.3 The Customer's right to possession of the Equipment shall terminate immediately if: the Customer has a bankruptcy order made against them or makes an arrangement or composition with his creditors, or any bankruptcy, insolvency or analogous procedure is commenced, relating to the insolvency or possible insolvency of the Customer, or any receiver is appointed over any of the assets of the Customer; or the Customer suffers or allows any execution, whether legal or equitable, to be levied on their property or obtained against them, or fails to observe or perform any of their obligations under the Contract or any other contract between CCHSA and the Customer, or is unable to pay its debts as they fall due or the Customer ceases to trade; or the Customer encumbers or in any way charges any of the Equipment.

4. Installation and Commissioning

- 4.1 CCHSA shall provide the services of suitably trained and experienced personnel to install the Equipment at the delivery point. The Customer shall make available such personnel, equipment (of the Customer) and access as CCHSA may request for this purpose.
- 4.2 The Equipment shall be installed at the location agreed between the Customer and CCHSA, however the ultimate decision and responsibility for location rests with the Customer.
- 4.3 When the Equipment has been installed, CCHSA shall carry out its standard test of the Equipment to ensure that the Equipment is correctly installed and is in satisfactory working order.
- 4.4 CCHSA shall provide initial training and documentation to the Customer to assist the Customer in the use of the Equipment.

5. Operations and Maintenance

- 5.1 Customer undertakes to operate the Equipment and store the fuel in accordance with all relevant manufacturers' instructions and documentation.
- 5.2 CCHSA will provide scheduled and unscheduled Maintenance for the biomass boiler installation during the Contract. Scheduled Maintenance will be in accordance to the manufacturer recommendations and be provided by qualified and approved technicians, and maintain all relevant warranties.

6. Capital Costs and Payment

- 6.1 CCHSA fund the Capital Costs of purchasing, installing and testing the Equipment.
- 6.2 The Customer shall make all payments due under the Contract in full without any deduction whether by way of set-off, counterclaim, discount, abatement or otherwise.
- 6.3 If the Customer fails to pay CCHSA any sum due pursuant to the Contract, the Customer shall be liable to pay interest on such sum from the due date for payment at the annual rate of 2% above EURIBOR accruing on a daily basis until payment is made, whether before or after any judgment.
- 6.4 The customer shall pay CCHSA according to the following:
- 6.5 A fixed fee per annum of €..... payable in 12 monthly instalment of €....., one month in advance by direct debit. This fee will remain the same for the duration of the Contract.
- 6.6 A variable fee of €0.0..... per kWh for heat supplied as read from the heat meter . This will be payable within 30days from date of issuing the invoice.
- 6.7 The variable fee will be indexed at the end of each year (on the anniversary of the date of issuance of the certificate of working order). The index will be based on the following
- 6.8 The price is based on a metered heat usage of..... kWh per annum. If this is reduced by more than 25% then CCHSA entitled to revise its variable charge sufficient to cover fixed costs included this variable rate. Such fixed costs include Maintenance and administration costs.
- 6.9 The total amount of metered heat is estimated to bekWhs per year.

7. Fuel Supply

- 7.1 CCHSA shall supply fuel to the system.
- 7.2 CCHSA shall be responsible for monitoring fuel usage and requesting a delivery. The customer will assist by advising on any unusual changes in usage.

8. Limitation of Liability

- 8.1 The following provisions set out the entire financial liability of CCHSA (including any liability for the acts or omissions of its employees, agents and sub-contractors) to the Customer in respect of any breach of these conditions;
 - any use made or resale by the Customer of any of the Equipment, or of any product incorporating any of the Equipment; and
 - any representation, statement or tortious act or omission including negligence arising under or in connection with the Contract.
 - all warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.
 - nothing in these conditions excludes or limits the liability of CCHSA:

- for death or personal injury caused by negligence;
- for any matter which it would be illegal to exclude or attempt to exclude its liability; or
- for fraud or fraudulent misrepresentation.

Subject to clause 0 and clause 0:

- Total liability in Contract, tort (including negligence or breach of statutory duty), misrepresentation, restitution or otherwise, arising in connection with the performance or contemplated performance of the Contract shall be limited to the capital value of the project.
- CCHSA shall not be liable to the Customer for any pure economic loss, loss of profit, loss of business, depletion of goodwill or otherwise, in each case whether direct, indirect or consequential, or any claims for consequential compensation whatsoever (however caused) which arise out of or in connection with the Contract.

9. Termination

- 9.1 Either party shall be entitled to terminate this Agreement if the other party is in material breach of any of its obligations under this Agreement and has failed to rectify same within thirty days of having received notice to that effect from the other party. Either party may refer a dispute regarding termination to the Expert for dispute resolution.

10. Dispute Resolution

- 10.1 In the event of any dispute between the parties hereto on any matter, the parties shall negotiate in good faith to attempt to resolve the dispute. If after 30 days the parties have not resolved the dispute, either party may refer the matter to the Expert for resolution. The procedure for dispute resolution is outlined in Schedule 3.

11. Assignment

- 11.1 Neither party may assign the Contract or any part of it to any person, firm or company without the prior written approval of the other party, such approval not to be unreasonably withheld. The parties hereby undertake and agree that this Agreement shall be binding on the successors and assigns of the parties.

12. Force Majeure

- 12.1 Both parties reserve the right to defer the date of delivery or to cancel the Contract or reduce the volume of the Equipment ordered if it is prevented from or delayed in the carrying on of its business due to circumstances beyond its reasonable control, including, without limitation, acts of God, governmental actions, war or national emergency, acts of terrorism, protests, riot, civil commotion, fire, explosion, flood, epidemic, lock-outs, strikes or other labour disputes (whether or not relating to either party's workforce), or restraints or delays affecting carriers or inability or delay in obtaining supplies of adequate or suitable materials, provided that, if the event in question continues for a continuous period in excess of [180] days, either party shall be entitled to give notice in writing to terminate the Contract.

13. Public Relations

13.1 Both Parties agree to manage and coordinate public relations activities on a joint basis.

14. General

14.1 If any provision of the Contract is found by any court, tribunal or administrative body of competent jurisdiction to be wholly or partly illegal, invalid, void, voidable, unenforceable or unreasonable it shall to the extent of such illegality, invalidity, voidness, voidability, unenforceability or unreasonableness be deemed severable and the remaining provisions of the Contract and the remainder of such provision shall continue in full force and effect.

14.2 The formation, existence, construction, performance, validity and all aspects of the Contract shall be governed by Irish law and the parties submit to the exclusive jurisdiction of the Irish courts.

THIS AGREEMENT has been entered into on the date stated at the beginning of this Agreement.

Executed as a Deed by as a duly authorised signatory for and on behalf of CCHSA in the presence of:	
Witness Signature:	
Name: Address: Description:	

Executed as a Deed by as a duly authorised signatory for and on behalf of client in the presence of:	
Witness Signature:	
Name: Address: Description:	

15. Dispute Resolution

- 15.1 In the event of any dispute between the parties hereto on any matter, the parties shall negotiate in good faith to attempt to resolve the dispute. If after 30 days the parties have not resolved the dispute, either party may refer the matter to the Expert for resolution.
- 15.2 An Expert is a person appointed in accordance with this clause to resolve a matter under this Agreement. The parties shall endeavour to agree on the appointment of an independent Expert. The Expert shall act as expert and not as an arbitrator and the provisions of the Arbitration Acts, 1954 to 1998 shall not apply. The Expert's written decision on the matters referred to him shall be final and binding in the absence of manifest error or fraud.
- 15.3 If the parties are unable to agree on an Expert within seven days of either party serving details of a suggested Expert on the other, either party shall then be entitled to request the President for the time being of the Institute of Chartered Accountants in Ireland to appoint an Expert who is an accountant of repute with relevant experience and experience in acting as an Expert.
- 15.4 The Expert is required to prepare a written decision and give notice (including a copy) of the decision to the parties within a maximum of three months of the matter being referred to the Expert.
- 15.5 If the Expert dies or becomes unwilling or incapable of acting, or does not deliver the decision within the time required by this clause then:
- either party may apply to the President for the time being of the Institute of Chartered Accountants to discharge the Expert and to appoint a replacement Expert with the required expertise; and
 - this clause applies in relation to the new Expert as if he were the first Expert appointed.
- 15.5 The parties are entitled to make submissions to the Expert including oral submissions. The parties hereto shall provide (and shall procure others such as the Expert may request or indicate) the Expert with such assistance, documents and other information as the Expert reasonably requires, and shall give the Expert access to all documentation and personnel as the Expert requires, for the purpose of reaching a decision.
- 15.6 To the extent not provided for by this clause, the Expert may in his reasonable discretion determine such other procedures to assist with the conduct of the determination as he considers just or appropriate, including (to the extent he considers necessary) instructing professional advisers to assist him in reaching his determination.
- 15.7 Each party shall bear its own costs in relation to the reference to the Expert. The Expert's fees and any costs properly incurred by him in arriving at his determination (including any fees and costs of any advisers appointed by the Expert) shall be borne by the parties equally or in such other proportions as the Expert shall direct.

For further information please contact:

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