Wood Energy Strategy and Action Plan:

Full Version

WDC

WESTERN DEVELOPMENT COMMISSION
COIMISIÚN FORBARTHA AN IARTHAIR

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Abbreviations

CHP	Combined Heat and Power
CO_2	Carbon Dioxide
EPA	Environmental Protection Agency
ESCO	Energy Supply Company/Contract
FTE	Full time equivalent jobs
GWh	Gigawatt hour
IBEC	Irish Business and Employers Confederation
IDA	Industrial Development Agency
kW_e	Kilowatts of electrical power
kW_{th}	Kilowatts of thermal heat
LPG	Liquid Petroleum Gas
MW_e	Megawatts of electrical power
MWh	Megawatt hour
MW_{th}	Megawatts of thermal heat
OECD	Organisation for Economic Co-operation and Development
ORC	Organic Rankine Cycle
R&D	Research and Development
SEI	Sustainable Energy Ireland
SO_2	Sulphur dioxide
WDC	Western Development Commission

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Executive Summary

This report is a strategy for the development of the wood energy sector within the Western Region, setting out levels of market growth and a detailed action plan for the implementation of the strategy. The work was prompted by the changing energy policy environment culminating with the publication of the *White Paper on Energy* and the *Bioenergy Action Plan* in March 2007, and the realisation that although the Western Region has 40% of the national wood resources, the wood energy market is relatively underdeveloped by international comparisons. The strategy is based upon extensive consultations and has been delivered under the guidance of the Western Development Commission (WDC) and the Regional Wood Energy Advisory Group (RWEAG)[1].

The strategy

The strategy developed will focus on the following key themes with specific actions identified to achieve the attendant aims:

- getting the message across
- growing the market
- developing an integrated wood supply
- providing supportive policy, finance and regulation

Impact of strategy

As part of the strategy the WDC commissioned an economic impact study to examine the benefits of the development of the sector in the Western Region (please see economic impact report). The gross impacts of the chosen strategy (medium scenario) by 2020 were estimated to be:

- 887 full time equivalent (FTE) jobs created
- increased annual Gross Value Added (GVA) in the Western Region of €15 million
- increased regional timber usage providing €1.7 million to the farming sector per annum
- CO_2 emissions savings of 619,000 tonnes

Therefore, the strategic added value of implementing the regional wood energy strategy includes:

- development of an indigenous, sustainable, renewable energy resource
- adherence to Kyoto protocol emission reduction targets
- lowering of the regional (and therefore the national) carbon footprint

Wood energy development in Europe

Other counties and regions have achieved significant market growth through the implementation of proactive wood energy development strategies. Since 1994, Upper Austria has supported the development of the wood energy sector through a co-ordinated, regional development programme. By 2002 more than 30% of the primary energy consumption was produced from renewable energy sources with wood energy providing 14% of this installed capacity. In 1998, Finland had approximately 20MW of wood heating capacity installed, rising to 170MW of installed capacity by 2006 through the support of a network of regional energy agencies.

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[1] Sustainable Energy Ireland; Teagasc (Research and Forestry representatives); LEADER Programme; Údarás na Gaeltachta; Galway Energy Agency; local authorities (Donegal County Council); Sligo Institute of Technology (Department of Environmental Science); Department of Community, Rural and Gaeltacht Affairs; Department of Communications, Energy, and Natural Resources; The Forest Service of the Department of Agriculture and Food; IFA Farm Forestry; Rural Generation Ltd; Imperative Energy Ltd/Green Belt Ltd.

Policy context

The *White Paper on Energy* and the *Bioenergy Action Plan (2007)* provide a clear policy context for the development of the wood energy sector in the region. The White Paper identified three core issues in relation to energy development: sustainability, security and competitiveness. The development of a wood energy sector can address each of these core issues: wood fuels are a sustainable fuel derived from sustainably managed forests; they are owned, grown, managed and processed in the region and displace imported fossil fuels; and currently wood fuel is the lowest cost fuel available in the region.

The White Paper states the need for *"sustained multi-agency collaboration, at national, regional and local level, working in strategic alliances to ensure that we realise"* the renewable energy potential. The proposed strategy is a strategic, multi-agency approach to development of the wood energy sector facilitated by the WDC.

Wood fuel resources in the Western Region

In the Western Region, 11.5% of land is afforested (approximately 40% of Ireland's forestry) and the projected increase in planting rates is 3,000 hectares per annum. The forest resource offers the following types of potential wood fuel resource:

- post consumer wood waste (recycled wood)
- purpose grown energy crops, e.g. short rotation coppice such as willow
- co-products (by-products of the sawmill industry)
- 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)

The potential wood fuel supply from each of these resources was reviewed to estimate the wood fuel available within the region. For the regional wood fuel resource projections, only wood produced from **private sector forestry and co-products** was included. The sustainable production forecasts for this forestry material (combined with sawmill co-products) was 210,500 tonnes per annum by 2010, set to rise each year to **516,000 tonnes per annum by 2020.**

This forestry material is available within the region due to the woodlands being of a young age profile and the main harvesting activity over the next 20 years being thinning of private sector forestry. This material is ideal for energy use as it is: low value; small in diameter and thus suitable for chipping, and has achievable low moisture content of approximately 35% through conventional air drying processes, resulting in a quality woodchip fuel. Critically, this material is **additional to current market demand** and could be supplied into a wood energy market without a displacement impact on the supply of wood for other markets in the region and beyond.

Market research concluded that a price for delivered wood fuel in the range of €55.50 to €75 per tonne (50% moisture content) would make it commercially viable to undertake thinnings (this would result in a delivered heat price of 2.8 to 3.8 cent per kWh). As wood fuel is a bulky, low value commodity, it is disproportionately affected by transport costs. Therefore it must be grown and consumed within a restricted geographical distance (approximately 30 to 40 mile radius) if it is to be commercially viable.

Market potential

Wood fired heating technologies are likely to form the most important part of heat market growth in the region due to the size of the heat market and the price competitiveness of wood as a fuel (please see comparative fuel costs table below). Wood systems are much more ***expensive to install*** than fossil systems. However, they are much ***cheaper to operate*** as the cost of wood fuel is much lower than oil and gas; market development is based upon a fuel saving justifying a capital investment.

Comparative fuel costs 2007

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

The most commercially attractive market for wood fuel will be larger scale commercial and industrial heat users, typically using oil, such as large hotels, care homes, hospitals, secondary schools, process heat users and industrial heat users. Here the cost reductions offered by wood fuel are sufficient to justify the capital investment as the paybacks can be below three years with current SEI grants (typically when compared to oil systems). **This commercial and industrial heat market is the key target market segment of the strategy and action plan.**

Barriers to market development

The main constraints to market development in the region are analysed under four headings.

1. Getting the message across

- **Awareness:** many energy users are simply unaware of the technology and the wood fuel supply options.
- **Confidence:** there is a lack of market confidence in the technology and fuel supply chain because it is new to the region.
- **Fuel supply confidence:** the market is not confident that quality wood fuel can be supplied reliably and that it will not 'simply run out'.
- **Confidence in long term price:** there are market concerns over how stable wood fuel prices will be over the next few years.
- **'Reliability and usability' of the technology:** there are market concerns over how reliable and convenient the technology is.

2. Growing the market

- **Practical skills and experience:** how wood boilers operate efficiently and convert wood to energy are new areas of knowledge that must be developed if the sector is to grow.
- **Understanding the business case:** knowledge of what it will cost and how the economics work must be increased.
- **Complexity of investment process:** the investment process is not only more complex, it is new, involving procurement of wood fuel and technology where specialist expertise is required.
- **Capacity of installers:** this is a key factor in increasing the rate of market development.
- **Design and project management skills:** a range of technical and design skills are needed to install wood energy systems.
- **Design quality:** the impact that poor quality and badly specified projects can have on early market development is significant.
- **Aftercare and maintenance:** provision of reliable and cost effective after sales service.

3. Developing an integrated wood supply

- **Lack of awareness amongst growers:** lack of awareness and understanding prevents participation in the market.
- **Small size plantations:** the woodlands that are most suitable for wood energy production are dispersed and small in scale, causing commercial difficulties in undertaking harvesting unless plantations are 'clustered'.
- **Equipment and infrastructure:** requires new investment based upon market opportunities and knowledge of the correct equipment.

4. Providing supportive policy, finance and regulation

- **Regulations:** supportive planning polices will increase the rate of market development.
- **Emissions to air:** concerns over the combustion of wood and its regulations must be actively addressed.

Market scenarios and targets

The strategy identified the following scenarios:

'do nothing' scenario

- A static market environment and no additional public intervention through a regional action plan; the current SEI boiler installation grant scheme is discontinued in 2010.

low scenario

- A static market environment for wood energy but an action plan is implemented to promote market development; the current SEI grant support for boiler installation is continued after 2010.

medium scenario

- The action plan is implemented to support market development and fossil fuel prices continue to rise above the rate of general inflation in the economy. More supportive policy and regulation and the current SEI grant support for boiler installation is continued after 2010.

high scenario

- The action plan is implemented to support market development and fossil fuel prices increase at 15% per year. Carbon taxation is introduced with aggressive renewable energy targets, additional polices and very supportive regulations. The current SEI grant support for boiler installation is continued after 2010.

The table below summarises each of the scenarios presented. These figures represent newly installed capacity and are additional to the estimated baseline position for 2007 of 65.5MW.

Summary of growth scenarios and targets (from baseline)

	'Do nothing' (MW)	Low Scenario (MW)	Medium Scenario (MW)	High Scenario (MW)
Wood heat energy by 2010	5.5	20.0	40.0	70.0
CHP heat energy by 2010	15.0	15.0	15.0	15.0
Total heat energy by 2010	**20.5**	**35.0**	**55.0**	**85.0**
Wood heat energy by 2020	75.0	232.0	402.0	532.0
CHP heat energy by 2020	30.0	60.0	75.0	90.0
Total heat energy by 2020	**105.0**	**292.0**	**477.0**	**622.0**
Tonnes of wood required per annum by 2020	120,000t	305,600t	**471,600t**	605,600t
% of Western Region heat market achieved	3%	7%	**10.7%**	13%

The medium scenario is recommended as the basis for the strategy and action plan. It represents a logical balance between the available resources, the national renewable heat targets and the likely way in which the external environment and the proposed action plan would impact upon the region.

Action plan

The three year action plan is designed to deliver on the target set out under the medium scenario. It seeks to stimulate the demand for wood energy amongst energy users and facilitate capacity building of installers and fuel suppliers to ensure an effective fuel supply chain. The action plan establishes a strategic, co-ordinated development framework for the sector and complements the existing regional and national support programmes.

The WDC will facilitate the delivery of the action plan. The proposed delivery structure for the action plan is: a Regional Wood Energy Advisory Group to provide strategic direction and oversee the implementation of the action plan; a steering group to deliver on operational issues.

The action plan is intended to be implemented over a three year period, with an annual evaluation to assess effectiveness, progress and value-for-money. It requires direct financing and benefit-in-kind working arrangements from relevant partners, including: Sustainable Energy Ireland (SEI); Department of Communications, Energy and Natural Resources; Teagasc; LEADER Programme; energy agencies; Forest Service of the Department of Agriculture and Food; COFORD; county councils and energy agencies.

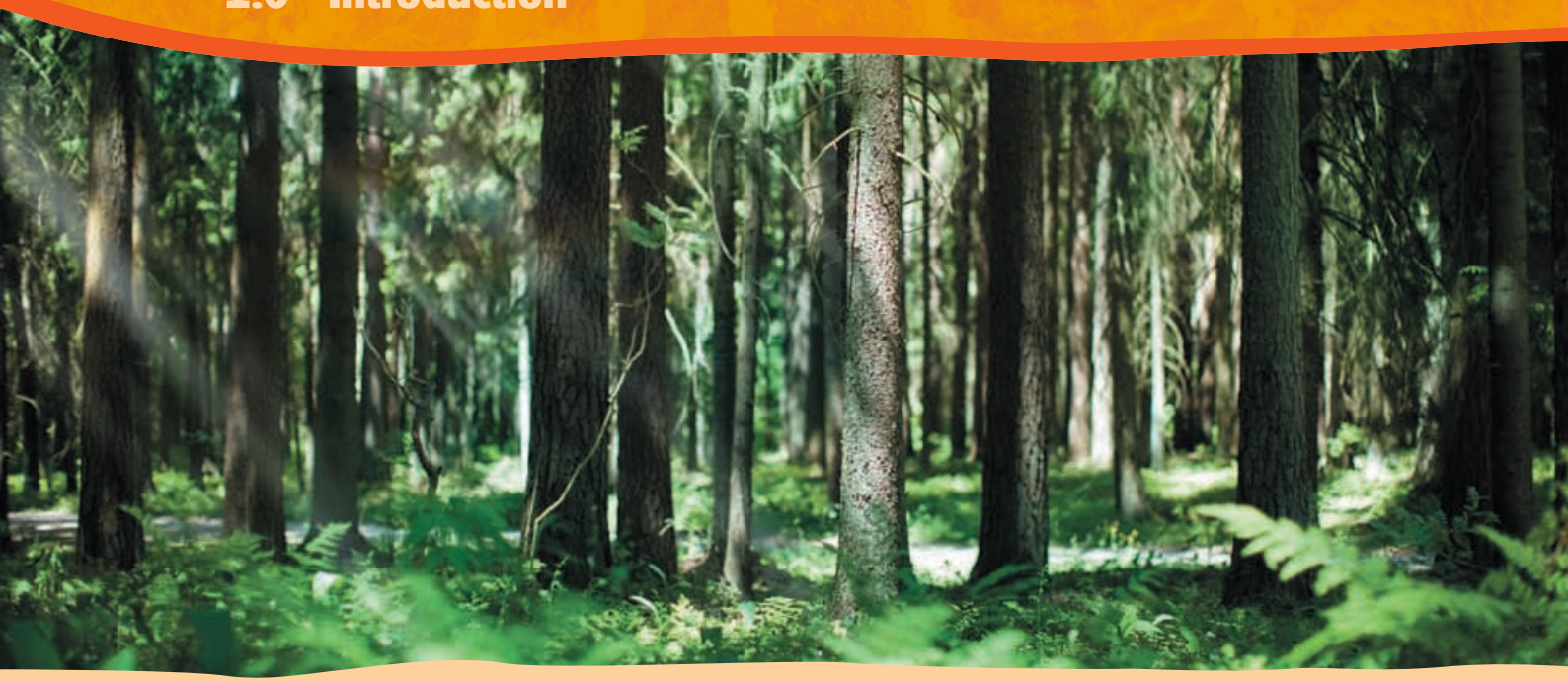
The themes and costs are summarised in the table below.

Action plan summary

Theme	Action	Estimated Cost
getting the message across	A regional information campaign to increase market awareness with actions including conference, information leaflets, learning journeys, website portal, and regional 'wood energy trail'. The campaign would be delivered via a partnership approach involving stakeholders such as WDC, SEI, LEADER, energy agencies and county councils.	€128,000
growing the market	A set of demand-side measures to increase market deployment with actions including advisory and technical support services, database of approved installers and scoping of CHP market potential. Market development officers would have primary responsibility for delivering the actions, working closely with relevant partners such as energy agencies, LEADER, and SEI.	€762,000
developing an integrated wood supply	A range of supply-side measures to ensure a sustainable, consistent, quality fuel supply to the market with actions including resource assessments, fuel supplier database, scoping of producer groups, training and quality testing services. Wood fuel advice officers would be responsible for delivery of most of these actions working closely with partners such as Teagasc, Forest Service and existing regional projects, e.g. Donegal Forest Link, Clare Wood Energy Project.	€463,000
providing supportive policy, finance and regulation	A range of actions to improve the local and national policy environment, for instance provision of guidance to county councils, working with county councils to establish county based targets and engaging in monitoring of strategy. Market development officers would delivery the majority of these actions.	€22,500
Total annual cost*		**€593,500**
Total cost over 3 year term		**€1.78 million**

**Of this, the staffing cost of the regional team is estimated at €485,000 per annum.*

1.0 Introduction



1.1 Background to report

This report has been prepared for the Western Development Commission (WDC) by Steve Luker Associates and DARE Ltd. It presents a strategy and action plan for the development of the wood energy sector within the Western Region. It has been produced to set out projected levels of market growth in the sector by 2020 and provide a detailed action plan to underpin the achievement of this market growth.

This work is based upon consultations with a large range of individuals and organisations as listed in Appendix 1 and has been delivered under the guidance of the Regional Wood Energy Advisory Group (RWEAG). The members of the RWEAG are:

- Sustainable Energy Ireland
- Teagasc (Research and Forestry representatives)
- LEADER Programme
- Údarás na Gaeltachta
- regional energy agencies
- local authorities (Donegal County Council)
- Sligo Institute of Technology (Department of Environmental Science)
- Department of Community, Rural and Gaeltacht Affairs
- Department of Communications, Energy, and Natural Resources
- The Forest Service of the Department of Agriculture and Food
- IFA Farm Forestry
- Rural Generation Ltd
- Imperative Energy Ltd/Green Belt Ltd

The RWEAG members represent a broad cross section of public and private sector stakeholders in the wood energy sector.

1.2 Wood energy development project

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 counties of Donegal, Sligo, Leitrim, Roscommon, Mayo, Galway and Clare.

The WDC facilitates the development of sustainable strategic initiatives in the region by acting as an 'honest broker' in the development process. The approach involves establishing a knowledge base for a 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. In August 2006 the WDC established the RWEAG to guide the development of the project.

The WDC consider this partnership approach between the stakeholders fundamental to achieving successful implementation of the strategy. It is also an approach that is encouraged by the *White Paper on Energy* and *Bioenergy Action Plan*.

The wood energy development project has three distinct phases:

Phase one: research

Phase one concluded with the completion of the research document *Wood Energy Development in the Western Region* that was published in February 2007[2]. The research showed that the wood energy sector has the potential to grow and bring significant benefits to the region including reducing CO_2 emissions, providing a locally available, competitively priced fuel, displacing reliance on more expensive imported energy and generating locally retained income and employment. The research also established that the sector required active intervention to fully capitalise on the potential benefits. The presented strategy and action plan draws on the findings of that report.

Phase two: regional wood energy strategy and action plan

This phase was completed between June 2007 and December 2007. It comprised a strategy and action plan to underpin and support market growth, and ensured that the potential economic benefits of a regional wood energy sector were fully realised. The strategy and action plan are set out in this report.

Phase three: delivery of the action plan with stakeholders

The WDC and the RWEAG plan to commence co-ordination and delivery of the action plan at the beginning of 2008. The WDC will act as a facilitator and help feed back relevant policy recommendations at national level. Successful delivery will require the commitment and effective partnership of the various stakeholders in the region, including those at national level.

[2] Available for download on http://www.wdc.ie/publications_reports.html

1.3 Need for a wood energy strategy and action plan

In 2007, the Department of Communications, Energy and Natural Resources published the *White Paper on Energy* and the *Bioenergy Action Plan for Ireland*. These policy documents highlighted the potential of bioenergy in terms of how it can contribute towards:

- security of energy supply and fuel diversity objectives
- climate change
- rural development
- renewable energy targets

The White Paper noted the need for:

> ***"sustained multi-agency collaboration, at national, regional and local level, working in strategic alliances to ensure that we realise this potential".***

The White Paper also set a national target for renewable heat of 12% by 2020.

The Western Region's wood energy strategy and action plan is a direct response to the opportunities presented by this policy context and provides a coherent regionally developed framework to deliver on the national bioenergy targets and capture the rural development, climate change and energy supply benefits at regional level.

In addition to the new policy context a key reason why the Western Region in particular should develop a wood energy strategy is that it contains 40% of Ireland's forestry, with three times as much forestry per capita than Ireland as a whole. The region has a significant potential wood fuel resource.

Crucially, timber production from this forestry is forecast to rise rapidly over the next 20 years, particularly from privately owned plantations. The type of timber that could be produced is highly suitable for energy production because it is small diameter thinnings from younger plantations.

This rise in the availability and future production of thinnings timber production is a direct consequence of government forestry grant schemes that promoted planting in the 1980s. The existing market for this material is limited because of the current market prices and the economics of harvesting. Furthermore, as this timber is a low value commodity it would not be commercially viable to transport production outside the region. Therefore, the development of a regional market for wood energy would provide the forestry sector with a new and viable market for its products that would help sustain and promote the forest industries sector in the region.

Oil is the main fuel for the heating sector in the region. Other fuels include LPG and in some more limited areas, mains gas. These fuels are imported and subject to price volatility, rising in price by up to 50% since the late 1990s. The development of a wood energy sector would help to displace imported fossil fuels and reduce the impact of price rises and subsequent volatility in heating market as a result.

1.4 Objectives of the wood energy strategy and action plan

The key objectives of the strategy and action plan are:

- to establish a regional framework incorporating short and medium-term **growth targets**
- to **set out an action plan** to stimulate and facilitate market development and thereby achieve proposed growth targets
- to **facilitate and create a framework for the co-operation and support** of local, regional and national policy makers and stakeholders in developing the sector

1.5 Consultation process and methodology

This strategy and action plan draws upon phase one research document *Wood Energy Development in the Western Region*. In addition, further desk based research was undertaken during the course of the development of the strategy and action plan.

A key principle in the design of this action plan and strategy has been to develop an inclusive approach so that the recommendations fully reflect the needs and aspirations of the key market players and main stakeholders in the sector; after all, it will be the stakeholders who are responsible for achieving the targets that are set.

The consultative process began with the research in phase one of the project and was actively continued to develop the strategy and the action plan. Consultations were based upon seeking the views, experience and knowledge of those already involved in the wood energy sector as suppliers of fuel or technology. This also extended to obtaining the views of many existing wood energy users and a sample of prospective wood energy users.

In addition to seeking general views and information, very specific consultation was undertaken on the proposed regional market growth targets and the proposed action plan in two overlapping stages. The intention of this has been to help ensure the strategy and action plan is grounded in and reflects actual market conditions.

Proposed regional market growth targets

The consultation process began in June 2007 and was undertaken via face-to-face meetings, workshops, telephone, postal and email contacts. A full list of the consultees is included as Appendix 1 of this report. Following this a detailed set of proposed market growth targets were complied into a short report. This report was circulated to the RWEAG and key interested parties in July 2007, with feedback sought and obtained. Following this a final version of the market growth targets was developed and this was formally approved by the RWEAG in September 2007.

Proposed action plan

A similar process was adopted with the development of the proposed action plan, however, it was important that this issue was considered after the market growth targets were established as the scope and nature of the action plan depended on how ambitious the targets were.

2.0 Renewable energy

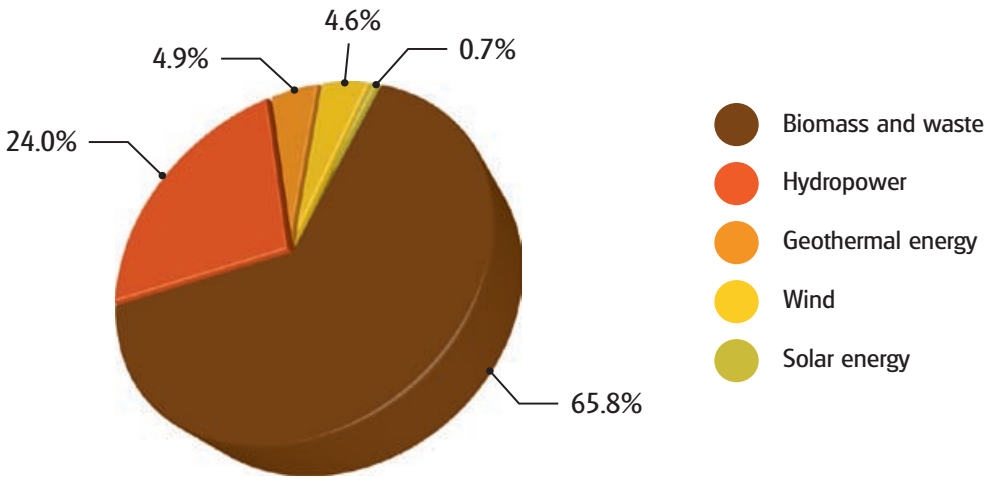
This section discusses renewable energy and biomass use in Europe, Ireland and the Western Region. It outlines the renewable energy targets established under the Energy White Paper together with the core issues for development of the energy sector. It concludes with an outline of why wood energy is a major opportunity for the Western Region.

2.1 Use and deployment of renewable energy

Wood energy is one of the main components of the renewable energy sector worldwide, in Europe, in Ireland and to a lesser extent in the Western Region itself. This part of the report describes how wood energy fits into that wider context.

Renewable energy covers a diverse range of technologies. The following pie chart[3] illustrates the main technologies and their relative importance in terms of use world wide.

Figure 1: Usage of renewable energy technologies in Ireland



This 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.

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.

Across the EU approximately 7% of **all energy** used is from a range of renewable sources[4]. The pie chart below illustrates the renewable energy technologies and their relative contributions[5]. This split is broadly in line with the use of renewable energy worldwide.

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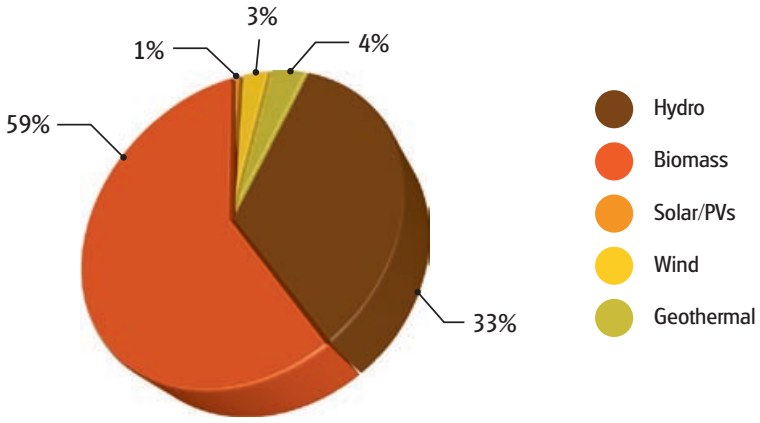
[3] Source: Eurostat 2006

[4] Source: Eurostat 2004

[5] For the EU15. Source: Eurostat 2004.

Figure 2: Use of renewable energy technology in EU



2.2 Renewable energy in Ireland

Only a little over 3% of Ireland's energy needs are met from renewable sources. In 2004, the consumption of energy in Ireland was 14.7 million tonnes of oil equivalent[6] and of that, renewables contributed 0.34 million tonnes of oil equivalent.[7]

In terms of the different renewable energy technologies deployed in Ireland, the following table[8] illustrates the role played by each technology (2004 figures).

Table 1: Renewable energy technologies deployed in Ireland

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**

A significant point is that Ireland lags well behind the EU average in terms of the use of renewable energy with a deployment rate at 3% (of total energy use) compared to over 7% on average across the EU.

However, in common with world wide and EU use, biomass in all its forms (solid/landfill gas/biogas) provides the majority of the renewable energy used in Ireland, at 68% of the total. Solid biomass[9] 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.

6 The measure 'tonnes of oil equivalent' is an accepted means of comparing energy use and is the method used by Sustainable Energy Ireland (SEI) in its national reporting of Irish figures. 0.34 million tonnes converts to 1.57M tonnes of wood fuel (see 5.3 for details on conversions).

7 Source: SEI

8 Data sourced from SEI for 2004.

9 Solid biomass is a term for wood energy.

In terms of how this energy is converted and used, 192,000 tonnes of oil equivalent are used for heating and 119,000 tonnes of oil equivalent are used to generate electricity. The rest of the energy is lost in transformation[10]. Therefore, the most important source and use of renewable energy in Ireland is wood for heating.

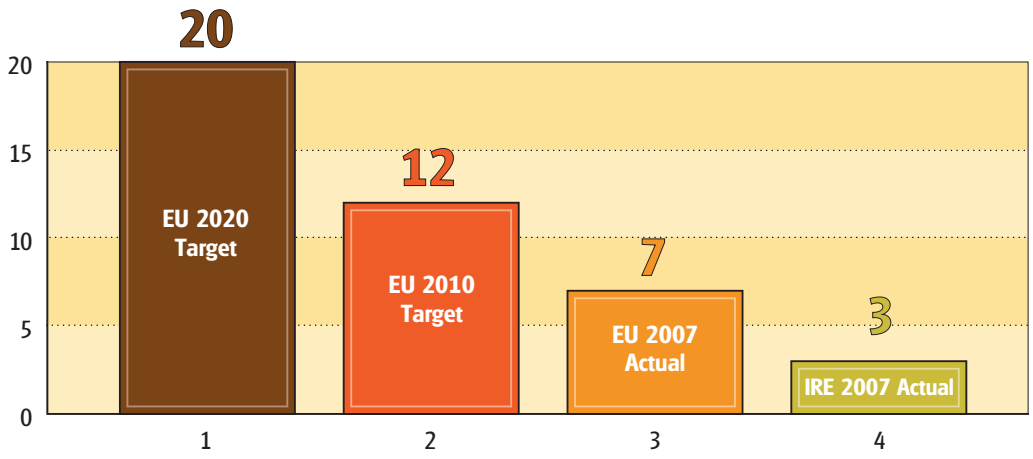
2.3 Targets and policies for renewable energy

The overall targets for renewable energy deployment in the EU as a share of total energy use were set in January 2007 by a communication from the Council of Europe to the European Parliament (the communication is titled the *Renewable Energy Road Map Renewable: Energies in the 21st century: Building a more sustainable future*) and are:

- 12% by 2010
- 20% by 2020

These targets are compared to the actual levels of use achieved in Ireland and the EU in the bar chart below.

Figure 3: Renewable energy deployment in EU



Energy White Paper

In March 2007, the Department of Communications, Energy and Natural Resources (DCENR) published a White Paper on Energy entitled *Delivering a Sustainable Energy Future for Ireland*. In the foreword to the White Paper by Taoiseach, Bertie Ahern T.D. it is stated:

> *"Taken together, the White Paper, the recently launched Bioenergy Strategy, the forthcoming Climate Change Strategy and the imminent National Energy Efficiency Action Plan provide a comprehensive suite of policy initiatives which will contribute to environmental sustainability whilst at the same time delivering reliable, competitively priced energy to businesses and consumers."*

This places bioenergy at the centre of the government's objective to deliver a sustainable energy future for Ireland. The foreward by Noel Dempsey T.D. also states:

> *"The policy actions underway and planned in this White Paper will result in a transformed landscape for the Irish energy sector. Our energy sources will be more sustainable and more diverse. The energy market will have more players and more competition and will operate in a lightly regulated environment. The availability of reliable, secure and competitively priced energy supply will be assured."*

[10] The process of converting fuels results in energy loss through generation or transmission.

The focus on more sustainable, secure and diverse energy supplies creates a strong reason to review and develop this wood energy strategy because it would directly address these concerns. In this context it is worth noting how the White Paper summarises the actions to promote the sustainability of energy supply and use. The White Paper places sustainability at the heart of the government's energy policy objectives. The challenge of creating a sustainable energy future for Ireland is proposed to be met through a range of strategies, targets and actions to deliver environmentally sustainable energy supply and use, including:

- accelerating the growth of renewable energy sources
- delivering an integrated approach to the sustainable development and use of bioenergy resources

The White Paper contains three core issues:

- sustainability
- security
- competitiveness

The development of a wood energy sector would play a role in addressing each of these issues.

Sustainability

Wood fuels will replace the use of finite fossil fuels.

Wood energy production is a sustainable activity in the region because wood fuel is harvested from sustainably managed forests. The principal that underpins this is that each year the total amount of biomass in a forest increases as a result of natural growth caused by photosynthesis. In forestry terms this is called the annual increment and is determined by climate, soils and species. In Ireland forestry is regulated so that overall the annual harvest must equal the annual increment. This means the forecast harvest figures are indefinitely sustainable. In practice some areas of forestry are thinned, some areas are clear felled and some areas are re-planted. In contrast, fossil fuels are extracted from a finite resource base that will inevitably run out.

The other key sustainability issue is that fossil fuels emit CO_2 when they are used for energy production. However, wood fuels are in a closed carbon cycle. They fix carbon during tree growth and release the equivalent amount of carbon when used for energy. If the tree was not harvested for wood fuel production it will eventually die and decay, releasing the carbon it fixed during growth. Thus the tree is in a closed carbon cycle whether it is used for energy or not (provided the whole forest estate is sustainably managed as it is in Ireland).

Security

Fossil fuels are imported; these resources are not owned or controlled by the region or Ireland as a whole. In contrast, wood fuels are owned, grown, managed and processed in the region. This means that the region is able to own and control the supply chain for wood fuels. This is a crucial advantage and ensures that, in proportion to the market share wood fuels secure, security of energy supply is transformed.

Competitiveness

The table below shows the current costs of different fuels in kWhs.

Table 2: Comparative fuel costs (2007)

Fossil fuel prices: Fuel Cost Analysis Report by Enercomm International Consultants Ltd for WDC Oct 2007	
Fuel	**Cost of delivered heat in cent/kWh**
Electricity	6.8 to 14 cent
LPG	7.8 to 8 cent
Oil	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

These figures illustrate that wood fuel has the lowest cost energy. The competitiveness of energy supply for the region would be improved if wood fuels secured a significant market share. It should also be noted that oil for heating dominates the region and therefore it has higher energy costs than other areas of Ireland that have better access to mains gas. Section 3.5 of this report deals in more detail with how the wood fuel price is determined.

It is perhaps in this context that the White Paper contains a notable range of detailed measures to support the bioenergy sector. It proposes to implement (and report annually on) the strategies and targets in the *Bioenergy Action Plan* through integrated and co-ordinated action across government departments and state agencies in consultation with stakeholders. The *Bioenergy Action Plan* intends to continue to roll-out, review and expand as necessary, the fiscal and grant schemes supporting bioenergy development and deployment, including:

- Greener Homes
- Bioheat
- REFIT
- Bio Energy Crop Scheme
- Energy Crops Assistance Scheme
- Biomass Harvesting Scheme
- BES & Seed Capital Schemes
- Research and Development and Innovation Schemes for forestry, biofuels, crops
- Biomass CHP grant scheme

The *Bioenergy Action Plan* proposes to ensure that the public sector leads the way as exemplar, through the deployment of bioenergy heating, the use of renewable electricity and CHP in public buildings. Support is emphasised for the delivery of targets for biomass in the heating sector and the need to accelerate progress in developing a reliable supply chain in the wood energy sector for the private as well as the national forest estate.

The White Paper sets very ambitious targets for expanding the role of renewable energy, notably the target of 33% of electricity consumption to come from renewable resources by 2020.

Other relevant targets include at least 400MW from Combined Heat and Power by 2010 through continued support under the CHP Deployment Programme, and research and development supports, with particular emphasis on biomass fuelled CHP that aim to achieve at least 800MW by 2020.

Renewable heat targets are also proposed; these are discussed under the next section.

A final important aspect of the White Paper is the emphasis it places on partnerships to deliver on the aspirations. It states:

> *"We will improve the linkages between Government Departments, State-sponsored bodies and regional and local organisations to enhance the delivery of energy policy and service delivery at all levels, and, in that context, review the remits, structures and funding arrangements associated with the local energy agencies, with the aim of enhancing their valuable role, taking account of the need to balance efficiency, operational economies of scale and the benefits of local action"*

This suggests that there would be national policy support for the strategy and action plan in the Western Region.

The Bioenergy Action Plan for Ireland

In March 2007 the *Bioenergy Action Plan for Ireland* was published. This established the following national targets (in line with the White Paper):

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

The *Bioenergy Action Plan* does not explicitly state the technologies and fuels that will deliver the targets. Clearly solar and geothermal technologies can provide renewable heat and may experience market growth in Ireland and the Western Region, thereby contributing towards the targets. Currently 96% of the EUs renewable heat is provided by biomass[11], so based upon the evidence of more developed EU markets we expect biomass fuels to be the main contributor to these national targets going forward.

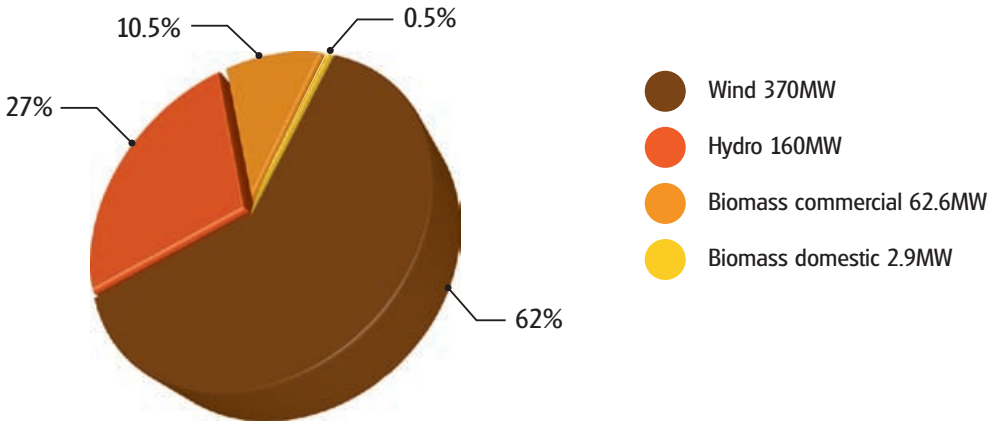
The *Bioenergy Action Plan* sets out the importance of bioenergy and sees its role in the heat, electricity and transport sectors. It terms of wood biomass it notes its versatility for heat, CHP and electricity markets.

[11] Source: Eurostat

2.4 Renewable energy in the Western Region

The following figure[12] illustrates the present installed capacity (in MWs) for various renewable technologies (heat and electricity markets) within the Western Region.

Figure 4: Renewable energy deployment in 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 next most important sector and this is based upon capacity that has been in place for 50 years or more.[13] Most of the biomass capacity is located in the forest processing sector and small scale commercial heat sector.

It is significant to note 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 is going to be from a relatively low base in the region.

2.5 Biomass and wood energy

Biomass can be defined as the biodegradable fraction of products, wastes and residues from agricultural, forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste. There is no common definition of biomass fuels, but the following list summarises the main sources[14]:

- cereal and agricultural crops (straw/OSR/sugar beet, etc.)
- spent cooking oils
- animal slurries
- solid municipal waste and refuse derived fuels
- industrial and commercial wastes (particularly from the food sectors)
- wood

[12] 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 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.

[13] Ardnacrusha Hydro Scheme: 85MW

[14] It should be noted that wood energy crops are not part of this mix at present.

Across the EU, 85% of the biomass market is supplied with solid wood biomass, which is approximately 100 million tonnes of wood.[15]

For the Western Region there are four possible sources of solid wood biomass fuel, namely:

- Forestry produced wood fuels are mostly small diameter logs (small roundwood) that are extracted to roadside, air dried, chipped and delivered to heat boilers. These are known as thinnings. At a larger scale, whole tree chipping, and chipping of brash and branches (usually in forest) can supply wood fuels to the CHP and co-firing markets.
- Co-products are woodchips, dust and bark produced by sawmills as they process logs into product such as planks.
- Post consumer wood waste is recycled wood that is processed and chipped into clean woodchip by timber recycling companies.
- Purpose grown energy crops are typically fast growing willow trees planted on agricultural land and harvested every three to five years, often referred to as short rotation coppice willow (SRC). This source of woodchip is not used on a widespread commercial basis in the EU on a scale that is measurable[16]. As this land use is not part of food production it is possible to dispose of sewage sludge on the SRC sites and this has allowed gate fees to make SRC planting commercially viable in some circumstances.

Section 4 of this report examines these sources of wood energy, and shows that in the Western Region the primary source of fuel will be forestry produced woodchips (these chips will come from thinnings in the privately owned forest estate) and sawmill co-products. Throughout this report all references to wood and wood fuel assume a 50% moisture content to allow common comparisons.

During the 1980s a significant amount of forestry was planted in the region, and this now requires thinning. This thinnings material is ideal for wood fuel production and lacks viable alternative markets. The rise in co-products is accounted for simply in higher sawmill throughput as they process the increased timber from forestry.

2.6 Focus on wood energy in the Western Region

There are a number of reasons why the Western Region should focus on wood energy market development.

Resource availability

The overriding argument is that the region has a large and growing forestry resource that will be seeking viable local markets. Section 4 of this report examines the available resource in some detail and shows that the region contains 40% of Ireland's forestry; in fact it contains three times as much forestry per capita than Ireland as a whole. In addition to the concentration of timber in the region, timber production from this forestry is forecast to rise rapidly over the next 20 years because the forests are young and many are reaching a stage of first harvesting (thinning). This means the type of timber being produced is highly suitable for energy production as it is small diameter and most suited to chipping for energy production. The existing market for this material is limited because of the current market prices and the economics of harvesting make it difficult to manage and harvest wood profitably.

Wood fuels are a low value commodity, and are disproportionately affected by transport costs. This means timber must be grown and consumed **regionally** if it is to be commercially viable[17]. This is another significant factor in why the Western Region should develop a viable regional market.

15 Renewable Energy World, July 2005

16 Sweden does have a small commercial market however, and in Northern Ireland 450 ha of SRC has already been planted and a further 350 ha of planting is planned in 2007 and 2008.

17 Pellets are traded as a commodity and transported over long distances due to their energy density, but woodchips are not a traded commodity and are always produced and used regionally in all energy markets.

Fundamentally, the region is uniquely placed to develop a wood energy sector because it has the forestry resource, now and going forward, required to supply market demands.

Policy issues

The *Bioenergy Action Plan* states: *"Wood biomass has the potential to play a major role in Ireland's national bioenergy strategy"*. The action plan goes on to argue that wood biomass is the most versatile of renewable energy sources and notes its existing dominance as a source of renewable energy in Ireland. Therefore an important reason to focus on wood energy is that there is already a clear national policy focus on the sector and the Western Region clearly has an ability to make a significant contribution to that national policy. Indeed it is unlikely that national policy targets would be achieved unless the Western Region made an equitable contribution because so much of biomass resource is located in the region.

Ireland now imports over 90% of its energy[18], and is heavily and increasingly reliant upon imported fossil fuels. The total primary consumption of energy in Ireland is 14.7 million tonnes of oil equivalent (2004) and since the mid 1990s the share of indigenous energy (in meeting this consumption) has fallen quite substantially as a result of the decline in production from the Kinsale gas field. In 1995 indigenous energy supplied was 3.7 million tonnes of oil equivalent. By 2004 this had fallen to approximately 1.5 million tonnes of oil equivalent.

The only sector of indigenous energy to rise in the last 10 years was renewable energies. This suggests that renewable energy sector is set to play an increasingly important role if the reliance on imported energy is to be stabilised or even (over a long term) reduced.

Market trends

As section 2 of this report demonstrates, wood energy is the most significant source of renewable energy in the EU. Therefore, it would be in line with other comparable EU markets to focus on wood energy in the Western Region. Wood energy is a technically mature, widely deployed and commercially viable sector and its development in the Western Region is an achievable and logical step. Examination of the market prospects (section 3 of this report) shows the underlying economic attractiveness of certain types of wood energy investment in the region. An important reason to focus on wood energy is that it would build upon a sector that is demonstrably viable, commercially attractive and helps to improve regional competitiveness.

It is in this context that energy costs are rising sharply, partly as a result of the need to import the majority of the fuel. Industrial consumers of energy have experienced a doubling of heating oils and gas prices over the last four years. In 2002, fuel oil was approximately 31 to 34 cent per litre and at the start of 2007 it was approximately 50 cent per litre. Natural gas prices show at least a 120% rise from 2002 to 2006[19].

These national trends are equally applicable to the Western Region, i.e. a massive reliance on imported energy, a falling share of indigenous energy and rising energy prices.

Conclusion

The combination of factors or drivers described establishes that wood energy could have a useful and important role in the energy supply mix of the Western Region. It will be able to improve the security of energy supply as energy would be sourced locally, it will help insulate the region from worldwide price volatility, offer low cost energy solutions and most importantly it will use and consume a locally available resource that has no other viable market.

[18] Source: SEI

[19] Source: SEI 2007

3.0 Wood energy market prospects

This part of the report reviews the four market sectors where it is possible to use wood fuel and presents an analysis of the main issues associated with those sectors in the context of the Western Region. These sectors are:

- power generation
- Combined Heat and Power (CHP)
- co-firing
- heat

In this report we show the costs of wood fuel production in the region at 2007 prices. This shows that a price for delivered wood fuel in the range of €55.5 to €75 per tonne should make it commercially viable to undertake thinnings. It is important that market sectors are capable of **at least** meeting these prices, as lower prices would not be commercially sustainable.

3.1 Power generation for renewable electricity

Straight power generation from biomass is almost always in the form of using waste streams as the fuel input, not from wood. These are commonly referred to as 'waste to energy' projects. Domestic and commercial refuse, animal and food wastes[20] are all used as fuel for power generation. It is possible that the Western Region will see some growth in this sector, although this is not the subject of this report, as outlined in section 2. As 'wastes' these fuels tend to be inexpensive and may even command a gate fee to avoid land fill tax costs.

It is also worth noting that the price paid by power generators for wood fuels in the UK is around the current market price of woodchips produced for board mills in the UK. If this price was translated to Ireland it would mean a power generator would pay €35 per tonne delivered at 50% moisture content. Clearly the financial structures in both countries are different and as there are no power generation projects in Ireland to illustrate prices it is not possible to establish a market price with certainty. However, the board mill price in Ireland is apprximately €32 to €35 per tonne delivered. If UK and Ireland board mill prices are very similar it would tend to suggest that power generation wood fuel prices would be similar. This indicates wood fired power generation might well be commercially unsustainable in Ireland.

We have concluded that wood fired power generation seems an unlikely area of market growth in the Western Region. If such a project(s) was to emerge it would require massive capital investment by a major utility and probably significant state support to make it commercially viable.

3.2 Combined Heat and Power (CHP)

The White Paper sets a national target of 10MW_e to 15MW_e of biomass CHP (2007 to 2013). The extent to which wood fuels, as opposed to biomass fuels in general might operate in this market is considered below.

CHP is a highly fuel efficient technology. 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).

Because CHP inherently makes more efficient use of the fuel it uses, in comparison to power generation, it would indicate a higher purchase price might prevail for wood fuels in this sector.

[20] Often mixed with fossil fuels such as coal.

The application of wood fired CHP in the Western Region is likely to be quite limited for specific commercial and technical reasons. Without significant grant aid, small scale biomass CHP appears to be commercially challenging and the limited availability of commercialised technology under $5MW_e$ suggests this will remain the case in the short term.

Most biomass CHP projects in commercial operation across the EU are large scale and tend to be $30MW_e$ to $50MW_e$ and above, this requires a heat load of three or four times the size of the electricity generation. There are almost certainly no locations in the Western Region where such large single thermal loads are to be found[21]. Without large thermal loads the heat generated is wasted; yet the biomass fuel must still be purchased to generate the electricity.

Despite this, CHP projects could be developed around the 5MW electrical scale and there are likely to be a number locations in the region that have heat and power requirements that would be suitable.

Although there are no installed projects in the region, Mayo Power Ltd are considering the feasibility of developing a large scale CHP plant in north Mayo, the combined output is reported to be 360MW, with a flexible solid fuel mix. A second project is being developed at the early stages in south Mayo. t is reported to be a small scale biomass fired CHP plant and will be situated in a business park.

3.3 Co-firing

The national target for co-firing biomass fuels in peat fired power stations is set at 30% of fuel input by 2015[22]. There has been no detailed investigation of the availability of biomass fuels to meet this target (see Appendix 2 for details of the planned fuel supply mix).

To meet the 30% co-firing target Bord na Mona Energy Ltd estimate that one million tonnes of biomass material (at 50% moisture content.) are required[23]. Edenderry Power Station will be a pilot plant for co-firing trials in 2008/9. Due to licensing and technical reasons co-firing is unlikely to commence at the other two power plants until 2010 or later. There is no technical reason why the power plant at Moneypoint could not also co-fire biomass with coal. This issue is not considered in this report as there are no announced plans to co-fire at Moneypoint.

Bord na Mona indicate that a commercially viable purchase price of woodchip fuel must be approximately €65 a tonne delivered at 40% moisture content. This is roughly equivalent to €51 per tonne at 50% moisture content.

It is extremely unlikely that Western Region sourced wood fuel could be harvested, processed and delivered to the peat plants profitably at this price. This report shows that wood fuel must secure a price in the range of €55.50 to €70 per tonne delivered; the price that Bord na Mona could pay less than this range. Even if this was to prove economic it would only be for material harvested very close to the power plants, and would effectively exclude supply from the vast majority of the Western Region where transport costs would make supply uneconomic. On that basis we do not foresee any significant implications for the wood resources of the Western Region without changes to policy and regulation.

[21] In other countries, city wide district heating grids offer the large thermal loads needed to justify biomass CHP.

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

[23] Currently the three power stations combined use approximately three million tonnes of peat annually. This peat contains approximately 23.7 PJ p.a. of energy. This means the 30% co-firing target must provide 7.1 PJ p.a. of energy.

3.4 Wood heat

Wood fired heating technologies are likely to form the most important part of market growth in the Western Region. Wood heating systems are much more ***expensive to install*** than oil or gas heating systems. However they are much ***cheaper to operate*** as the cost of wood fuel is much lower than oil and gas. In simple terms, wood heating will gain market share where the fuel savings justify the capital investment.

Cost components in the wood fuel supply chain

For commercially viable paybacks to be achieved the price of wood fuel must be much lower than fossil fuels. The price of wood fuel is built up by 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.

Based upon interviews with forestry contractors we have found that the following range of prices for pulpwood will allow the first thinning to be undertaken on a commercially attractive basis in the region:

price to grower	**= €2.5 to €5 per tonne at 50% MC**
harvesting costs	**= €26 to €34 per tonne at 50% MC**
haulage to wood fuel process depot	**= €6 to €8 per tonne at 50% MC**
chipping into energy fuel	**= €7 to €10 per tonne at 50% MC**
haulage to boiler	**= €6 to €8 per tonne at 50% MC**
overheads and admin costs	**= €8 to €10 per tonne at 50% MC**

(Prices as at September 2007)

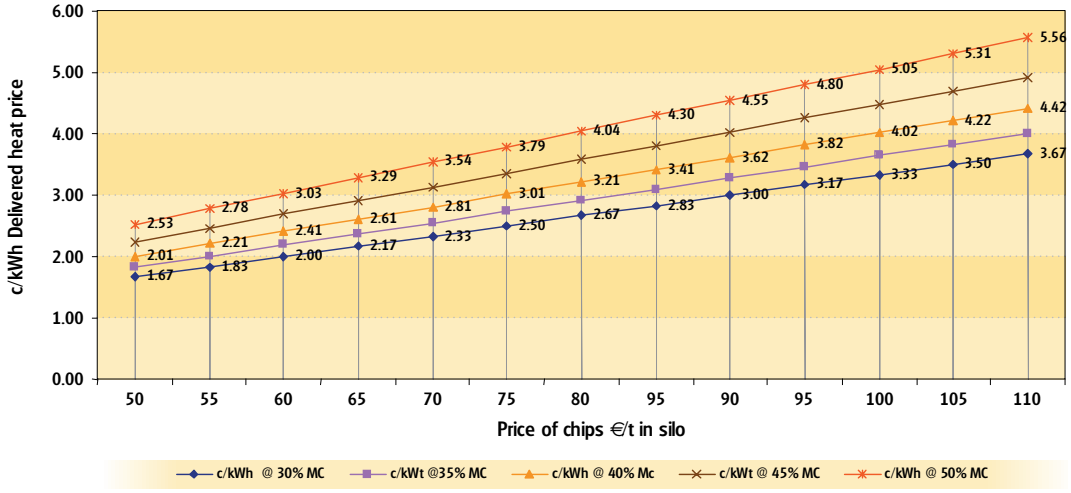
Price level

Overall it is possible to conclude that a price for delivered wood fuel in the range of €55.5 to €75 per tonne should make it commercially viable to undertake thinnings (section 4 of this report on the wood resources shows thinnings will form the bulk of supplied wood fuel in the region over the next 10 or 15 years). This does not imply that the market will always supply wood fuel at these prices as factors such as supply demand relationships will affect supplied costs.

We would expect that the price of delivered wood heat to be approximately 3.2cent kWh.

The drier the wood fuel the greater its energy content. The following chart illustrates the cost of heat for differing wood fuel moisture contents at differing prices per tonne.

Figure 5: Cost of heat for differing wood fuel moisture content



It is worth noting that fuel moisture content of 35% was achieved in the Western Region by conventional air drying, unaided by mechanical drying. The typical approach is to store round wood outside under covers and let it air dry down over the summer months. It is then chipped into a shed until needed for delivery to boilers. The costs of this are included in our overall cost estimates for fuel production. In practice the costs are mostly associated with start up during the first 12 months of a fuel supply business. Once a stock of round wood is available and dry for chipping, the process becomes simpler and more robust in terms of ensuring the correct moisture content.

Price comparison

The table below shows the prices of differing fuels. This table is based upon the *Fuel Cost Analysis Report* by Enercomm International Consultants Ltd for WDC in October 2007. The prices shown are valid as at October 2007 and based upon commercial and industrial purchasers of oil, gas, LPG and electricity. It is likely that smaller commercial and domestic energy users will be paying more for their energy.

Table 3: Comparative fuel costs (2007)

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

Bearing in mind that heating with oil costs 5.3 cent per kWh, this table illustrates that wood heating can be a very attractive fuel option. It is not clear what the exact price of heating with wood will be in the Western Region and of course this is a matter that the 'market will determine'. The key point is that taking into account the need for wood fuel suppliers to operate at a profit and the need for energy users to buy wood fuel at less than fossil fuels to secure a realistic payback, the economics are demonstrably attractive.[24]

The other issue for the Western Region is that it relies heavily on oil for heating and lacks widespread access to relatively cheaper mains gas. Although there are no reliable figures on the extent to which the region relies on oil, we have looked at a number of studies. In counties Clare and Limerick we have found that 34,431 households rely on oil for heating, but the other 29,709 households use other heating fuels such as coal, gas and peat[25]. *The Limerick and Clare Energy Balance Study* states that 73.8% of total final energy consumption is accounted for by oil. *The Galway Energy and Emissions Study* (August 2001, produced by the Galway Energy Agency) indicates that in 2000, oil use in Galway was 3,700GWh (TFC[26]) out of a total energy consumption for Galway as a whole of 4,800 GWh.

It seems likely that such figures would be broadly similar for the Western Region as a whole and suggest that for the oil for heating will be the dominant energy market and that it will account for more much than 50% of the total heat market.

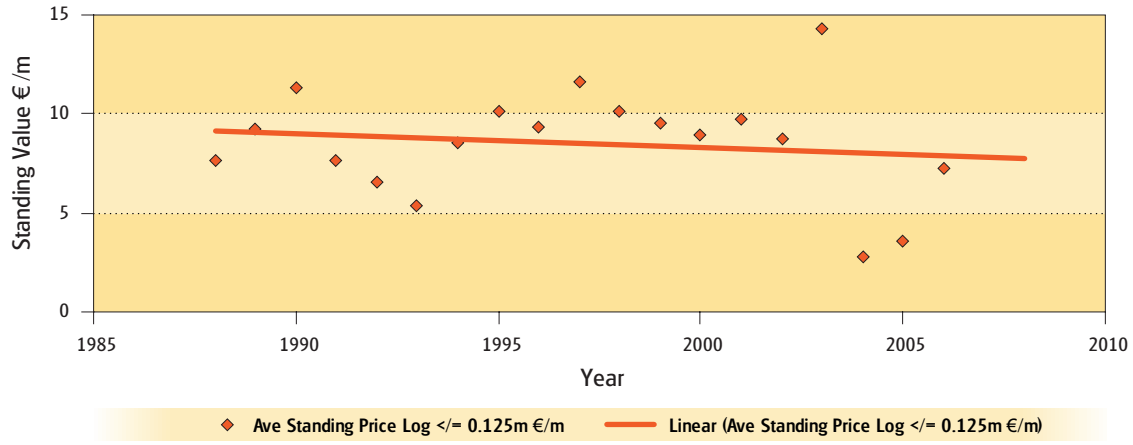
This reinforces the cost advantages of wood fuel in the region going forward as its key competitor will be relatively expensive oil and not lower cost, and more convenient gas.

Price stability

A final point is that wood fuel costs appear to be reasonably stable and are linked to the long term price of wood fibre. This means that wood fuel heating can offer a degree of price predictability over the longer term.

The following chart illustrates the fluctuation in standing prices for small diameter logs, typically first and second thinnings. The dots represent the annual average price per cubic metre standing across all species and site types. They exclude any long term contract sales to board mills. In real terms the price of timber has actually fallen slightly over the last 20 years as indicated by the linear trend fitted.

Figure 6: Average standing timber price



Source: Coillte and ITGA 2006

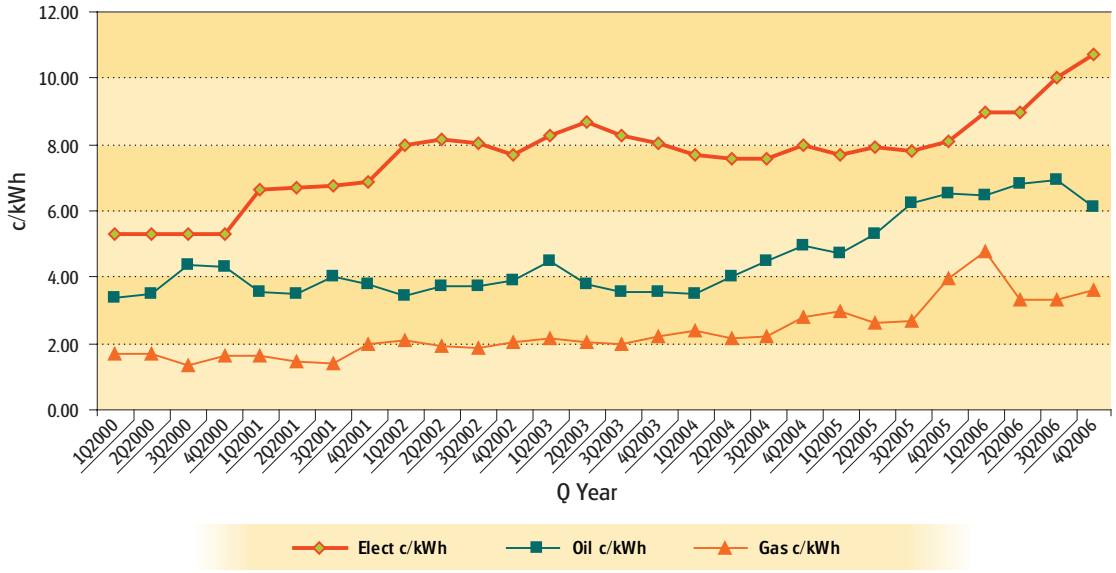
[24] It is important to recognise that wood fuel for CHP and co-firing markets will be of a different specification and more based upon larger scale harvesting operations, making greater use of brash, stumps and other presently unused forestry resources. It can also be delivered wetter and at a much larger scale in larger contracts. This means the market prices for wood fuel in the CHP/co-firing markets can be less.

[25] Source ESRI 2003

[26] Total Final Energy Consumption

This stability contrasts with fossil fuel heating prices over the last seven years, as illustrated in the chart below (all figures sourced from SEI in November 2007).

Figure 7: Delivered heat prices over time



In mature wood energy markets such as Finland, Sweden and Austria, the price of wood fuels has become partly tied to the fossil fuel price. This has occurred because wood heat prices are calculated using the 'basket approach'. This usually allows the price of wood heat to be pegged to three items:

- the wood fibre price
- general inflation
- fossil fuel heating prices

Individual wood heat supply contracts, especially in the district heating context, will often use each of these elements to allow the annual price indexation of a contract to be determined. In this way there is a partial relationship between the rise and fall in the price of fossil fuels and wood heating. However, it does remove much of the volatility in the price when compared to fossil fuels. We would anticipate that wood heat contracts in Ireland would begin to use methods of indexation like this. On that basis, wood heat would offer greater price stability and certainty than fossil fuels.

There is direct evidence[27] that potential wood energy customers are attracted to investment on the basis of the longer term price stability offered by wood fuels. This allows companies to make long term financial plans and avoid short impacts caused by volatile energy bills.

Wood heat market opportunities matrix

The technology used for providing wood heating can be categorised based on fuel used, scale of heat generated and market application:

- log boilers: domestic and small scale.
- pellet central heating boilers: generally for single buildings such as large houses or small offices, but with some potential to serve micro-networks

[27] County Clare Wood Energy Project appraisals by DARE Ltd and Steve Luker Associates Ltd 2006/7.

- small-medium sized woodchip boilers (≤~500kW): generally for single buildings/users or micro-nets or small-scale community heating
- medium-large sized woodchip boilers (~500-5,000kW): providing for a variety of applications, including community heating
- large-scale woodchip boilers (>5,000kW): generally for large process applications or, potentially, large district heating; most viable CHP applications would fall within this category

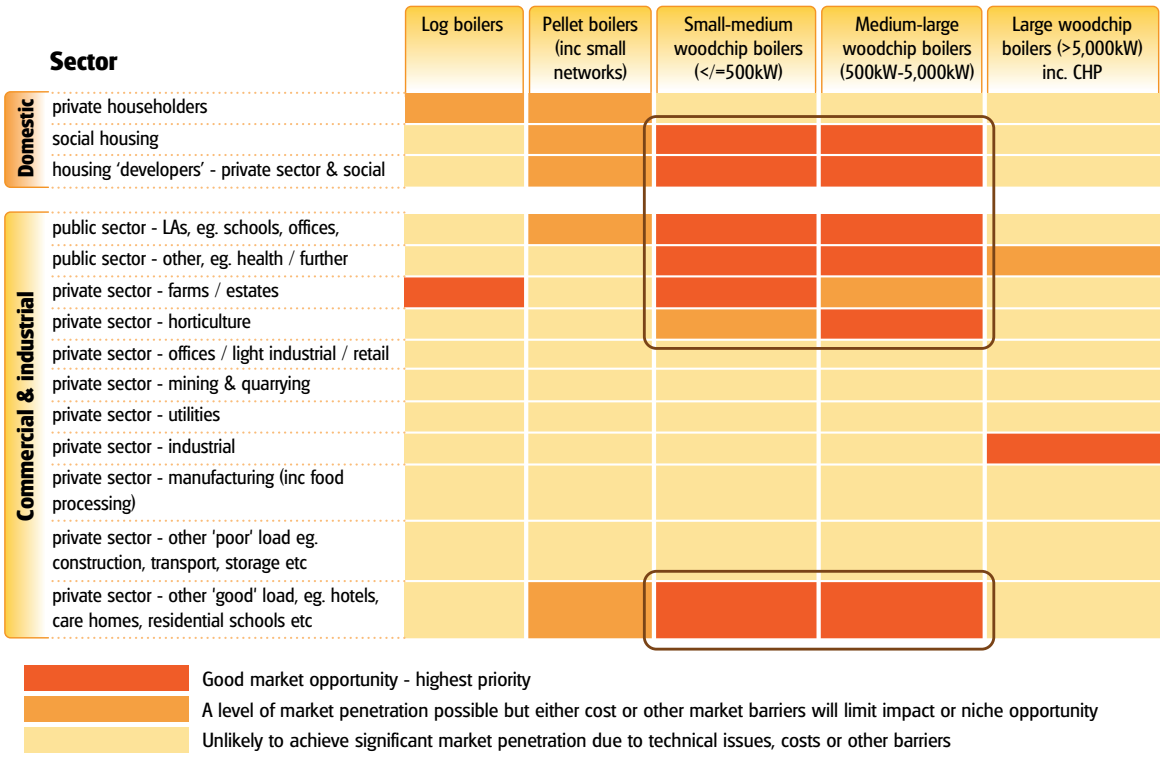
This technology review encompasses all the commercially available types and is based upon a well developed manufacturing base that is readily accessible to the region. The range of market applications for this technology has been divided into market segments that are relevant to the region. These range from the small scale domestic heating markets through to the large scale commercial and industrial heating markets.

We have then illustrated this analysis in the wood heat market opportunities matrix that follows. The role that all technologies have to play in a developed market, including log boilers at one end and large scale process heat applications at the other, is acknowledged; although at this stage of early market development it seems desirable to focus only on the most attractive market situations in the region. These opportunities are highlighted by the dark orange boxes and enclosures in the matrix.

The table is based upon our professional judgment of the markets and technologies, and is a recognised technique for illustrating markets and opportunities in this sector. It takes into account our price analysis of wood fuel, fossil fuel and investment costs associated with wood energy. It is primarily based upon commercial considerations, and highlights heating market sectors that would be able to make investment in wood heating and secure a sound commercial return.

To produce the matrix, we assumed the price of delivered wood heat is 3.2cent kWh and the price of oil heating is 5.3 cent kWh.

Table 4: Wood heat market segmentation by technology



As noted, the argument for these opportunities is based on the underlying economics. The table that follows provides generic illustrations of how paybacks look at 2007 prices in the Western Region. The table is based upon real life examples, but modified to protect commercial confidentiality.

Table 5: Paybacks on wood energy installations (2007)

Site	current oil spend (€)	future wood spend (€)	saving pa(€)	Capital costs of boilers (€)	payback years
regional hospital	150,000	50,000	100,000	175,000	1.75
care home	109,000	60,000	49,000	140,000	2.8
secondary school	27,500	15,000	12,500	56,000	4.3
office	22,000	12,000	10,000	52,500	5
retail warehouse	18,000	10,000	8,000	49,000	6
primary school	17,500	9,250	8,250	52,500	6

It illustrates that for larger heat users, such as hospitals and care homes, the cost reductions offered by wood fuels are sufficient to justify capital investment as the paybacks can be below three years with current SEI grants.

A worked example

To further support the analysis presented by the matrix, the following example presents the business case for wood energy at an existing large hotel. It is based upon a real life example in the Western Region in 2007. It illustrates the economic and market conditions that positions the commercial/industrial heat user as a key market segment for the region.

The hotel's current costs of heating with gas are approximately €110,000 per annum. It is this gas bill that can be directly replaced with cheaper wood fuel.

In this case it would be desirable to size the wood boiler so that the existing gas boilers can be retained as back-up and that infrequent peak loads (such as on very cold days with high hotel occupancy) are met with some gas boiler use also. This avoids the need to size the wood boiler on the peak load and reduces the capital cost of the system. On that basis it can be assumed that 90% of the gas use is replaced by wood fuel use. This means that the future heat energy bills of the hotel are estimated as follows:

- €11,000 pa on gas use for peak load top up via the two main existing plant rooms
- €43,750 pa on wood fuel based upon approximately 2,200,000 kWh pa being replaced with wood fuel = 625 tonnes pa at €70 per tonne delivered

This estimate indicates that conversion to a wood fuel system would mean an annual total gas and wood fuel bill of €54,750. This compares to a current gas bill of €110,000 and shows an annual saving of €55,250. As the cost of gas rises, annual savings will increase.

An approximately 500kW rated wood fired system is needed to meet 90% of the hotel's heat load with an estimated installed cost of €230,000. SEI offer a grant and this will reduce the cost to €177,500. This cost estimate is based upon a turnkey solution where a specialist wood energy installer undertakes all the work.

As the annual saving is €55,250 the simple payback is therefore estimated at 3.2 years excluding the cost of finance.

Other market opportunities

In the overall EU wood energy market, wood pellets account for approximately 5% of the wood market. If this is replicated in the market development of the region we would not expect to see a large scale role for pellets. In addition, the costs of pellet production exceed the cost of woodchip production and even taking into account the greater energy density, of pellets they cannot offer the energy cost savings of woodchips. This is important in the context of the commercial/industrial heat markets, where price is a key determinant of market uptake.

However, the role that pellets can play in opening up market opportunities, otherwise unsuited to wood fuel, is a very real one and is reflected in the matrix, but this is predicated on the development of an effective supply infrastructure that *should* be based on indigenous production. It is only the lack of such an infrastructure that prevents a higher priority being given to pellet applications in the matrix.[28]

The role of the public sector in early market development is a key one and an essential priority for action. This includes not just county councils, but all of the public sector, including in particular 'high load' users such as hospitals, prisons and university campuses, etc.

The key conclusion of this section is that where (medium and large 500kW+) woodchip boilers replace fossil fuel boilers the economics are likely to be the most attractive relative to any other wood energy technology. The range of typical applications includes, but is not limited to:

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

A final point is that in general (but not always) retrofitting wood boilers will be more commercially attractive. This is because a modern wood boiler would be replacing an older oil or gas boiler, which means:

- an investment in a new boiler would be needed at some point
- the old boiler can be retained for back up heating, thus avoiding the cost compared to new build
- the old boiler can be retained for peak load heating, thus avoiding installing a wood boiler for 100% of the heat load and saving on investment costs; this also means the wood boiler can be operated more efficiently[29]
- the economics are favourable, compared to an older, less efficient system

[28] Plans to develop pellet mills in Clara (County Offaly) and Tuam (County Galway) are known and could allow indigenous production.

[29] Wood boilers are less efficient at 'cycling' (the process of modulating demand) than fossil boilers and so should be sized on the 'mean' and not 'peak' loads, and operate on a standby system.

4.0 Assessment of the wood biomass resource

4.1 Introduction

From the *Forest Service Irish Timber Growers Association (ITGA) Yearbook (2007)* we know that 280,000 hectares or 11.5% of the Western Region is afforested, of this approximately 113,400 hectares is in private ownership and is increasing at a rate of approximately 3,000 hectares per annum. The remaining 166,500 hectares is in public ownership and is increasing at a rate of only approximately 60 hectares per annum.

The Western Region contains 40% of Ireland's forestry, but only 18% of the population. There is three times as much forestry per capita in the Western Region than in Ireland as a whole.

In the Western Region the total amount of **private sector** timber available for harvesting is forecast, by the *ITGA Yearbook (2007)* to rise rapidly over the next 10 to 20 years as young conifer plantations come to the point where they require a first thinning. This forestry was encouraged and established by government funded forestry grant schemes. The existing market for this material is limited because of the current market prices and the economics of harvesting. Wood fuel production appears to be the only possible commercially sustainable option for growers and those involved in harvesting, processing and haulage of this forestry.

Therefore we have assessed in detail, the wood fuel resource that will be available from the private sector. We also considered and examined all the other possible sources of wood fuel available in the region, including:

- post consumer wood waste
- purpose grown energy crops
- co-products (by-products of the sawmill industry)
- harvesting residues
- the public sector forest resource (owned and managed by Coillte)

Our approach has been to establish a robust and highly cautious approach to resource estimation, so where we consider that wood fuel might not be commercially available we have excluded it from our resource estimate. We have also excluded all wood that is committed to existing markets so that any use of wood for energy from our resource estimations will have no displacement impacts or impacts on any other sectors of the regional or national economy.

4.2 Private sector forestry and co-product

Forestry and co-product resources are considered together as the two are linked in terms of supply and demand, via markets and prices. This is because as more forestry is harvested, sawmills increase through-put of timber, which in turn produces greater quantities of co-products. Co-products are the woodchips, bark and sawdust that are generated when sawn logs are processed into planks, posts, etc. by sawmilling.)

Context

Forestry in the Western Region can be harvested for three main markets, based upon the diameter of the trees in the forest:

- **sawlog** is cut from the butt end (largest part of the log), down to a diameter of 20cm at its small end; this category is used to supply timber to the construction industry
- **pallet or boxwood** is taken from the mid section of the log; minimum diameter of this category is 14cm and is used to supply material for the packaging market
- **pulpwood** is harvested from the top section of the trees; its minimum diameter is 7cm and has traditionally been used to supply material to produce stakes or round logs to board mills

In the Western Region, the main harvesting activity will be thinning because much of the forestry was planted in the 1980s and is coming to a stage of requiring thinning. Thinning is the process by which **small diameter** or poorly formed trees are removed from a plantation, providing space for the remaining trees to develop. As the quantity of timber removed must be below or at the annual growth rate, thinning does not effect the overall production of the plantation and is therefore a sustainable practice. The principal that underpins this is that each year the total amount of biomass in a forest increases as a result of natural grow caused by photosynthesis. In forestry terms, this is called the 'annual increment' and is determined by climate, soils and species. Forestry is regulated so that overall the annual harvest must equal the annual increment. This means the forecasted harvest figures are indefinitely sustainable, although in practice some areas of forestry are thinned, some areas are clear felled and some areas are re-planted.

Therefore, the predominance of young conifers means that much of the harvest in the next 20 years will be the smaller diameter and lower value pulpwood. Market opportunities for pulpwood derived from the private sector are limited as the delivered price paid by the board mills for pulpwood and the cost of harvesting have resulted in negative returns from first thinning[30]. The role and importance of the board mills is explained further in Appendix 3 of this report.

By the end of 2004 the woodlands in private ownership comprised 113,400 hectares. Some 30,400 hectares[31] of this is mature woodland (planted prior to 1982) or amenity and scrub woodlands. This leaves 83,000 hectares of forestry (planted between 1982 and 2004) in private ownership that is highly suitable for wood fuel production.

The oldest of these plantations have now reached or are approaching the age of first thinning. Over the next 20 years a substantial proportion of these 83,000 hectares will require thinning and hence a need for a market for small diameter pulp wood.

It is this forestry resource that we have considered for wood fuel production.

Production forecasts

There is no reliable and agreed forecast for timber production from privately owned forestry in the Western Region. This means it is not possible to accurately asses the future harvest and hence estimate the quantity of material available for wood energy.

Therefore, we undertook an appraisal of a representative sample of plantations and used constraints displayed by the sample (in terms of the amount of wood energy it can produce) to apply to all the private sector plantations. From this appraisal it can be concluded that approximately 64,600ha of privately owned plantations will be suitable for thinning and as such will form the basis of the forecasts included in this report.

[30] Source: *County Clare Farm Forestry Study 2005*

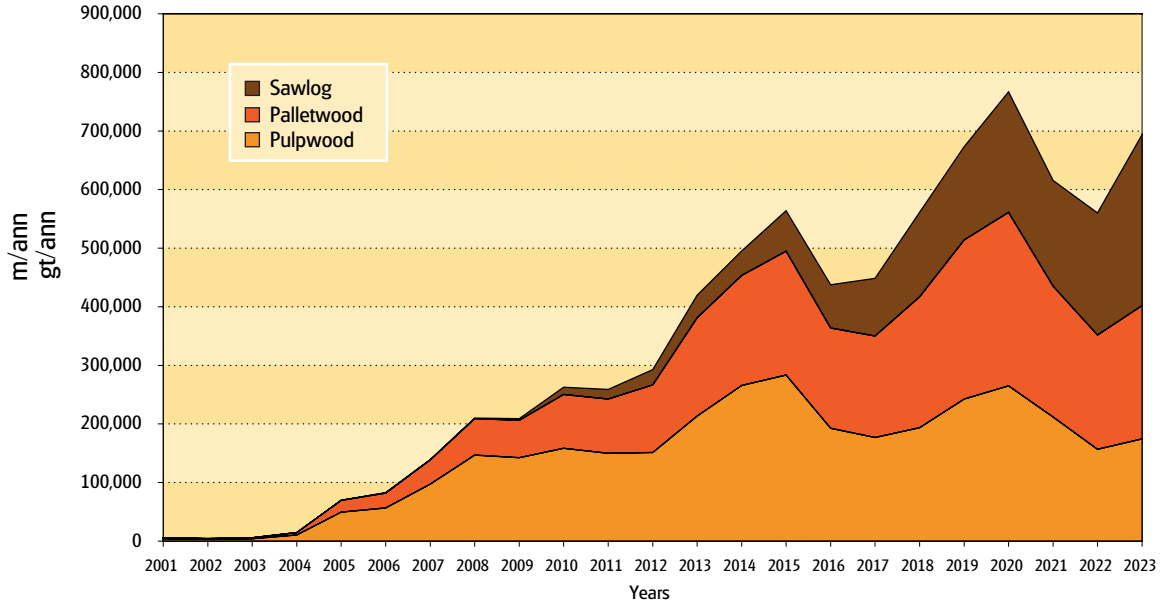
[31] Source: *Forest Service ITGA Yearbook 2006*

Thinning commences when a forest is approximately 18 years old and is repeated on a five year cycle. The average volume that will be harvested is forecasted at 50 tonnes per hectares of which approximately 71% of the first thinning is pulpwood.

The percentage of pulpwood decreases with each subsequent thinning and by clear fell[32] (after 35 years) the percentage of pulpwood will have declined to approximately 2.5%.

The following figure illustrates the potential yield in cubic metres[33] from the private plantations across all timber categories showing the cumulative production of pulpwood, pallet wood and saw log for the period 2001 to 2023.

Figure 8: Potential yield in cubic metres from private plantations (2001 - 2023)



This indicates the increasing annual yield of pulpwood:

- from 56,600 tonnes in 2006
- to 158,000 tonnes in 2010
- to 265,000 tonnes in 2020[34]

It also shows the increasing production of pallet wood and saw log, which when processed by the sawmilling sector will increase the amount of co-product produced (woodchips, sawdust and bark).

This volume of increasing co-product must be added to the pulpwood harvest to forecast the total potential available wood for energy.

The figure below indicates the combined effect of the pulpwood and new stream of co-product over the period 2001 to 2023.[35]

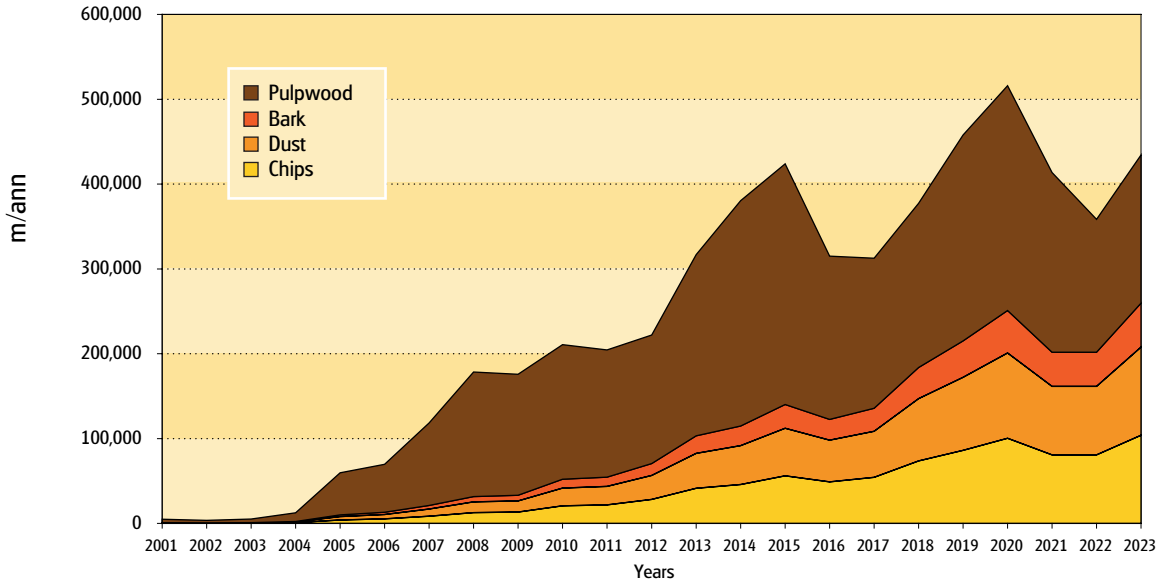
[32] The process of felling a whole plantation.

[33] A cubic metre is equal to one tonne of woodchips at 50% moisture content.

[34] Analysis based upon *Forestry Commission Booklet no 39*: Stand Over Bark Assortment Tables.

[35] Analysis based upon *Forestry Commission Booklet no 39*: Stand Over Bark Assortment Tables plus average conversion rates for co-products at sawmills.

Figure 9: New pulpwood and co-product residues (2001 - 2023)



As a result of this process of analysing the private sector standing forest resource and applying constraints in terms of harvesting, **the combined volume of new to the market pulp wood and co-product in the Western Region will be 210,500 tonnes per annum by 2010, rising year-on-year to 516,000 tonnes per annum by 2020.**

The forest resource can to some extent remain un-harvested as clearly it will be dependant upon the existence of a viable market. We have estimated that the price required to liberate this resource for wood fuel would be in the range of €55.50 to €75 per tonne.

4.3 Post consumer wood waste

In 2005, the EPA estimated that nationally approximately 125,000 tonnes[36] of mixed wood was recycled. Of this, 52% was untreated[37] and therefore potentially suitable for wood energy use. Repak[38] administer the wood recycling scheme for larger firms[39] and estimate that in the Western Region approximately 9300 tonnes of wood were recycled in 2005. This is a conservative estimate as there are a large number of small recycling firms who operate outside the Repak scheme.

However, on this basis it appears that this source of wood fuel will not play a significant part in the Western Region wood energy market for the time being, particularly when compared to the very large volumes of pulpwood and co-products suitable and available for energy use.

We have excluded this source of material from our resource estimations at this stage.

36 www.epa.ie

37 Treated wood could be contaminated and unsuitable for normal combustion.

38 Correspondence with Repak.

39 Defined by Repak as any company handling over 1000 tonnes of packaging per annum.

4.4 Energy crops

Non-woody biomass crops

At present only 10 hectares of non-woody biomass crops have been established in the Western Region. These are expected to yield approximately 1850 tonnes in spring 2009.

Woody biomass energy crops

We have not located any commercial scale planting of woody biomass crops, (e.g. SRC Willow) in the Western Region. Therefore we have excluded this source of material from our resource estimations at this stage.

4.5 Harvesting residues

Harvest residue is the term used to describe material left on woodland sites after clearfelling. It consists of tree tops, branch, stem wood and stumps. Normally this material is left to rot. Experience from Finland and other European markets indicates that this type of wood is an ideal fuel source for large scale boilers (1MW+) or CHP projects and may produce 50 to 100 tonnes of additional wood fuel per hectare.

In 2008, Coillte will commence a pilot programme to investigate the potential yield from forest residues while still complying with the Irish National Forest Standards for biodiversity.[40]

We have excluded this source of material from our resource estimations at this stage.

4.6 Public sector forestry

Coillte manage all the public sector forest resource and own the country's two largest board mills and a number of smaller scale sawmills. Both board mills are located in the south east and have a combined consumption of 1.1m tonnes of wood per annum. Coillte's pulpwood production has reached a plateau and all of its available supplies will be required to meet this demand.

At present, a substantial proportion of the pulpwood produced by public sector forests in the Western Region is transported to these mills in the south east by rail or on trucks. This is not an economically sustainable practice as the material has a low commodity value and the costs of transport are high, however, it seems unlikely that Coillte can in the short term discontinue the practice of providing its board mills with raw material from the region.

However, as some timber from the private sector comes on stream in the southern region it will be more profitable for Coillte to purchase wood closer to the board mills thus reducing the need to use pulpwood from the Western Region.

Therefore, it is possible that Coillte could make available between 40,000 tonnes and 100,000 tonnes of pulpwood annually to the market in the Western Region[41]. This is totally dependent on Coillte securing supplies from private woodlands in the south east and southern regions as these forests commence harvesting. This is likely to start by 2015 as the main planting activities in these regions commenced in the late 1980s and early 1990s.

[40] Coillte, September 2007: presentation to WDC

[41] Coillte, September 2007: presentation to WDC

The Western Peatland Project

The Western Peatland Project will be undertaken by Coillte over the course of the next 40 years. It involves approximately 30,000 hectares of peat land forests. These forests will be restructured in a variety of ways. Some will be clear felled and restored to their previous bog habitat type. Some plantations will be clear felled and replanted with environmentally friendly species. It is these latter sites that offer the potential for the wood energy sector in the longer term.

In summary, Coillte could free-up wood production in the Western Region currently destined for its board mills or have wood available because of the Western Peatland Project. We have concluded that it would be unwise to rely upon this source of wood fuel until more formal commitments are made by Coillte.

Therefore, we have excluded all public sector forestry from our resource estimations at this stage.

4.7 Issues affecting the development of wood fuel supply

Price

An important point about developing a wood fuel supply chain in the Western Region is that it must be able to sell the fuel close to the forest at a price that makes thinning commercially viable.

In terms of price, the point at which it becomes viable for a forest owner to undertake a first thinning depends upon a complex set of factors. It is important to recognise that in any thinning operation the harvest will comprise a mix of timber for different markets. The larger diameter material (not suitable for wood energy) will have the best price and be most viable to harvest. Owners are often happy just to cover costs in selling the lower value smaller diameter timber (pulpwood).

As presented in section 3, the following range of prices (for pulpwood) will allow the first thinning to be undertaken on a commercially attractive basis in the region:

price to grower	**= €2.5 to €5 per tonne at 50% MC**
harvesting costs	**= €26 to €34 per tonne at 50% MC**
haulage to wood fuel process depot	**= €6 to €8 per tonne at 50% MC**
chipping into energy fuel	**= €7 to €10 per tonne at 50% MC**
haulage to boiler	**= €6 to €8 per tonne at 50% MC**
overheads and admin costs	**= €8 to €10 per tonne at 50% MC**

(Prices as at September 2007)

These prices are contract prices that should be achieved under normal commercial conditions in 2007. The reason for the range in prices is that costs vary according to the size and location of the forestry. Smaller more remote and less accessible forests will cost more to harvest.

Overall it is possible to conclude that a price for delivered wood fuel in the range of €55.5 to €75 per tonne should make it commercially viable to undertake thinnings.

It is crucial to note that our costs are based on 20km haulage distances between the forest and fuel process depot, and 20km between that depot and the boiler site. Together these costs represent approximately 20% of the delivered fuel price. If the haulage distances were increased the fuel price would rise.

Wood fuel in the range €55.5 to €75 means a delivered heat price of 2.8 to 3.8 cent kWh. This compares to oil heating at 5.3 cent kWh. These figures demonstrate that price should not be a limiting factor in liberating the available wood resource for energy purposes.

Other constraints to supply chain development

Awareness of markets

During the consultation process undertaken for this study, it emerged that many of the forestry growers operated in isolation and were unsure of the process involved in harvesting, and of the markets for timber products for any market. The results from 400 replies to a postal survey conducted by the WDC and the Forest Service, (see Appendix 4 for details) highlighted this issue.

If growers lack knowledge and understanding of the wood energy market, it will clearly result in low rates of participation in the market.

Small plantation size

The size distribution of plantations is a factor in whether wood fuel could be produced on a commercial basis. Plantations of 10 hectares or less make up 5,260 individual cases or 30,671 hectares (with an average size of 5.8 hectares)[42]. This is approximately half of the total resource. As individual plantations these would be uneconomic to harvest as the harvestable volume is small relative to the cost of harvesting. Without action to overcome these factors the overall amount of wood fuel resource and the price of that resource could be adversely affected.

One way to overcome these difficulties would be to group the plantations into clusters. Appendix 5 looks at this issue in more detail.

4.8 Conclusions on the available resource

Our work has established that there will be a sustainable harvest of pulpwood and a related supply of co-product that **in 2020 is forecast to be 516,000 tonnes per annum**.

This material is additional to **any current market demand** for wood fibre and our figures suggest that there should not be any price based constraints on liberating this resource for energy uses (in the heat market). Although awareness of the owners about wood energy and the small size of the plantations are certainly factors in how fast a supply chain could emerge.

This growth in available wood resource can be seen as a significant problem for the region, the forestry industries and the owners if in the event that no commercially viable markets emerge to use it. It would be difficult to delay harvesting as trees cannot be prevented from growing and there is need to act quickly to help develop markets.

We believe all of this material could be supplied into an emerging wood energy market with no displacement implications and without affecting the supply of timber for other markets in the region or beyond.

[42] *Source Forest Service ITGA Yearbook 2006*

The methodology we have used provides quite a cautious view on the likely availability of wood for fuel. In particular, it does not assume any supply from the state owned forests nor does it rely on post consumer wood waste, energy crops or harvesting residues and it assumes that the larger diameter logs will not be used for energy. It is certainly possible that all this other potential material could be liberated for wood energy if the market expanded beyond the private sector/co-products materials.

A final point is that as a supply chain infrastructure for wood fuel begins to develop it would allow other streams of wood fuel to become more viable over time. This could be particularly important for energy crops in the medium term.

5.0 Scenarios and targets

5.1 Scope of targets

A central part of this strategy is that regional wood energy targets are set to focus development and support for the sector. We recommend that the time frame for targets is 2020. This would replicate EU and national targets; a 12 year horizon is a reasonable timeline for long term planning and development within the sector.

We propose that incremental targets are set each year to achieve the 2020 target. This would allow for annual monitoring and help ensure adjustments are made in the light of actual progress.

The targets are set to cover the use of wood for energy production in two markets:

- heat
- CHP

We recommend that the co-firing target remain national as it would be difficult to see how a regional strategy could help deliver on projects that would be national in scale and character, as well as affecting sites outside the region.

We do not recommend the development of a renewable electricity target in terms of wood use for the region. This would not be an achievable issue for a regional strategy because in practice it would represent a single massive investment project using most of the wood resource.

We recommend that the targets are expressed in two ways:

- MWs of installed capacity
- tonnes of fuel used

Both these metrics are simple to measure and easy to verify. It is likely that most projects would secure SEI grant aid and this process would record the size of systems in terms of MWs. But if not, it is very simple to inspect an installation and determine its installed capacity in MWs.

Fuel used should also be easy to establish as fuel suppliers and fuel users both have a commercial interest in recording this. Indeed it would not be possible to justify investment or control costs without information on fuel used (just as data is recorded on oil used at present).

We also recommend that the targets are monitored annually so that other outcomes and benefits of these targets can be estimated or measured, as listed below:

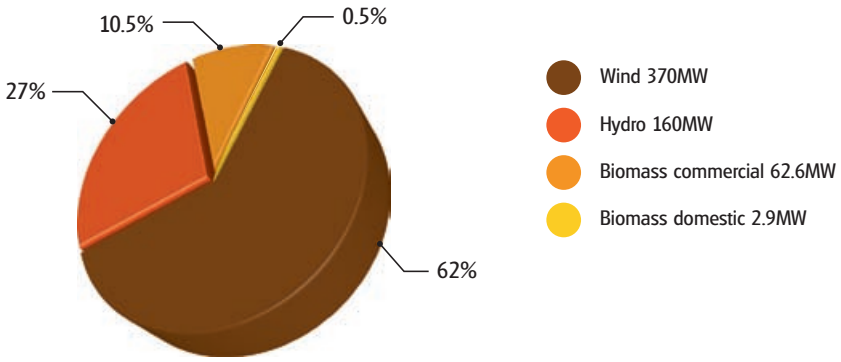
- % penetrations of the heat/CHP markets
- millions of tonnes of oil equivalent
- value of capital investment
- value of fuel sold
- CO_2 savings
- fossil fuel displacement
- jobs created
- savings in fuel costs

5.2 The baseline

The starting point for consideration of annual targets for wood energy to 2020 is what is already installed and what capacity does the market already have to supply and install systems and fuel.

We conducted a telephone survey of the biomass sector in the Western Region during November and December 2006. We found that installed or contracted wood energy capacity in the Western Region is approximately 65.5MW or 11% of the installed renewable energy technologies (see section 2.4 of this report).

Figure 10: Renewable energy deployment in the Western Region (2006)



The current wood energy capacity can be divided into three market segments:

1. large industrial scale (1MW+); 52MW installed

There are five large scale installations based at sawmills or panel board mills where the boilers provide process heat for drying or reducing woodchips to fibre. The installations consume approximately 125,000 tonnes per annum. Most of the fuel is co-product generated on site and a small proportion comes from recycled packaging material.

2. medium commercial scale (60kW to 1MW); 10.6MW installed

There are approximately 30 commercial scale boilers (60kW to 1MW) totalling 10.6MW that have been installed or are contracted to be installed in nursing homes, leisure centres, schools, the agricultural sector and some public buildings. These boilers consume approximately 10,000 tonnes of woodchip per annum.

3. domestic scale; 2.9MW installed

The domestic sector, broadly defined as boilers under 60kW rated capacity, are largely installed in the private housing sector. At present there is an estimated 2.9MW of installed capacity driven by the Green Homes Scheme. The dominant fuel type is wood pellets.

Installers and suppliers

Overall, there are 21 installers and suppliers operating in the region. All of these are small or start up companies, although several appear to have large companies backing them. The sector clearly has some small market presence but is tiny compared to the conventional fossil fuel sector.

There are no installed wood CHP projects in the region and only two in Ireland as a whole.

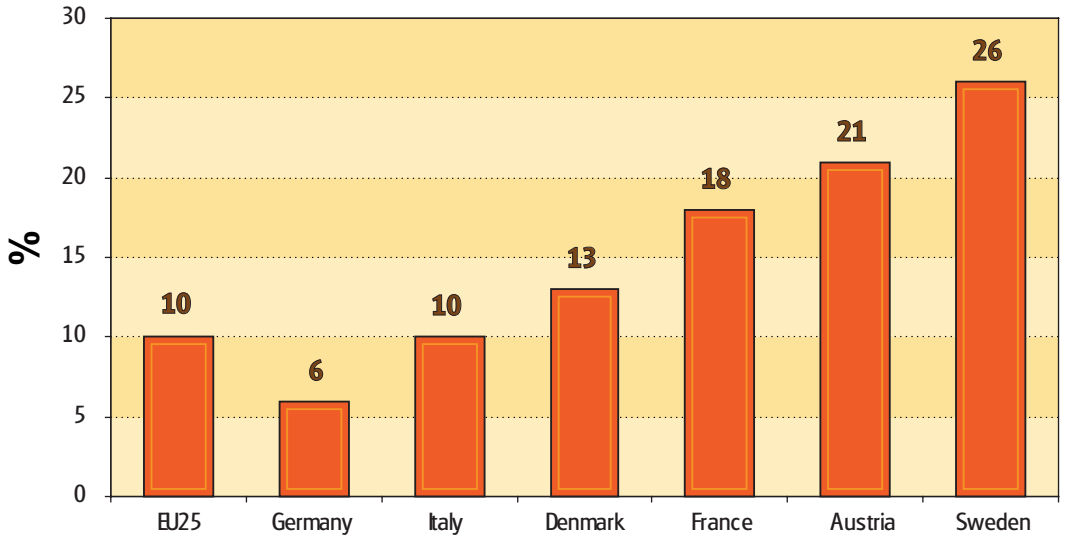
5.3 Wood heat market share

In order to understand the scale of the opportunity for wood heat we reviewed the size of markets in Europe and the overall size of the heat market in the region, as it is a share of this market that wood heat would secure.

EU heat markets

If the Western Region is to become more aligned to other EU energy markets it would mean aspiring to having biomass account for approximately 10% of its heat market, this being the 2004 EU average share. The figure below shows how some other countries are performing.

Figure 11: Biomass % share of heat market in EU members states (Eurostat 2004)



Western Region heat market size: methodology

There are no published figures on the size of the heat market in the region. The *Bioenergy Action Plan* defines the total Irish heat market as being equal to 5.3 million tonnes of oil equivalent (forecast at 2010 by SEI). The table below shows that the Western Region contains 17.98% of the total Irish population.

Table 6: Population of Western Region by county (2006)

County	Population
Clare	110,850
Galway	231,670
Leitrim	28,950
Mayo	123,839
Roscommon	58,768
Sligo	60,894
Donegal	147,264
Total	**762,335**
% of Irish population	**17.98%**

Using the population proxy, the Western Region heat market should equal 18% of the national heat market.

This means the Western Region heat market is equal to 948,700 tonnes of oil equivalent.

We can convert this into litres of oil by using the standard conversion factor that one tonne of oil equivalent is multiplied by 1183 to arrive at litres of oil.

Therefore, the region's heat market is equal to 1.122 billion litres of oil.

We know that a litre of oil contains approximately 9kWhs of energy.

This means the region uses approximately 10.1 billion kWhs of energy in the heat market.

A tonne of woodchips at 50% moisture content contains 2300kWhs of energy.

This means that to supply 100% of the Western Region heat market with wood fuel would require 4.39 million tonnes of wood fuel per annum. Therefore, a 10% market share of wood energy would be in the order of 440,000 tonnes per annum.

Wood heat market share

As each 800 tonnes of woodchip would normally require 1 MW of installed capacity it can be inferred that a 100% share of the region's heat market would equal approximately 5,490MW of installed wood energy capacity.

The region has so far achieved 65.5MW installed wood capacity. Clearly it would be a massive undertaking for the sector to gain even a small proportion of this potential market opportunity.

The main issues is that the wood heat sector has a massive heat market into which it can grow and the size of the overall heat market is not a limiting factor for wood heat market growth.

5.4 CHP market share

As noted in section 3.3, the wood energy CHP market will be restricted to a few single projects. In the Western Region it can be assumed that there could be only a small number of locations where suitable combinations of large scale demand for heat and power use combine to offer the prospect of biomass CHP investment. This might include large process heat users in the pharmaceuticals industry, food processors, cement works and possibly a few major public buildings like regional hospitals, airports, etc.

In 2007, a national target of 10MW_e[43] to 15MW_e of biomass CHP (2007 to 2013) was set. As the Western Region contains approximately 18% of the population of Ireland it can be assumed that the region should contribute to approximately 18% of the national biomass CHP target.

This suggests 1.8MW_e to 2.7MW_e should be installed by 2013 to allow the region to make an equitable contribution to national targets in line with its share of population.

[43] MW_e refers to the installed capacity in terms of MW electrical. As in all cases a CHP project is capable of generating more heat than power, it can be assumed that 1MW_e also represents 3MWt; this means 3 MW of heat output.

5.5 Development of market growth scenarios

Taking into account the issues noted in this section we have decided to develop three market growth scenarios. These are designed to illustrate the rate at which wood energy might be able to gain market share in the Western Region. A complex range of factors will influence the level of market growth and the following provides an analysis of the key factors.

Energy prices

As this report has demonstrated, an important factor in the uptake of wood energy is the future price (and availability) of fossil fuels. Wood energy systems are much more ***expensive to install*** than fossil fuel systems. However, they are much ***cheaper to operate*** as the cost of wood fuel is much lower than oil and gas. Therefore, wood energy will gain market share where the fuel savings achieve a commercially viable payback on investment.

The current differences in prices of fossil fuels and wood fuels in the Western Region are already sufficient to make wood energy an attractive investment option in some parts of the energy market. This is shown in the table below.

Table 7: Comparative fuel costs (2007)

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

This has created the small amount of market growth that we have seen in Western Region. However, if the price differential between wood and fossil fuels was less attractive in the future, i.e. wood fuels prices rose and/or fossil fuel prices fell, then market growth would stall.

Furthermore, it is possible that even a long period of price stability in terms of fossil fuels could reduce the stimulus to invest in wood energy projects. This is because part of the perceived advantage of wood fuels over fossils fuels is price stability.

However, if the price of fossil fuels was to continue to rise further and exhibit increased volatility then the stimulus to invest in wood energy would strengthen a great deal. For example, more projects would become commercially viable if switching from oil based systems to wood fuel had a payback on investment of below two years. Many more projects with paybacks within a three to five year payback range might also attract investment.

Carbon taxes

The government does not impose any carbon taxes, unlike many other parts of the EU. If a carbon tax (or useable carbon trading mechanisms and incentives to use renewable fuels) was introduced in the coming years it would stimulate conversion to wood fuels due to the exemption from tax or secure financial benefits over fossil fuels.

Renewable energy targets, policy and regulation

Existing EU and national renewable energy targets already create a strong focus on renewable energy. If the existing targets are to be achieved then there would need to be high rates of market growth in the Western Region. For the scenarios that follow we show how they relate to current national targets.

It is possible that over the next 12 years, targets could be increased and this would certainly focus even more effort on how wood energy could contribute.

Importantly, the effect of targets is to allow related policy and regulation to be improved to help achieve them. For example, emissions regulations and planning policy impact on the rate of investment in wood energy projects and so if these policy areas become more supportive then rates of market growth can increase.

Capacity, skills and supply chain development

There are 21 companies involved in the sector in Ireland with the majority being small scale enterprises, mainly located outside of the region. Based upon consultations as part of this report we estimate that the majority of these companies employ fewer than three people. Seven or eight of these companies probably employ more than 10 staff and will have installed approximately 10 wood fuel systems each to date. Most of these companies have been established in the last five years. Many of them are cross-sectoral and also involved in the supply of other renewable technologies such as solar thermal panels.

The rate of growth of these small companies and the number of new entrants in the market will be key factors in market development. As already noted, the heat market is very significant in size and will not limit wood energy market growth. Therefore, setting aside wood fuel resource constraints, a key factor in market growth is capacity, skills and supply chain development.

Without active help and support it seems unlikely that market growth can be sufficiently rapid to achieve national targets. For example, creating the conditions where hundreds of growers contribute to fuel supply will require intervention to overcome the current lack of awareness and the challenges of harvesting from small plantations. In terms of boiler installation, growing demand would stretch the capacity of companies to respond, possibly resulting in poor installations, higher prices or both. In Austria there are currently over 100 qualified wood energy design engineers[44], and in Ireland we estimate there could be fewer than 10 individuals with similar skills. Bridging this capacity gap is clearly a big challenge if the sector is to grow rapidly.

Market confidence and awareness

Ultimately, the rate of market growth is determined by the demand for wood boilers by energy users. They must be convinced about the technology and its reliability. They must also be persuaded that wood fuel is available in the long term and at a stable price. Finally of course they must understand and accept the commercial case for investment.

Effectively these issues require a degree of market confidence and awareness. The extent of this will determine the rates of market growth in the region.

[44] Source: Styria Energy Agency

Impact of the action plan

The following section outlines how much of an impact an action plan would have on growth rates and explains why this would occur. However, there are two other factors that provide a context for this and explain the nature of the growth patterns we set out.

The action plan is implemented over three years to the end of 2010, but market growth continues strongly after that date. Over the period of the action plan many of the current key barriers to market development could be overcome. In specific terms, this includes the delivery of a wood energy promotional campaign to raise awareness, build confidence in the sector and create demand, and the establishment of sustainable, reliable fuel supply chains with the capacity to expand to meet market demand.

Many aspects of the process would remain as an operational legacy beyond 2010. This includes promotional material, case studies, a well populated and informative web portal, a suppliers' database, an accurate and detailed wood resource assessment, supply chain clusters and co-operation, and published costs and market data.

Furthermore, in the period of the action plan the skills, training and infrastructure (chippers, delivery vehicles, fuel processing depots) of the sector would also create a 'step change' in the sector because of the support offered by the action plan.

Part of the action plan is the establishment of a framework for co-ordination and co-operation between the relevant agencies such as the Forest Service, county councils, local energy agencies and Teagasc. Such agencies are now, and will increasingly, engage with the wood energy sector.

Importantly, the number and range of wood energy installations would grow to approximately 100MW (under our recommended target by 2010). This is approximately 200 individual installations at 500kW each. At that scale of deployment the sector would start to become part of the conventional and routine energy sector. Therefore almost every end user considering an investment would be close to a recent installation. They would be familiar with the technology and see a functioning active supply chain that supports it in a way that is impossible now.

It is in that context that we show that after 2010 the rates of annual market growth start to increase. This pattern of growth is reinforced by the lag time in project development.

For example, the Clare Wood Energy Project has seen most projects take two years to develop from initial inception to installation and commissioning. The reasons for such long development periods are partly associated with the lack of confidence by investors who feel they must test out every issue before a commitment is made. It is also as a result of the inherent complexities of wood energy compared to conventional mature energy sectors. Another factor is the length of time required to order and import some boiler equipment, which has tended to be on three month lead times. Design, project management, planning and regulations all also add to the timescales.

This suggests that many of the projects that would be conceived and developed during the period of the action plan would only be installed and commissioned in the years following the action plan.

For all these reasons we have developed market growth scenarios that have increasing rates of market growth for wood heat after approximately 2012.

By the end of the 2010s we show a small slowing in the rates of market growth in all our scenarios. This is because we anticipate that the market will have delivered on most on the most commercially viable market segments in the preceding 10 years and there would be some moderation in the rates of growth thereafter.

A further issue that we have assumed in terms of the action plan is that it is responsive and adaptive within an overall framework of annual market growth targets to 2020. This means it would be able to develop and change in response to market growth needs over the next three years. For example, particular issues might require more

or less support over time. This can be achieved as the proposed regional team of officers build up knowledge and experience and direct their efforts in the light of practical experience.

A final point in terms of the action plan is that the proposed regional team, the RWEAG and steering group will have an opportunity to develop a clear exit strategy by the end of 2010. The development of the action plan is likely to embed a range of self sustaining support mechanisms into the region. Some of these relate to policy, others to structures and co-operation. The extent of progress in the various areas will determine the exit strategy. However, it can be assumed that many aspects of the strategy and action will become in part or full, self sustaining. For example, a suppliers' and installers' database might grow into a formal trade association for the industry. The development of fuel production forecasts might become part of the conventional forestry forecasting process and so on.

CHP market growth

Another factor that should be taken in account is the impact of wood CHP projects on the overall rate of market growth. Because we anticipate only a handful of CHP projects, it would not be possible to illustrate these in a conventional market growth curve over 13 years. We have therefore simply stated what we view as realistic, the number of CHP projects for each scenario we have developed. This sits alongside the market growth curves for each scenario.

The impact that the action plan can have on the emergence of a few wood CHP projects is different to the impact it can have on wood heat market growth. This is because the heat sector can grow by the implementation of hundreds of individual smaller projects. The main focus of the action plan is to influence, kick start and support the more numerous smaller scale investment decisions in the commercial/industrial heat market. Web portals, promotional campaigns, generic cost and other data have an effective role but are not as relevant to a few large CHP projects.

Nevertheless, the action plan would have a positive impact on the development of wood CHP projects because it proposes an environment where wood fuels are regarded as a conventional and widely used fuel. In a practical sense, some of the capacity development in the heat sector would provide skills, infrastructure and resources that would be useful for CHP market development. For example, a wood fuel processing depot or energy chipper could be used in both the heat and CHP markets.

Within the action plan we have also included a specific task that can be used to help kick start a wood CHP sector through the identification of site specific investment opportunities in the region, where these exist to help develop the technical and commercial case.

The scenarios

We have developed four scenarios for the levels of targets based on all these factors:

- 'do nothing' scenario: static market environment and no additional public intervention through a regional action plan; the current SEI boiler installation grant scheme is discontinued in 2010
- low scenario: a static market environment for wood energy but an action plan is implemented to promote market development; the current SEI grant support for boiler installation is continued after 2010
- medium scenario: the action plan is implemented to support market development and fossil fuel prices continue to rise above the rate of general inflation in the economy; more supportive policy and regulation and the current SEI grant support for boiler installation is continued after 2010
- high scenario: the action plan is implemented to support market development and fossil fuel prices increase at 15% per year; carbon taxation is introduced with aggressive renewable energy targets, additional polices and very supportive regulations; the current SEI grant support for boiler installation is continued after 2010

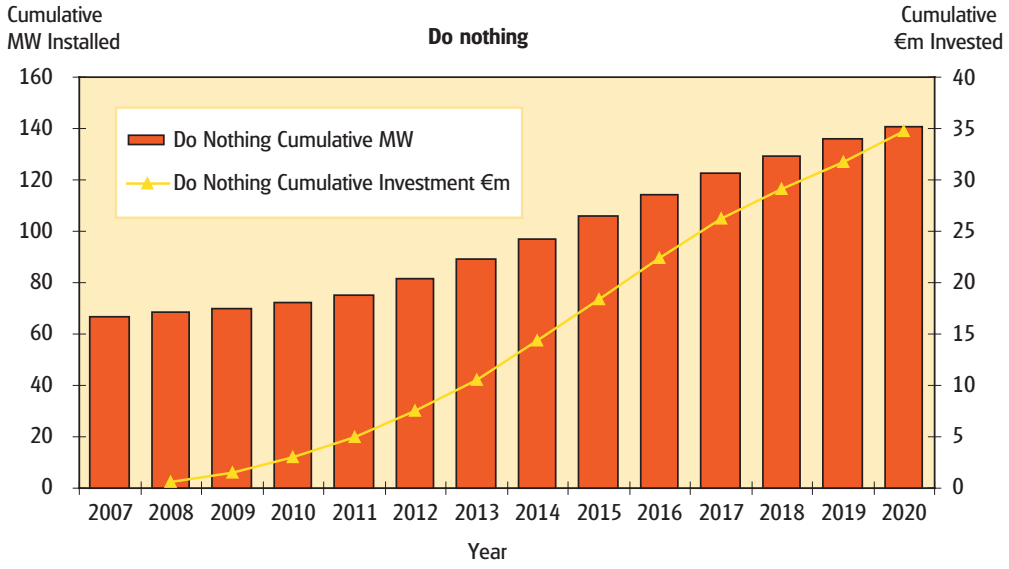
All the scenarios show the 65.5MW of already installed capacity as the baseline.

5.6 Do nothing

Under this scenario the action plan is **not** implemented. We have assumed that the current price of fossil fuels remains reasonably stable and does not rise above the rate of general inflation in the economy. With an average annual rise of 5% this means oil for heating would be at approximately 6 cent kWh (equal to 63 cent/litre) in 2010[45]. We have assumed that carbon taxes are not introduced at any future point. The introduction of additional renewable energy targets, additional polices and more supportive regulations are not part of this scenario either. Finally, we have assumed that the current grant support for wood energy is discontinued in 2010 as the SEI current grant scheme ends.

In summary, this is the least supportive environment for wood energy with external policy and prices no better than now and no action plan to underpin market growth. The figure below illustrates our assessment of the rate of market growth (heat only) under this scenario.

Figure 12: Rate of market growth under the 'do nothing' scenario



This shows 75MW of installed new heat capacity by 2020 and is developed on the basis that local policy and regulation, capacity, skills and supply chain development, market confidence and awareness are very important factors in the growth of wood energy. Since all of these factors would not be developed effectively without an action plan or the full implementation of the strategy proposed in this report, there would be a large impact on rates of market growth. At the moment the external policy and price context delivers a few projects each year and there is little reason to suppose this would change dramatically unless greater support was provided. Thus the do-nothing scenario represents approximately two projects per year per county.

It also assumes that the development of two CHP projects, as prices, policy and local support (via an action plan) would not create conditions better than now, so over 12 years only two projects seem reasonable. This means 30MW of new CHP heat capacity by 2020.

The use of fuel would be 120,000 tonnes per annum by 2020.

The do nothing scenario would only allow the region to meet 25% of its equitable contribution towards the national renewable heat target by 2020[46]. It would only represent approximately a 3% share of the region's heat market.

[45] Please note that the scenarios were prepared in July 2007 and therefore reflect the oil price of that date.

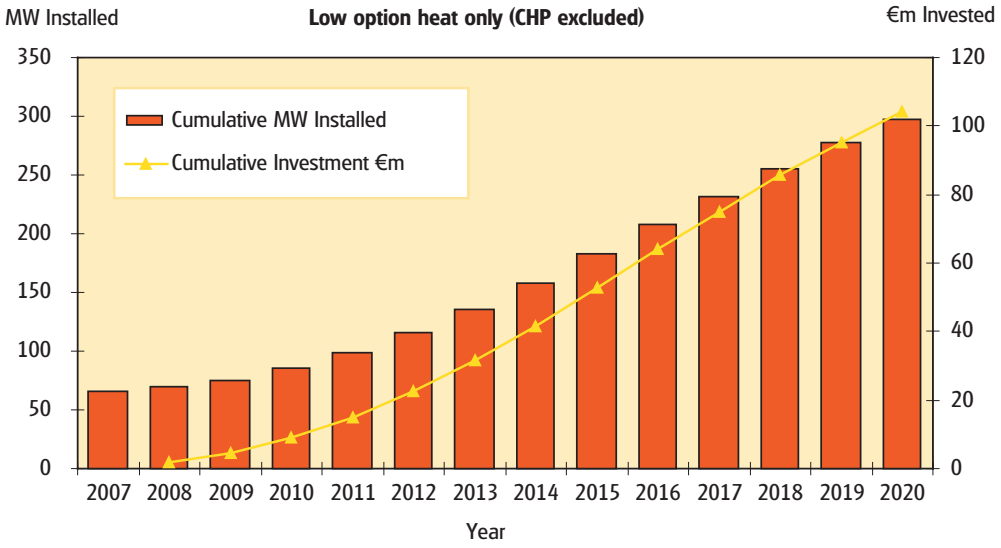
[46] Including the 65.5MW already achieved.

5.7 Low scenario

Under this scenario the action plan is implemented to support market growth, but the external environment is exactly the same as under the do nothing scenario. The action plan provides support to market development, but the external environment for wood energy in terms of policy and prices is no better than now.

The figure below illustrates our assessment of the possible rate of market growth under this scenario.

Figure 13: Rate of market growth under the low scenario



This shows that we estimate market growth will achieve 232MW of new installed heat capacity by 2020.

We also estimate that four 5MW CHP projects could be developed in the region by 2020. This would add approximately 60MW of heat capacity and require 90,000 tonnes of wood fuel per annum.

The average annual rate of installed heat capacity is just under 20MW, this equates to approximately five or six 500kW projects per county per annum over the next 12 years. This is a little above current trends in the region. It is quite close to the levels of growth currently seen in County Clare where a focused programme of support[47] is assisting market development. In the context of little change in external policy and prices we think the action plan and strategy should help deliver this level of market growth.

The use of fuel would be 305,600 tonnes per annum by 2020.

The low scenario would only allow the region to meet 54% of its equitable contribution towards the national renewable heat target by 2020[48]. It would represent approximately 7% of the region's heat market.

[47] See section 6.2 for fuller details of the County Clare Wood Energy Project.

[48] Including the 65.5 MW already achieved.

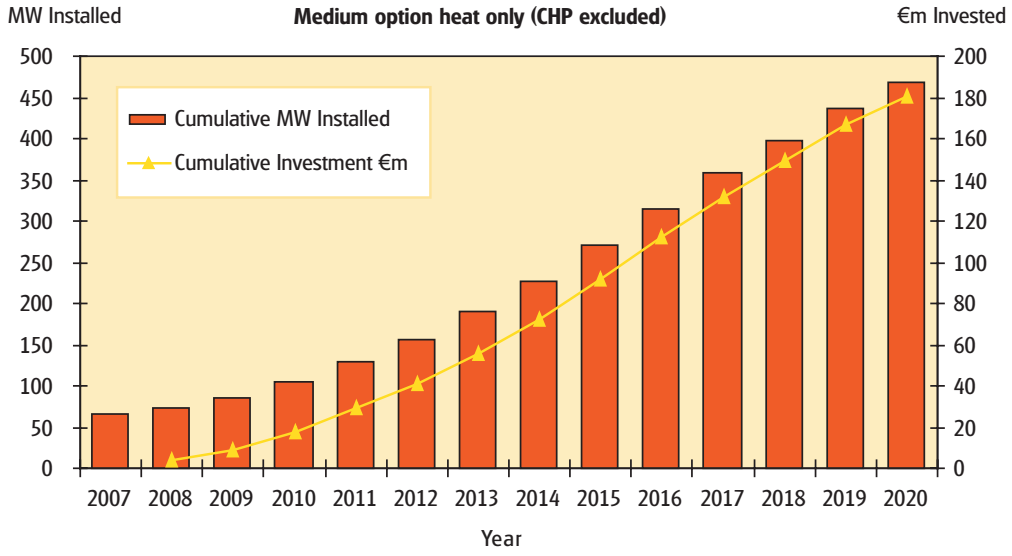
5.8 Medium scenario

Under this scenario the action plan is implemented to support market development and we have assumed that fossil fuel prices continue to rise above the rate of general inflation in the economy. This means we have assumed that oil for heating rises by approximately 10% year on year. This would make oil for heating cost 7.5 cent kWh by 2010 (equal to approximately 72 cent a litre for oil)[49]. The gradual improvement of polices and more supportive regulations are assumed to develop year on year. Finally we have assumed that the current grant support for wood energy is continued after 2010 as the SEI current grant scheme ends.

In summary, the action plan provides support to market development and the external environment for wood energy gradually improves with more supportive policy and price advantages growing over the next 12 years.

The figure below illustrates our assessment of the possible rate of market growth under this scenario.

Figure 14: Rate of market growth under the medium scenario



This shows that we estimate market growth will achieve 402MW of new installed heat capacity by 2020.

We also estimate that five 5MW CHP projects could be developed in the region by 2020. This would add approximately 75MW of heat capacity and require 150,000 tonnes of wood fuel per annum.

The average annual rate of installed heat capacity is over 30MW, this equates to approximately eight or nine 500kW projects per county per annum over the next 12 years. This is significantly above current trends in the region and higher than the levels of growth currently seen in County Clare.

In the context of a more supportive environment envisaged under this scenario and the implementation of the strategy and action plan we believe this scenario is achievable over the next 12 years.

The use of fuel would be 471,600 tonnes per annum by 2020.

The medium scenario would allow the region to meet 82% of its equitable contribution towards the national renewable heat target by 2020[50]. It would represent approximately 10.7% of the region's heat market.

[49] Please note that the scenarios were prepared in July 2007 and therefore reflect the oil price of that date.

[50] Including the 65MW already achieved.

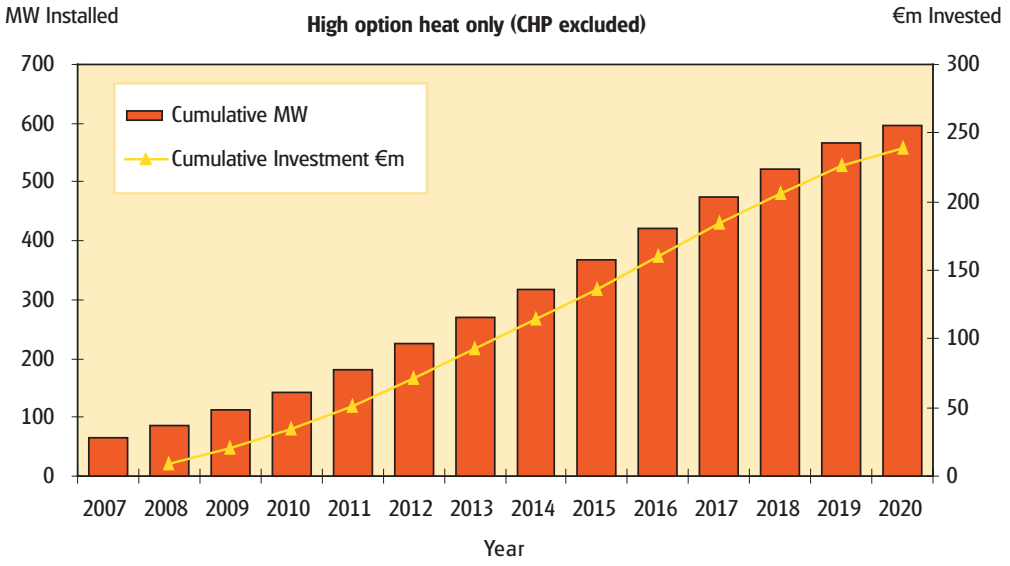
5.9 High scenario

Under this scenario the action plan is implemented to support market development and we have assumed that fossil fuel prices are volatile but rise overall at the rate of 15% per year. We have also assumed carbon taxation is introduced to exaggerate this price differential. This means that by 2010, oil for heating would be at 9.5 cent kWh (equal to approximately 82 cent a litre for oil)[51]. We assume aggressive renewable energy targets, additional polices and very supportive regulations are developed rapidly, such as the imposition mandatory renewable energy targets in the land use planning system. Finally, we have assumed that the current grant support for wood energy is continued after 2010 as the SEI current grant scheme ends.

In summary, this is a highly supportive environment for wood energy with the action plan promoting market development, in the context of external policy rapidly improving and price advantages for wood fuels growing quickly.

The figure below illustrates our assessment of the possible rate of market growth under this scenario.

Figure 15: Rate of market growth under the high scenario



This shows that we estimate market growth will achieve 532MW of installed heat capacity by 2020.

We also estimate that six 5MW$_e$ CHP projects could be developed in the region by 2020. This would add approximately 90MW of heat capacity and require 180,000 tonnes of wood fuel per annum.

The average annual rate of installed heat capacity is over 44MW, this equates to approximately 12 500kW projects per county per annum over the next 12 years. This is highly significantly above current trends in the region and much higher than the levels of growth currently seen in County Clare.

In the context of the very supportive environment envisaged under this scenario and the implementation of the strategy and action plan we believe this scenario is achievable over the next12 years.

The use of fuel would be 605,600 tonnes per annum by 2020.

The high scenario would allow the region to exceed its equitable contribution towards the national renewable heat target by 2020 by 4%. It would represent approximately 13% of the region's heat market.

[51] Please note that the scenarios were prepared in July 2007 and therefore reflect the oil price of that date.

5.10 Likely scenario

The table below summarises each of the scenarios developed. These figures represent newly installed capacity and are additional to the estimated baseline position for 2007 of 65.5MW.

Table 8: Summary of the scenarios

scenario by 2020	do nothing	low	medium	high
new heat capacity	75MW	232MW	**402MW**	532MW
new CHP capacity (heat only)	30MW	60MW	**75MW**	90MW
total new heat capacity	105MW	292MW	**477MW**	622MW
% of national 2020 heat target achieved**1**	25.8%	54.2%	**82.2%**	104.2%
tonnes of wood required per annum by 2020	120,000t	305,600t	**471,600t**	605,600t
% of Western Region heat market achieved	3%	7%	**10.7%**	13%

Scenarios compared to national renewable heat target

Under the do nothing scenario we have shown that the rates of market growth would be low and that the wood energy might only achieve a 3% share of the regions heat market by 2020. Furthermore, assuming the region should meet approximately 18% of the national renewable heat target (as it contains 18% of the population) the do nothing scenario can only meet a quarter of its equitable share of the national renewable heat target. As it is most unlikely that other parts of Ireland can deliver a much greater share of the national target than is equitable[52], the 2020 national target would not be met.

The high scenario does exceed the national renewable heat target however this does not take into account the role of other renewable technologies such as solar thermal, regionally and nationally. Furthermore it requires the external policy and price environment to be extremely supportive and we view this as less likely to occur than the medium scenario.

The medium scenario can be viewed as making a regionally equitable contribution as at 82% of the national renewable heat target it would provide the vast bulk of the target and allow some growth in solar thermal and other technologies.

Scenarios compared to wood resources

We have also compared these scenarios with our estimations of available wood energy resources. This report demonstrates a robust and cautious estimate of wood available for energy use in the region by 2020 of 516,000 tonnes per annum. It is very important to note that this estimation of wood resource only includes new wood resources that are **surplus to any current market demands for wood** (in any of the wood markets) and is available sustainably and annually.

[52] Because they do not contain as much of the wood biomass resource as the Western Region.

This means that under the do nothing and low scenario the demand for wood fuel would be well within the additional and surplus resources of the region. Therefore, the region would continue to have a problem in providing a viable market for its forecast rise in wood production.

Under the high scenario the additional surplus resources would not meet the demand for wood energy by 2020. This suggests that other sources of wood fuel would be required or that existing wood users would see direct competition for the existing wood resources.

The medium scenario estimates a wood fuel requirement of 471,600 tonnes thereby creating a market for most of the surplus forecast wood of the region, while not likely to create price or supply pressures in other wood markets.

Conclusions

'Doing nothing' only allows the region to meet approximately a quarter of its equitable contribution to the national renewable heat target and would almost certainly result in Ireland as a whole failing to meet the target.

The low scenario would also achieve lower levels of market growth than required by national renewable heat targets. It would also not use up the surplus wood supplies of the region and would leave large areas of private sector forestry without commercially attractive markets.

The high scenario requires the use of wood resources in direct competition with other wood users. We also believe that it would require an unrealistically supportive external environment of policy and prices to be established.

We recommend basing the action plan on the medium scenario as this represents a logical balance between the available resources, the national renewable heat targets and the likely way in which the external environment would impact upon the Western Region.

We also propose that the targets be broken down into annual targets, set out until 2020, to be in line with the *Energy White Paper* and allow close monitoring of the strategy. These annual targets are shown in the following table.

Table 9: Annual targets under the medium scenario (2008 - 2020)

Medium scenario heat growth 2008 – 2020 (ex CHP heat)							
year	already installed	new installed capacity in MWs	annual investment* €m	annual fuel use in tonnes at 50%	cumulative new installed capacity in MWs	cumulative annual investment €m	cumulative annual fuel use in tonnes at 50%
2007	65.5				65.5		
2008		8	3.6	6,400	73.5	3.6	6,400
2009		12	5.4	9,600	85.5	9.0	16,000
2010		20	9.0	16,000	105.5	18.0	32,000
2011		24.5	11.0	19,600	130	29.0	51,600
2012		26.5	11.9	21,200	156.5	41.0	72,800
2013		33.5	15.1	26,800	190	56.0	99,600
2014		36	16.2	28,800	226	72.2	128,400
2015		44	19.8	35,200	270	92.0	163,600
2016		44	19.8	35,200	314	111.8	198800
2017		43.5	19.6	34,800	357.5	131.4	233,600
2018		40	18.0	32,000	397.5	149.4	265,600
2019		38	17.1	30,400	435.5	166.5	296,000
2020		32	14.4	25,600	467.5	180.9	321,600
		402	180.9		467.5		321,600

** Annual investment is based on an estimate of €450,000 per MW installed*

In addition to this, the scenario projects 75MW of CHP projects. We estimate this would be five of 5MW$_e$ (electrical), thus providing approximately 75MW of heat via CHP output at 15MW heat each. We recommend that by 2010 at least one CHP project be targeted for completion.

6.0 Challenges for developing market share

6.1 Regional examples in Europe

It is useful to see how regions of Europe have developed their wood energy markets and what this implies for the Western Region, and this strategy and action plan.

Upper Austria

Upper Austria is one of the nine states of Austria. With 1.3 million inhabitants, Upper Austria is the fourth largest Austrian state by land area and third largest by population. The development of wood energy in Upper Austria over the past 10 years provides a striking view of what can be achieved.

In Upper Austria, from a standing start in 1994, a clearly defined strategy for wood energy heating has been pursued via an effectively co-ordinated and properly resourced development programme. The target for renewable energy uptake was 25% and by 2002 the actual figure had reached 30%, with wood energy providing 14%. It is instructive to note that this period of support was sustained over 10 years and that it has been delivered within an overall framework for renewable energy deployment. The critical importance of wood energy, which accounts for half of all the renewable energy, was recognised from the outset. The following is a list of a relevant statistics for Upper Austria:

- forest cover: 41 % (491,180 ha)
- modern wood heating systems: 15,100
- 852MW of installed capacity
- biomass district heating plants: 200
- wood pellet installations: 4,500
- large pellet producing companies: 12
- companies producing biomass boilers and stoves: 15

Clearly, one difference between Upper Austria and the Western Region is the proportion of forested area. However, while significant, this difference is not necessarily a fundamental determinant, and in this regard it is telling that a wide range of other renewable technologies have also been successfully deployed in Upper Austria.

The success in developing wood energy is not simply accounted for by the extent of forestry in the region. A key conclusion that emerges from a review of the experience in Upper Austria is the extent to which comprehensive and concerted actions, including a whole range of measures via policy to promotion and facilitation, can be effective in stimulating market development.

The regional energy agency in Upper Austria

O.Ö. Energiesparverband (ESV) is the regional energy agency of Upper Austria. Due to a comprehensive regional energy plan renewable energy sources have a high priority. ESV supports the regional government in the development of its energy strategies and is responsible for the implementation of most of its programmes. The energy agency is active on local, regional, national, EU and international levels with numerous projects and programmes.

The main activities of the agency include comprehensive information and awareness raising activities on sustainable energy production and use. For example, the provision of energy advice to private households, public bodies and companies (more than 15,000 advice sessions per year), media campaigns, training courses or publications for different target groups. This also includes the organisation of meetings, events and conferences.

ESV issues over 4,000 energy performance certificates for new and retrofitted buildings every year with a programme budget of €20 million per year. Activities also include a regional energy research and development programme with a budget of €2 million per year and the operation of a regional fund for energy investment.

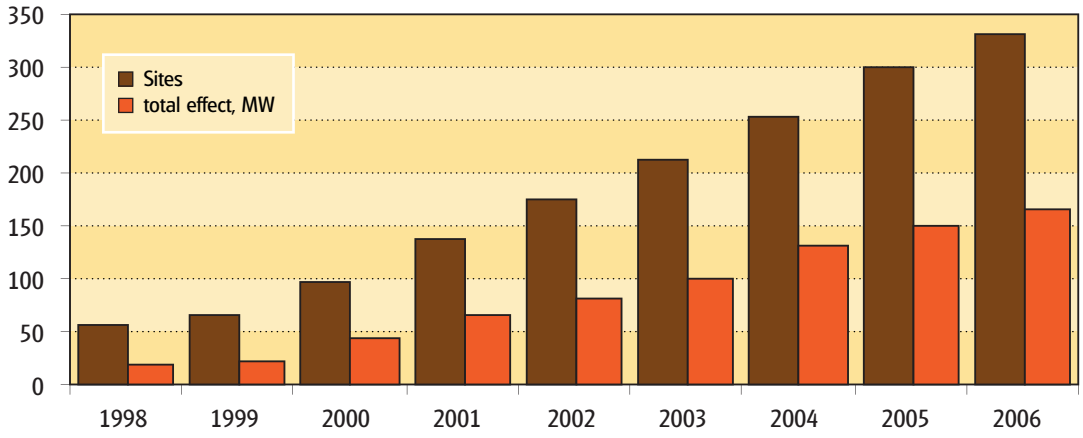
The agency frequently supports the government with expert opinions on new programmes and projects. It also provides a number of services for municipalities, including support in tender procedures for new buildings/ installations and local energy strategies.

For Austria as a whole the annual investment in wood energy technology in 2006 was €320 million[53]. This illustrates how regional market development and national market development combine to create what is clearly a large energy sector over a period of approximately 13 years.

Finland

Another example of how the wood energy share has been established and developed can be seen from the experience of Finland from 1998 to 2006. In 1998, Finland managed to install approximately 20MW of wood heating capacity. The amount installed each year rose gradually and in 2006 approximately 170MW of capacity was installed. This growth is illustrated in the table that follows.

Figure 16: Finnish wood energy installed capacity (1998 - 2007)



Market development in Finland is supported by a comprehensive network of regional energy agencies[54]. A total of 11 energy agencies are established in Finland. The overall intention of the regional and local energy agencies is to promote the efficient use of energy and renewable energy sources in their respective areas of operation.

All energy agencies are individually organised. They function, for example, in conjunction with another institution, government department, company or as independent unit.

[53] Source: Styria Energy Agency 2007

[54] *Background and Present Situation of Energy Agencies in Finland - 2003* by Mikko Ahonen, Central Finland Energy Agency.

The energy agencies typically have between one and four employees, who are experts in the energy sector. A management or steering group guides their activities. The energy agencies are independent units and they have no national parent organisation. Services of the energy agencies include:

- initiator and lead on projects (idea generation, marketing, project planning)
- building of necessary industry network (local, national, international - EU)
- marketing of energy conservation agreements, especially in the municipalities of an energy agency's specific area of operation
- technical energy conservation services
- comprehensive service/life-span service
- energy audits
- efficiency-promotion plans
- consumption monitoring
- training services
- investment and financing alternatives /marketing of ESCO activities
- compiler/consultant of local/regional energy balances
- promoter of new technology
- information provider for attitude training and consumption behaviour
- information desk

6.2 The County Clare Wood Energy Project

The County Clare Wood Energy project (CCWEP) has been working to facilitate and stimulate the uptake of wood fuel energy in County Clare. The project is managed by Rural Resource Development in conjunction with Teagasc and is funded by the Forest Service. It was commenced in late 2005 and could be seen as a county based version of a regional action plan.

The project has employed two part time specialist consultants and they have developed a programme of contacting and developing potential wood heat customers. To date, 29 organisations or companies have been contacted in County Clare and shown interest in the concept of wood heating. For many of these the project has developed outline business plans and led them through a tender process for fuel supply and technology installation.

By early September 2007, three (approximately 500kW) systems had been installed and another three to five projects were well developed in terms of tendering. The systems have been developed in the mid commercial heat scale such as hotels, care homes and factories.

In addition to this the project put in place a great deal of help in terms of fuel supply chain development with local growers and wood processors. This has created several new fuel supply companies and provided the confidence for energy users to invest in wood projects. This work included workshops, training sessions and awareness raising.

The project has generated a large amount of publicity and presents its 'offer' as follows:

> ***What can the County Clare Wood Energy Project do for you?***
>
> ***Reduce your energy bills:***
>
> - *By pegging your future energy bills to CPI and not the fluctuations of fossil fuel prices*
> - *By allowing you to convert to the largest, most mature and reliable RE in Europe*
>
> ***We can:***
>
> - *Help cost and prepare an outline wood heating plant design*
> - *Help manage a tender process to install heating plant*
> - *Help secure the 30% SEI grant aid and other capital funding sources that are planned to come on stream.*
> - *Help decide upon suitable fuel and boiler maintenance contract.*
> - *Help secure other reliable wood chip fuel supply from farmers/foresters and the wood sector.*

It can be summarized that the project will help deliver at least six and possibly closer to eight commercial scale (500kW) projects over two years from a standing start. This is analogous to the rates of market growth that we show under the medium scenario.

6.3 Key barriers and issues

The examples of Austria, Finland and County Clare offer an insight into how the key barriers and issues that impact on market development in the Western Region can be addressed. These lessons are drawn from direct experience of the authors in the region and detailed knowledge from other markets.

Energy customers

The demand for wood fuel and the investment in wood energy technology are created by energy customers converting to wood energy. There are significant barriers to investment, outlined below.

- **Awareness**

  Many energy users are simply unaware of the technology; this is not surprising as the subject does not secure much national press attention and it is difficult to expect building owners to be fully aware of all the renewable energy issues.

- **Confidence**

  The technology and fuel supply chain are new to the region. Clearly, energy users will tend to lack confidence until they see a critical mass of users and installations.

- **Fuel supply confidence**

  Energy users know they can get oil delivered but currently lack full confidence that wood fuel can be supplied reliably and that it will not 'simply run out'.

- **Confidence in long term price**

  Concerns over how stable wood fuel prices will be over the next few years. A key reason to convert to wood is that it is cheaper than oil and gas but it must be 'proved' it will remain so over a long term.

- **'Reliability and usability' of the technology**

  Many energy users are not aware of the sophistication of the technology and how it can operate in a manner equal to the automation gas or oil boilers. They also express concerns over how reliable the technology is. These issues are not raised or considered when contemplating investment in oil or gas boilers. However, communication and demonstration of these issues is important to overcome energy customers' concerns.

- **Regulations and issues related to emissions to air**

  Energy customers often express concerns over the combustion of wood, which they see as issue unlike the combustion of gas and oil. In part this issue is associated with how simple it is to secure consent to install a wood system, but it is also another issue of information and communication to energy users.

- **Understanding the business case**

  To make an investment decision a customer must know what it will cost and how the economics work. Most energy users are unaware of this and unable to obtain impartial and reliable information. Any cost information they can get is from market players hoping to sell fuel or technology, and this reduces the chances of energy users making investment decisions.

- **Complexity of investment process**

  If energy users wish to invest in fossil fuel systems they can do so with considerable ease. They can secure advice, help and support very easily and they have confidence it will be a simple enough process. This is not the case with wood energy. In fact the investment process is not only more complex, it is new, involving procurement of wood fuel and wood systems in a new market context. In many instances, even if the business case is attractive, the effort of managing an investment process does not appear worthwhile. Most energy users are focussed on what their business does day to day (running a hospital, leisure centre, hotel, etc.) and to devote effort to a process that seems risky or difficult and complex is often a key barrier.

- **Technology installation**

  Wood energy systems must be installed by reliable and reputable companies. To develop a large scale market a number of barriers must be overcome.

- **Capacity of installers**

  This is key factor in the rate of market development. There are 21 companies involved in the sector, they are all small and many are not based in the region. Based upon consultations, as part of this report, we estimate that the majority of these companies employ fewer than three people. Approximately seven or eight of companies probably employ more than 10 staff and will have installed approximately 10 wood fuel systems each to date. Most of these companies have been established in the last five years. Many of them are cross-sectoral and also involved in the supply of other renewable technologies such as solar thermal panels.

  It is unlikely that market demand for installations could be met without growth in the capacity of these companies. For the medium scenario the average annual rate of installed heat capacity is over 30MW, this equates to approximately eight or nine, 500kW projects per county per annum over the next 12 years. This requires €13.5 million of capital investment per annum across the region. As these companies mostly operate nationally and undertake projects all over Ireland it would severely stretch their capacity to meet these levels of market demand in the Western Region. The medium scenario also requires five 5MW CHP projects be developed in the region by 2020. This adds a further demand on the capacity of the sector to meet market demand.

- **Design and project management skills**

  This factor is related to capacity as there are only a small number of individuals in Ireland who presently have the technical and design skills to install a wood energy system. It will take some years for the number of well qualified and suitably experienced individuals to grow to a point where market demand can be properly satisfied.

- **Design quality**

  Related to capacity issues, the impact that poor quality and badly specified projects can have on market development is very important. In most cases potential energy users will seek out examples of projects, so when there are very few examples to see, those that are not good provide a reason not to move forward. In that context, the success and quality of the installed projects in the first few years of market development is much more important than in mature markets where critical mass has already establish the sector.

- **Aftercare and maintenance**

  Energy users will be almost as interested in the quality of aftercare and maintenance as they will be in the quality of design and installation. This aspect of the market is not well developed and it is quite difficult for newly established companies to prove they can provide after sales service in a reliable and cost effective way.

Fuel supply

The development of a fuel supply chain is fundamental to market development. However, it proceeds and not precedes installation of technology. Wood boiler systems demand fuel, rather than fuel supply companies creating markets simply because they exist. This creates a timing and scale issue. The main point is, that as markets emerge it makes sense for fuel supply companies to become established if the fuel contracts on offer are commercially large enough to establish a business. This is one of reasons why small scale installations are more difficult to develop in an early market. This is a complex market development issue that covers:

- **Lack of awareness amongst growers**

  The owners of the wood energy resource in the region are generally small private owners who have very limited knowledge of the wood energy market. This lack of awareness prevents participation in the market.

- **Small size plantations**

  The woodlands in the region that are most suitable for wood energy production are dispersed and small in scale. This makes it commercially difficult to undertake harvesting unless plantations are 'clustered' and developed with particular wood energy projects that require fuel. The market alone is unlikely to deliver this co-operation.

- **Equipment and infrastructure**

  Fuel supply chains rely upon wood fuel depots, purpose designed energy chippers and supply chain logistics. This requires investment based upon market opportunities and knowledge of the most appropriate equipment.

- **Practical skills and experience**

  The harvesting, chipping and delivery of wood fuel is basically a simple operation that is largely based upon existing forestry skills. However, the detailed knowledge of how wood is converted to energy (cubic metres of wood to kWhs of energy, etc.) and how wood boilers operate efficiently and convert wood to energy are new skills that must be developed if the sector is to grow.

7.0 Action Plan

7.1 Structure and delivery of action plan

This part of the report identifies actions to support wood energy market development in the Western Region. It also identifies appropriate stakeholders and sets out the structures required to deliver on the action plan. It is based upon the assumption that the medium scenario is set as the regional target for 2020 and is intended to deliver that target if implemented.

Indicative costs and other resources required for the action plan are shown with potential sources of funding for individual actions. Many of these have already been discussed with key stakeholders, but will require further detailed agreement.

We consulted on a range of possible actions that the regional wood energy strategy and action plan might contain; from this came the action plan that follows. The action plan is therefore a reflection of the requirements of the stakeholders and partners.

The recommended three year action plan is primarily a tool to promote and support market development. In that context it must address demand and supply in a co-ordinated manner i.e. adopt a full supply chain approach. This means it seeks to stimulate the demand for wood energy amongst energy users and facilitate capacity building in terms of installers and fuel suppliers to ensure an effective fuel supply chain.

It is intended that the RWEAG (existing group or a selection of its current members) role is formalised to provide a strategic body of experts to oversee and deliver the action plan over the next three years. The following structure is recommended to manage this process:

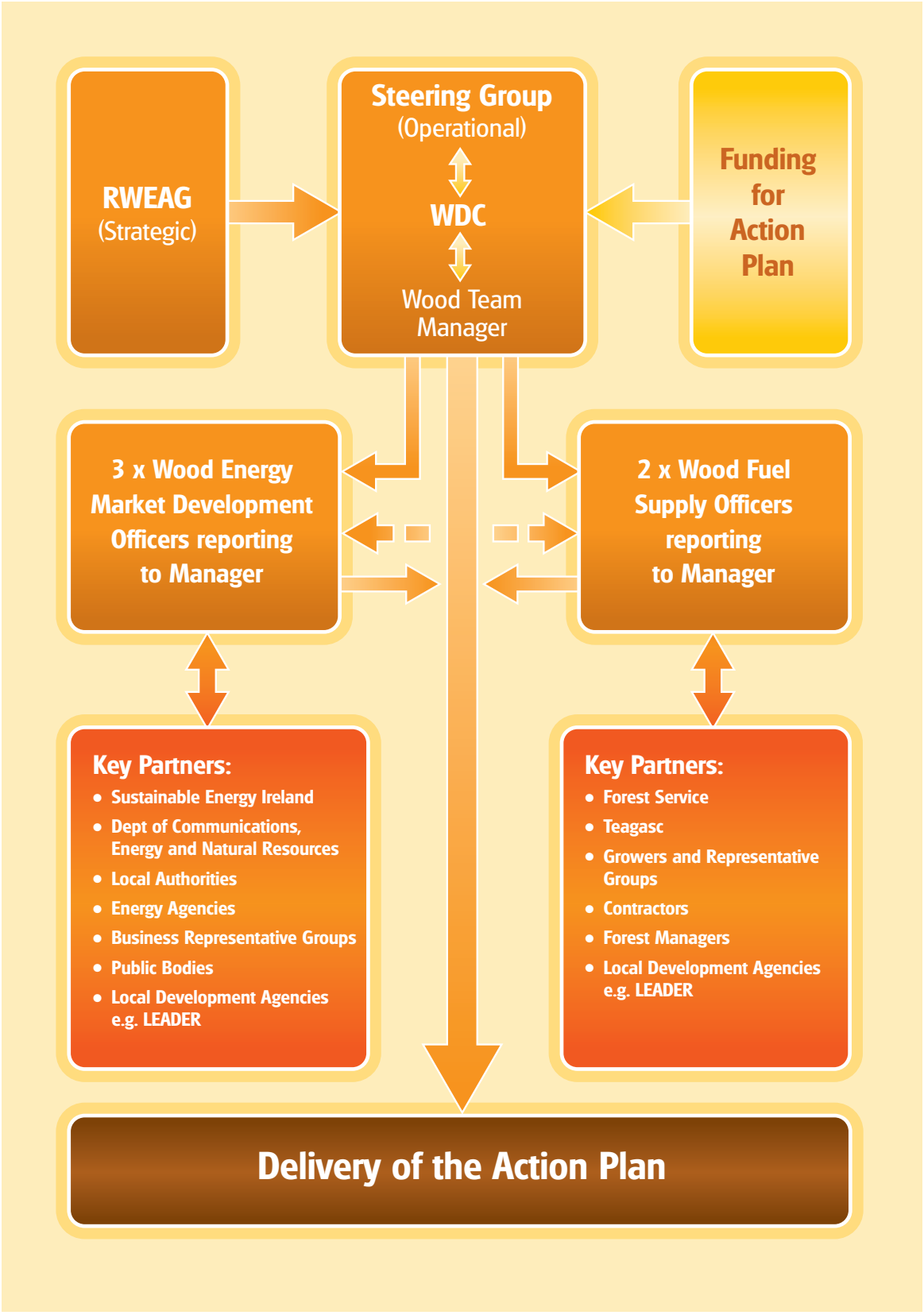
- the RWEAG to provide strategic direction and oversee implementation of the strategy; to meet twice a year and publish an annual progress report; members to include the current group with possible new members, e.g. COFORD, private sector representatives
- a separate steering group to be established to deliver on operational issues including project plans and officer work programmes; to be a sub-group of the RWEAG and meet on a quarterly basis

Given the complex barriers facing the development of the sector, the provision of expertise, advice and active project development support at regional level will be the critical driver of development in the sector. Therefore, the employment of a regional team under the guidance of the WDC is the core proposal to deliver market growth development. This team would be responsible for the implementation of a significant number of the proposed deliverables and would secure project budgets through existing support mechanisms, and work closely with the identified partners through benefit-in-kind working arrangements.

The proposed regional team of seven staff includes a manager, an administrator, three wood fuel market development officers and two wood fuel supply officers.

The nature of the team is shown in the flow diagram below.

Figure 17: Proposed structure for delivery of action plan



7.2 Delivering the action plan

Role of the RWEAG and steering group

The RWEAG and steering group will ensure a focus and adherence to the regional strategy and action plan both at a strategic and operational level. They will fulfil a range of required functions including:

- maintaining regular liaison with the partners who are responsible for implementing projects and ensure funding is in place for duration of the action plan
- assisting the regional team and partners to identify and apply for necessary funding to implement actions, e.g. INTERREG, EU programmes
- building on the partnership approach between the various national, regional and local bodies and identify new opportunities as appropriate
- providing guidance and leadership to the regional team to ensure ongoing commitment to the regional strategy
- providing management and support to the regional team to ensure work programmes delivered
- participating on management teams of key strategic initiatives
- ensuring projects and emerging proposals are strategic in nature and complement regional strategy
- evaluating the strategy and development approach to ensure its ongoing effectiveness and relevance
- sharing the experience and learning of the partners with other regions and partners

These objectives should be developed to ensure actions, where appropriate, become self-sustaining and evolve into viable projects embedded in the sector and/or mainstreamed into relevant agencies as appropriate. This should be a key principal of the approach of the WDC and the other stakeholders in the process.

Role of WDC

The WDC will play a key role in the delivery of the strategy and action plan:

- leading, facilitating and overseeing the development process required under the action plan
- providing policy analysis and ensuring regional strategy links to national policy

The 'buy in' of the various partners is required for the successful implementation of the strategy and action plan. The WDC will lead and facilitate the set-up of the proposed delivery structures as noted above. The WDC will support and oversee the management of the strategy where appropriate to ensure its implementation within the specified timeframe, i.e. start of 2008 to the end of 2010.

The WDC, with the support of the partners, will secure funding for the appointment of interim consultant as the first step in delivering the proposed action plan. The WDC together with the partners will seek to secure funding for the regional team, and from there work on the design of employment contracts and recruitment process of the regional team officers. When the regional team is in place, the WDC will act as management support, facilitating the reporting to the steering group. When the management structures are formalised, the WDC will offer on-going secretariat support to the RWEAG and steering group.

The WDC, through its work in the area of policy analysis and development will also work to ensure that the needs and experience of the Western Region are taken into consideration at a national level.

7.3 The action plan in summary

The three year action plan is designed to describe a range of specific tasks, setting out when, how and by whom they are to be delivered, as well as placing all actions in a coherent and deliverable framework. We recommend that the actions be organised into four themes:

getting the message across

growing the market

developing an integrated wood supply

providing supportive policy, finance and regulation

Each of the themes will require action and the following table describes 30 specific, timetabled and costed recommended actions. The general assumption is that most of the actions should be commenced and delivered during 2008, 2009 and 2010. Longer term actions are also noted.

A key proposal of the action plan is the appointment of a regional team to include: regional manager; administrative support; three regional wood energy market development officers and two wood fuel supply officers. It is recommended that the regional team would be supported by an 18 month consultant's contract to offer training and start up services.

It is this support framework, managed and directed through the RWEAG, that will deliver the action plan. The regional team will be appointed on a regional basis, working with and complementing the existing national and regional projects in the sector. With partnership as a principle of the action plan, the team will work with the following partners:

- National programmes and government departments including the Department of Communications, Energy and Natural Resources, Forest Service of the Department of Agriculture, Fisheries & Food, and Sustainable Energy Ireland
- Energy agencies and build on the current market development role of these sub-regional agencies
- County Clare Wood Energy Project and learn from the experience of this successful project
- Donegal Forest Link Project and Teagasc Producer Groups and thereby link into existing fuel supply chain development
- Local authorities in regard to both the policy framework and relevant local projects
- Other projects as initiated by local development agencies such as LEADER Programme

The regional team will also work with county councils to develop a role in the strategy on a sub-regional basis. It will be possible for each county council, working with one of three regional wood fuel market development officers, to develop local targets and work towards these using the resources and measures of the proposed action plan.

Table 10: Action plan summary (2008 - 2010)

ACTION PLAN 2008 - 2010	WHEN	RESOURCES	WHO?
regional team manger and admin support	Q1 2008	€405,000	SEI/DCENR
Getting the message across			
regional strategy and action plan.	by Q1 2008	already funded	WDC/SEI
hold a regional wood energy conference/ seminar	by Q1 2008	€3,000	WDC supported by strategy partner SEI
establish a web portal for wood energy in the Western Region	by Q2 2008	€25,000	WDC/SEI/Leader
establish a 'wood energy trail' and publish case studies	by Q3 2008	€20,000	WDC/SEI/Leader/EU
organise learning journeys	from Q3 2008	€30,000	WDC/SEI/Leader/CCs
wood energy promotional campaign	from Q2 2008	€50,000	WDC/SEI/Leader/councils/ Forest Service/COFORD
Sub-total		€128,000	
Growing the market			
3 x wood energy market development officers	from Q1 2008	€630,000 (officers) €50,000 (consultant)	WDC/SEI/Leader/EU/ Forest Service/COFORD/ DCENR/councils
technical support	from Q1 2008	€72,000	as above
formalise the Regional Wood Energy Advisory Group	from Q1 2008	nil	membership formalised
develop a database of approved installers	from Q3 2008	nil	inc in market development officer
develop a model procurement contract	from Q2 2008	nil	inc in market development officer
develop CHP market	by Q4 2008	€10,000	WDC/SEI/Leader/EU/ Forest Service/COFORD/ DCMNR/councils
Sub-total		€762,000	

ACTION PLAN 2008 - 2010	WHEN	RESOURCES	WHO?
Developing an integrated wood supply			
2 wood fuel supply officers	Q1 2008	€420,000	Forest Service
publish a non-technical wood resources report	by Q1 2008	€5,000	Forest Service
regional resource assessment	from Q1 2008	nil	Forest Service
develop a wood fuel suppliers database	by Q3 2008	€3,000	Forest Service
scope out need for wood fuel producers group	Q4 2008	€10,000	Forest Service/Teagasc/officer
workshops for growers	Q2 2008	nil	Teagasc/officer
workshops for forest managers	Q2 2008	nil	Teagasc/ officer
development of supply side database	Q2 2008	nil	Inc in wood fuel supply officer
field training for wood fuel suppliers	in 2008/09	€10,000	Forest Service/officer
set up a wood fuel quality testing service	by Q2 2008	€15,000	wood fuel officer
Sub-total		€463,000	
Providing supportive policy, finance and regulation			
contribute to national policy and new local policy as needed	ongoing	nil	inc in wood energy officers
produce guidance on planning for county councils	by Q2 2008	nil	WDC/SEI/Leader/Forest Service/ COFORD
work with county councils to develop supportive policy	in 2008	€15,000	WDC/SEI/Leader/Forest Service/ COFORD
scope opportunities for EU funds	in 2007	€7,500	WDC/SEI
annual monitoring of wood energy strategy and targets	annually	nil	inc in wood energy officers
develop a regional grant support scheme	by Q4 2010	nil	inc in wood energy officers
establish a database of costs for installation and fuel supply	by Q4 2008	nil	inc in wood energy officers
Sub-total		€22,500	
TOTAL		€1,780,500	
Annual cost		€593,500	

The total action plan budget is estimated at €1.78 million over three years with additional resources provided through benefit-in-kind from relevant partners. While not explicitly stated, the benefit-in-kind contribution requested of partners is significant.

The main cost component is the regional team with a total cost of €1,455,000 (€485,000 per annum).

The action plan requires direct financing and benefit-in-kind working arrangements from the appropriate partners. The following table outlines potential funders and providers of benefit-in-kind across the four themes of the action plan.

Table 11: Potential action plan funders and 'benefit-in-kind' partners

Action areas	Partners
getting the message across	funds: WDC, SEI benefit-in-kind: WDC, SEI, LEADER, county councils, COFORD, Forest Service
growing the market	funds: SEI , DCENR benefit-in-kind: LEADER, energy agencies, county councils
integrated Wood Supply	funds: Forest Service benefit-in-kind: Teagasc, LEADER
supportive environment	benefit-in-kind: all RWEAG and steering group members, county councils, energy agencies

The action plan has annual targets to achieve, that will allow a detailed delivery of actions that evolve and adapt to changing circumstances in the market place.

7.4 The action plan in detail

The following provides specific details on each action listed in the preceding table.

getting the message across

Regional strategy and action plan

What

The findings of this report should be summarised in an accessible published brochure called the *Wood Energy Strategy and Action Plan*. This publication should also include the findings of the WDC study of the economic impact of a regional wood energy strategy. The publication should be endorsed by all the main stakeholders. The document should be available as a hard copy and WDC should circulate a published version as widely as possible upon publication. A PDF version should be available on the proposed Western Region wood energy portal (see below) and in the meantime, members of the Regional Wood Energy Advisory Group (RWEAG) could post the document on their respective websites.

The publication of the strategy should be promoted with a regional wood energy conference (see below).

When

Publication during 2008.

Who

WDC will produce and publish the strategy, but it will be with the endorsement of the members of the RWEAG.

Resource implications

WDC has agreed to fund the publication of the strategy.

Why

To provide a key platform for marketing, the promotional campaign and the establishment of a route map that offers a sense of market confidence.

Hold a regional wood energy conference/seminar

What

A conference to formally launch and highlight the recommendations of the *Wood Energy Strategy and Action Plan*.

When

During 2008.

Who

WDC should lead the planning and organisation of the conference, with the endorsement and support of the members of the RWEAG.

Resource implications

A cost of €3,000 is estimated.

Why

This would formally launch the strategy and action plan, and acts as the first main task in the regional marketing campaign.

Establish a web portal for wood energy in the Western Region

What

A website that acts as a 'one stop shop' for information about wood energy in the Western Region. An example of this type of website is www.usewoodfuel.co.uk.

When

Go live during Q3 2008.

Who

WDC should lead the set up of the website with appropriate partners including SEI, Forest Service, and local agencies such as LEADER. Its management and maintenance should become the responsibility of the regional wood energy market development officers (see below).

Resource implications

The design, creation and population of a professional, informative and genuinely useful website is a significant task that requires external specialist consultants. A reasonable budget is estimated at €25,000.

Why

A web portal is an essential tool to communicate the key activities of the action plan. It would provide a place where market participants (suppliers, installers, energy users) could interact and seek information. It would promote the sector and help build awareness.

Establish a 'wood energy trail' and publish case studies

What

The 'wood energy trail' is a well established concept that highlights existing wood energy installations and provides case study information about installations. Installations are identified on a regional map and information boards are provided on each site. Case study material is produced to explain some of the technical and commercial information. Based upon the number of known installations it would be possible to have a trail that included at least 10 sites.

When

Have wood energy trail and case studies available for Q4 2008.

Who

External consultants would be required to design and establish the trail and case studies. The promotion and management of the trail should become the responsibility of the regional wood energy market development officers (see below). This could be part of a joint project with SEI to help publicise the wood energy projects they have grant aided in the region.

Resource implications

The design, creation and publication of case studies and the creation of a trail requires external specialist consultants and a reasonable budget is estimated at €20,000.

Why

In an early market that lacks installed examples, this activity is important to facilitate and promote wood energy investment decisions. These tools allow prospective wood energy users to locate and visit installations; this is often critical in making an investment decision.

Organise learning journeys

What

Learning journeys are a well established concept that takes groups of potential wood energy users to see clusters of installations in mature markets. It is usual to organise a group of approximately eight to 12 individuals with similar interests, e.g. housing, schools, hotels or commercial, and then take two or three days to see relevant installations in markets like Sweden, Austria or Finland. The planning of such trips requires specialist knowledge and local guides.

When

We recommend that two learning journeys are planned each year for 2008, 2009 and 2010. This would potentially allow approximately 60 prospective Western Region wood energy projects to see real life examples in other markets.

Who

The delivery of the learning journeys should be the responsibility of the regional wood energy market development officers (see below).

Resource implications

It is assumed that participants would meet their own flight costs, however the learning journeys have direct costs (in country travel and guides) and a reasonable budget is estimated at €5,000 per visit x 6 = €30,000.

Why

In an early market that lacks installed examples, this activity is important to facilitate and promote wood energy investment decisions. These tools allows prospective wood energy users to locate and visit installations, which are not available locally, and this is often critical in making an investment decision.

Wood energy promotional campaign

What

A structured and professional regional promotional campaign that links all the actions described in 'getting the message across' is recommended. This should include the development of a segmented database of potential wood energy users, which can be used to focus the development of a suite of branded marketing materials across the range of media (website, case studies, conferences, etc.). The segmented database can be targeted using email, mail shot, etc.

When

It is important that the marketing materials and brand image of wood energy in the region are fully established at the outset and then consistently applied over time to create confidence and build brand awareness. Therefore, this aspect of the action plan should be commenced in early 2008, with a brand image established and available by mid-2008.

Who

The creation of marketing material and a brand image is a specialist task and would need to be undertaken by an advertising agency. The WDC should initiate and help structure the overall marketing campaign initiative and secure the involvement of the partners, including SEI, LEADER, county councils and energy agencies. The RWEAG should provide formal approval of the marketing materials and brand image. The energy agencies and LEADER companies could facilitate delivery of the promotional campaign in the region and act as direct partners in its development. The future promotion and management of the campaign should become the responsibility of the regional wood energy market development officers (see below).

Resource implications

This aspect of the action plan requires specialist services of an advertising agency and a reasonable budget is estimated at €50,000.

Why

This would help overcome the current lack of awareness in the sector, and of the sector and its benefits. It would be an effective way of promoting the rate of market development.

growing the market

Regional manager and administrative support

What

The regional manager will coordinate the market and supply actions under the action plan. The proposed market and supply officers would report directly to the manager. The manager would act as the liaison with partners, regional projects and relevant state agencies. The role would provide the overall direction to the officers and report back to the steering group. The manager would ensure the continued relevance of the action plan and engage in the evaluation of actions to ensure they are effective and appropriate.

When

We recommend that the manager is appointed in 2008 for a three year contract.

Who

The WDC should facilitate the identified partners to set up the regional structure to appoint the manager.

Resource implications

We estimate the manager salary and costs would be €90,000 pa (total cost over three years of €270,000). Administrative support would also need to be provided. The estimated costs of an administrator are €45,000 p.a. (total cost over 3 years of €135,000).

Why

The examples of successful market growth in other regions and countries establish the importance of good quality staff input to help deliver the programmes and activities of a market development programme. The action plan could not be delivered without staff and a manager to direct and control resources, time and effort.

Three wood energy market development officers

What

Wood energy market development officers would be a central component of the action plan. They would report to the manager and have a key management and market development function. The role would encompass all aspects from boiler design and installation through to fuel supply and maintenance.

They would provide support in delivery of this action plan, and proactively help and support wood energy investment across the region. This role would involve a degree of commercial, technical and practical knowledge of wood energy systems and fuel supply.

The most important aspect of the role would be to offer prospective wood energy users[55] impartial technical, commercial and procurement support as they decide to invest in wood energy systems. They would also offer guidance in terms of grants, fuel supply, planning and regulations, etc. In effect, they would provide prospective wood energy users with high quality advice and support so that as many of the barriers to investment are removed as possible. Given the scale of the market and level of likely demand it would not be usually possible for the officers to offer individual projects detailed support in terms of feasibility studies and bespoke procurement advice.

[55] Please note that the target markets of the action plan are commercial/industrial users.

The other important role would be to help ensure, that as the market grows, best practice is replicated and built into procurement, installation and fuel supply. For example, this would involve making sure installation and fuel supply contracts are correctly worded and reflect current best practice.

The key barriers to the development of the wood energy industry include weak supply chains, lack of information, lack of specialised, local, technical support. The officers could address these barriers by:

- helping to build the capacity of potential producers, suppliers and support services to develop new wood fuel operations and services in order to support existing or create new jobs
- raising awareness in the public and private sector, of the potential economic and environmental benefits of a local wood fuel industry
- helping businesses to gain a strong competitive advantage through improved performance and enhanced capacity to diversify or specialise in wood fuel heating provision
- strengthening linkages between potential suppliers and customers
- promoting a co-ordinated approach for the provision of wood energy advice, funding, technical information and long term support
- working closely with county councils to develop and deliver sub-regional targets

It is recommended that the officers' role should run for an initial period of three years. The officers could be procured in three ways:

- as external consultants on a term contract
- as members of staff with an existing organisation or a specific project structure
- a combination of both of the above

The dilemma with recruiting members of staff is that it is very difficult to attract high quality, well qualified individuals and the set up time could be quite lengthy in terms of advertising, interviews and appointments. The use of external consultants on a term contract would be quicker, but offer less control and be more expensive. A good compromise would be to appoint interim consultants to set up and manage the process, they could provide the services of the officers initially and help create a framework for recruiting and training members of staff.

When

We recommend that the officers are appointed in 2008 for a three year contract. We recommend that the external consultants are appointed in early 2008 and given an 18 month setting-up contract.

Who

The WDC should facilitate the identified partners to set up the regional structure to appoint the consultants and officers. We propose that the manager and three officers are appointed on a regional basis.

The officers would report to the regional manager. This would help ensure the objectives of the officers are not subsumed into local or employer objectives. A more detailed scope of work for the officers is contained in Appendix 6 of this report.

Resource implications

It is assumed that the three officers are appointed for three years at an annual salary of €70,000, (includes costs of travel and subsistence, pension, etc). This totals €210,000 for three officers per year (€630,000 for the three year action plan). The 18 month consultant contract would focus on initial market support and subsequent recruitment and training of the officers. An ongoing role would be to help support the officers as they establish their role. A reasonable budget estimate for this service is €50,000.

Therefore the total resource implications of the officers are €630,000.

Why

The examples of successful market growth in other regions and countries establish the importance of good quality staff input to help deliver the programmes and activities of a market development programme. The action plan could not be delivered without staff.

Technical support

What

The wood energy market development officers could only offer limited technical support to the development of individual wood energy projects. In many cases this type of limited support will be sufficient to allow energy users to move forward to investment. However, for some potential wood energy projects, particularly larger projects, including CHP, that would have greater impact, it would be beneficial to be able to offer more focused technical support. This support could include a detailed feasibility study, financial planning, help and support with tendering and procurement and the development of commercial heat supply contracts for fuel supply. The County Clare Wood Energy project is an existing example where this type of support is offered. The delivery of this support could be controlled and organised by the wood energy market development officers and become part of the tools that they deploy to help key projects develop.

When

We recommend that nine projects a year are supported to this level over each of the three years from 2008 to 2010.

Who

The delivery technical support would need to be completed by specialist consultants.

Resource implications

We would expect that each technical study would cost €8000, with total direct costs being €72,000. However, we would propose that 25% of the costs of each study are met by the customer who is benefiting from the study and 40% could be met via existing SEI feasibility study grant aid. This means that the three year costs would be €25,200.

Why

This addresses the need for energy users to be offered direct help and support that presently they lack, and prevents even financially sound investment decisions be made.

Formalise the Regional Wood Energy Advisory Group

What

The RWEAG (existing members or a selection of its current members) should be formalised into a regional group that provides ongoing strategic control and direction to the strategy and action plan. Appendix 8 of this report contains a proposed terms of reference for the group.

This is best offered via the agencies and stakeholders of the RWEAG and others who are invited or wish to commit time. The RWEAG could agree to meet bi-annually

When

By Q2 2008.

Who

As currently established with scope for new members, e.g. COFORD, private sector representatives.

Resource implications

None, although clearly the benefit-in-kind and time input of the members' time and expertise would be invaluable.

Why

To offer strategic control and create the confidence required to promote market development.

Develop a database of approved installers

What

The creation of a single regional database of companies who can design, supply and install wood energy technology.

When

By Q3 2008.

Who

This could be created by the regional wood energy market development officers and made available via the web portal. This action could build upon an 'installers' charter' being developed by SEI.

Resource implications

None.

Why

This would improve customer confidence and help bring installers closer to market opportunities. A key barrier amongst energy users is a lack of knowledge regarding who can install systems. A regional database is the most effective way of overcoming this.

Develop a model procurement contract

What

The creation of a model form of contract that could be used by prospective wood energy users to specify and tender for the installation of technology.

When

By Q2 2008.

Who

This could be created for the regional wood energy market development officers and made available via the web portal.

Resource implications

None.

Why

Energy users are unable to successfully procure wood energy and this naturally prevents investment. This would improve customer confidence and help bring installers closer to market opportunities.

Develop a CHP market

What

This report has noted that only the largest energy users in the region could benefit from wood CHP. It is proposed that a rapid appraisal of the range of possible sites be undertaken. This would scope out and identify the best regional investment opportunities. It would seek to target the five high potential wood CHP sites in the region. For each site it would briefly review the investment case and highlight the commercial opportunity to the site owners. If this established a genuine interest then 'technical support' could be provided to help develop the CHP project in more detail.

When

By Q4 2008.

Who

This should be undertaken by specialists.

Resource implications

€10,000 for a short focused study.

Why

The opportunities must be identified to be exploited.

developing an integrated wood supply

Wood fuel supply officers

What

The role would be to coordinate the wood fuel supply side on a regional basis. They would work in conjunction with both the Forest Service Inspectorate and Teagasc at local and administrative levels, liaise with all supply side groups such as growers' groups, forest managers, etc. They would work closely with the three wood energy officers.

Two officers are required for the project has to undertake the work required to develop the clusters accessing the Forest Service database. A detailed job specification is attached in Appendix 7. Key tasks are:

- forest cluster development
- resource assessment within each cluster
- arrange and coordinate growers groups
- hold workshops based around clusters
- evolve fuel processing model for each cluster
- develop fuel output metrics for each cluster

When

The post should be established by Q2 2008 and cover a three year period.

Who

The officer should work through the local Teagasc office network, which could provide office space and IT support.

Resource implications

As with the market officers the estimated cost of each of the supply officers is €70,000 each per annum. The total cost of two supply officers for a three year period is estimated as €420,000. The posts could be procured as secondments from one of the state agencies and on this basis the salary and overheads would be an in-kind contribution.

Why

The fuel supply chain needs direct support to achieve market development.

Publish a non-technical regional wood resources report

What

Creating market confidence in an early market requires prospective energy users to have an appreciation of the total availability of fuel resources. This work should be based upon the work already completed by the WDC report *Wood Energy Development in the Western Region (2007).*

A regional wood resources non- technical report should provide a clear, concise statement on the available wood energy resources of the region in a way that allows energy users to consider the long term use of wood fuel with confidence.

It should be published as a short brochure and made available as a downloadable PDF on the web portal.

When

This can be completed during the early part of 2008.

Who

The document could be written by the regional wood energy market development officers (or the support consultants).

Resource implications

Costs only relate to publication/printing of the brochure, estimated at €5,000.

Why

Confidence in resource availability is a key factor in market take-up by energy users.

Regional resource assessment

What

We propose a two phased resource assessment to finally overcome the uncertainty that all players legitimately have in terms of the available resources for wood fuel. This will comprise a scoping survey to establish example clusters of woodland resource and secondly a detailed stand by stand inventory. The latter will be of great benefit to all sectors of the wood processing industry.

The formation of clusters will be based upon a 'working unit' for a given supply chain based on the district electoral division or local areas as recognised by county councils. The clusters will then be examined to identify the available resource within each cluster, in terms of:

- productive area (based on aerial photographs)
- age
- harvesting schedule

Within each cluster, the assessment should establish initial contact with plantation owners who are outlining the market opportunity and gather information from them regarding the harvesting process, grant schemes and the management of their plantation. The process would then seek their permission to enter the details as potential suppliers on a suppliers' web based database.

The results of this survey would be published on a cluster basis and include information regarding potential resources, with a detailed forecast over five years and an indicative forecast on a 10 year basis.

There is general consensus throughout the forest industry that a complete stand-by-stand inventory of private sector wood is urgently required. The results of such an inventory would provide key planning information for all involved in the wood processing sector and provide a definitive estimate of wood fuel resources. It would also provide accurate information on the need for energy crops and other supply side measures to ensure that national and regional renewable energy targets are achievable.

When

Initial scoping and cluster development required in Q1 and Q2 2008. The stand-by-stand inventory would be undertaken from Q3 2008 and could take until Q1 2010 to complete.

Who

The wood fuel officer and Forest Service, which has information on databases and access to aerial photos, would undertake the development of the clusters. The stand-by-stand inventory would be undertaken by the Forest Service.

Teagasc are currently looking for research funding to develop cluster models.

Resource implications

None. Benefit in-kind from the Forest Service forms part of their plans for a full site-by-site inventory and part of the fuel wood officers' role.

Why

Confidence in resource availability is a key factor in market take-up by energy users.

Develop a wood fuel suppliers database

What

In the Western Region there are a number of wood fuel supply companies and a range of small businesses that are selling wood fuel in addition to other activities often associated with commercial forestry or farming. Most of these businesses are very small and operate in a restricted geographical area. Beyond this, there are other companies that are exploring the idea of becoming fuel supply companies on the back of planned CHP and heating plant projects. These companies are mostly larger businesses and operate in the forest industries, managing forestry or are associated with haulage and transportation.

We recommend that an event could be structured to allow a series of short presentations by companies involved in wood fuel supply. This would allow all the companies participating to present information about their activities in a series of poster displays. Breakout workshops could focus on particular issues, for example fuel specification, fuel handling, transportation and fuel supply contracts.

Everyone invited to the workshop would be asked to provide details to create a database of wood fuel suppliers. This could be maintained on the proposed website. On a local level, the clusters will provide map based resource information to which another layer could be added showing the location of potential suppliers.

The wood fuel supply companies would be able to learn about the activities of all the other wood fuel companies, hopefully resulting in future commercial co-operation such as the sharing of equipment, facilities and provision of back-up in the event of being unable to fulfil contracts.

The wood fuel officer could subsequently manage and maintain the database.

When

The workshop could be planned for Q2 2008 and a database could be published by the Q3 2008.

Who

The wood fuel supply officer would plan and organise the event, and setup and maintain the resulting database.

Resource implications

Limited to the cost of hosting the event, estimated at €3,000.

Why

Confidence in resource availability is a key factor in market take-up by energy users.

Scope out the need for a wood fuel producers group

What

In the north east of England, a public sector funded producer group has been established (www.newfuels.org.uk). The concept is that local growers co-operate to meet supply demand, fronted via a new company that underwrites some of the start up costs with public funds. A similar company could be established in the Western Region. The process of developing the wood fuel suppliers' database would provide evidence of the likely usefulness of this idea. However, the concept would need a full feasibility study to investigate costs, benefits and mechanisms.

When

A feasibility study could be conducted in Q4 2008.

Who

The external consultants working closely with the wood fuel supply officer.

Resource implications

To undertake a review of this type would include investigation of similar mechanisms in the UK and Europe. A reasonable budget estimate for this work is €10,000.

Why

Producer groups can improve the rate of fuel supply chain development; this could increasingly important after 2010 as demand rises.

Workshops for growers

The co-operation and support of growers will be a key element to the success of the action plan and the future of the wood energy market. A fundamental part of this process will be the provision of workshops for growers based on the cluster structure, which will explain:

- the emerging wood energy market
- the harvest process, grant aid (roading), legal requirements (felling licences), harvest planning and harvest contracts
- the advantages of group harvesting
- supply chain elements
- opportunities for grower participation in new enterprises
- sale of timber products
- presentations from companies interested in woodchips (meeting point and networking at end of workshop)

When

To allow full coverage it will be necessary to run an average of three such workshops in each county each year for three years. The workshops would target Growers Associations IFA, ITGA, etc.

Who

Teagasc Regional Advisers in conjunction with the wood fuel supply officer.

Resource implications

Organisation and delivery of the workshops, including venues would be an in-kind contribution of Teagasc, supported via the wood fuel advice officer.

Why

Awareness raising amongst growers creates the opportunity to bring wood resource into the supply chain.

Workshops for forest managers

What

Provide a series of workshops specifically for forest managers and harvesting contractors, dealing with:

- the emerging wood energy market
- the harvest process and requirements for wood energy and harvest contracts
- the advantages of group harvesting
- supply chain elements
- wood fuel quality issues
- opportunities for participation in new enterprises
- sale of timber products
- presentations from companies interested in woodchips (meeting point and networking at end of workshop)

When

Host one or two workshops per county and repeat on an annual basis over three years.

Who

Teagasc Regional Advisers in conjunction with the wood fuel supply officer.

Resource implications

Organisation and delivery of the workshops, including venues would be an in-kind contribution of Teagasc supported via the wood fuel advice officers.

Why

Awareness raising amongst forest managers creates the opportunity to bring wood resource into the supply chain.

Development of supply side database

What

Provide a single supply side database which will be used to publish the following on-line information:

- harvesting process, draft contracts (harvesting and heat supply agreements) and upcoming harvesting schedule
- members forum and bulletin board
- clusters: contact details for growers subject to their approval
- resources available in each cluster and timescales (estimates for all products help promote closer links to sawmill sector on line sales)
- technical resources: harvesting, haulage and chipping contractors
- professional services to promote co-operation and outsourcing
- current chip supplies and round logs in storage
- register for companies sourcing chips, estimates for quantities and alternative suppliers should back-up be required
- sourcing point for those wishing to purchase wood fuels
- publish quarterly e-newsletter for members

The database and the above information would be hosted on the wood energy web portal. This would provide information that allows groups of woodlands to be clustered, thus making smaller, remote and less viable sites more likely to be commercially attractive for harvesting.

When

Commence the process in Q1 2008 and complete/publish populated database by Q4 2008.

Who

The wood fuel supply officer could undertake this task.

Resource implications

None.

Why

Co-operation amongst growers and owners creates the opportunity to bring wood resource into the supply chain. Crucially it makes smaller, remote and less viable harvesting sites more commercially attractive as they can be clustered into a single contract.

Field training for wood fuel suppliers

What

The provision of field training for wood fuel suppliers to offer practical, technical and commercial support to potential fuel supply companies as they invest in chipping equipment, drying sheds etc. This would complement and build on existing initiatives such as the demonstration programme provided by Teagasc and COFORD.

When

Hold a three day site based training course in 2008 and repeat in 2009.

Who

Delivered by external experts recruited to plan and organise training.

Resource implications

A reasonable budget estimate for this would be €5,000 per three day training course, totalling a budget of €10,000.

Why

Supply chain development is hampered by lack of skills.

Set up a wood fuel quality testing service

What

A testing service that allows loads of wood fuel to be independently tested against wood fuel supply specifications. This would test particle size and moisture content using a grader and specialist moisture meter.

When

This could be commenced in spring 2008.

Who

This service shall be provided by the forest officers. A sampling scheme shall be agreed as part of the supply contract. The cost of this service to be split between supplier and purchaser.

Resource implications

Three sets of the following equipment shall be required, each set shall consist of the following; moisture meter for chips, moisture meter for roundwood and woodchip grader with sieves appropriate to the required standard. The cost of this equipment is €15,000.

Why

Poor quality standards reduce rates of market development, that testing can overcome.

providing supportive policy, finance and regulation

Contribute to national policy and new local policy as needed

What

The Western Region Wood Energy Strategy and Action Plan will place the region in a unique position to provide input into new national and regional wood energy policy. It will establish a mechanism to link policy makers and the development of the sector. It will have detailed and practical knowledge that should help inform policy and improve it as it operates locally. It would allow policy issues to flow from a county level, via the RWEAG to a national level in an effective manner.

When

Ongoing.

Who

Wood energy and wood fuel officers, County Councils and the Regional Wood Energy Advisory Group.

Resource implications

None, however, the contribution made by the county councils, RWEAG and the officers would be a significant contribution nationally and for other regions.

Why

Supportive and co-ordinated policy helps the rate of market development.

Produce guidance on planning for county councils

What

County councils will face increases in planning applications that include wood energy systems. This will range from simple domestic installations to large scale commercial and public sector building projects. The scope will include retrofit and new build. County councils might be better able to assess planning applications that include wood energy, or at a pre-planning stage promote consideration of wood energy by using a checklist.

A checklist could contain summarised non-technical guidance to planning officers that allows them to promote wood energy at a pre-planning stage and to ensure appropriate checks are made on submitted planning applications.

When

This could be produced in Q2 2008.

Who

The wood energy market development officers could work with selected county councils to produce a checklist and then circulate this to all county councils in the region.

Resource implications

None.

Why

Supportive and co-ordinated planning guidance helps the rate of market development.

Work with county councils to develop supportive policy

What

There are seven land use planning policies, as expressed through County Development Plans, in the Western Region. These are each updated every few years and each is at a different stage. However, it is important that when they are updated and new development plans are adopted they provide a consistent and supportive policy framework for wood energy. For example, it is not clear under what circumstances a wood energy project requires planning permission, or what type of development project would be most suitable for what type of wood energy solution.

This issue extends to building control and emissions, where the policy and regulation of wood energy is not equally and consistently applied. For example, what information should the planning authority require in order to demonstrate that the emissions to air from a wood boiler are acceptable and how does that compare to the alternative of an oil boiler.

It would be helpful to focus effort in gaining consistent support policy and regulation in this area. This could be achieved by working closely with a single county council, such as Donegal, to work out the generic issues. Then this could be applied to the other six councils.

This process might allow set standards or thresholds for new build and refurbishment projects that form part of the planning process. For example one type of policy might be that all relevant planning applications must include 10% renewable energy provision to secure planning consent. Also, this may allow the councils to develop their own targets for wood energy use that are in line with the targets in this report.

The regional team will also work with county councils to develop a role in the strategy on a sub-regional basis. It will be possible for each county council, working with one of three regional wood fuel market development officers, to develop local targets and work towards these using the resources and measures of the proposed action plan.

When

This work could be completed via external consultants during 2008.

Who

The wood energy market development officers, with the input of the energy agencies and Donegal Council, could scope out the work and appoint suitably qualified consultants to undertake this task.

Resource implications

This work would take three months to complete; a reasonable budget estimate is €15,000.

Why

Supportive and co-ordinated policy helps the rate of market development.

Annual monitoring of wood energy strategy and targets

What

This proposed strategy and action plan contains explicit targets; these will require monitoring on an annual basis to see how market development relates to regional targets.

When

This should be completed annually, 2008 to 2020.

Who

The officers can report into the RWEAG who should explicitly monitor and review performance.

Resource implications

None.

Why

This will allow the action plan to be adjusted and refined in the light of actual performance.

Scope out opportunities for EU funding

What

An early evaluation of the opportunities to seek EU funding (possibly via the IEE programme) would be a valuable exercise. The basic nature of this three year costed action plan is ideally suited to EU funding and would allow local resources to be matched with EU funds.

It is proposed that consultants are appointed to review the EU schemes and match these to the activities of the action plan. It is also likely that an EU bid would be transnational therefore the review should identify potential EU partners.

As part of this scoping exercise cross-border funding programmes can also be assessed.

When

This scoping study should be commenced in Q4 2007 and would take approximately 1.5 months to complete.

Who

By specialist consultants.

Resource implications

A rapid scoping study would cost no more than €7,500.

Why

Additional resources could help the rate of market development.

Develop a regional grant support mechanism

What

At present, SEI runs a national bioenergy grant scheme that runs to 2010. From 2010 and beyond it is hoped that a new or extended wood energy grant scheme will be in place. It would then be desirable if the grant scheme was implemented and delivered at a regional level and in the context of the regional support and action plan proposed in this report. This would mean the grant scheme was nationally controlled and funded. However, the initial process of promoting the grant scheme and then guiding applicants through the grant process would be better dealt with at a regional level. This approach would bring together all the technical, commercial and practical support into a regional 'one stop shop'.

One possible advantage of this approach is that it could avoid the adverse implications of a grant scheme simply pushing up tender prices in line with the size of grant available. This problem has been seen to arise in several other biomass grant schemes outside of Ireland. If local grant advisors had hands on commercial and technical knowledge they would be able to identify if market prices were rising and control the quality of applications through direct local involvement.

When

This process would require the clear agreement of SEI and would need to be planned in 2009 and assumes a successor to the current national grant scheme.

Who

The grant scheme could be administered locally by the wood energy market development officers under the regional structure.

Resource implications

None.

Why

It would allow local relationships to be built between applicants and grant advisors, ensuring only well thought out and appropriate schemes were processed through a grant scheme.

Establish a database of costs for installation and fuel supply

What

Across the region it is now possible to start compiling a database of commercial and current market costs for the installation of wood energy systems and for the costs of wood heat, wood fuel and boiler maintenance.

When

This data could start to be collected in Q2 2008 and published by Q3 2008. It could be updated and added to thereafter.

Who

By the wood energy market development officers.

Resource implications

None.

Why

Market data helps inform and promote more and better investment decisions

7.5 Summary

The action plan contains 30 action points with an estimated direct financial cost of €1.78 million and covering the period up to 2010 in specific terms, with some issues having an ongoing aspect. The full resourcing and complete delivery of the action plan would represent the ideal outcome and this report has been prepared with the intention of reflecting all the stakeholders and partners aspirations in this regard.

However, it is inevitable that the availability of resources will have an impact on what is capable of being delivered. It will be for each of the partners and stakeholders to evaluate the benefits of the full action plan and allocate resources accordingly. Direct finance and benefit-in-kind is required from the range of specified partners to deliver on the action plan.

The core proposal of the action plan is the appointment of a regional manager, three wood energy market development officers and two wood fuel supply officers, with an annual cost of €485,000. Our key recommendation is that this part of the action plan is fully funded up front by the partners and stakeholders.

This level of resource commitment appears quite reasonable in the context of the economic and environmental benefits as established in the accompanying *Economic Impact Study* carried out by ADAS Ltd. This report estimates the gross impacts of the medium scenario in 2020 relate to 477MW heat capacity installed (including CHP) and are summarised as follows:

- use 472,000 tonnes of timber with an annual value of €1.7 million to the farming sector
- increased annual Gross Value Added (GVA) in the Western Region of €15 million by 2020 per annum
- 887 FTE jobs created per annum

CO_{2e} savings for wood versus oil energy are estimated at 619,000 tonnes (462,000 tonnes net) under the medium scenario in 2020. The economic value for carbon saved would be realised by reducing the number of credits the government needs to purchase to meet its Kyoto commitments. The value of this carbon offset at €15 per tonne (the price assumed by government for credits purchased for the 2008 to 2012 period) is €6.9 million. This highlights that the economic value of carbon savings in 2020 may be comparable with the direct economic impacts.

APPENDICES

Appendix 1: Consultations

Organisation	Name
Bord na Mona	Charles Shier
Enterprise Ireland	William Fitzgerald
Northern Ireland Energy Agency	written submission
Galway LEADER	written submission
Teagasc / Dept workshop	Steven Meyen
VEC – Donegal	Bonnie Oliver
VEC – Galway City	Charlotte Quinn
VEC – Leitrim	Robert McNabb
VEC – Mayo	Dr Katie Sweeny
VEC – Roscommon	Mr Larry O'Farrelly
VEC – Clare	Theresa Markham
DCMNR	Katherine Licken
Myles Staunton	Mayo Power Ltd
Pat Cummins	NCF
Clearpower	Fred Tottenham
NPS	James Kennedy
Powertech	Francis Martin
REMS	Trevor Buttimer
Igneus	Gerald O'Donoghue
SEI	Pearse Buckley
Teagasc	Mary Ryan *1
Forest Service	Philip Carr *2
LEADER Programme	Doirin Graham
HSE	Caroline Gleeson
OPW	Conor Clarke
Clare and Limerick Energy Agency	Pat Stephens
Galway Energy Agency	Peter Keavney
Mayo Energy Agency	Brendan Killion
Shannon Development	Gerard O'Connor
Donegal County Council	Michael Heaney
Údarás na Gaeltachta	Frank Conlan

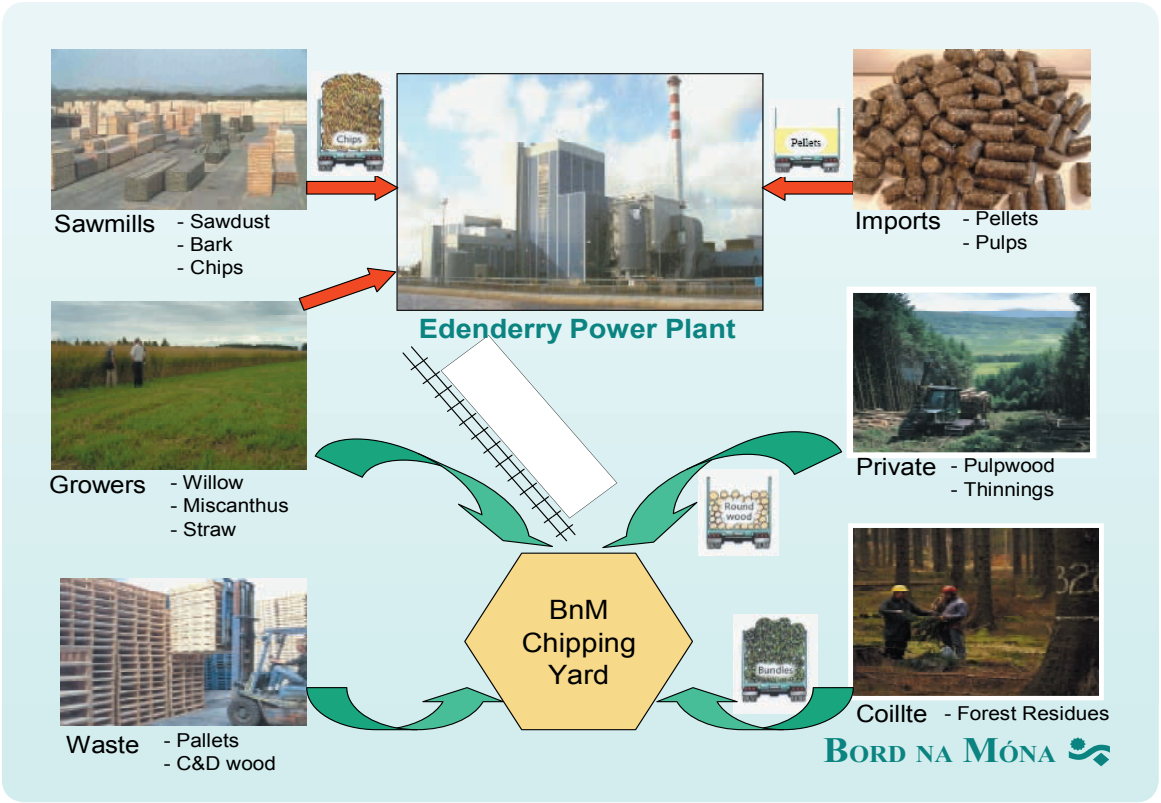
Appendix 2: Co-firing fuel mix

Bord na Mona Energy are considering the following biomass fuel sources:

- forests: thinnings, residues
- wood processing: chips, sawdust, bark
- energy crops: willows, Miscanthus, RCG
- waste: untreated recycled wood
- agricultural residues: straw, manures
- food processing residues: MBM
- imports: wood pellets, olive cake, peanut husks, sunflower seed husks

Bord na Mona Energy is currently assessing material volumes and market prices, and plans to highlight the supply and price issues that will impact on their ability to meet the 30% target. They hope this will prompt decisions on support mechanisms and other actions required of the government.

They believe that the co-firing target can only be met, and if at all, by a gradual build up and that it will require a mix of fuel inputs. This strategy is illustrated in the following diagram:



Appendix 3: Growers' survey

During the consultation process undertaken for the purposes for this study, it emerged that many of the growers operated in isolation and were unsure of the process involved in harvesting and of the markets for timber products. The table below illustrates the results from 400 replies to a postal survey conducted by the WDC and the Forest Service (2006).

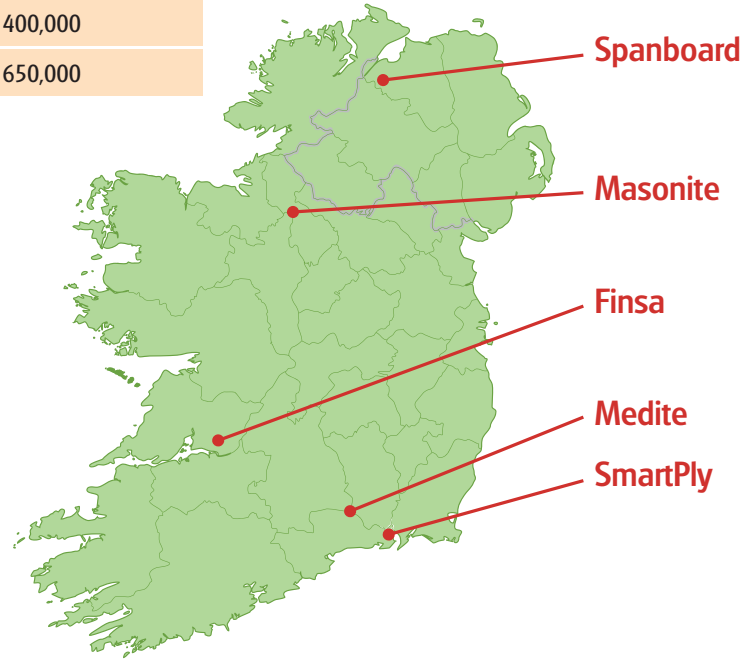
Question	No %	Yes %			
Do you have a management contract?	90	10			
Are you aware of the procedures for thinning?	70	30			
Have you consulted with a forester regarding your plans?	54	46	Forest Service 8%	Teagasc 12%	forester 26%
Are you aware of the various markets for forest products?	58	42			
Have you attended information days?	44	56			
Are prepared to co-operate with neighbours in harvesting and roading?	18	70	12 (don't know)		

Appendix 4: The board mills

Currently there are five operational board mills in Ireland. Two of these are located in the south east and are owned by Coillte. The others are located along the eastern boundary of the Western Region. The total consumption of these board mills is approximately 1.6m tonnes of wood, most of this is currently supplied by Coillte (approximately 0.9m tonnes) and the balance is supplied by sawmill co-product and post consumer wood waste. The following figure indicates the location and capacity of the board mills. Coillte pulpwood output from conventional harvesting has now reached a plateau and therefore it can be assumed that all of this material will be used to supply the board mills into the foreseeable future

Board mill	Annual demand tonnes[2]
Spanboard	100,000
Masonite	120,000
Finsa	350,000
Medite (Coillte Owned)	400,000
Smartply (Coillte Owned)	650,000

This resource review therefore assumes that the forestry available for wood energy only comes from the small diameter material harvested from the private sector within the Western Region as it has the lowest value and limited existing markets.



Appendix 5: Clusters of woodlands

These clusters should be based on recognised geographical areas, for example District Electoral Divisions (DED) or the county based electoral areas, for ease of administration. The cluster should become the working unit for:

- resource estimation
- harvest planning
- scheduling
- developing linkages with other current and planned resource inventory projects

The co-operation of Forest Service, Teagasc, wood fuel advice officers and growers would be a key factor in the successful development of clusters. The first step should be to contact growers with plantations at or approaching thinning age and provide an information pack regarding cluster organisation and market potential.

In order to develop the clusters it will be necessary to carry out a scoping exercise to determine the following:

- number and age of each plantation within the cluster
- the total area and productive area for each plantation (using aerial photographs)
- local production class (Yield Class YC) for the cluster
- using the age and YC class determine harvesting schedule in order to group plantations into annual harvesting schedules
- yield of potential wood fuel
- current level of activity; applications for roading grants and felling licences
- match wood fuel supply to boiler demand

Appendix 6: Scope of work – wood energy market development officers

Wood energy market development officers would be a central component of the action plan.

They would report to the regional manager who links back to the steering group of the RWEAG on a quarterly basis.

The overall role of the officers is the provision of support in delivery of this action plan and the proactive help and support of the wood energy sector across the region.

The most important aspect of the role would be to offer prospective wood energy users impartial technical, commercial and procurement support as they decide to invest in wood energy systems. They would also offer guidance in terms of grants, fuel supply, planning and regulations, etc. In effect it would provide prospective wood energy users with high quality advice and support so that as many of the barriers to investment are removed as possible. The role would encompass all aspects from boiler design and installation through to fuel supply and maintenance.

The other important role would be to help ensure, that as the market grows, best practice is replicated and built into procurement, installation and fuel supply. For example, this would involve making sure installation and fuel supply contracts are correctly worded and reflect current best practice.

Specifically the key barriers to the development of the wood energy industry include weak supply chains, lack of information, and lack of specialised, local, technical support. The officers could address these barriers by working towards the targets in this action plan.

It is recommended that once the regional remit of each officer is geographically defined that they develop sub regional market growth targets based upon the population proxies in section 4.2 of this report. This would allow the officers to work towards very specific sub regional targets for wood heat investment. These sub regional targets would be described at a County by county level, allowing each county council to understand and engage with its relevant wood energy market development officer.

Appendix 7: Wood fuel supply officers

The wood fuel supply officers would facilitate and help co-ordinate the supply of wood from the private growers of the region to the wood energy market by helping to develop all elements of the supply chain. They would support existing supply chains and assist the development of new supply chains.

The officers will work in conjunction with the Forest Service and Teagasc to develop the following:

- local clusters and resource potential: to identify productive areas and local potential harvest schedules. The production forecasts will be used to match boiler deployment to annual yields. Their role would include:
  - establishing initial contact with the growers, contractors, forest managers
  - outlining initial market opportunities
  - providing information regarding harvesting process, grant schemes
  - seeking information from growers as to the management of their plantations
  - seeking permission to include the growers on suppliers' database
  - drafting summary of regional resources
- education and awareness: promote the emerging wood energy market via a series of targeted work shops. Liaise with other projects already established nationally and locally to minimise overlap and promote regional awareness for such projects, including:
  - growers' work shops (approximately five per county each year) focusing on grower related issues grant aid, timber products, harvesting process, group harvesting, supply chain elements and opportunities for growers (but not be limited to these elements)
  - forest managers' and contractors' work shops (approximately two per county each year) focusing on market opportunities, supply chain elements, fuel wood quality
  - liaison with wood energy officers to match supply chains to new demand
- development of supply side Database: supply side database as part of the over all web site. This supply side database will host a range of information regarding;
  - information; bulletin board, harvesting process, draft contracts (harvesting and heat supply agreements) and upcoming harvesting schedule
  - members' forum
  - clusters (contact details for growers subject to their approval)
  - resources available in each cluster and timescales (estimates for all products help promote closer links to sawmill sector on line sales)
  - technical resources: harvesting, haulage and chipping contractors, professional services to promote co-operation and outsourcing
  - current chip supplies and round logs in storage
  - register for companies sourcing chips, estimates for quantities and alternative suppliers should back-up be required
  - sourcing point for those wishing to acquire purchase wood fuels
  - publish quarterly e-newsletter for members

Wood fuel quality testing

Wood fuel advice officers to provide independent testing services for both suppliers and end users to ensure compliance with wood fuel standards. This would include moisture content and particle size analyses and receipts to both suppliers and end users. They would also monitor the drying of round logs for suppliers

Requirements:

Practical experience in private forestry management, harvesting and roading. Understanding of biomass heating systems, fuel requirement, fuel wood quality standards.

Appendix 8: Terms of reference for Regional Wood Energy Advisory Group

The RWEAG shall meet bi-annually. Its key function shall be to offer strategic guidance in the delivery of this action plan and its stated targets.

Its key obligation will be to review progress towards the agreed wood energy targets each year and as required, propose adjustments to ensure the targets are met.

Working with the wood fuel market development officers and the county councils, the RWEAG shall seek to agree sub regional targets on a county by county level.

The RWEAG shall publish an annual report that sets out how it has achieved against its stated targets. It shall make this report widely available and seek views on it as it develops and refines the ongoing work of the action plan each year.

The RWEAG shall seek to develop the resources and partnerships required to deliver the stated aspects of the action plan. They shall seek additional resources as required.

The RWEAG shall consider how to take forward the action plan after 2010 and seek to refine and renew the action plan from 2011 and onwards.

The RWEAG shall appoint a steering group to meet on a quarterly basis. The steering group shall comprise at least the body(s) that intend to support the regional team. The steering group shall monitor and direct the work of the regional team at a more detailed level. The steering group shall report to the RWEAG and seek their approval in terms of management and direction of the work of the officers.

Appendix 9: Summary of costs for regional team

Team role	Annual cost	Cost 2008 to 2010
regional manger	€90,000	€270,000
administrator	€45,000	€135,000
market development officers x 3	€70,000 x 3 = €210,000	€630,000
wood fuel advice officers x 2	€70,000 x 2 = €140,000	€420,000
Total	€485,000	€1,455,000

Design: JDK Design 071 912 0905

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NDP
National Development Plan 2007 - 2013

WDC
WESTERN DEVELOPMENT COMMISSION
COMHCHOISTE FORBARTHA AN IARTHAIR