

Development of a market strategy for domestic fuelwood in Ireland

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Executive summary

A survey of woodfuel producers, suppliers and endusers was carried out in Northern Ireland, the Irish Republic and in Switzerland. The purpose of this survey was to estimate size of the woodfuel market in these countries, to identify their main strengths and weaknesses and to generate recommendations for the development or improvement of the woodfuel market in Ireland.

The size of the domestic woodfuel market in Switzerland was relatively easily identified at about 2 million m³ per annum. This market was dominated by wood from a well-established, sustainable forestry sector that had been well researched. In Northern Ireland and the Irish Republic the woodfuel market was dominated by farm woodland and hedgerow exploitation, or with waste from the arboricultural industry. Because this market was not linked to the established forestry sector and was not, normally, scrutinised by the tax authorities, woodfuel sales were not accurately catalogued or understood. Sales of at least 22,000 m³ per annum of woodfuel were identified in Northern Ireland and at least 58,500 m³ per annum were identified in the Irish Republic. The true size of the domestic fuelwood market in Ireland is, however, likely to be much larger than these figures suggest and the market is also likely to respond quickly and dramatically to external influences.

Domestic fuelwood consumption in Ireland was, traditionally, associated with the urban poor, who burned it with coal in inefficient open grates. In these circumstances the addition of wood increased the efficiency of the coal fire, regardless of the seasoning of the wood. In Switzerland, wood was traditionally burnt on its own, either in open fires or in stoves, and, in these circumstances, seasoned wood was essential. The market for wood-burning stoves in Ireland was being actively encouraged and, because this market sector required seasoned wood, the existing woodfuel market was not considered to be functioning well.

The replies from respondents indicated that many of the issues raised in Switzerland were pertinent to Ireland. A log fire creates a pleasing atmosphere and produces plenty of heat, regardless of the Country in which it burns. Woodfuel is also bulky, dirty and awkward to store and handle everywhere. Competition from oil and gas was seen as the most significant threat to the woodfuel market in the three countries surveyed.

The most significant difference between the woodfuel markets in Switzerland and in Ireland concerned the perceived quality of the product. In Switzerland, a traditional quality standard was in place and was known and understood by producers and purchasers of woodfuel. In Ireland, however, no such quality standard was in place and this led to criticisms from all sectors of the woodfuel market.

Other, more subtle, differences in the woodfuel markets of the three countries surveyed included the influence of cost, (which was seen to be more important in Northern Ireland, the poorest country of the three) and the impact on the environment of burning wood, (which was seen to be more important in Switzerland).

The report concluded that

- A 'Black Market' structure was not, necessarily, a problem to the woodfuel market in Ireland as it introduced a high degree of flexibility and allowed the producers to respond quickly to external influences.
- The Irish woodfuel market must switch substantially to selling seasoned and sorted fuelwood if it is to

exploit the opportunities associated with the expanding wood burning stove market.

- A standard for woodfuel, governing the size of logs, species composition, volume measurement and dryness, should be established. This standard must meet the requirements of the wood burning stove manufacturers and local Government officials responsible for monitoring pollution and house fire hazards.
- A research programme should be designed to establish a methodology by which woodfuel producers can achieve this standard.
- The woodfuel standard should be widely publicised to ensure that consumers are made aware of its existence. Trading standards Officers should then monitor retail outlets to ensure that the woodfuel they sell meets the standard
- There was a substantial opportunity for the agricultural sector to diversify into seasoned woodfuel production, particularly as there are now a surplus of well-constructed and well-ventilated sheds available.
- There is a need to control the exploitation of farm woods to ensure that the EC 'Habitats Directive' (Council Directive No. 92/43/EEC of 21st May 1992) is enforced. Changes in the legislation in Northern Ireland will be required for this control to be effective.
- Suppliers of wood burning stoves and woodfuel should be encouraged to supply woodfuel storage and handling equipment.
- Large-scale woodfuel producers should be encouraged to diversify into the production of energy (heat or CHP) using surpluses and un-exploited residues.
- The woodfuel market should be encouraged to co-operate to promote woodfuel as a desirable and environmentally friendly product

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1 Introduction

Wood has long been considered the most primitive fuel used by man and has formed the basic resource for providing heat and cooking facilities for thousands of years. Perhaps because of this primeval image, an open log fire has become somewhat of a status symbol and is now the standard method that advertisers use to define a comfortable and traditional lifestyle in Western Europe.

In Ireland, another indigenous fuel has become the standard symbol of a traditional home fire. Peat, or turf, has been cut and used for fuel for at least 300 years and the market for this has been fairly well developed, with a major, state owned organisation promoting and selling fuel peat throughout Ireland. The relative scarcity of lowland mires in Western Europe, and their importance in wildlife and landscape conservation, is likely to curtail the peat fuel market in the future.

Notwithstanding the tradition that 'Old Ireland' only burned peat, wood appears to have been important as an indigenous fuel, particularly in the East. Exploitation of woodlands for wood fuel may have some positive effects on Ireland's few deciduous woods, by providing habitat diversity and by creating a strategic resource of quality sawlogs. Recent planting schemes have dramatically increased the amount of lowland deciduous woods in Ireland and these, in turn, will help to support a local woodfuel market as they begin to be managed.

Switzerland has a long tradition of woodlands being managed for the common good and has maintained a tradition of woodfuel. The marketing mechanisms for woodfuel in Switzerland are well developed and fairly well understood. Switzerland has also been a richer society than Ireland for most of this century and the

market there may provide insights into the way that the woodfuel market is likely to develop in Ireland.

The purpose of this analysis of the existing woodfuel market in Ireland and Switzerland is to define their size and structure and to identify areas where the market may be improved, either by encouraging market development or by the adoption of new technology.

2 Methodology

This market analysis was based on a series of interviews with producers, processors, suppliers and end users living and working in Northern Ireland, the Irish Republic and in Switzerland. A series of pro-forma questionnaires were developed to ensure that the answers given at interviews could be analysed. Where possible, these interviews were carried out at face to face meetings. Because of the un-registered and un-declared nature of the domestic woodfuel market in Ireland anonymity was offered to all participants. Summaries from interviewees who requested anonymity have been designated a regional identity only. The pro-forma questionnaires used in this research are reproduced in the attached appendices, as are the summaries of the answers obtained.

Expert opinion on the fuelwood market was identified using local knowledge and recommendations from other experts. The results from the interviews with experts were used to select the participants in the SWOT interviews and to identify the key market sectors.

All respondents were asked to provide information on the amount of fuelwood they produced, processed, sold or consumed during a year and to comment on market trends. In addition, those who produced fuelwood were asked to estimate their maximum potential throughput. A number of analytical techniques were then used to estimate the actual and potential market of fuelwood in Ireland and Switzerland. These included a cumulative total of the throughput identified and the percentage of this throughput that appeared in each of the following market sectors.

The selection criteria used to identify interviewees for the SWOT surveys varied between the market sectors. Where a fairly confined market niche was identified, such as tree surgeons or fuel merchants, all relevant companies that were listed in the telephone directories were interviewed. The potential size of the customer base for fuelwood in Ireland precluded a random approach to sampling this section of the market chain. Instead, an attempt was made to sample relevant customer types that had been identified in the replies received from producers, processors or suppliers. An effort was also made to produce a geographically dispersed sampling pattern.

The responses to the SWOT questionnaires were used to produce a list of replies, summarised as appropriate, in

each of the market sectors surveyed. The number of times that similar responses were received was noted and the most common replies were used to identify the most important strengths, weaknesses, opportunities and threats in the domestic fuelwood market in Ireland and Switzerland.

2.1 Limitations of dataset

Expert opinion on the fuelwood market was identified using local knowledge and recommendations from other experts. This methodology provided a well-balanced series of interviews in Switzerland, where the local fuelwood market is considered important and is well understood. In Ireland, those with expertise in the fuelwood market were almost entirely State foresters or participants in the marketplace. Academics do not appear to have studied the domestic woodfuel market in Ireland, nor do there appear to be many recognised marketing experts in this field.

While the structure of the domestic fuelwood market in Switzerland is relatively well known and was probably accurately described by the experts questioned. In Ireland, expertise in the woodfuel market tended to be much more local, with few of those interviewed having knowledge of the market in other parts of the country. Moreover, the state foresters did not consider the production of firewood as central to their expertise. It was also clear that most of the experts interviewed held the Irish fuelwood market in some contempt, primarily because of its perceived un-professionalism.

The preponderance of 'Black Market' transactions within the domestic fuelwood market in Ireland has made it particularly difficult to estimate its size. It may also have produced some distortion in the estimate of throughput, either because of operatives downgrading their involvement for fear of official interest, or operatives upgrading the involvement to inflate their relative importance. Every effort has been made to identify these distortions through tactful questioning and by giving assurances of anonymity. The authors believe that, because of this, the figures quoted here for fuelwood production identified reflect the actual amount produced or sold by these firms.

Because almost every household in Ireland is a potential customer for the fuelwood market, the sampling strategy adopted for this sector of the market may have produced some distortions, particularly when these replies have been used to estimate market size. The methodology applied tried to counter these distortions and, in doing so, many interviews were conducted with householders who did not burn fuelwood. While these interviews have not been included in this market analysis, the over sampling involved has tended to support the findings that are included here.

3 Results

3.1 Historical perspective

Although it seems that wood was an important source of fuel in Ireland up until the end of the seventeenth century (Evans 1957) there are relatively few records of a trade in fuelwood. What records there are included as derisory comments about poor quality woods fit only for firewood (McCracken 1971). Fitzpatrick (1965) fails to mention fuelwood at all (although this may have more to do with the view of foresters, that firewood sales represent a failure to produce good quality sawlogs).

By the time Authur Young visited Ireland in 1776 Anglo Irish Landlords owned most of the remaining woodland resource (Young 1780). Young provides some useful insights into the state of the rural economy in Ireland at that time. Unfortunately, he does not always separate out the fuel used, giving quotations for 'firing' costing between 14 and 30 shillings per year. It is not clear whether this firing denotes wood, coal or peat. It is clear, however, that, by the 1770s, peat and 'bog timber' were the predominant fuel used in most of rural Ireland.

The ownership of the main woods in Ireland by landlords appears to have damaged the market for fuelwood. There does not appear to have been any public right to branch wood or forest residues. Although peat is, in some ways, an inferior fuel to seasoned hardwoods, it is less labour intensive to produce. Moreover, it is suited to the form of hearth that was prevalent in Ireland's rural housing, where a peat fire could be made to burn continuously, providing heat and cooking all the year (Evans 1957).

Due to the relative scarcity of written sources on the development of the woodfuel market in the nineteenth and early twentieth century, some reliance has been placed on verbal evidence from the respondents interviewed for this report. There appears to have been some regional variation in wood burning traditions, depending on local resources.

In the eastern counties of Ireland most of the local peat resources were depleted in the nineteenth century and a switch was made to burning coal, imported from the British Mainland. Coal merchants were already well established in 1832 (Anon. 1841). In rural areas this, relatively expensive, fuel was supplemented by wood where it was available. Most of this wood was produced from hedgerow trees (ash and sycamore), the hedges themselves (hawthorn), or other salvaged wood (apple wood was, and is, an important firewood near the orchards in Co. Armagh). Although most of the wood produced in this way was consumed by the wood owner, there were some local sales of surpluses. The larger Anglo Irish estates also produced wood during this period, mostly as a bi-product of forestry operations. This firewood was supplied to the estate workers and surpluses were available for local sale. In the western counties in Ireland peat continued to dominate the fuel market in all but the most

urban areas. In the larger towns and cities in the west, a coal based fuel market similar to that in the east developed.

The two World Wars provided an impetus to the timber and fuelwood markets in Ireland. During, and shortly after, these two wars there was a strong demand for all types of timber and farm and estate woods were exploited (Fitzpatrick 1965, Blackstock 1998). It is probable that the fuelwood market was also stimulated during this period, both because of a shortage of other forms of fuel and because of a surplus of felling residues.

The most recent impetus to the fuelwood market in Ireland was the oil price rises of the 1970s. Many of the industry experts questioned referred to this period, indicating that a lot of new fuelwood processing businesses started at that time. Some of these businesses went on to become important and successful forestry contractors or tree surgeons and are now dominating these markets. Interestingly, the official figures for firewood production in both the Irish republic and the United Kingdom show a marked decrease in firewood production during this period (Anon. 1984a).

A relatively recent development in the fuelwood market in Ireland has been the environmental debate. The most significant impact of this environmental concern has been to stop the sale or use of fuelwood in Belfast, in favour of smokeless fossil fuels. Two pieces of legislation govern the types of fuel that are authorised for burning in the smokeless zones of the greater Belfast area, the Clean Air Act 1981 and the Smokeless Fuel Order 1997. The Smokeless Fuel Order in particular restricts the sale of unauthorised fuel within a smoke control area. Fuelwood is not an authorised fuel and is banned. Heatas (Anon. 1995) provides the basis for identifying appliances and their fuels that have been tested to conform to BS7256. This list includes two wood burning stoves that have been fitted with a catalytic conversion chamber. It is stressed in this publication, however, that any wood burned in these stoves must have been stored under cover and in an airy environment for at least 24 months.

Similar legislation in Dublin appears to have adopted a subtly different approach. In this city compressed peat briquettes and, apparently, fuelwood have been accepted as being suitable for burning in a smoke control area.

3.2 Literature review; Switzerland

Forestry, like all aspects of Swiss life, is very fragmented because the country is a confederation of 26 semi-autonomous cantons. As a result the central state is much weaker than in other European countries and each canton has its own legislation; although central legislation does exist. Extensive variation in topography and climatic conditions also greatly influence forest and forestry practices.

3.2.1. Background

The forest cover of Switzerland is 12,523 km² or 30.3% of the country's surface area. The forest cover varies from 20% in the lowlands and Alps to 40+% in the Jura Mountains and Pre-Alps. Most of the forests are naturally regenerated and the use of exotic timber species is very limited and in many places totally absent. In a number of cantons clearfelling is banned or discouraged. A high proportion of the trees (up to 25%) exhibit some crown dieback but the ultimate causes for this dieback are not fully understood (Mahrer 1990).

The ratio of conifers to broadleaf's is roughly 2 to 1. The dominant species by volume are, in decreasing order of importance, spruce (*Picea abies*), beech (*Fagus sylvatica*) and fir (*Abies alba*). The relative importance of the three species varies according to regions. To the north and west of Switzerland, which covers over 70% of the country, these three species are dominant. Many other species of trees grow in Switzerland and their distribution varies according to climate and species such as larch, pines, horse chestnut and oak may be locally dominant (Mahrer 1990).

There are two main types of forest ownership, private and public, in Switzerland, but most of the forests are communally owned (73%). However this type of ownership is very varied and only around 5% is owned by the central or cantonal states while villages or various types of associations own the remaining. There is a great variation in the types of ownership between cantons. The average size of public forests is 211 ha (range: 53-500+ ha) and is much greater than that of private forests which is only 3 ha (Mahrer 1990).

Legislation: there is a Federal Law and then each canton has their own laws, which have to be compatible with the Federal Law.

Administrative structure: Each canton has a similar set-up. There is a general manager who oversees forest inspectors. Each inspector (a university graduate in forestry) is in charge of a region and works with 4 to 8 forest guards. Each forest guard deals with about 100 ha of forest, carries out direct management of forests and is responsible for selling the timber. The management decisions are taken jointly by the forest guard and the forest inspector and they must produce management plans for all public forests. Privately owned forests do not require management plans, however, they do not have the right to cut trees with a diameter exceeding 16 cm without permission from their local forest guard. Costs of marking of trees to be cut are paid by the state.

In 1995 forest industries in Switzerland employed 90,817 people in 12,415 companies. Forestry itself provided jobs to 9102 in 1730 companies. Each year around 30 forest engineers, 30 forest guards and 300 forest workers obtain their qualifications in various forestry educational establishments. All forestry workers need a qualification for full-time employment. The relative importance of

forestry and forestry related industries to the national economy has steadily decreased since World War II from over 7% of the GNP to less than 2% (Anon. 1998a).

During the 1990s public forests have been heavily in the red despite the fact that they are very heavily subsidised. For example in 1997 the deficit of exploitation of public forests was SF46 million out of a turnover of SF447 million and the subsidies covered over 20% of the total (Anon. 1998a). The deficit has increased as a result of depressed timber prices and increasing overheads. Different types of subsidies exist and the two main ones are: 1. forest silviculture and 2. protection against natural catastrophes. Between 1965 and 1996 the price of conifer logs has decreased from 400 to 120 FS m³ (Sandoz 1997). Following the devastating storm of December 1999, which blew down two years worth of harvest (Nussbaum 2000) prices have decreased by 20% and may even halve in Spring 2000 (Anon. 2000).

The production of woodfuel, as well as the production of raw material, is considered to be an essential part of the Swiss economic forestry policy (Semadeni 1995). In some forests, wood as a source of fuel is not simply a bi-product of other harvesting operations, but is now an integral part of the management and forestry planning (Sauter 1995).

3.2.2. Energy consumption and woodfuel promotion

The importance of wood, and that of other fuels, has radically changed in Switzerland during the 20th century (Wind et al. 1992, Thomas & Catrina 1990). In 1930 wood was the second energy source (15%) after coal, whereas now it represents only 2% of the total, just like coal, while oil provides 66% and electricity 21% (chiefly hydro power) of the energy requirements. Energy is mostly used for heating (60%), but there is some year to year variation caused by varying winter temperatures affecting the amount of energy required for heating.

There is much variation between cantons in terms of energy production and consumption. In the canton of Neuchatel the final energy consumption is, in decreasing order of importance: fossil fuel for transport (34%), oil for heating (26%), gas (15%), electricity (19%) and others, including coal and wood (6%). Local production of renewable energy covers only 6% of the total energy consumption, and is mainly produced by hydroelectricity (39%), burning of refuse (33%) and wood (25%). In 1997 most of the woodfuel consisted of logs (62%), wood subproducts (24%) and woodchips (14%). Since 1990 the wood consumption has roughly doubled, but the increase is mainly in wood chips or sub-products used in distance central heating (Anon. 1998b).

The federal government, as part of an Energy 2000 action programme, is aiming, over a period of 10 years, to substantially increase the thermal energy consumption and the electricity production originating from renewable sources of energy. This is carried out in partnership with the private sector which is grouped in an organisation

(Association Suisse pour l'Energie du Bois, ASEB) promoting the use of wood as a fuel. Wood chip central heating is seen as the key to this programme and is widely promoted (e.g. Anon. 1991; Anon. 1996a,b). The ASEB produces its own biyearly publication (Bulletin de l'energie du bois) in French and German (circulation 4000 copies).

The Swiss government subsidises renewable energies and half of the budget goes towards automatic wood chip central heating systems. The subsidy covers 10% of the installation costs (Anon. 1997).

3.2.3 Air pollution

In Switzerland, very strict regulations regarding the

burning of wood exist. Wood to be burnt indoors (fireplaces, stoves), or in outdoor open fires must be wood from the forest and the burning of any treated timber, as well as paper, cardboard and plastics, is strictly prohibited. Treated timber can only be burnt in especially designed incinerators as they release large amount of pollutants and heavy metals in particular (Anon. 1996c). The public is widely informed (Anon. undated a) in order to reduce air, water and soil pollution.

3.2.4 Woodfuel prices

In 1997/98 in the canton of Vaud the prices of various types of woodfuel were as follows (Table 3.1, Prices in FS from Anon. 1999a):

Table 3.1. Cost of wood fuel in the canton of Vaud, in Switzerland for the 1997/98 season, expressed in Swiss Francs.

Firewood type	Green wood in forest Per m ³	Logs in bags from yard, per 100 kg	Small logs for stoves, per 10kg	Firewood type
Conifer	40-50	40-45	50-55	Conifer
Mixed Broadleaf	45-60	NA	NA	Mixed Broadleaf
Beech	50-70	45-50	55-60	Beech
Birch	80-100	60-65	70-75	Birch

Wood chip (recommended prices in FS per m³)
broadleaf: dry 42-46 and wet 36-42
conifers: dry 30-34 and wet 24-30.

However, it was noted that prices for woodchip had in recent years been much lower than recommended prices. With regard to the price of fire wood logs it was noted that, for small quantities, supermarkets can charge several times more than producers or forest owners (Anon.1999a).

3.2.5 Type of wood burning installations and wood consumption

In 1997 an exhaustive survey (Anon. 1998c) was carried out in Switzerland to determine the type of wood burning systems and their respective wood consumption (see Table 3.2 for details). It was estimated that there were 670,708 systems using 2.3 million m³ per year. Most of the logs were burnt in central heating systems or in ceramic stoves but this represents less than half of the total wood used for energy production. The main change observed between 1990 and 1997 had been the threefold increase in wood use in non-industrial woodchip central heating systems, the increase in the number of closed fireplaces and chimney stoves and the reduction in combined wood/oil central heating systems. It is worth noting that, as pointed out by Keel et al. (1996), owners of small systems often do not know how much they are using and thus making estimations of their consumption difficult.

3.2.6 Other European countries

The history and structure of the fuelwood market in mainland Europe is very like the Swiss fuelwood market.

Woodland has traditionally been owned in some form of commonage or shared ownership and the rights to the "fruits of the forest" were encoded in local laws. Fuelwood was, traditionally, offered for sale cut into faggots about 1.0 m in length and were sold by the cubic metre of stacked and split timber. The wood was usually dried for one or two years in the forest before being sold. Many traditional housing structures included some shelter to ensure that fuelwood was kept dry, well aired and convenient.

The choice of species considered best varied with the region and seems to have reflected the most abundant resource locally. In parts of NE Spain holm oak was and still is a significant fuelwood (Mayer & Roda 1993). Oak and, especially, beech have been important over much of central France and in Germany. The conifers become dominant in the Alps and, along with birch, in Scandinavia.

The form of cooking and heating appliances vary with the regions. However, there appears to be a trend from slow burning stoves with a very high heat inertia in regions with prolonged or severe winters, to the so called "pot bellied stoves" that give quick and readily available heat, in warmer regions. Around 60,000 heating appliances are sold annually in Europe and the two largest markets are Germany and France (Anon. 1995b).

Most of the firewood that is produced in central Europe comes from sustainable managed woodlands or forests and is sold through a mature supply chain that produces a

consistent and reliable product. However, it is likely that a significant proportion of the processing of firewood in all European countries is carried out on the "Black market".

It is important to note that in most European countries

increases in wood fuel to meet higher targets in renewable energy production programme focus on the promotion of wood chips (Pouet & Laurier 1995, Varley 1995, Serup 1999).

Table 3.2. The number of wood burning heating systems in Switzerland in 1997, and the total amount of woodfuel consumed in these systems.

Appliance	Number of Units	Wood consumption m ³
Open chimney	51,255	23,542
Closed Chimney	86,715	56,814
Chimney Stove	131,660	99,684
Stove, single	106,306	51,336
Stove, ceramic	116,010	265,502
Cooker	109,114	105,842
Cooker/central heating	18,303	136,180
Central heating with logs <70KW	27,121	319,462
Central heating with logs >70KW	492	5,592
Central heating, combined log & oil	18,373	50,745
Automatic central heating <70KW	2137	124,060
Automatic central heating, >70KW Wood processing industries	2097	492,020
Automatic central heating >70KW Others	1057	303,533
Incinerators for wood waste	37	278,260
Incinerators for household waste	29	29935

3.3 Estimate of market size and structure in Switzerland

The production of woodfuel in the 1980s was around 10000 TJ per year and increased sharply around 1990 and is now just under 20000 TJ per year, but this represents only 2.2% of the Swiss energy consumption. This represents just 10% of the energy produced by hydroelectric power and half of that obtained from house and industrial waste.

In 1997 2 million m³ of woodfuel were exploited and it is estimated that twice that amount is readily available. Theoretically it is thought that between 5.5 and 7 million m³ should be available for harvesting every year (Streiff & Brondli 1991). The major reason for this glut of firewood has been un-competitive prices. The price of firewood has remained steady (just over SF60 m³) since 1985 (Anon. 1998a). Over the past few years there has been much political debate to tax non-renewable sources of energy in order to promote renewable ones including woodfuel.

In 1997 2.3 million m³ of woodfuel was consumed in Switzerland. Three main types of wood fuel installations

are recognised and in decreasing order of importance they are (% of total consumption in brackets)

- Individual burners using logs with an output of less than 70 kW (53%)
- Automatic central heating systems using wood chips with output > 70 kW (34%)
- Specialised burners to dispose of waste wood products (13%)

During the 1990s the consumption of wood for individual installations has remained steady whereas that of wood chip burners has steadily increased (Anon. 1998a,c).

It is generally acknowledged that from a purely economic viewpoint woodfuel is at a disadvantage compared to other sources of fuel. However, for public buildings, particularly in villages where a large supply of wood exists, it has the advantage of creating jobs and boosting the local economy. The points in favour of woodfuel are thought to be:

- renewable energy source,
- efficient and environmentally friendly,
- wood production is localised and thus reduces transport.

Of prime importance is that the full potential of wood fuel can only be realised if an efficient organisation is set up. A good understanding of wood heating systems is also required.

As mentioned above there is a great potential to increase the consumption of woodfuel. However, an increase in the consumption of firewood is widely viewed as impossible and indeed a decrease would be more likely. The interest in burning wood chip started in the early 1980s as an alternative to firewood. The consumption of wood chip has steadily increased during the 1990s and this is considered to be the only feasible way to use the full potential available.

All interviewed individuals pointed out that figures provided by the National Office for Statistics are very good and reliable. However it was also pointed out that although the total amount of woodfuel was correctly estimated the number of people actually cutting small amounts of firewood was difficult to estimate.

Production of firewood is very common as a Saturday activity and is carried out by people who cut wood for their own consumption and also by some who sell it to family, friends and neighbours. This supplements income for 'poorly paid' workers and is not declared. Farmers, even if they do own forests, generally do not produce firewood as this is not deemed to be financially rewarding. However farming is changing rapidly and it appears that poorer farmers, badly hit by reduction in farming subsidies, are now starting to sell firewood. As they have few overheads and their wood is sold on the black market their prices are highly competitive.

Foresters consider firewood as a by-product of harvesting which one needs to get rid of. Wood deemed to be firewood, and this usually represents 50% of the broadleaf's felled, is then processed by a wide variety of individuals and the market is very unorganised. The producer sells straight to customers and there is no marketing at all, although in some areas there are wholesalers. Sawmills do not produce firewood and burn their residues for heat.

Sale of firewood in the public forest is generally organised as follows. All cut trees are cut into 1m length and stacked along forest tracks. Commune or state sell the firewood themselves and it is generally sold locally to their own citizens. Private owners tend to keep the firewood for themselves. Small companies, which carry out tree felling and silvicultural operations, do not make money out of firewood and only prepare wood when requested. They insist on the wood being picked-up in the forest as delivering is not a viable operation. Consumers buy wood cut either in logs of 50, 33 or 25cm, but for the greater majority the length is 33cm. All producers cut the wood to exactly the same sizes and sell it by cubic metres.

Beech is the main wood and is the reference, but small

quantities of ash are often mixed in. Oak is cheaper but people don't particularly like it as it needs to dry longer (3 years). Where broadleaf's are uncommon, such as in the Alps, conifers may become the main firewood. Wood calorific value is based on that of beech, which equals 100. Hornbeam is rated 110, ash, oak, robinia and sycamore are between 90 and 100, birch 85-90 while spruce and fir are around 60%. In some areas both birch and larch are considered as excellent firewood.

There is no problem with quality control, beech is dried for two years and customers rapidly spot wood that has not been seasoned properly. A large consumer will require 30-40 m³ per annum when heating a house solely with wood. In the countryside many farmhouses are solely heated with wood. The usual customer will require 1-2 m³ of wood per year for fireplaces and this is only for pleasure.

Three fundamental problems in the market chain have been identified. Firstly and most importantly transport is expensive, especially because of high wages and high road tax. As a result deliveries tend to be local and usually the producer or wholesaler prefers to see the wood being collected. In the case of the few large wholesalers their transport costs are further increased due to the 28 tons limit imposed on lorries in Switzerland. It appears that their businesses only remain viable if they consistently break this regulation. Storage is another difficulty as the wood requires to be protected from the elements prior to delivery. Both the high price of land and exorbitant building prices as well as planning regulations would prevent the setting up of a new business. A more recent trend has been the increased competition by supermarkets that manage to buy large quantities, often foreign imports, at a price that is below production costs.

It is worth pointing out that forestry, and the production/supply/use of firewood in particular, has, like most things in Switzerland, been rather stable since the 1950s. Now the country is being confronted with major changes (unemployment, globalisation, exceptionally damaging storms in 1990 and 1999, etc...) and many crucial decisions need to be made, including the sort of relationship Switzerland will have with the EU. In this context most forestry experts, and indeed the public, foresee major difficulties ahead (e.g. Rime 1997) although no one appears to have much of clue as to what will happen and what sort of changes will really be required.

3.4 Market structure in Ireland

It appears from the summary of expert opinion in Table 3.3 that the Irish fuelwood market is rather loosely structured, with endusers getting their fuel from a variety of levels within the market. There are a number of key retail outlets, including Coalmen, petrol stations and small supermarkets. There are also recognised producers of fuelwood who either deliver to local customers or who provide yard sales for collection. Almost all of the

fuelwood market is run by individuals or small family concerns, with only a very few larger companies involved. There was a cumulative total of about 150 full time job equivalents identified by the experts, although this figure was recognised as being suspect by those interviewed.

Most of the processing of logs to fuelwood was carried out with minimal equipment and was, consequently, very labour intensive. The largest firms involved in this market had independently developed bespoke equipment to process fuelwood. This equipment included Heavy-duty

log splitters, lifting and handling equipment, various fuelwood processors and bespoke bagging equipment. Some of these pieces of equipment appeared to confer some competitive advantage. Many of the largest firewood processors did not have to pay for their raw materials, again giving these larger organisations a competitive advantage. While there is an apparent shortage of the more desirable hardwoods in the west of Ireland, there was no shortage in the east, where a glut of suitable material had led some of the tree surgeons to dump or burn otherwise suitable logs.

Table 3.3. Summary of replies from key informants on the domestic woodfuel market in Northern Ireland and the Irish Republic.

Question	Summary of answers
What is the usual market chain from forest to customer?	Mostly fuelwood processors who sell to retailers or the public or private sales. Very few wholesalers
How many people are employed in the industry	Cumulative total of 150. Most respondents warned that this figure did not represent the cumulative total of man-years spent in producing firewood, nor did it reflect the number of people officially employed in this sector
How big is the usual woodfuel enterprise?	Individuals or families dominate. Part time work usual. Only three or four companies larger than this and these were associated with Belfast and Dublin.
What is the usual and best equipment	Chain saws dominant. The large enterprises have log splitters and firewood processors. The largest companies have developed their own equipment which usually includes some sort of bagging system
What is the usual price paid for logs by wood fuel producers?	3. £0 to £15.00 per m ³ The largest producers use their own wood, from large estates or from tree surgery operations
Is there a shortage of suitable raw materials	There appears to be a shortage of hardwoods in the west of Ireland, with Limerick, Donegal, Sligo and Fermanagh reporting problems. In the east, there is a pronounced glut, with a lot of suitable logs being dumped for want of a customer
Who does the domestic customer normally receive their firewood	There were three distinct methods described. Fuel merchants (Coalmen) who delivered fuel direct to customers Garage forecourts, where customers collected their logs Fuelwood merchants, where customers collected their logs. These latter tended to be associated with large estates or tree surgery businesses. Garage forecourt sales were more common in the east and around the large cities
How is the fuelwood graded and sorted	No grading was carried out. Only one respondent suggested that hardwoods and softwoods were sometimes separated
What is the retail price	3 £40 - £80 per m ³ , average £55.
Who Burns logs	Urban poor and professional were the most common customers cited. Others included pubs and hotels and impulse buying
What are the most important species	Conifers in the west, otherwise hardwoods, including beech oak ash birch sycamore
What is the most significant problem	Safety legislation was cited by the foresters questioned, otherwise poor marketing, labour intensive, lack of quality and fossil fuel prices

At between £40 to 80.00 per m³, the retail price of fuelwood in Ireland was significantly greater than that paid in Switzerland. There was also no quality control or seasoning of the material before it was offered for sale, suggesting that the consumers of logs in Ireland were being sold a product with a different and lesser specification when compared with their continental counterparts. It seems that the urban poor were the traditional customer for woodfuel in Ireland, however,

there is evidence that a professional class is becoming more important. These two customer types appear to be using their wood in different ways. The poor still use it in open fires, where it is mixed with coal. The professionals, on the other hand, are increasingly installing efficient wood burning stoves. These two market sectors have different requirements, with those with open fires needing small, hardwood logs and those with wood burning stoves needing dry logs. The experts questioned also indicated

that sales of fuelwood to Hotels and pubs were an important, if minor sector.

In the west of Ireland, the fuelwood market was dominated by sales of softwoods, derived from plantation forestry. This seems to indicate that there is a shortage of the more suitable species in this region. In the East, where hardwood woods are more plentiful and where the large arboricultural companies are concentrated, most of the hardwood species were seen as important in the fuelwood market.

Recent legislation covering the training of chainsaw operatives on State controlled forests were seen as the most significant problem by the foresters

3.5 Market size in Ireland

In the Irish Republic FAO statistics are available and have been included in Fig 3.1. Because Northern Ireland is part of the United Kingdom no separate fuelwood production figures for this Province were produced, However, the production figures for the UK have been included and these, like those of Ireland, do not show any increase in market effort during the 1973 to 76 oil price rises. The Swiss fuelwood production figures show a fairly steady rise in production during the 1980s, although they too show a somewhat perplexing drop in production in the late 1970s.

Other estimates of the size of the woodfuel market in Ireland have tended to be somewhat variable. The sale of firewood from the state forests has remained relatively static over the last decade, at about 3000 tonnes in Northern Ireland (N.I. Forest Reports 1983 – 97) and at about 6000 tonnes in the Irish Republic (Coillte 1995). Graham (1980), on the other hand, indicated that annual timber production from the privately owned woodlands in Northern Ireland was significant, particularly in the hardwood sector that contributes most to the fuelwood market.

More recent research in Northern Ireland (Anon. 1999) and the Irish Republic (Anon., undated) puts the annual production of available fuelwood at 54,000 tonnes and 140 000 tonnes respectively, although the figures for Northern Ireland include forest residues that are not yet being harvested. The estimates for market size in the Republic of Ireland were based on a fairly detailed survey and appear to be more reliable.

In order to produce some estimate of the annual production of domestic fuelwood in Ireland, all participants interviewed in the course of the market research presented here were asked to provide estimates of the amount of fuelwood that they produced, processed, sold or used last year. The cumulative totals of fuelwood that has been identified in each of the market sectors sampled are included in Table 3.4.

Table 3.4. The cumulative total of domestic fuelwood production that has been identified as a result of a market review in Northern Ireland and the Irish Republic. The percentage of this fuelwood that had been obtained from identified supplying sectors is also given.

Sector	Northern Ireland		Irish Republic	
	Total (m ³)	% identified from supplying sectors	Total (m ³)	% identified from supplying sectors
Producers & Processors	4950	–	11255	–
Retailers	950	10.5	850	3.5
Endusers	103.5	26.4	126	20.6

These data clearly indicate that the earlier official statistics of domestic woodfuel production are suspect. This seems to have occurred because, unlike most of the rest of Europe, the fuelwood market in Ireland is not dominated by the forestry sector. It is also clear that the data presented in table 3.4 do not account for all the fuelwood produced in Ireland. The number of endusers who obtain their fuelwood from sources not identified is significant, as is the amount of fuelwood supplied to retailers from other sources. In addition, certain sectors of producers, particularly the large Anglo Irish estates and individual farmers who harvest hedgerow trees, were not fully sampled. While it is recognised that the size of an unregulated and un-disclosed market will always be open to

interpretation; it is possible to gain some indication of its size by comparing the amount of fuelwood identified as coming from those who produce or sell fuelwood with the percentage volume that endusers actually get from these sources. Using this crude technique, the current size of the fuelwood market in Northern Ireland is estimated to be at least 22,000 m³ and in the Irish Republic it is at least 58,500 m³. Given the amount of woodfuel supplied to the retail sector from un-sampled suppliers and the number of processors not sampled, the true size of the domestic fuelwood market in Ireland is likely to be significantly larger than these figures indicate.

The volatility of the Irish fuelwood market presents

significant problems in identifying and verifying the actual size of this market. Because the market is dominated by part-time entrepreneurs and individuals supplementing their income, the cumulative effect of external factors, such as fluctuations in fossil fuel prices, agricultural incomes and the scarcity of well-paid jobs, can have an immediate and dramatic effect on the production and consumption of fuelwood. For these reasons, a definitive estimate of the size of the fuelwood market in Ireland cannot be accurately produced.

3.6 SWOT survey in Switzerland

The results of the SWOT questionnaire in Switzerland gave rise to two very distinct types of users. One type uses firewood as their only source of heating and has usually

always done so whilst the other group (2/3rds of the respondents) only burns wood as a source of enjoyment. The former use closed boilers (generally central heating system) that utilise more than 3 m³ of wood per year whereas the latter have open fireplaces including outdoor ones for summer barbecues that use less than 1 m³ per year (many of the respondents found it difficult to estimate their consumption). The only thing all respondents agreed upon was related to the negative aspect of firewood; that it is basically a dirty business and many considered that it took too much time to look after.

Beech was the preferred species although many people who used small amounts of firewood per year had no idea of the species used and simply guessed or gave no answer.

Below (Table 3.5) are summaries of the answers to the following questions:

Table 3.5. Summary of replies from SWOT interviews on the fuelwood market in Switzerland, displayed by market sector and by order of frequency. The number of times the answers were given is also recorded.

	Producers	Processors / Suppliers	Endusers
Strengths	Atmosphere 3 Eco-friendly 1 Home product 1	Atmosphere/looks 4 Good supply 3 Eco friendly 3 Cheap 2 Healthy 1	Atmosphere/looks 34 Quick heat 12 Eco friendly 10 Smell 6 Cheap 3 Less dry than central heat 2 Chopping wood- relaxing 2 Fun 1 Traditional 1
Weakness	Cost 2 Labour intensive 1 Transport 1 Space 1 Time consuming 1 Low profits 1	Space 4 Heavy 2 Awkward 2 Labour intensive 2 Location 2 Transport 2 Poor returns 1	Cleaning 14 Storage 13 Dirt 12 Labour intensive 8 Not practical 7 Heavy 6 Too much work 5 Pollution 5 Space 4 Old age 3 Cold in mornings 2 Price 2 Fire risk 1
Opportunity	Wood chip 1 Availability 2 Lower tax 1 Reduce cost 1	Wood chip 7 Higher oil price 3 Other markets for wood have collapsed 3 Marketing 1 Plenty of wood 1	None 11 Higher oil price 8 Good supply 6 Lower price 5 Wood chip 3 Reduce nuclear power 2 Pizzeria oven 1

Strengths

Consumers with forests or cheap access to wood saw woodfuel as a cheap option to other types of heating. People using smaller amounts in fireplaces thought the use of a renewable fuel, especially wood, to be very important from an environmental point of view including issues such

as forest dieback and global warming.

Weaknesses

As stated above dust and dirt was seen as the big problem. A third of the consumers considered storage a problem both in terms of finding space and keeping the wood dry.

A small number of people considered the chopping of wood as healthy activity both physically and mentally.

Opportunities

Nearly a quarter of people did not have any opinion whereas consumers who appear to have a keen interest in woodfuel central heating considered the promotion of woodchips as the best opportunity to expand the market.

Threats

No clear trends have been identified. Responses range from a shortage of firewood to too much of it, although further drop in oil prices was mentioned by a quarter of the interviewees. A similar number of people had no opinion on the matter.

Most significant problem

The two main problems identified were falling oil prices and awkwardness of woodfuel both in term of dirt produced and labour requirements.

Table 3.6. Summary of replies from SWOT interviews on the fuelwood market in Northern Ireland, displayed by market sector and by order of frequency. The number of times the answers were given are also recorded.

	Producers	Processors	Suppliers	Endusers	Stove suppliers
Strengths	Up-market 1 Eco-friendly 1 Attractive 1	Traditional 5 Burns well 2 Upmarket 1 Eco-friendly 1 Cheap 1	Traditional 4 Burns well 4 Looks 2 Cheap 2 Smell 1	Cheap 18 Good heat 16 Clean 12 Handy 8 Looks 8 Traditional 8 Eco-friendly 5 Smell 5	Efficient stoves 5 Cheap 4 Good heat 4 Eco-friendly 2
Weakness	Poor market 2 Awkward 2 Dirty 1 Seasonal 1	Fossil fuel price 7 Labour 3 Dirt 1	Seasoning 6 Dirt 4 Open bags 3 Awkward 2 Expensive 2 Lack of quality 2 Supply problems 1	Seasoning 16 Labour 12 Storage 12 Awkward 11 Dirt 10 Sparks 4	Supply problems 6 Seasoning 4 Labour 1 Storage 1
Opportunity	Energy production 2 Woodburning stoves 1	Holiday trade 2 Traditional 1 Eco-friendly 1 Energy production 1	Cheap 1 Plentiful 1 Holiday trade 1	Traditional 9 Looks 4 Efficient 2 Strategic 1 Holiday homes 1 Wood burning stoves 1	Strong demand 5 Woodburning stoves 3
Threat	Market structure 2 Fossil fuel price 2 Legislation 1	Fossil fuel price 9 Mild winters 1 Legislation 1 Awkward 1 Labour 1	Market collapse 11 Fossil fuel price 3 Not essential 1	Fossil fuel price 24 Awkward 10 Supply problems 6 Market collapse 4	Fossil fuel price 5 Quality 3 Market structure 2 Labour 1

3.7 SWOT interviews in Ireland

Strengths

Producers and suppliers in Ireland felt that there was a well advertised, traditional market for fuelwood and that it was an environmentally friendly, up market product that produced a lot of heat. Those who burnt fuelwood stated that it produced good heat and that it was clean to burn. This clean burning attribute appears to be associated with the tradition of burning logs with coal on an open fire. In these circumstances, the higher temperature that wood burns, when compared with coal, means that the coal is more fully burnt and that there is less smoke and soot produced (C. Luckhurst, pers comm). The look and smell

of a log fire was also considered important. Interestingly, wood was considered as a cheap fuel in Northern Ireland, but not in the Irish Republic, perhaps reflecting the current economic situations pertaining to both parts of Ireland. The environmental aspects of using wood as a fuel did not appear to be important to most users. The stove suppliers considered wood to be cheap, efficient, effective and environmentally friendly, and thus their replies fully supported the products they sell.

Weakness

There was a subtle difference in opinion on the weakness of the fuelwood market between those who produce and sell fuelwood, and those who consume fuelwood. The

producers tended to consider that the market was badly structured. Labour costs and competition concerned the processors. The suppliers considered fuelwood awkward and dirty and they considered it difficult to get quality, dry fuelwood at the right price. The enduser, on the other hand, felt that fuelwood was not seasoned, it was difficult to store and handle and that it was dirty and prone to sparking. The stove suppliers felt that there were problems with supply and, more importantly, that much of the fuelwood was supplied without being seasoned.

Opportunities

The producers and processors of fuelwood were aware of opportunities in new markets like the growth of holiday homes, the expansion of the wood burning stove market and the possibility of producing energy from waste wood. The endusers, on the other hand, still felt that the traditional image of the log fire could be exploited to advance the market.

Threats

The relative cost and handiness of oil and gas were seen as the dominant threat to the fuelwood market in Ireland. Many of the retailers and some of the endusers considered this to be causing a market collapse that would not be reversed. Other problems included the effect of legislation, the 'Black market' and a shortage of suitable timber.

4.0 Discussion and recommendations

It is clear that the market for fuelwood in Switzerland is significantly different from that in Ireland. In Switzerland, wood was the traditional local fuel and is almost exclusively produced in well managed, sustainable forests. In Ireland wood was not the dominant traditional fuel and it is not normally produced as a bi-product of sustainable forestry. It is also clear that the method of utilisation of fuelwood was different in Switzerland and Ireland. In Switzerland, wood was burned on its own and, because of this, it needed to be well seasoned. In Ireland, on the other hand, wood was, until recently, burned with coal in open grates and, in these circumstances, dry wood was not essential.

Notwithstanding these differences, it was clear from the SWOT replies that many of the issues raised in Switzerland were pertinent to Ireland. A log fire creates a pleasing atmosphere and produces plenty of heat, regardless of the country in which it burns. Woodfuel is also bulky, dirty and awkward to store and handle everywhere. The price of alternative forms of fuel, particularly oil and gas, and the ease in which it can be used, was seen as the most important threat in all three countries. These opinions appear to reflect the fundamental strengths and weaknesses of wood as a fuel in the twenty-first century.

There were subtle differences between the replies received

in the three countries that seem to reflect both the relative affluence and degree of sophistication of their citizens. Northern Ireland was the poorest country surveyed and, in Northern Ireland, the relative cheapness of woodfuel was seen as a major strength. In Switzerland, with its continental sophistication, the sampled population was more aware of pollution and environmental aspects of the woodfuel market than in Ireland.

The potential market for woodchip for heating is being actively developed in Switzerland and throughout Continental Europe (Lemaire et. al. 1998). This has influenced the woodfuel producers and suppliers, who are now considering this new market as an opportunity. In Ireland, where this market has yet to be established, the producers and suppliers were mostly un-aware of this opportunity.

There was an element of the 'Black Market' surrounding the production of fuelwood in both countries. This produced an un-regulated and very volatile working environment that was able to adjust quickly to changes in the market place. Thus, in Switzerland, the farming community was beginning to exploit fuelwood to supplement their income. In Ireland, the oil price rises of the 1970s provided an opportunity for a number of young entrepreneurs to accumulate enough capital by selling fuelwood to establish and build large and successful companies. It appears that the flexibility of a 'Black Market' economy confers some advantages to the fuelwood market and should not, necessarily, be considered a problem in all cases.

The preponderance of farmer produced fuelwood in Ireland should raise some concerns about the impact that the harvesting of this from farm woodland. Research suggests that many of these woods form important natural habitats (Cooper 1985, Blackstock, in preparation) and should be subject to protection under the Habitats Directive (Council Directive No. 92/43/EEC of May 21st 1992). At present, no enabling legislation has been produced in Northern Ireland to comply with this directive and there is, consequently, a risk that serious environmental damage may occur if the woodfuel market expands.

There was evidence of a subtle change occurring in the fuelwood market in Ireland. The traditional customer base, that of an urban poor who had to rely on in-efficient open fires, were becoming more affluent and were replacing open fires with more efficient forms of heating. At the same time, the wood burning stove was becoming much more popular, particularly in the suburban and rural areas. In Ireland, the relatively lax planning controls have allowed the rural housing stock to expand and to lose its connection with the farming industry. This market, of mainly professional, rural, owner-occupiers, was becoming the most important group of fuelwood consumers. Unfortunately, fuelwood, as normally supplied, was much too wet to be burnt in stoves without

causing damage and corrosion. For this emerging market to be exploited there must be a substantial switch to selling seasoned fuelwood

In Switzerland logs are air dried, in 1.0 m lengths, for about two years, after which time they are considered dry enough for domestic consumption. Such a procedure may not be entirely effective in Ireland because of its relatively cool, wet climate. Air drying of long logs would also introduce another series of procedures into a production cycle designed to supply much shorter logs.

There are ways in which the change to seasoned fuelwood can be encouraged to take place. Most of the local suppliers of fuelwood identified by the endusers in this survey were farmers. The agricultural grant structure in Ireland has tended to produce over-capitalised farming enterprises with well constructed out buildings. As the farming sector consolidates, surplus, well-constructed and well-ventilated sheds are becoming available for other enterprises. These sheds, with slatted floors providing ample under-floor ventilation, are ideally suited for fuelwood seasoning and should allow even un-regulated producers and processors to produce dry fuelwood.

Because of the difficulties in enforcing some discipline on an un-regulated market, quality control will always be difficult to establish. It should be possible, however, to control the retailers by establishing some form of standard. This will be essential in the large urban centres, where smoke control legislation is being enforced. A standard specification for woodfuel should be developed in conjunction with the manufacturers and suppliers of woodfuel stoves and with organisations like the Environmental Health Departments of local government, the Irish Energy Centre, the Irish Bioenergy Association and Heatas Ltd. When a specification has been developed, research should be instigated to assess the actual methods of woodfuel production, sorting and drying required to reach the required standard. The results of this research should then be widely disseminated to agricultural co-operatives, tree surgery firms and through trade magazines and local newspapers, to ensure that woodfuel producers are given the knowledge and the encouragement to start to produce a quality product.

By developing a series of standards to govern the quantity, dryness, size of blocks and species composition of domestic fuelwood, some controls can be exerted on the market. Such controls will be made more effective by the involvement of Trading Standards Officers and by promoting these standards to ensure that most customers know what to expect. When acceptable standards for domestic fuelwood have been formulated, these can then be used to address the problems that exist with categorising domestic woodfuel as suitable to burn in smoke control areas.

There will be an onus on local, regional and central government to respond to changes in the quality of

firewood produced by showing some flexibility in the methods used to assess the suitability of certain fuels for burning in smokeless zones.

One of the most significant weaknesses listed for the domestic fuelwood market in Ireland was that logs were difficult and awkward to store and to handle. This weakness in the fuelwood market must be seen as an opportunity for manufacturers of garden sheds and craft workers able to weave log baskets. The development of a simple and cost effective domestic storage facility for fuelwood should be encouraged, as should the marketing of log baskets. The suppliers of wood burning stoves, and the larger fuelwood producers and retailers, seem to be in the ideal position to retail such products.

There appears to be point sources of surplus timber, particularly in the east of Ireland. Some of this material, mostly waste wood from tree surgery operations, is now being disposed of, at additional cost, into landfill or is being burnt on bonfires. It seems that this material is ideal, and is in an ideal location, to act as a feedstock for a number of small-scale combined heat and power plants. The larger tree surgery operations should be encouraged to identify local customers or partners to develop these enterprises.

Notwithstanding the present nature of the domestic woodfuel market in Ireland, there are enough progressive and well organised producers and processors to merit the support of a co-operative marketing organisation or trade association, such as the Irish Bioenergy Association, whose aims should include the promotion of wood as a fuel. Such an organisation should also promote produce supplied by its own members, develop new standards and markets and should seek assistance from national governments and the EC to develop and promote their members product.

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