

WIAREP

Western Isles

Waste Wood Inventory Study

Final Report

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Background

UK Government policy on recycling, waste reduction to landfill and a commitment to using renewable sources of energy are driving businesses to carefully consider how they dispose of waste products. Financial penalties are imposed when waste materials are disposed of to landfill (Landfill Tax) and encouragement given through mechanisms such as tax credits and Packaging Renewable Notes (PRN's).

In order for these measures to achieve the desired effect however, and reduce the amount of waste wood disposed of to landfill, a strategic approach to solving the problem is required.

In most UK regions, the obvious source of waste wood available for burning for heat energy is from sawmill and forestry by-products and from white wood (clean) pallets. Large quantities are available for chipping and recycling companies have been set up to offer complete services to potential users of waste wood. None of this supply infrastructure exists in the Western Isles and the range of waste materials available for recycling in the Islands is somewhat different to mainland examples.

It has been suggested that a significant quantity of waste wood is disposed of into landfill in the Western Isles. The technology currently exists to convert waste wood, free of contaminants, into heat energy. Indeed there are potential end users of this heat energy, in the form of office or public buildings owned by The Stornoway Trust, Comhairle nan Eilean Siar and Lews Castle College.

The first stage in delivering an alternative use strategy for waste wood in the Western Isles must be to identify the quantity, quality, location and duration of supply and to suggest a practical solution for collection and use of the material.

Aim of the study

The overall aim of the study is to carry out an assessment of the potential for the use of available waste wood in the Western Isles as a primary source of fuel.

Specific objectives of the study

- Report on the availability of waste wood in different parts of the Western Isles; present and future projections.
- Carry out an assessment of the suitability, legal issues and economics of using available waste wood as a source of primary fuel.
- Identify ways to increase the amount of waste wood currently entering the mainstream collection and available for re-use.

Methodology

The assessment of quantity and geographical distribution of waste wood production in the Western Isles was achieved primarily through the compilation and use of a questionnaire, a copy of which is included in the appendices of this report.

A list of target businesses was compiled using data from the Yellow Pages and the Construction Industry Training Board (CITB) listings, a copy of which is also included in the appendices. The building enterprises were split into three categories depending on the number of staff working within the businesses. This was done with assistance from a trainer involved with the local building trade. The main business sectors identified for this study included:-

- Small building/civil engineering firms
- Medium building/civil engineering firms
- Large building/ civil engineering firms
- Fish farms/processors
- Agricultural merchants
- Miscellaneous (forestry, woodland, retail, utility companies)
- Builders merchants
- Hauliers

A sample number of businesses from each category were selected and contacted in order to complete the questionnaire, the businesses selected are detailed on the sheet, included in the appendix, listing the target businesses. The businesses surveyed as part of this study are listed below.

Business Category	Total No of Businesses in Category	No. of Businesses contacted	
		Lewis/Harris	Uist/Barra
Small building/engineering	36	6	
Medium building/engineering	19	3	1
Large building/engineering	14	7	1
Fish farms/processors	7	6	
Agricultural merchants	2	1	
Miscellaneous (including forestry, woodland, retail)	8	8	
Builders merchants	4	2	2
Hauliers	5	4	1
<i>Total</i>	95		
TOTAL no. of Businesses Contacted	42 (44%)		

Most (73%) of the building companies identified are based in Lewis and Harris, with the remaining 27% in the Uists and Barra. It was intended to ensure that a similar percentage was achieved when contacting the businesses to discuss the project. However, it proved extremely difficult to contact building firms in the Uists which meant that the actual numbers of builders contacted was skewed towards Lewis and Harris (89%) and a response rate of just 11% achieved in the Uists and Barra.

The questionnaire, once compiled, was tested on five businesses and this demonstrated that it was clearly presented and the questions unambiguous. However, it became apparent that the respondents found it extremely difficult to provide accurate information, with some unable to provide figures on quantities of waste wood and the remaining estimating these weights.

In an effort to counteract this difficulty, the sample size for the study was increased and the questionnaire completed either by telephone or personal visits. This yielded a response rate of 44% of the target businesses rather than the more usual 20% (or lower) achieved by postal methods of information gathering. It also provided the opportunity to tease out information which normally would not have been included in a written response.

The results were collated and where possible responses were verified by discussions with other organisations or by using any relevant statistics which were available.

A second method of cross checking the data gathered in the survey was carried out by analysing information on the quantities of waste wood to landfill from site operators CnES with the quantities suggested in the survey.

Results

The main findings from the survey are shown below.

- Waste wood arises in the form of:-
 - Clean wood, single use pallets
 - Treated 'blue' multi use pallets
 - Demolition waste
 - Kit - House erection and other construction waste
 - Waste wood stripped out in the refurbishment of old houses
 - Old fencing materials
 - Furniture
 - Packing material including crates and cable drums
 - Forestry and sawmill by-products
- There is very strong support among all categories of the enterprises producing waste wood for recycling initiatives.
- Only one of the businesses contacted, who produce mixed waste i.e. from demolitions, currently separate this from other materials. However, all the businesses expressed a willingness to segregate waste wood for collection, although it would have to be financially worthwhile to do this.
- Some businesses would be unable to store waste wood due to space restraints.
- The businesses stated that they will not be able to separate metal, nails, staples or other contaminants from the wood as it would be time consuming and not a viable activity in financial terms.
- There is little evidence of change in the amount of waste wood produced in the building trade over the last five years. Similarly, little change in volume is anticipated in the next five years.
- Waste wood production on fish farms, has dropped significantly in the last five years. This is due to a move away from fish food deliveries on pallets to sea deliveries and presentation of feed in tonne bags. A potentially significant source of clean waste wood, due to the single use policy of pallets, has therefore been removed. None of the fish farm companies anticipate the re-introduction of the pallet system of feed deliveries.
- Waste wood production appears to be relatively constant throughout the year, however in the autumn months leading up to November 5th, waste wood is collected from businesses by individuals/groups for use on bonfire night. Most building firms therefore stated that they would not have any waste wood in September, October and November.
- Current disposal methods of waste wood include:-
 - in skips to landfill (generally forming part of mixed waste)
 - private wood burning stoves/fire wood/kindling
 - crofting use (hay/silage storage, compost heaps, fencing, handling facilities, quad tracks)
 - on site incineration
 - left with customer for disposal

- distribution amongst own workforce
- recycling within the business e.g. pegs, shuttering
- to other local businesses who then reuse it

Quantifying Waste Wood Production

As stated in numerous papers and articles regarding waste wood, quantifying waste wood production relies heavily on estimation, primarily, because there is a lack of record keeping for this category of waste. This problem also applies to the Western Isles and the quantities of waste wood stated below are based on figures provided through the questionnaire and enhanced and/or compared against information provided by the Comhairle nan Eilean Siar, the Crofters Commission and other relevant organisations. Consequently, all the figures quoted are estimations.

Fencing Material

A combination of estimation and purchase records suggest that 30 articulated lorry loads of fencing materials are bought into Lewis & Harris per annum (*Lewis Crofters Ltd*) with a further 10 loads going to Uist and Barra. Assuming that 80% of each load is of wood origin (i.e. strainers, stays and fencing posts) and that each load weighs 25 tonnes, this provides a total of 800 tonnes of wood material coming to the Western Isles per annum. Continuing this calculation with the assumption that 75% of the total fencing material will be replacing existing fencing, this means that 600 tonnes of fencing will be replaced.

The weight of new fence posts and strainers (as measured on the calibrated scales at Steinish auction mart) compared to the weights of posts and strainers which have rotted at ground level, shows an average loss of material 41.67%.

On this basis, therefore, if 600 tonnes of replacement fencing is being erected circa 350 tonnes of old fencing will be removed providing a potential source of waste wood. This would equate to some 262.5 tonnes in Lewis & Harris and 87.5 tonnes in the Uists and Barra, all of which would be classed as treated wood.

Summary	262.5 tonnes Lewis & Harris	Treated wood
	87.5 tonnes Uist & Barra	Treated wood

Kit house erection

There is a consensus of opinion between the builders that 90% of all new builds in the Western Isles are in form of kit houses. This figure is supported by (indicative/general) statistics provided by Alistair Banks (*Head of Building and Planning Control at CnES*).

Planning applications to the Comhairle in 2004 indicate that circa 340 houses were built in the Western Isles during the year of which, it is suggested, 255 were in Lewis & Harris and 85 in the Uists. The opinion amongst the building trade is that an average of 0.5 tonnes of wood is leftover/waste per house built, this view is supported by Scotframe (*Inverurie*). On this basis, spare/waste wood from the erection of kit houses would be 90% of 255 multiplied by 0.5 tonnes giving 114.75 tonnes in Lewis & Harris and 38.25 tonnes in the Uist and Barra. Wood used for the external walls, joists and roof trusses will be treated although the internal panels would be white wood. Potentially, there could be significant waste from internal panels if the room dimensions are not of standard size. On this basis it is estimated that 30% of waste wood is clean.

Summary	80.32 tonnes Lewis & Harris	Treated wood
	34.43 tonnes Lewis & Harris	Clean wood
	26.77 tonnes Uist & Barra	Treated wood
	11.48 tonnes Uist & Barra	Clean wood

Demolition waste

There were approximately 150 applications to the Comhairle for permission to demolish buildings, of which some 50 applications related to houses, with the remaining 100 covering a range of buildings including byres, Nissan huts, temporary classrooms etc. The inter-island split for these is 50:50 - Lewis, Harris: Uists, Barra.

The estimation of waste wood recorded in the questionnaire from this work varied significantly from 3 tonnes up to 30 tonnes which clearly reflects the range of buildings that are demolished. Using the mode of the figures quoted, which worked out at 8 tonnes, this suggests that up to 1,200 tonnes of waste is yielded from demolitions.

It is unlikely that timber from houses and buildings erected prior to the 1970's was treated, however it has not been possible to establish a precise cut off date for the change from untreated to treated timber usage. It is perhaps prudent therefore to treat timber from demolitions as treated.

Summary	600.00 tonnes Lewis & Harris	Treated wood
	600.00 tonnes Uist & Barra	Treated wood

Pallets

Pallet usage and subsequent waste have decreased significantly in the last five years, primarily because fish farms are no longer using pallets for feed deliveries. Feed, in the main is transported by sea to the various sites and is now contained in tonne bags. There is little evidence from the fish farms to suggest that the practise of using pallets will be revived.

The majority of pallets used by businesses in the Western Isles are returned to the supplier as failure to do so incurs a charge that appears to range from £10.00 to £20.00 per pallet depending on the business and numbers used. These pallets are made from treated wood, are usually coloured blue and are quite substantial which means that they can be reused many times.

A number of the builders highlighted the fact that pallets used for some material deliveries are no longer made from wood. Instead they are manufactured from compressed cardboard. If this practise continues, waste wood from pallets will decrease in future years.

Businesses dispose of as many waste pallets as possible to their customers and private individuals who in effect 'recycle' them. Uses include:-

- Kindling which is then given to the elderly
- Croft usage including fencing, handling systems, hurdles, gates, dog kennels, quad tracks, hay and silage bale storage, feed storage, building compost heaps
- Bonfires
- Removal to other local businesses who reuse them
- Private wood burning stoves

Remaining pallet waste is taken to the respective landfill sites in Lewis & Benbecula. Disposal to landfill therefore appears to be the last in a long menu of options for pallet disposal. Consequently, quantifying this waste is based purely on the amounts that are recorded by the Comhairle's landfill records and these are shown below. It has been assumed that 80% of the pallet waste would be clean wood and the remaining treated wood.

Summary	22.6 tonnes Lewis & Harris	Treated wood
	90.4 tonnes Lewis & Harris	Clean wood
	1.75 tonnes Uist & Barra	Treated wood
	7.0 tonnes Uist & Barra	Clean wood

Miscellaneous

In addition to the specific sources of waste wood listed above it is recognised that businesses will have additional waste wood arising from off cuts, packaging etc. None of the businesses questioned were able to quantify this amount apart from the general description as a '*small*' amount. A notional weight therefore of 0.5 tonnes per business has been attributed for each of the business identified as potential sources of waste wood (appendix 1) with 50 % of this classed as white wood and 50% treated wood. This provides circa 26.5 tonnes of waste in Lewis and Harris and 13 tonnes in the Uists and Barra.

Summary	13.5 tonnes Lewis & Harris	Treated wood
	13.5 tonnes Lewis & Harris	Clean wood
	6.5 tonnes Uist & Barra	Treated wood
	6.5 tonnes Uist & Barra	Clean wood

Forestry and woodlands

Although the Western Isles are not usually noted for large numbers of woodlands generating timber of harvestable quality, there are two notable exceptions.

The Stornoway Trust Woodland in the Lews Castle grounds on the southern edge of Stornoway is recognised as a designed landscape and is the subject of a Millennium Forest Scotland Trust award with the long term aim of replacing non-native and exotic species with native trees. General management of the Trust woodlands and the gradual process of felling out non-native species currently yield between 80 and 100 tonnes of timber per annum suitable for cutting and sale as firewood.

The storm of January 2005 has caused a considerable amount of windblown damage, some of which resulted in trees becoming uprooted and branches broken off. It has been estimated by the Trust Factor, Mr Iain Maciver that over 300 trees were damaged in a 24 hour period during the storm and this has produced a significant, unexpected supply of waste wood. The Trust estimates that a total of 4,000 tonnes of timber is lying on the ground in the Castle Grounds. Some of this timber will be used in the trust sawmill to produce high quality woodworking timber and further tree sections can be cut for fencing, panelling or boarding use. However, it is realistic to assume that approximately 800 tonnes of waste wood per year for the next 4 or 5 years will be available in the form of firewood, sawmill off cuts and brash. During normal annual maintenance out-with this period, at least 200 tonnes of waste wood is produced.

The Forestry Commission planted two large scale woodlands during the early 1980's at Achmore (north and south of the road) and a further 625 ha of mainly Lodgepole Pine woodland at Aline on the Lewis/Harris Border. All of the woodlands were damaged by infestation of Pine Beauty Moth and large numbers of trees died. There are currently negotiations progressing the transfer of Aline

forest to community ownership and development as a community asset, meeting needs for leisure, recreation, whilst operating as a commercial investment. Consultants Scottish Woodlands have predicted that up to 1,000 tonnes of timber could be harvested from the Aline forest over the next three years following felling to establish cycle tracks and walkways and from felling out some of the standing dead timber. However, the practicalities of extraction and the quality of the timber must be carefully considered when the value as a waste wood asset is assessed.

A number of crofter forestry plantations and shelterbelts on croft land have been established with Woodland Grant Scheme (WGS) and Crofting Counties Agricultural Grant Scheme (CCAGS) assistance. Although planting objectives include timber production, positive landscape impact and shelter, it is unlikely that significant quantities of good quality timber will be harvested but resulting tree growth may be suitable for chipping for wood fuel.

Summary	Stornoway Trust Woodland - 800 tonnes p/a 'fresh' wood	Untreated wood
	Aline Community Woodland - 330 tonnes p/a 'fresh' wood (proposed)	Untreated wood

Landfill Records on the Quantity and Quality of Waste Wood Disposed of in the Western Isles

A SEPA Waste Management License is required by any business involved in the collection, recycling or disposal of waste materials. There are two landfill sites in the Western Isles licensed to take waste wood. Both of the sites are operated by the Local Authority (CnES) and accept a wide range of waste materials from household, commercial and industrial sources. Sites are located at:

- Bennedrove Landfill site, Marybank, Isle of Lewis
- Rueval Landfill Site, Isle of Benbecula

Three private companies are licensed with SEPA to collect waste wood for recycling. These companies are:

- Highland Metal Recycling, Bennadrove Road, Marybank, Isle of Lewis
- Askernish Quarry, Lochboisdale, Isle of South Uist
- MacInnes Brothers, Uachdar, Isle of Benbecula

Highland Metal Recycling hopes to have a pilot scheme for collection of waste wood for recycling operational before the end of 2005. Waste wood needs to be free from other waste materials such as metal strapping, nails and fixings and from plasterboard. The collection is likely to be offered in a limited area of Lewis and Harris and possibly initially only in the Stornoway area.

A further three companies have applications pending for SEPA licenses to recycle waste wood:

- Griminish Quarry, Lochmaddy, Isle of North Uist
- Garrygall Quarry, Castlebay, Isle of Barra
- Peter Nicholson, 183 Balnabodach, Isle of Barra

Information on quantities of waste wood disposed of in licensed landfill sites was requested from the site managers at both Bennadrove and Rueval through the CnES Senior Recycling Officer, David Macleod.

CnES are required to provide information to SEPA annually, as part of the national 'Local Authority Waste Arisings Survey'. The regional data relates to the waste arisings and the recycling, composting and disposal of all waste collected by or on behalf of CNES during each financial year (April to March). However, this information does not require a detailed breakdown of waste material categories and significant degree of estimation is necessary to gain any idea of the quantities of material involved.

No factual data is available on the volume of each class of waste wood disposed of to landfill, as much of the material arriving on site is not separated from other waste. It is estimated by CnES that currently, most of the clean wood capable of separation is in the form of single use pallets, primarily used in the Western Isles fish farming industry. These are made from untreated white

(soft) wood and cannot be reused by the farming companies because of the importance of protecting fish biosecurity.

The most significant volumes of waste wood taken to landfill to the Bennadrove site are from the Fjord Seafood Scotland Farming Ltd (formerly WISCO) and at Rueval in Benbecula, from Stolt Seafarm Ltd and Marine Harvest Scotland Ltd (formerly Marine Harvest McConnel) fish farming companies.

Although the current volumes are significant, changes to working practices such as direct bulk feed deliveries by boat or land haulage using plastic sacks containing one tonne of feed are likely to bring to an end the use of wood pallets as the main transport system for fish feed.

Quantity of waste wood to Landfill (Annual)

Site	Information available	Estimate of total annual quantity of waste wood to landfill
Bennadrove	113 tonnes of processed timber and waste wood between 1/4/04 and 31/12/04 <ul style="list-style-type: none"> ▪ includes grass cuttings, branches and some paper, but all pallets ▪ excludes unsorted timber, demolition waste etc. 	170 tonnes
Rueval	25 tonnes per year - site managers estimate of total quantity of waste wood received	25 tonnes
Total		195 tonnes

Source: Comhairle nan Eilean Siar (January 2005)

It cannot be assumed that records of waste wood disposed of to landfill is an accurate representation of the potential amount of material which may be available for a wood fuel project. There is a clear discrepancy between the estimated amount of waste wood produced in the Western Isles (see results of the survey undertaken as part of this report) and the quantity recorded as received at the two local authority landfill sites. The survey of major waste wood producers undertaken as part of this report shows that wood is recycled or disposed of in a number of alternative ways to landfill.

Alternative disposal methods

Producers of waste wood reported a number of alternative methods of recycling and disposal of clean wood. The advantage to commercial businesses of recycling the waste is that the quantity and associated cost of disposing to landfill was reduced. Alternative uses are generally driven by demand and incur little or no costs to the company generating the waste.

Domestic use in wood burning stoves

A number of building and joinery firms reported that members of their staff used waste wood for fuel in their domestic boilers and stoves. This practice encourages separation of waste wood from other material and often leaves the company with very little or no waste product to dispose of.

Crofting, agriculture and animal penning

There is an on-going demand from crofters and other land managers for waste wood in useful lengths to be used for fencing, in small scale building projects and for rural structures like bridges and access tracks. This method is a much more significant alternative to landfill in the Western Isles, where over 25% of the population are land managers or are crofting tenants, compared to the UK average of 2% involved in land management.

Pallets and pallet wood is in demand for a number of uses including:

- Compost bin construction
- Animal penning
- Fencing and windbreak around gardens and vegetable plots
- Agricultural fencing repairs
- Quad bike access tracks on boggy terrain

In the vast majority of cases, waste wood for these uses is collected by crofters, saving the company both haulage and landfill charges.

Community use

Many of the construction companies reported at least two months of waste wood production (over 15% of the annual amount) was taken by members of the public for local bonfires during the month of October.

Recycling 'in-house'

One major construction company has purchased a purpose built wood crusher. This machine pulverises the waste wood and reconstitutes into products to be used as pegs and packers. Not only does this alternative save the cost of waste disposal to landfill, it also saves on consumable material purchase costs.

The Stornoway Trust processes much of its forestry arisings and felled or windblown timber through an industrial chipper, creating a material which can be used for a range of uses including garden landscaping, creating access paths and as a horticultural mulching material.

Dumping

Although the dumping of waste is illegal, there is a significant amount of dumping of waste materials in the Western Isles. Fly tipping is most commonly seen along the shoreline and on moorland accessible by hard tracks leading to traditional peat cutting areas.

The problem has eased considerably in recent years, following the introduction of community skips by the Local Authority. Each parish has a number of skip locations and skips are uplifted free of charge to the communities they serve.

It is clear that some construction firms use the community skips to dispose of waste material and it is common to see between 10% and 20% of skip contents as waste wood from demolition, fencing or building projects. This waste wood takes a number of forms but includes;

- Old fence posts and other treated fencing timber
- Timber sheeting (used plywood, MDF and hardboard and off-cuts from new sheets)
- Timber off-cuts
- Wall strapping (often attached to plasterboard)
- Garden waste - tree and shrub cuttings

Suitability of Waste Wood as Fuel (recycling by thermal conversion)

The UK is around 20% self sufficient in timber, with the balance imported from a number of countries including Scandinavia and the United States. There is therefore considerable scope for recycling of at least some of the waste wood to make cheaper wood products such as MDF board.

It is estimated that each year up to 750,000 tonnes of waste wood is generated by the construction and demolition industries and 600,000 tonnes from wood packaging (including crates and pallets). A further 420,000 tonnes of waste wood is produced by UK households, representing around 5% of the domestic waste total.

The Western Isles produces very little home grown timber and is noted for the largely 'tree-less' landscape. The exposed location of most land available for planting and a combination of high rainfall and windy climate severely restrict the potential to grow timber of any real value to the construction industry. The only real exception to this is the Stornoway Trust woodland in the town of Stornoway which features trees species imported from around the world, many of which have thrived in the sheltered location.

The poor land quality of the majority of the island (MLURI land classification 63 - land suitable only as rough grazing) adds further disadvantage to any attempts at commercial timber production. Traditional timber crops grown in the islands have been limited to willow production for crofting and fishing use. Very little timber has been grown for use as heating fuel, with the ready supply of peat preferred because of the quantities easily accessible in all areas of the islands.

The recently developed Western Isles Woodland Strategy prioritises the objectives of new planting as landscape and environmental impact, rather than commercial forestry for timber production. Land managers are encouraged to plant small areas of riparian woodland for positive landscape impact, but many of the sites are not accessible or practical for timber production or extraction.

On the other hand, the island population are consumers of timber and as such generate significant quantities of waste wood. The island industries including fish farming, agriculture and the associated supply and service industries are significant consumers of timber for packaging, transport and fencing purposes and much of it could be available for recycling. Apart from the Stornoway urban area, the remainder of the Western Isles population is dispersed throughout the archipelago between the islands of Barra in the south and Lewis in the north. Much of the wood waste is similarly distributed, with agricultural and fish farming businesses located in some of the most remote parts of the islands.

The Scottish Climate Change Programme developed in 2000, in response to EU support of the Kyoto Protocol set targets for the reduction in emissions of six 'greenhouse' gases. A strategy consisting of a combination of development initiatives and financial penalties through taxation. The Landfill Directive and National Waste Strategy are the main policy drivers in Scotland, encouraging businesses to generate less waste by a combination of increasing the financial burden associated with waste disposal and the use of waste efficient business systems.

The '*polluter pays*' principle has resulted in the direct taxation of waste disposed of to landfill and increased financial commitments on business to licence and monitor waste management systems.

Each tonne of waste material to landfill is taxed under the Landfill Tax at the rate of £18 per tonne. This tax will rise by a further £3 per tonne per year in the coming years up to a maximum of £35 per tonne.

Legal Constraints

The process of converting waste wood to either heat energy or power generation is controlled by legislation, overseen in Scotland by SEPA. The National Waste Strategy: Scotland, produced in 1999 sets out the context in which the treatment including the '*thermal treatment*' of municipal waste can take place. An Area Waste Plan (AWP) for the Western Isles is charged with the responsibility to ensure the practical delivery of the National Strategy at local level.

A key theme of the National Waste Strategy is the reduction in the non-sustainable practice of disposal of waste to landfill. The strategy suggests control measures at each step in the '*waste production*' process, but requires any waste minimisation treatment or conversion process to deliver the highest efficiency and use Best Available Techniques (BAT)

Pollution Prevention and Control (Scotland) Act 1999 and PPC Regulations 2000

Any proposed waste treatment plants, including those burning waste wood for energy or power, are required to obtain a permit before they can operate. The permit will only be issued if the process fits in with the aims of the National Waste Strategy and the Area Waste Plan and delivers net benefits in waste control. New processes are required to make the best use of new technologies and demonstrate that they are a key element of an integrated strategy to manage the waste.

PPC regulations ensure that the treatment produces no secondary waste or, where it does, that the waste is recovered or contained.

Waste Incineration Directive

This directive applies to new waste incineration installations from the date on which they start operating. In the case of the conversion of waste wood to heat energy or power, the waste materials or by-products of the process must be identified, monitored and controlled to the satisfaction of SEPA. In practice this will impact on the type of material which can be burned in the incinerator and different wood treatments will require appropriate control strategies.

Licensing of processes to burn '*clean*' or untreated waste wood and timber

Clean or untreated wood will be exempt from the Waste Incineration Directive requirements, but will require a permit under the PPC regulation. However, if the capacity of the burner is less than 0.4 megawatts net rated thermal input, the process will be exempt from the requirement to hold a waste management licence and will instead only need to register with SEPA as an exempt activity. The cost of application to SEPA for a licence to operate an incinerator for clean waste wood under the Pollution Prevention and Control Regulations is:

Application fee	£2,000
Annual fee	£1,000 - £3,500

Licensing of processes to burn treated waste wood

A permit will also be required before treated wood can be incinerated and the Waste Incineration Directive will apply, regardless of the capacity of the burner.

The cost of obtaining a permit to incinerate treated waste wood is estimated by SEPA as follows:

Application fee	£3,700
Annual fee	£1,000 - £5,000
Monitoring emissions	£ unspecified

A serious concern when planning to burn treated wood is the unknown cost of satisfying SEPA of satisfactory control of the substances discharged into the air from the combustion process. This will involve monitoring of the emissions from the burner and installing appropriate filtration systems to scrub out polluting materials such as the heavy metals and organic compounds which are constituents of many wood preservatives. A further complication is the variation in materials used to treat timber. These can range from surface paints, to pressure treatment with preservatives using a wide range of chemical processes.

Trends of Supply Which Will Affect the Availability of Waste Wood Medium and Long Term

Treated wood

Construction and demolition timber is a large potential contributor of waste wood in the Western Isles. Comhairle nan Eilean Siar are currently delivering a policy to remove derelict buildings, viewed as eyesores in rural communities. It is anticipated that this work will continue at the current rate in the foreseeable future. However, the severe storms of January 2005 have resulted in a short-term increase in production of demolition timber waste, particularly in Uist and Barra.

The rate of new home construction is expected to be maintained or to increase in the coming five years. It can be assumed that availability of waste wood from construction and demolition will be maintained in the medium term.

Changes to crofting grants supporting the replacement of end of life stock fencing are due to take effect in September of 2005. The new arrangements will require applicants to gain prior approval from SEERAD for any proposed replacement fencing. The criteria for grant eligible fencing will also change and routine replacement of old fencing will not automatically be approved. The net effect of these changes to support mechanisms, will be to reduce the amount of fencing replaced annually.

Re-usable pallets, packaging and crating are treated with wood preservatives to prolong the life of the products. The use of a '*fine*' of between £10 and £20 for pallets not returned to suppliers will encourage recycling and it is unlikely that the availability of these sources of treated waste wood will change in the short term. However, many of the suppliers who use treated pallets are large businesses and as such are most likely to be responsive to the Packaging Directive and move to longer life handling systems for goods such as metal structures or bulk plastic bags.

Clean (untreated) wood

Potential supplies of '*fresh*' waste wood from the Stornoway Trust Woodland and from Aline Community Woodland are likely to be maintained at similar levels in the short to medium term future (3-5 years).

The supplies of waste wood from the Stornoway Trust Woodland are then anticipated to continue in the long term, but at a lower rate (up to 500 tonnes per year). The long term supplies of waste wood from ex-forestry commission woodlands such as Aline Forest are less able to be guaranteed, as after the initial development has taken place, the amount of waste wood is likely to fall.

Supplies of white wood pallets from fish farms, agricultural and builders merchants, retail multiples is anticipated to fall dramatically in the medium term. A significant move from single use pallets to bulk deliveries using 1 tonne plastic bags has already been observed in the fish farming industry. Many of the fish farming businesses contacted during the course of this study anticipated a continuing trend away from the use of pallets to alternative transport methods such as bulk deliveries direct to the fish farms by boat.

Multiple retailers, agricultural and building suppliers are rapidly moving to the use of returnable pallets or new materials such as compressed cardboard (100% recycled), thus reducing the quantity of waste packaging material produced by the business.

Recommendations on How to Increase the Amount of Waste Wood Recycled

The survey of waste wood producers carried out as part of this study gathered information on the attitude of businesses toward potential wood recycling initiatives. Most of those contacted were supportive of any initiative to recycle or re-use waste wood, as it would solve a potentially expensive problem for each business (the cost of landfill tax and waste disposal charges) and would help meet business recycling targets.

However, it should be noted that many of the smaller businesses had already found low cost solutions for disposing of waste wood through local 'recycling' use as a domestic heating fuel or in the case of pallets, for a wide range of agricultural and crofting uses. A good example of this practice involves a local retailer producing wood waste of 20 single use pallets per week. This currently amounts to 350 kg per week (assuming that each pallet weighs 17.5 kg) or 18.2 tonnes of clean waste wood per year. However, the waste is completely removed by individual customers for recycling, prompted by an occasional in-store advert offering the pallets for free collection.

Such solutions significantly reduce the tonnage of waste wood taken to landfill and do not, therefore, attract Landfill Tax or waste disposal charges. Had the business in this example disposed of 18.2 tonnes of waste wood to landfill after 1st April 2005, the annual cost of disposal would have been £327.60 in Landfill Tax plus a further £445.90 in Local Authority disposal charges (total of £773.50) if the waste was delivered to the landfill site, or £937.30 (total of £1,264.90) if the waste was uplifted from the business in Stornoway.

A collection service, for example, would therefore need to be free of charge or available at a low cost, to provide an attractive alternative to current waste disposal practices for most small businesses in the Western Isles. Most wood fuel recycling projects purchase waste wood from businesses either directly, or from a service company, which collect, process and deliver waste wood suitable for fuel. The cost of wood fuel to the end user is around £40/tonne and an element of this value can be passed on to the company producing the waste as an incentive to maintain supply. The actual amount paid for waste wood will depend on the economic efficiency of the collection, processing and delivery service, but be in the order of 50% of its marketplace value. Further incentives to encourage the recycling of waste wood include Packaging Renewable Notes, which trade around £5/tonne.

Businesses in the Western Isles were generally prepared to sort wood waste from other wastes, although those involved in demolition would be unable to remove all of the wood from the waste stream and could not ensure that all of the material was free from fixings and strapping materials.

Many companies have the capacity for modest storage of waste wood and would be able to make it available for collection for recycling purposes. This element is important, as wood which becomes wet (quite likely in the Western Isles) is expensive to dry again.

There are now six businesses licensed or in the process of becoming licensed by SEPA to handle waste wood for recycling in the Western Isles. These companies will represent a comprehensive geographic spread covering all of the Western Isles:

Isle of Barra	2 businesses licensed to recycle waste wood
Isle of South Uist	1 business licensed to recycle waste wood
Isle of Benbecula	1 business licensed to recycle waste wood
Isle of North Uist	1 business licensed to recycle waste wood
Isle of Lewis	1 business licensed to recycle waste wood

The availability of an effective collection, processing, storage and delivery service will be critical to the success of any waste wood energy project. It can work using a range of operating models, from a full commercial service offered by one of the foregoing licensed waste wood recycling agents to a community collection scheme, where wood is collected by or delivered to the end user without the need of a service contractor.

Supplies of waste wood need to be reliable and of consistent quality. The simplest supply system model and the one with the best chance of ensuring a reliable supply of waste wood will involve a commercial operator offering a full service or delivering a full service in partnership with the Local Authority.

Waste wood processing equipment can be expensive and have a moderately high economic operating threshold, so in the context of the Western Isles it would be sensible to use existing wood chipping or crushing equipment in the initial stages of a new project. A wood crusher has recently been purchased and is located at the Bennadrove landfill site. The machine also has some capacity to remove metal fragments including nails and pallet ties.

A skip based collection service would also be required, covered storage for processed wood and a delivery system appropriate to the burner system and fuel hopper arrangement would also need to be designed.

Estimate of Waste Wood in Economic Terms in the Western Isles

The economic case for recycling waste wood for fuel is based on cost savings (waste disposal and landfill tax) plus a marketplace value as a heating fuel.

Costs per tonne for waste disposal to landfill

If waste wood is not recycled but instead disposed of at a Local Authority landfill site, each business will pay a combination of charges including Landfill Tax at the standard rate, a waste disposal charge per tonne plus associated transport and on site storage costs. From 1 April 2005, the Standard Rate of Landfill Tax applicable on waste wood is £18 per tonne.

The CnES website lists the additional charge for standard waste delivered to landfill sites as £24.50 per tonne. Further charges for provision of a skip are £10 for skip delivery, a standing charge of £5 per week and £27 for skip uplift (Stornoway location assumed).

A business in Stornoway producing 0.5 tonnes of waste wood per week, stored in a Local Authority skip, collected fortnightly will therefore pay up to £89 per tonne or if collected after six weeks (when the skip is full) the charge will fall to £64.83 per tonne.

Businesses located out-with Stornoway pay an additional haulage cost of £24.14 per hour travelling time. Therefore, a business located in Tarbert will pay an extra £48.28 per skip uplift, raising the cost for waste disposal to between £80.92 and £137.28 per tonne using the above calculation.

However, it must be remembered that most producers of waste wood in the Western Isles operate on a relatively small scale and many currently have in place local arrangements to recycle waste wood at little or no cost to the business.

The economic value as wood fuel

The Net Heating Value of wood fuel depends on a number of factors including:

Moisture content - fresh wood and wet wood waste can have a moisture content as high as 60%, or when dried, a content as low as 25%. By-products of the wood milling industry can have a moisture content of down to 10% when stored in dry conditions. High moisture content has the effect of reducing the energy yield of wood fuel due to the additional energy required to vaporise the moisture and the loss of energy from steam vented from the process (unless recovered separately)

Presentation of the wood fuel - the particle size of the wood fuel can influence burning efficiency. The wood burning system must be designed to cope with material of a specified size, otherwise burning efficiency will be affected. Larger chips or logs generally have a longer burn time due to the density of the fuel in the log or chip but are less efficient at energy production because of the loss of energy during transfer from wood fuel to heat. Smaller presentation of wood material such as shavings or wood dust can be burned efficiently in suspension or in well designed auto feed burners because of the air/fuel mix. The design of burner feeding mechanisms is critical to the burner efficiency and must be designed with a standard size of wood fuel in mind.

Degree of contamination - dirt contamination can reduce the burning efficiency of wood fuel due to its physical presence (it does not itself burn) and the build up of ash in the burner, which can further reduce efficiency. Sawmill and forestry by-products can be contaminated by soil and mud during extraction and storage.

:

For the purposes of the calculation of the economic value of wood fuel, the following assumptions have been made:

- Material has an average moisture content of 20%
- Material is chipped before burning
- Wood fuel is clean (<2% dirt)
- Wood fuel has a Net Heating Value of 12.1MJ/kg (fresh material)

Summary of current estimated quantities of waste wood in the Western Isles (by region)

Source	Lewis & Harris (tonnes/annum)		Uists & Barra (tonnes/annum)	
	Treated	Untreated	Treated	Untreated
Fencing	262.5	-	87.5	-
Kit houses	80.32	34.43	26.77	11.48
Demolition waste	600.00		600.00	
Pallets	22.6	90.4	1.75	7.0
Miscellaneous	13.5	13.5	6.5	6.5
Stornoway Trust		800.0		
Total (best current information)	978.92	938.33	722.52	24.98
<i>Aline Forest*</i>		<i>300.0*</i>		
Total Including Aline Forest	978.92	1238.33		

** Proposal only at this stage*

- 747.5 tonnes of waste wood (recycled timber) at a moisture content of 20% is available in Uist and Barra.
- 1117.25 tonnes of waste wood (recycled timber) at a moisture content of 20% is available in Lewis and Harris.
- 800 tonnes of virgin waste wood (forestry and sawmill by-products) at a moisture content of 40% is available in Lewis and Harris

Location	Wood Type	Quantity and moisture content assumed	Total MJ of Usable Net Heat Energy	kW of energy
Benbecula (Collected from Uist and Barra)	Clean waste wood	24,980 kg @ 20%	302,258	83,967
<i>Benbecula (Collected from Uist and Barra)</i>	<i>Treated waste wood</i>	<i>722,520 kg @ 20%</i>	<i>8,742,492</i>	<i>2,428,664</i>
Stornoway (Collected from Lewis and Harris)	Clean waste wood	138,330 kg @ 20%	1,673,793	464,979
<i>Stornoway (Collected from Lewis and Harris)</i>	<i>Treated waste wood</i>	<i>978,920 kg @ 20%</i>	<i>11,844,932</i>	<i>3,290,522</i>
Stornoway (Collected from Lewis and Harris)	Forestry and sawmill arisings (air dried)	800,000 kg @ 35%	7,200,000	2,000,016
Western Isles Total				8,268,148

Using the above data, 8,268,148 kW of energy generated from waste wood in the Western Isles has a value of £271,256 per annum based on comparison to current heating oil costs of around 32 pence per litre. However, the case for using waste wood fuel is that it offers potentially lower fuel costs than coal, oil or gas, so the market value in real terms would be between 50% and 60% of the above cost (£149,190 per annum).

Conclusions

There are significant quantities of waste wood produced in the Western Isles. Because of the nature of the businesses producing the waste wood the distribution of the supply is wide and fragmented. Costs of a comprehensive collection service, covering all areas and all producers of waste wood would be expensive, given the geography of the Western Isles. The range of wood waste varies greatly in quality and type.

The vast majority of waste wood is produced from the construction trade and is mainly in the form of demolition timber. Because there is currently little incentive to do so, demolition timber is not usually separated out before disposal to landfill. This makes the job of quantifying amounts of waste wood currently disposed of at the two licensed landfill sites in the Western Isles very difficult and open to a wide range of estimation.

Research carried out on the major waste wood producers shows that 90% of construction waste is treated by some form of preservative or surface treatment (paint, stain or covering).

Quantities of clean waste wood generated from commercial businesses are small and most have found local recycling solutions as an alternative to disposing of the waste to landfill sites. The cost of collecting small amounts of clean wood from a large number of dispersed locations, processing, storage and then subsequent delivery costs could make the use of waste wood fuel economically unviable. The alternatives could include a number of smaller scale wood fuel projects or a collection service offered only within a limited area.

To ensure the continuity of supply on projected levels would require the businesses to make waste wood available to any wood fuel project as a first choice for recycling. Encouragement could be given by SEPA to use a wood fuel collection service as the most appropriate recycling method.

Large quantities of fallen timber will be available in the medium term in the Stornoway Trust Woodland, following the storms of January 2005. Further quantities are produced annually as by-products of woodland maintenance and sawmill operations. Further fallen or standing timber may be available from Forestry Commission forests at Aline and Achmore, but extraction and transport costs may prohibit the full potential yield being realised. The potential quantity of clean wood produced from forest sources is considerable when compared to *'industrial'* waste wood currently available in the Western Isles. Given the community nature of the Stornoway Trust and its scale of operation and resources, the organisation has an important role to play in sustaining a wood fuel project in the Western Isles.

The cost of using treated waste wood can only be estimated because of the unknown cost involved in monitoring, identifying and controlling harmful emissions arising from the combustion of chemicals involved in the wood treatment process. This additional cost will drive the scale of the wood fuel project higher, with higher associated project risk. The risk is further increased by the range of treatments and treated waste wood products available for recycling in the islands. Many comparative wood fuel projects have identified a straightforward and reliable single wood fuel source and this has been noted as a project strength.

The most practical method of making waste wood available to potential users is likely to involve the creation of a new service to collect, process, store and deliver wood fuel according to demand. There are currently two licensed landfill sites, three businesses licensed to recycle wood and a further three applications to SEPA for licenses to recycle wood in the Western Isles. One of these licensed businesses has indicated an interest in setting up a skip based collection service for waste wood, although this may be offered only on a limited geographic area initially (Stornoway area).

Recommendations

Given the quantity and location of waste wood in the Western Isles, a careful approach to development of a wood fuel project is required. A phased approach to development is recommended involving supply agreements, arrangement with a licensed contractor to provide collection, processing, storage and delivery services and identifying a wood fuel user. This would involve setting up a '*bullet proof*' pilot project, where success can be ensured by removing as many risks as possible.

A pilot project in the Stornoway area will be the most realistic, but other smaller scale projects can be run using the same project blueprint, providing sufficient wood fuel supply is available. The Stornoway based project should involve the Stornoway Trust, because of the guaranteed back up of large amounts of fresh timber and windblown trees and branches (800t/annum) over a five-year period and the on-going supply thereafter of at least 200t/annum.

It is further recommended that only clean wood (untreated with surface or deep preservatives) should be used in the pilot project, as the scale of any initial development will be unable to carry the burden of higher cost associated with licensing incineration of treated material.

Supply

Information obtained from firms producing waste wood is rather vague and data collected contains a significant margin of error. Initially, an agreement to supply all of waste wood produced in the business should be drawn up with a small number of reliable participant companies. These may include: Lewis Crofters, up to 10 building firms, a multiple retailer and a haulier or civil engineering company. A critical part of the success of the project will be a guaranteed supply of waste wood.

Co-ordination of processing and delivery

An existing, licensed recycling business has demonstrated an interest in participating in the collection of waste wood for recycling. It will be important that a complete service is offered including:

- Regular collection/uplift of waste wood
- Dry storage of timber before processing
- Overseeing processing into appropriate sized chips
- Dry storage of bulk or bagged wood chips
- Delivery to wood fuel boiler and offloading into hopper or on site storage system

The most efficient collection mechanism is likely to be using skips and these can be dropped off for immediate filling and collection or can remain with the donor business over a number of weeks to be filled. The exact method agreed will depend on skip resources and associated costs.

It will make commercial sense to use existing chipping or crushing facilities. A wood crushing and chipping machine is owned by CnES and operates at the landfill site at Bennadrove and the processing element of the project could perhaps be contracted out to CnES.

Wood fuel heating system

The projected quantity of clean waste wood in the Stornoway area would comfortably be capable of supplying a 150 kW burner. This size of boiler, installed in an insulated and draught-proofed building will be capable of heating an area of up to 5000 cubic metres. This size of burner has been

successfully used to heat a small leisure centre in one development project (Averon Leisure Centre, Alness) and community centres, interpretation centres and business parks in other projects.

In the context of the Western Isles, potential applications could include the proposed interpretation centre in the Stornoway Trust Woodland, existing or new developments at Lews Castle College, piggy back heating system at the new Stornoway Leisure centre or the proposed Rural Centre at Steinish Auction Mart.

It is important that a secondary (back up) alternative heating system is installed in the building to be heated as several previous projects have experienced teething problems with supply, equipment and breakdowns. Wood fuel heating systems can successfully be installed either in new build projects, where the design of the building can incorporate the requirements of the boiler, or in existing buildings.

Consideration should be given to choosing a building where access to the maximum financial support is available. This may include a public building or a community project. An advertisement for interested participants could be used to connect with appropriate groups or organisations.

Appendix 1

WASTE WOOD SURVEY

BUSINESS _____

LOCATION _____

Current position

**Sources of waste wood
(e.g. pallets, arisings, demolition waste)**

Clean

Treated

Quantity of waste wood per annum (figures)

Current method of disposal - where

Collected or delivered

Cost of disposal

Is any of the waste wood recycled?

Trends (quantity and type)

Trend over the past 5 years

Predictions on quantity in the future 10 years - increase or decrease

Are there any seasonal peaks or troughs in supply?

Separation

Do you currently separate out waste wood from other waste products?

How easy is it to separate out waste wood?

Are you willing/able to separate out waste wood in future?

Suggestions and other information

How would you like to see waste wood being disposed of?

Appendix 2

Target Businesses and businesses surveyed

Business Name	Location	Area	Contacted
Builders/civil engineers			
• Small businesses (< 10 employees)			
A.J. Beaton	Eochar	Isle of South Uist	
A.J. Martin	Back	Isle of Lewis	Y
Angus MacDonald	Leurbost	Isle of Lewis	
Angus MacDonald	Breasclete	Isle of Lewis	
Angus Morrison & Son	Lochmaddy	Isle of North Uist	
Angus Morrison Builder & Joiner	Griminish	Isle of Benbecula	
Archie MacDonald	Torlum	Isle of Benbecula	
A. Smith	Ness	Isle of Lewis	
D. Campbell	Bragar	Isle of Lewis	
D.J. Maclean	Point	Isle of Lewis	
DM MacPhee	Nunton	Isle of Benbecula	
Donald MacSween Builder & Joiner	Stornoway	Isle of Lewis	Y
Donald MacNeil	Glen	Isle of Barra	
J. MacLennan	Stornoway	Isle of Lewis	
J. MacLeod	Balallan	Isle of Lewis	
J. MacLennan	Lochboisdale	Isle of South Uist	
MacLennan	Garynahine	Isle of Lewis	Y
J. MacLeod	Ness	Isle of Lewis	
Ian MacKenzie	Sandwick	Isle of Lewis	

John Angus MacDonald	Lochmaddy	Isle of North Uist	
John MacIver Joiner	Carloway	Isle of Lewis	
John MacLeod	Stornoway	Isle of Lewis	
M.G. MacLeod	Coll	Isle of Lewis	
Malcolm MacArthur	Carloway	Isle of Lewis	
Malcolm MacKay	Callanish	Isle of Lewis	Y
N Maciver	Carloway	Isle of Lewis	
Norman Maciver	Breasclete	Isle of Lewis	
R Finlayson	Newmarket	Isle of Lewis	
R.I. Campbell	Tolsta	Isle of Lewis	
Robert MacInnes Builders	Holm	Isle of Lewis	
Roderick MacDonald	Lochmaddy	Isle of North Uist	
Rosie's Builders	Point	Isle of Lewis	Y
Sound Construction	Leverburgh	Isle of Harris	
Stornoway Building Services	Stornoway	Isle of Lewis	
West Coast Builders	Point	Isle of Lewis	
William MacKenzie Contractors Ltd	Lochs	Isle of Lewis	Y
• Medium businesses (11-20 employees)			
A&A Martin	Stornoway	Isle of Lewis	
ADM Construction	Newmarket	Isle of Lewis	Y
Angus MacIver	Stornoway	Isle of Lewis	
Angus MacKay & Son	Coll	Isle of Lewis	
Hebridean Construction	Sandwick	Isle of Lewis	
IA & C Maciver	Stornoway	Isle of Lewis	Y
John MacDonald	Lochboisdale	Isle of South Uist	
John MacKay & Sons	Horgabost	Isle of Harris	
John MacLennan	Castlebay	Isle of Barra	

M.J. MacArthur	Stornoway	Isle of Lewis	
MacAulay Askernish Ltd	Lochboisdale	Isle of South Uist	
MacLain Ltd	Sollas	Isle of North Uist	
MacLeod & Buchannan	Stornoway	Isle of Lewis	
MacPhail Haulage & Plant Hire	Lochmaddy	Isle of North Uist	
Malcolm Smith Plant Hire	Stornoway	Isle of Lewis	
Neil MacKay & Co	Point	Isle of Lewis	
Nicholson Builders	Castlebay	Isle of Barra	Y
RDM Construction Ltd	Linshader	Isle of Lewis	Y
• Large businesses (20+ employees)			
Alex Murray Construction	Stornoway	Isle of Lewis	Y
Angus MacDonald Plant Hire	Stornoway	Isle of Lewis	Y
Calmax Construction	Newmarket	Isle of Lewis	Y
D&M Smith Construction	Stornoway	Isle of Lewis	
D MacDonald	Balivanich	Isle of Benbecula	
Donald MacFarlene	Stornoway	Isle of Lewis	
Duncan MacKay Ltd	Stornoway	Isle of Lewis	
John Murray & Co	Stornoway	Isle of Lewis	Y
Lewis Builders Ltd	Stornoway	Isle of Lewis	Y
MacInnes Bros Ltd	Uachdar	Isle of Benbecula	
MacKinnon plant hire	Stornoway	Isle of Lewis	Y
Maclean & Skinner	Uachdar	Isle of Benbecula	
McDowell Contractors Ltd	Stornoway	Isle of Lewis	Y
Uist Builders	Lochboisdale	Isle of South Uist	Y

Fish Farms			
Fjord Seafood Scotland Farming Ltd			Y
Hebridean Seafoods			Y
Marine Harvest (Scotland) Ltd			Y
North Uist Fisheries Ltd			Y
Smolts S&S Ltd			
Stolts Sea Farm Ltd			Y
West Minch Salmon			Y
Agricultural Merchants			
Lewis Crofters Ltd	Stornoway	Isle of Lewis	Y
Carnan Stores	Lochboisdale	Isle of South Uist	
Miscellaneous (including forestry, woodland, retail)			
Stornoway Trust			Y
Erisort Trust			Y
Forestry Commission			Y
Coop store			Y
Somerfield store			Y
MacLennans supermarket	Balivanich	Isle of Benbecula	Y
Highland Metals (MAKO)	Stornoway	Isle of Lewis	Y
Scotframe	Aberdeen		Y
Builders Merchants			
Caley Timber & Builders Supplies (Jewson)	Griminish	Isle of Benbecula	Y
Bain, Morrison & Co Ltd	Stornoway	Isle of Lewis	Y
Builders Centre	Stornoway	Isle of Lewis	Y

MacInnes Bros	Uachdar	Isle of Benbecula	Y
Hauliers			
Hebrides Haulage	Stornoway	Isle of Lewis	Y
MacAskill	Stornoway	Isle of Lewis	Y
Norman MacAskill	Lochboisdale	Isle of South Uist	Y
DR MacLeod	Stornoway	Isle of Lewis	Y
Woody's	Stornoway	Isle of Lewis	Y