Planning a Woodfuel Installation:
What do you Need to Know

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Heating with Woodfuel

-Highland Birchwoods

-Planning a Woodfuel Installation-
  What do you Need to Know

-Case Study

-Where to find more information
Heating with Woodfuel

Highland Birchwoods

- Formed in 1992 as a partnership between the Forestry Commission, Scottish Natural Heritage, the Highland Council and Highlands and Islands Enterprise
- Promote best practice in woodland and forest management to
  - improve conservation and biodiversity values
  - deliver sustainable rural development
  - enhance recreational, landscape and amenity facilities
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**Relative Densities**

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Bulk density</th>
<th>Energy density by volume</th>
<th>Volume per 25 mWh</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kg/m³</td>
<td>kWh/m³</td>
<td>(m³)</td>
</tr>
<tr>
<td>House coal</td>
<td>850</td>
<td>7200</td>
<td>3.47</td>
</tr>
<tr>
<td>Wood pellets</td>
<td>600-700</td>
<td>3250</td>
<td>7.69</td>
</tr>
<tr>
<td>Log wood (stacked - air dry: 20% MC)</td>
<td>350-500</td>
<td>1800</td>
<td>13.89</td>
</tr>
<tr>
<td>Wood chips (30% MC)</td>
<td>250</td>
<td>880</td>
<td>28.41</td>
</tr>
</tbody>
</table>

Adapted from [http://www.biomassenergycentre.org.uk/](http://www.biomassenergycentre.org.uk/)
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Types of woodfuel

Woodchip

-Produced from primary timber, forest co-products or recycled material

-Needs to be dried to specific moisture content

-Best used locally (high volume, low value product)
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• 30kw boiler uses about 18 tonnes woodchip/yr

• Average House (25 mWh) requires 7.5 tonnes

Or

• About 30 M3
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Types of woodfuel

**Woodchip**

- Generally suitable for small business scale and above
- 30 Kw boiler is about minimum output

- District Heating Schemes e.g. Glenshellach, Aviemore North
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Wood Storage

Wood Delivery

Automated Boiler ($\lambda$control, >80%, 1000º)

• Chimney Flue
• Ash
• Heat Delivery

1

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17
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**STORAGE**

- One of the biggest cause of problems
- No single solution

250kW @ 50% = 1-2 deliveries per week = 50m³ store

30kW@35% - 2m³ delivered per week – storage too small!!
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- Step grate machine.
  - Max moisture 50-55%

- Under fed hearth.
  - Max moisture 35%
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Fuel issues - woodchip
- Supplier nearby?
- Moisture content?
- What type of boiler could I run on this?
- Is it suitable for my property?
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What do you Need to Know

Suppliers

- Sawmills e.g. Raddery

- Estates e.g. Alvie

- Forest Managers e.g. DWP Harvesting and Marketing

- Specialist suppliers e.g. Woodtherm Fuels

Installers: list found on www.usewoodfuel.co.uk
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Woodchip – main issues

• Is a wood chip system suitable?
• Can I get it locally?
• Is the quality suitable?
• Volume or energy content?
• How is it delivered?
• Design of storage
Wood pellets

- Made from compressed sawdust/shavings
- Very high energy/volume ratio
- Manufactured to European standard
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What do you Need to Know

• 3 major producers in Highland and Grampian
• All with modern plant
• Capacity for c. 210 000 t
• Sufficient to heat 41000 houses
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What do you Need to Know

Wood pellet

-Suitable for domestic heating, and larger scales

-Boilers or stoves
Heating with woodfuel

Planning a Woodfuel Installation—What do you Need to Know

Wood Pellet

- Easy delivery and maintenance
- Storage requirement less than for chip
- Average house 5-8 tonnes/yr
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Heating with logs

- Traditional woodburning stove with back-boiler and accumulator tank
Heating with woodfuel

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- Automated log boiler and accumulator tank
Heating with woodfuel

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Considerations:

- Storage!

- Fuel source... be organised!

- Particularly suitable in combination with e.g. solar
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Three major factors to consider:

- What type of fuel is available to me?

- Are systems available that can run on this and are suitable for my property?

- What kind of storage can I have at my property?
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Storage:

- How will the fuel be delivered?

- Do I have enough space?

- Will this be economical??
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**Boiler sizing:**

- Heat demand?

- Heat storage e.g. accumulator?

- Dual system?
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• Moisture content of chips
• Size/shape of chips
• Fuel contamination
• Poor design: storage, delivery & boiler size
• Agitator and Augers
• Flue & Boiler Pipe work
• Poor Installation: Plumbing & Electrical
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What Do I Need To Think About?

You will need planning permission

- Visual Impact – storage and flue
- Location
- Proximity to Fuel, Transport, Grid
- Emissions & Clean Air Act
- Noise

- Recommend Early Dialogue
Case Studies: **Aviemore North**

**About The Project**

Albyn Housing Society Ltd last year completed the installation of a woodfuel district heating scheme which will provide heating and hot water for 130 homes in Aviemore.

- The plant is Albyn owned and
- controlled with the heat contract negotiated with Buccleuch Bio-energy Ltd.
- Financially sustainable business plan.
- 130 homes can be heated by the bio-mass district heating.
- The 130 homes heated by the scheme include 30 existing homes previously heated by oil.
- There are 3 boilers in place at the district heating plant. They are: 2 woodchip @ 400KW and 120KW respectively, and 1 oil backup at 540KW.
- The total cost of the project came to £1million.
- It is estimated that when the plant is utilised to its full potential it will use 1200 tonnes per annum woodchip (estimated).
- The Aviemore area has significant amounts of forest locally as well as large sawmills producing huge quantities of wood co-product.
Case Studies: **Aviemore North**

**Benefits of the Project**

- A Heat contract allowing inflation-only rises.
- Sold to 30 existing households previously heated by oil.
- Ecohomes accreditation. The use of a biomass heating plant has been one of the major contributors to Aviemore North becoming Ecohomes accredited.
- Renewed interest from wood chip suppliers.
- Profile of bio-mass has been raised.

**Review of Operation**

- The district heating plant in Aviemore North has been operational since October 2006.
- 71 homes now connected to boiler and 62 remaining to be completed.
- The billing is done on the basis of Domestic Credit Modules and meters in each house, credited by means of a smart card.
Case Studies: Aviemore North

Boilers and Chips

Step Grate System’. 450kW Kohblach boiler
Up to 60% mc

120kW Thermia boiler operates with an underfed grate, and as such it requires a higher grade of wood chip. These chips must be smaller and must not have a moisture less than 30%. Mc.
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Northern WoodHeat

- Encourage establishment of sustainable local woodfuel supply chains
- Use woodfuel production techniques that work with existing forest management goals
- Design training programmes and publicise benefits of woodfuel markets
Northern WoodHeat

- All have locally significant forest resources in peripheral areas with scattered small population centres.
- All have difficulty maintaining thinning programmes.
- Developing renewable energy technologies that combat greenhouse gas emissions.
- Varying stages of woodfuel development.
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Woodfuel production trials

- Harvesting, drying and chipping
  - Different sites
  - Different stakeholders

- Logistics and delivery
  - Different scales
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Environmental Implications

- Methods of low impact harvesting
- Minimising ground damage and nutrient removal
- Assessing biodiversity effects
- Monitoring of bird populations with BTO Scotland
- Enertree
- Modified for Scottish conditions to estimate impact of residue recovery
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Where Can I Find More Information? update

General woodfuel information

http://www.highlandbirchwoods.co.uk and http://www.northernwoodheat.net/
-Forestry Commission Scotland’s Wood Energy site www.usewoodfuel.co.uk
Boiler sizing guide http://www.dunsterwoodfuels.co.uk/images/boilersizewpdf.pdf List of suppliers and installers

Grant Aid
-Scottish Communities and Householders Renewables Initiative
http://www.energysavingtrust.org.uk/schri/
Updated list of accredited installers
http://www.greenbooklive.com/search/companysearch.jsp?sectionid=10037&partid=10013&companyName=&regionId=0&Submit=Search

Community Energy Scotland
www.communityenergyscotland.org.uk

-Ignite Training Course
Heating with woodfuel

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