# Planning a Woodfuel Installation:

# What do you Need to Know

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# Heating with Woodfuel

NORTHERN WOODHEAT

-**Highland Birchwoods**

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

-**Case Study**

-**Where to find more information**

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## 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

Forestry Commission Scotland

SCOTTISH NATURAL HERITAGE

The Highland Council
Comhairle na Gaidhealtachd
SERVING The Highland Community

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

## Relative Densities

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

Adapted from http://www.biomassenergycentre.org.uk/

achd

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

## 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)

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

- 30kw boiler uses about 18 tonnes woodchip/yr

- Average House (25 mWh) requires 7.5 tonnes

Or

- About 30 M3

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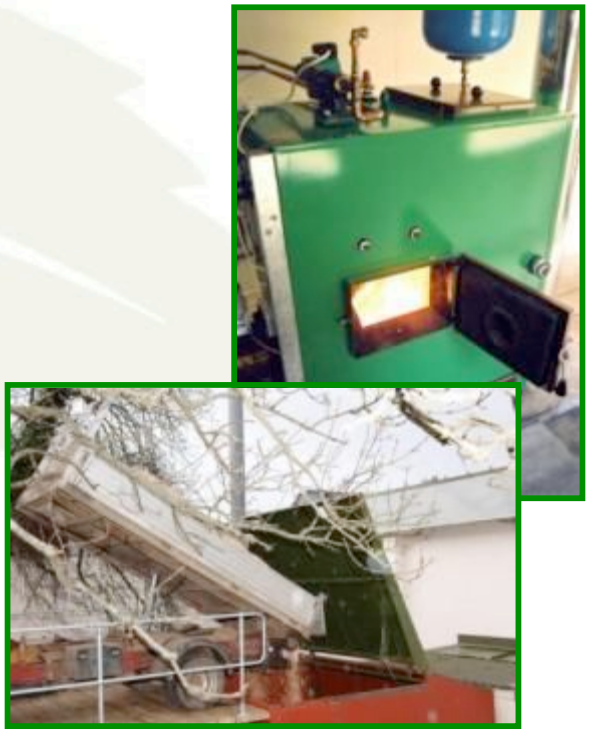
# Planning a Woodfuel Installation- What do you Need to Know

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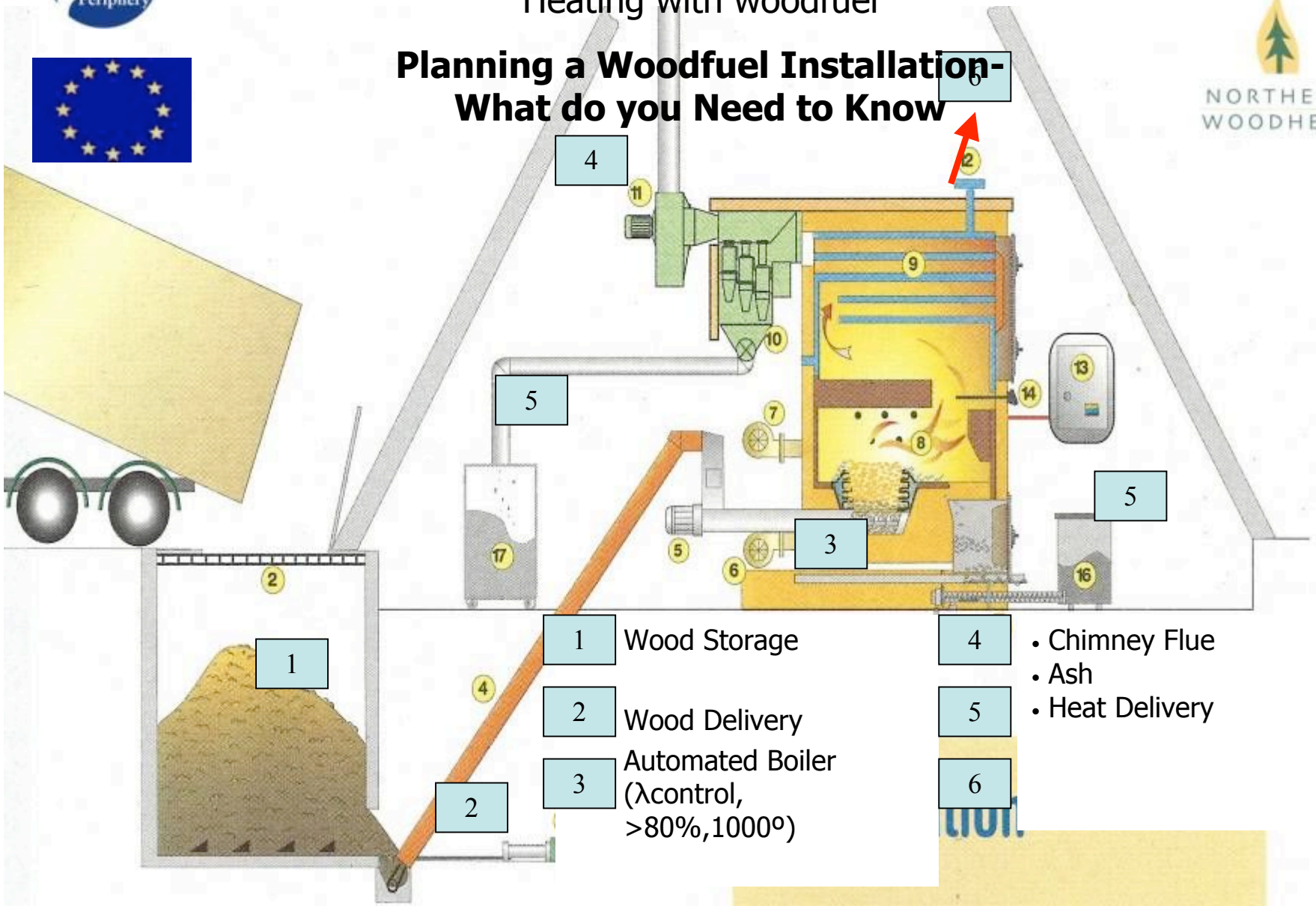
# Planning a Woodfuel Installation- What do you Need to Know




1 Wood Storage

2 Wood Delivery

3 Automated Boiler (λcontrol, >80%,1000º)

4
- Chimney Flue
- Ash

5
- Heat Delivery

6

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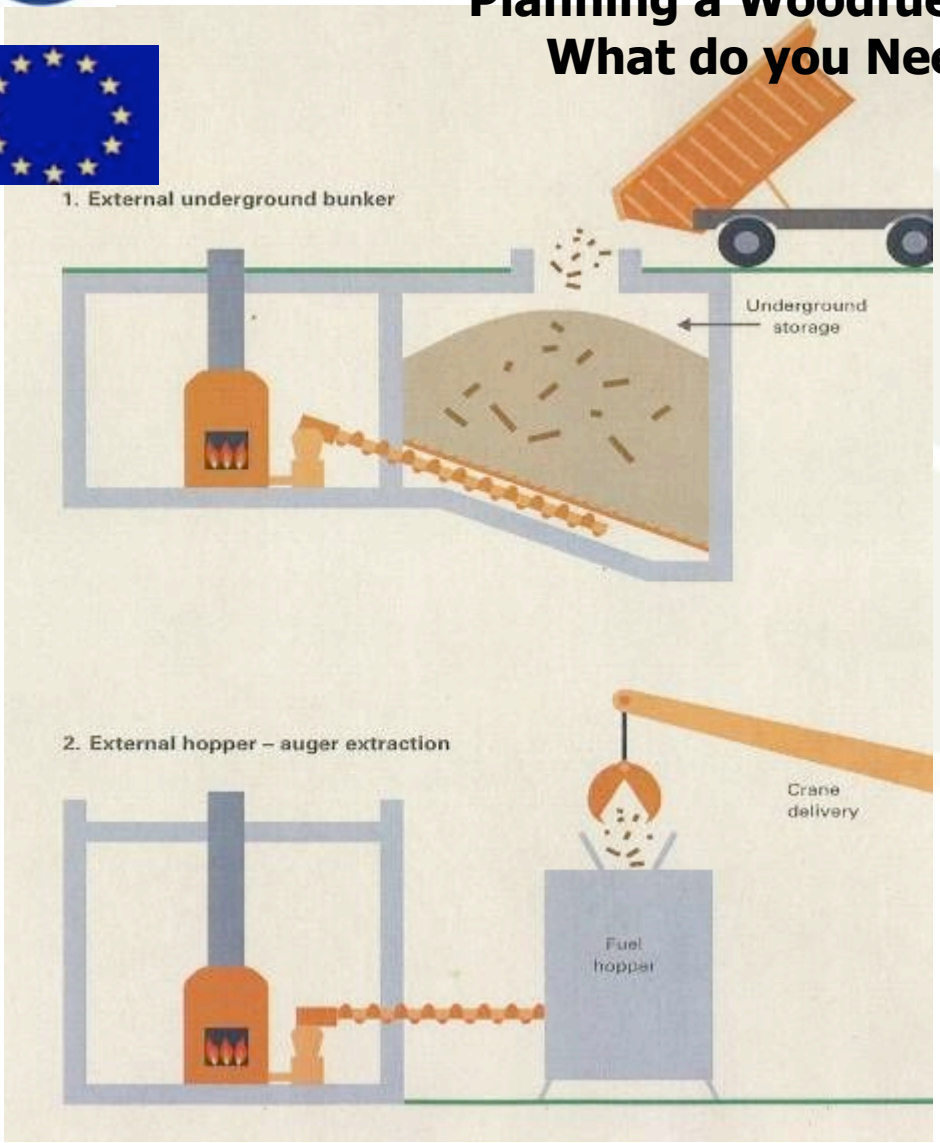
# Planning a Woodfuel Installation- What do you Need to Know




## STORAGE

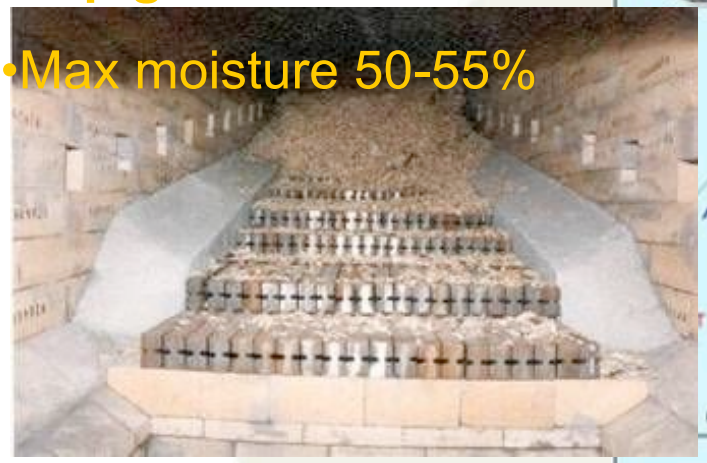
- One of the biggest cause of problems
- No single solution

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

30kW@35% - 2m3 delivered per week – storage too small!!

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

## Step grate machine.



•Max moisture 50-55%

## Under fed hearth.

•Max moisture 35%

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

Fuel issues - woodchip

-Supplier nearby?

-Moisture content?

-What type of boiler could I run on this?

-Is it suitable for my property?

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

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

## 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**

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## Wood pellets

- Made from compressed sawdust/shavings
- Very high energy/volume ratio
- Manufactured to European standard

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

## Wood pellet

-Suitable for domestic heating, and larger scales

-Boilers or stoves

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

## Heating with logs

- Traditional woodburning stove with back-boiler and accumulator tank

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Heating with woodfuel

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

•Automated log boiler and accumulator tank

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

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Considerations:

-Storage!

-Fuel source…be organised!

-Particularly suitable in combination with e.g. solar

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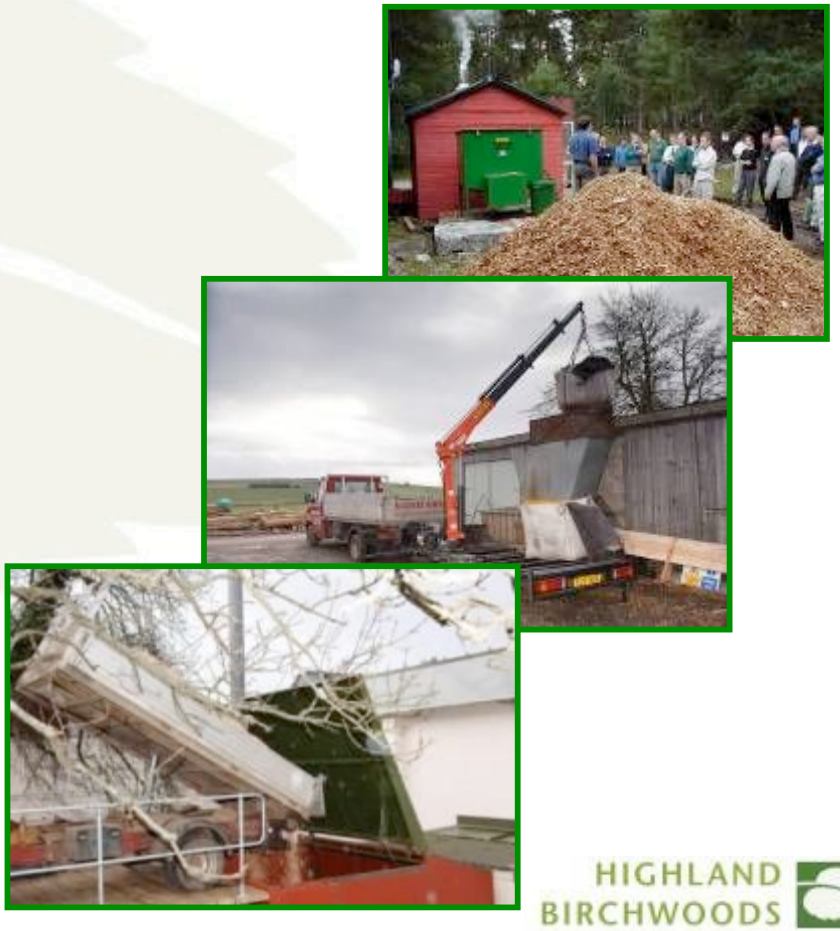
# Planning a Woodfuel Installation- What do you Need to Know

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

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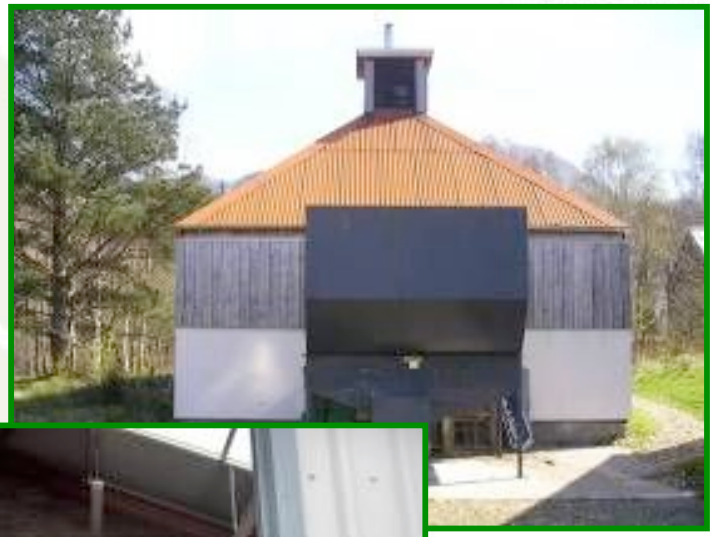
Storage:

-How will the fuel be delivered?

-Do I have enough space?

-Will this be economical??



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

**Boiler sizing:**

-Heat demand?

-Heat storage e.g. accumulator?

-Dual system?

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

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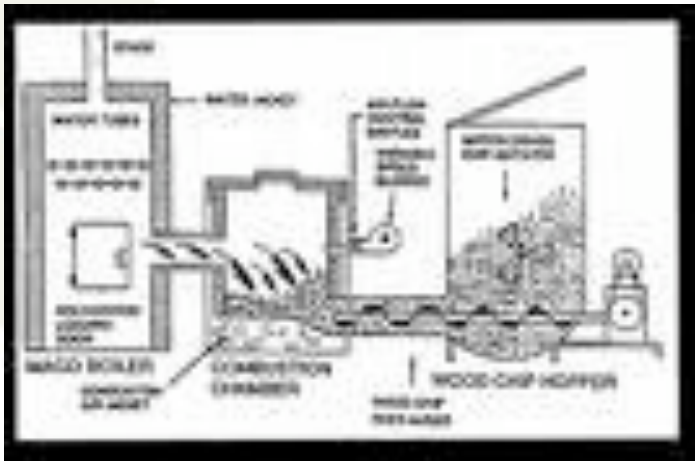
- Moisture content of chips
- Size/shape of chips
- Fuel contamination
- Poor design: storage, delivery & boiler size
- Agitator and Augers
- Flue & Boiler Pipe work
- Poor Installation: Plumbing & Electrical



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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.

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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.

# Heating with woodfuel

## 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

Heating with woodfuel

# 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

# Heating with woodfuel

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Woodfuel production trials

•Harvesting, drying and chipping

-Different sites

-Different stakeholders

• Logistics and delivery

- Different scales

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# Heating with woodfuel

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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/

as well as, www.biomassenergycentre.org.uk and www.Scottishrenewables.com

-Forestry Commission Scotland's Wood Energy site www.usewoodfuel.co.uk

Boiler sizing guide *http://www.dunsterwoodfuels.co.uk/images/boilersizewpdf.pdfList 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

Heating with woodfuel

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