



A district heating system fuelled by wood chips Aviemore North

Providing heat to a number of buildings can be a sensible and cost-effective way to get the most out of a powerful, central heat source.

In countries like Iceland, which benefit from hot springs and geysers, district heating systems are an ideal way to tap into geothermal energy and distribute heat to houses, offices and other buildings.

The idea has grown in popularity throughout Europe, and biomass is increasingly being used as a fuel source to heat multiple buildings.

In 2003 Albyn Housing Society acquired a major development site in Aviemore and made the pioneering decision to assess whether a wood fuelled district heating system could work for housing in the Highlands.

“The Aviemore site gave us a chance to test a biomass system, with all its advantages of providing carbon savings; contributing to an avowedly sustainable housing design; meeting our fuel poverty objectives and responding to the various policy drivers of the Government and Cairngorms National Park Authority,” explained Albyn’s development manager Donald Lockhart.

“We had a unique opportunity at the site at Aviemore North to prove that biomass was a viable option and to contribute to the development of renewable heating

in the Cairngorms National Park and broader Highlands.

“Aviemore is well placed for wood chip supply and was a good candidate for a biomass heating system. Albyn Housing has been keen to set an example in terms of sustainable housing projects. We made a conscious effort to make this project a showcase for biomass energy production and this aspect of the project has proved hugely popular with many requests for visits, demonstrations and talks.”

The system

The system produces energy in the form of hot water from any of three boilers, including an oil back-up boiler. The main heat source is a 400 kilowatt Austrian Kohlbach boiler complete with a walking floor, which is a hydraulically driven system which delivers the chips to the boiler.

Woodfuel is delivered by articulated lorries to an external bunker. From there it is transferred onto an internal walking floor and moved into a feed trough where it is pushed by hydraulic ram into the boiler system.

Find out more

This series of factsheets explores how households, businesses and communities are pioneering the use of woodfuel. They have been produced as part of the Cairngorms Woodfuel Action Plan and a partnership project run by the Cairngorms National Park Authority (CNPA) and the Clim-ATIC EU programme.

The Facts

Boilers	A Kohlbach 400 kilowatt Biomass Boiler, a 120 kilowatt Thermia boiler and a 520 kilowatt oil back up boiler
Tanks	2 x 3,000 litre buffer tanks
Boiler room	Purpose built boiler house.
Number of houses fed by system	100
Payback time	7 years (based on 2006 energy prices).
Fuel source	Woodchips with moisture content between 30% - 60% (wet basis).
Carbon reduction	Approximately 500 tonnes annually

The fully automatic, computerised control system enables the Kohlbach boiler to become the lead boiler during the winter and in situations where the load peaks. The Thermia biomass boiler acts as a top-up boiler and as a summer load boiler. Full back-up, and top-up in extreme conditions, is provided by the oil boiler.

The Kohlbach boiler is able to efficiently burn woodfuel up to 60% moisture content and, due to the ram stoker feed system, can use woodchips of random size.

The system also features self cleaning equipment, an ash removal device and a pre-drier for the chips.

The hydraulic rams feed the boiler on demand. This hot water is stored in large accumulator vessels before being pumped underground through a three-kilometre network of insulated pipes direct to the houses. Heat use is metered and paid for, in advance, by householders, by way of a smart card which owners and tenants can top-up at the Highland Council's Aviemore office.

The system has now been running since October 2006 providing heat and hot water to 100 homes in Albyn's Aviemore North development. In 2009 it produced 1,956,900 kilowatt hours of energy from 811 tonnes of woodchip consumed.

Performance so far....

"Naturally we deal with user issues and problems all the time, but mostly residents appear satisfied with the quality of the heating

service and the price paid," said Donald. "However whilst the system delivers many of the claimed benefits such as affordable fuel, carbon savings and promotion of renewable energy, there are challenges too.

"Governments want housing associations to be at the forefront of these technologies and this is something that we have readily embraced but we could certainly do with a bit more support when taking on what, in reality, are fairly risky projects.

"While the energy production part of the operation has worked almost flawlessly, the same cannot be said for the technology at the user end, giving rise to some reappraisal of the business model involved.

"Becoming something equivalent to a utilities provider should not be taken lightly and could well be a significant disincentive to future players in this area."

Installation and fuel supply

The system was installed by Buccleuch Bioenergy, a Borders-based company which also supplies fuel and provides ongoing maintenance for the system. This kind of arrangement is known as a heat supply contract.

An increasingly common way of running larger renewable heat systems is contracting out heat provision to an Energy Supply Company - or ESCo. Such a company may or may not install, own or maintain the boiler; however

Contacts

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Wood fuel installers and suppliers
www.usewoodfuel.co.uk/suppliers.stm

For more suppliers see
Biomass Energy Centre
www.biomassenergycentre.org.uk

it is responsible for ensuring heat is always available as required.

Funding

A total of around £100k of the £1M supply and installation cost of the whole system was funded by the Scottish Communities and Household's Renewables Initiative (now discontinued) and grants from the boiler manufacturer and the local enterprise company. The majority of the funding came in the form of housing association grant aid from the Scottish Government.



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