

Woodend Barn Arts Centre Biomass

Introduction

The Woodend Barn is a community-based arts venue situated on the outskirts of Banchory and surrounded by the beautiful scenery of Royal Deeside. An extremely versatile building which incorporates the Lang Byre Gallery, originally the cow byre, now an exhibition and workshop space, and a much larger space, originally the Hay Barn, which can be used for anything from theatre, concerts or ceilidhs to fabulous wedding parties. The Barn is run by the Woodend Arts Limited, a not-for-profit company and registered Scottish charity. Adjacent to the Barn is Buchanans café/bistro, a new building which is heated by the Barn's biomass boiler.



The boilerhouse and fuel store under construction

Woodend Barn is valued locally and nationally as a vital, rural hub of creativity, widening access to culture in North-East Scotland. This is achieved by delivering an innovative, diverse programme, collaborating with a broad range of partners and encouraging participation in the arts in order to enrich the quality of life of local communities, and enhance North East Scotland's cultural offering and reputation (www.woodendbarn.co.uk)

As a renewable energy source, woodfuel is considered to be almost carbon neutral, i.e. CO₂ emitted to the atmosphere on combustion is equivalent to that extracted from the atmosphere by the tree during its growth. Hence net CO₂ emissions are close to zero. Heating oil emits 0.25kg CO₂/kWh to the atmosphere. Based on forecast annual heating requirement at Woodend Barn of 300,000 kWh, a woodfuel heating system avoids around 80 tonnes of CO₂ from being emitted to the atmosphere, compared to electricity and oil (the previous heat sources).

Equipment

KWB Multifire Type USV ZI 100kw wood pellet boiler and controls complete with fully automated fuel feed system and two 1,500 litre accumulator tank and accessories

Cost and Grant Funding

Total project cost	£ 154,899	The remaining funding was obtained through: Aberdeenshire Council; Scottish Power Green Energy Trust; The People's Postcode Trust; Co-op Group Community Fund; Woodend Barn Arts Centre own funds
CARES grant	£ 123,919	
CARES grant percentage	80%	

Fuel Bill Savings

An energy audit was carried out which recommended that a biomass boiler should be considered. The audit indicated cost savings of about £1,900 per year via reductions in electricity and heating oil consumption. Other renewable heating sources were considered, however wood pellet was considered the most flexible and cost effective for this project. Running costs in Year 1 were substantially higher than predicted due to the boiler only running for about one hour a day during the summer months. The position has been improved during 2012 by increasing the load on the boiler.

Emission Savings

Estimated kWh savings p.a.	N/A
Annual Co2 savings (tonnes)	80
Lifetime Co2 savings (tonnes)	1,600

Project Monitoring

Operations and maintenance are managed by Hill of Banchory ESCo (HOBESCO) a local renewable energy supply company. The boiler is remotely monitored by HOBESCO, who ensure that the heating system is regularly maintained to maximise the life of the boiler. During 2011, HOBESCO arranged for the extension of the heating network to include a nearby private dwelling and rugby club changing rooms, which has improved operating efficiency by increasing the load on the boiler. Wood pellet fuel level is checked regularly to ensure a sufficient stock of fuel to meet heating needs. Fuel is sourced from local producers to ensure a sustainable and reliable supply, and minimise the total carbon footprint.



The boilerhouse after commissioning

Local Impact

This project has had a great educational impact and has demonstrated to all attendees that renewable energy is essential in the 21st century. The reduction in running costs help to make the centre more financially self sufficient, and may increase the number making use of the facilities.

Lessons Learned:

The biomass boiler is working well and the Barn and cafe/bistro are cosy in spite of night-time temperatures of around -20°C during the coldest winter nights. Both the fuel store and boilerhouse are large enough to cope with future expansion of the Woodend facilities. However, the original design of the boiler and associated facilities, conducted in 2009, over-estimated the efficiency of the biomass heating system and incorrectly assumed that the boiler could be operated at substantial turn-down without significantly compromising efficiency. In practice, during summer months where the boiler may only be firing for 1 hour in 24, overall system efficiency falls to around 55% in spite of a boiler efficiency of around 90% (when operating continuously at high temperature).

For further information, contact:

Woodend Barn Arts Centre contact:

Mark Hope
Woodend Barn
Burn o' Bennie
Banchory
AB31 5QA

T: 01330 825274
M: 07867907388
E: pmarkhope@gmail.com

Community Energy Scotland contact:

Jamie Wilkinson
Development Officer - North East Scotland
Huntly Business Centre
Gordon Street
Huntly
Aberdeenshire
AB54 8FG

T: 01466 794 704
E: jamie.wilkinson@communityenergyscotland.org.uk