

Barony College Biomass District Heating Scheme

Introduction

Located near Dumfries in South West Scotland, Barony College specialises in vocational training for the land-based and animal care industries. The 228 hectare campus includes dairy, beef, sheep, cereals, trout, red deer, forestry and horticulture commercial activities; giving students hands-on training in real working environments.

Since a major campus development in 1992, the College had relied on electrical heating, oil and LPG systems as it has no access to mains gas. The College therefore took the decision to replace their ageing existing fossil fuel boilers with a renewable energy source of heat from a biomass boiler.

Equipment : Binder 500k wood chip fired biomass boiler

Barony College paid for a feasibility study, in which it was demonstrated that the most cost effective approach would be wood (chip) district heating.



The boiler was installed and commissioned in November 2009; it provides heat for the main teaching buildings and student residential facilities, connecting these buildings using an underground pipe network.

Barony College Principal Russell Marchant said:

“This project has been a great leap forward for the College and wouldn't have been possible without the support of Community Energy Scotland – they have enabled us to make a very positive step towards significant reductions in our carbon footprint”.

Cost and Grant Funding

Total Project cost	£517,475.80	The remaining funding was obtained through: EST Grant £200,000 Interest Free Loan £117,475.80
CARES grant	£200,000	
CARES grant Percentage	39%	

Fuel Bill Savings

It was estimated that cost savings would be c.£67,000 per annum and that the boiler would make a significant contribution to the College's ambitious carbon management targets. The previous heating for the college was split between electric, oil and LPG. The biomass system was designed to replace 95% of this use. The oil and LPG boilers were retained to provide back up and peak load heating.

Emission Savings

Estimated kWh savings p.a.	n/a (replacing electric boilers)
Estimated annual Co2 savings (tonnes)	645
Estimated lifetime Co2 savings (tonnes)	16,125

Project Monitoring

The system was installed with a heat meter to allow real time monitoring of fuel use and energy supplied. Initially the fuel supplier charged based on tonnes delivered but this changed to a charge based on meter readings; this made it difficult to accurately estimate the actual fuel consumption as data was not provided on fuel moisture content. *Barony College has now requested that its fuel supplier provides detail of tonnes delivered and moisture content, so future monitoring will be much more accurate.*

Local Impact

The college intends to develop short training courses, open to prospective heating and plumbing engineers, to develop practical skills in the operation and maintenance of wood fuel systems. These short courses will also offer the opportunity to integrate and develop renewable energy within its current curriculum for students. Skills and expertise in this area can be developed by College staff and readily transferred into standard course teaching materials for the forestry and agricultural students. The existing forestry and farming courses are being developed to ensure students receive some basic teaching in renewable energy, with a focus on biomass.

The college is now considering installing an anaerobic digestion plant, using feedstock from its own land and surrounding farms.

Lessons Learned

- 1. Ensure fuel supplier provides data on tonnes delivered and moisture content, to allow accurate monitoring;**
- 2. The position of the ash bin within the plant room needs to be considered carefully to ensure it can be easily emptied;**
- 3. Over-sized woodchips can lead to boiler blockages;**
- 4. Boiler system can trip if it not actively managed and regularly cleaned out;**
- 5. Design of boiler system and fuel store is critical; this should be carefully considered at an early stage.**

Barony College Contact:

Russell Marchant
Principal and Chief Executive
Barony College
Parkgate
Dumfries
DG1 3NE
Tel: 01387 860 251
Email: RMarchant@barony.ac.uk

Community Energy Scotland Contact:

Keith Bale
Development Officer – South West Scotland
1 Ladyknowe
Moffat
Dumfriesshire
DG10 9DY
Tel: 07785 714975
Email: Keith.Bale@communityenergyscotland.org.uk