

Banff Academy Wood Pellet Boiler

Introduction

The Banff Academy campus comprises a 1000 pupil academy and a public swimming pool facility. The academy was constructed in the late 1960s, with a major addition in 1986. The pool facility, constructed in the mid 1970s, is a 25m community pool with ancillary accommodation.

Previously the the Academy and swimming pool was heated by oil-fired boilers. With this boiler plant reaching it useful service life a new system was needed. The new 850kW rated biomass plant ensures that wood replaces oil as the primary heat source for heating and hot water



Equipment: 850kW Binder biomass (wood pellet) boiler



Following the successful installation of a biomass boiler plant at Aboyne Academy and in line with Aberdeen Council's commitment to reduce its carbon emissions, a cost analysis and estimate of carbon savings was carried out for a scheme to provide a base load for both academy buildings and swimming pool from a common boilerhouse. The Council approached their local Community Energy Scotland CARES Development Officer and were able to discuss a variety of system options. Contributory factors for the choice of biomass (chip versus pellet) included:

- Site logistics i.e. a simpler boilerhouse and biomass store construction, smaller storage requirements, less frequent deliveries.
- A number of pellet manufacturers within a reasonable locality enabling competitive tenders to be obtained for fuel supply and the opportunity to reduce transport miles.
- Installing a pellet boiler system at this project presented an opportunity to compare the experiences of facilitating and operating both chip and pellet systems.

Cost and Grant Funding

Total Project cost	£ 644,485	The remaining funding was obtained through: Aberdeenshire Council's own funds
CARES grant	£ 100,000	
CARES grant Percentage	16%	

Fuel Savings

The previous annual heating consumption from oil was 2,506,000kWh/pa. The new system consumption from biomass is 1,448,000 kWh/pa; and from oil 877,000kWh/pa.

Emission Savings

Estimated kWh savings p.a.	171,000
Annual CO ₂ savings tonnes	354.88
Lifetime CO ₂ savings tonnes	8,872

*based on 25yrs

Project Monitoring

The boiler installers supplied the Council with a monitoring package consisting of sensors connected to a state of the art supervisory control and data acquisition (SCADA) system. Energy output is monitored with hydraulic flow meters and the readings converted to kWh. This information is available to the Council's Energy Unit, through the Council's building management system (BMS).

Local Impact

The biomass boiler installation contributes to the energy load for Banff Academy and Banff Swimming Pool. Reduced running costs will allow the Council to continue to keep a tight control of financial targets. The reduction in carbon helps the Council to work towards their environmental targets.

Lessons Learned 1. One of the selection criteria for plant procurement was that the manufacturer had Scotland based support engineers. However it initially became apparent that the selected manufacturer had to provide support from further afield. This situation has now improved with the appointment of a NE Scotland based service agent.

2. Operation of the plant has identified that the servicing / maintenance / cleaning is more onerous that was initially proposed. There are 2 weekly / 3 weekly maintenance implications, which have to be costed. It is therefore vital to budget, to allow for regular cleaning and maintenance (this is addition to servicing).

3. Initially there were problems with pellet dust; however, this situation has now improved.

4. The manufacturer's recommended 'turn down' ratio was advertised as being down to 20%. However during periods of 'low load' the boiler doesn't like operating at the lower end of the 'turn down' range, long periods and maintenance issues manifest themselves.

5. Ongoing monitoring revealed issues with the boiler / buffer combination resulting in the manufacturer identifying a manufacturing fault. The fault had a major impact on the boiler / tank control and has now been rectified by the manufacturer. The boiler has now been re-fired and is subject to further monitoring.

6. With a 'retrofit' project, ensure that conventional boiler plant and biomass boiler plant controls can be easily integrated.

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