

Capernwray Hall

Lancashire's leading woodfuel project



Capernwray Hall is a Christian holiday centre and Bible School that welcomes more than 250 students and 2,000 holiday guests each year.

The Capernwray woodfuel project is the largest and first of its kind on this scale in Lancashire, which is estimated to be reducing the School's carbon footprint by 367 tonnes. There are 12 hectares of woodland on the estate, plus access to neighbouring forestry plantations owned by the Forestry Commission. In addition to the local timber supply, the estate operation includes a working farm which provides the labour, material and buildings necessary for the woodfuel system. The scheme utilises this resource to provide sustainable energy.

objectives

- To provide a sustainable heating and hot water source for the whole campus, including accommodation areas, dining room, kitchens, sports hall and swimming pool. Capernwray has up to 220 students, guests and staff on site.
- Improve utilisation of the timber collected from their own woodlands and other local suppliers.
- To develop woodfuel usage and help create a sustainable visitor destination.

actions

- Initial technical appraisal for the Capernwray woodfuel project focussed primarily on the needs of a new dining room and accommodation (Jubilee Project), with the possible extension into other parts of the site, such as the swimming pool and sports hall.
- Capernwray's management team did a great deal of research before deciding where to site the boiler house and woodchip store. Having a split level site enables an efficient delivery of woodchip from the farm yard straight to the fuel store using a silage trailer.
- The majority of the work was carried out by Capernwray's own Projects and Maintenance teams, from heating design through boiler construction, installation of pipework and much of the internal control systems.

achievements

- The project is the largest and first of its kind on this scale in Lancashire and is only one of a small number in the local area.
- The Capernwray woodfuel system will benefit national and international students and other visitors staying at the centre.
- Based on the total peak energy requirement of 750kW, the system is based on a Heizomat 500kW wood boiler, providing heat and hot water to virtually all the buildings on the site and for up to 220 people.
- As well as the annual fuel cost savings, Mercia Energy calculated that by replacing 120,000 litres of oil by burning sustainable woodchip, it would also reduce Capernwray's carbon footprint by 367 tonnes.
- It is anticipated that the estate's present forestry plantations will be able to provide 34 tonnes of timber per year for the woodfuel system over the next ten years.

background

- The final cost of the project was £312,000. This included machinery involved with producing the woodchip, including tractor, crane, chipper and barn for storing wood. These items together totalled approximately £100,000.
- The system is based around use of their own wood and purchased slabwood and timber brought on to the site. This is stored within the existing farm working area in a newly constructed barn. The aim is to bring the timber moisture content below 35%. Based on a winter felling programme this will require an 18 month drying rotation. The lower the moisture content, the more energy is generated per tonne.
- On average the price per tonne of chip is approximately £53 (20% moisture content). They are now using approximately 400 tonnes of chip per year (20% moisture content).
- As part of the project, Capernwray anticipated replacing the oil boilers and renewing flues through the old building. Taking this into consideration, and the grants they obtained, the payback period would be 4.75 years.
- Alongside the woodfuel boiler they have a 320kW oil boiler which serves as a backup for times of failure or maintenance, and can also help fulfil any additional heat requirements. Their farm manager checks the boiler each week and undertakes some basic routine maintenance from time to time, but generally little maintenance is required.
- The boilers are located in a new purpose built boiler house which also incorporates a direct feed woodchip store and pumps to distribute heat around the site.

quotes

"When we first considered this project there were a number of considerations and options. We looked at ground source heat pumps and solar energy but finally decided on woodfuel. Some of the drivers for this decision were the small amount of timber on site, the cost, the sense of being more in control of our own heat source, and the environmental aspect.

"We entered into this project with some trepidation, unsure of how it would work out, but if we had to make the decision again now, there would be no doubt that we would choose biomass." Phil Burt, Capernwray Hall (www.capernwray.org.uk)

partners

Forestry Commission
Heizomat GmbH, Mercia Energy Ltd,
Nobbs & Jones, Jeff Hall
Aggregates Levy Sustainability Fund
DEFRA Rural Enterprise Scheme
Lancashire Environment Fund, Lancashire Woodlands Project, Leader +, SITA UK, Carbon Trust (interest free loan)

lessons learnt

- The added advantage of community-based schemes like this one is that local residents and visitors are fully involved in the estate's timber production. It is hoped that the scheme encourages other organisations to consider the environmental, economic and social benefits of using local wood to produce renewable energy.
- It is anticipated that further business opportunities may be created in the local area by supplying chip to local users or hiring equipment plus operator to others.