

# Capernwray Hall

Lancashire's leading Biomass project

Photo

Capernwray Hall was purchased in 1946 for use as a Christian holiday centre and Bible School and welcomes more than 250 students and 2,000 holiday guests each year. The swimming pool and sports facilities are also used extensively by local communities.

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 Biomass system. The scheme utilises this resource to provide sustainable energy; an important factor which also fits the ethos of the school.

## 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 biomass usage and help create a sustainable visitor destination.

## actions

- Initial technical appraisal for the Biomass 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 hopper. Having a split level site enables an efficient delivery of wood chip from the farm yard straight to the hopper 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 wider benefit of this system will be felt throughout the county and certain parts of the world, due to the involvement of the national and international student population.
- 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 250 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 Biomass system over the next ten years.

## background

- The final cost of the project was £312,000. This included machinery involved with producing the wood chip, including tractor, crane, chipper and barn for storing wood - these items together totalled approximately £100,000.
- The system is based around purchased slabwood and timber brought on to site in the round. This is stored within the existing farm working area, in a newly constructed barn. The aim is to bring the round wood 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 envisaged needing to replace 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 also provides additional heat on occasions of additional heat requirement. 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 wood chip store and headers 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, solar energy but finally decided on biomass. 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](http://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 involvement of the community in the mechanics of the estate's timber production adds a dimension to the project not normally possible with a non-community based property and it is hoped the scheme will also encourage others to consider the possibility of installing a biomass system.
- 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.