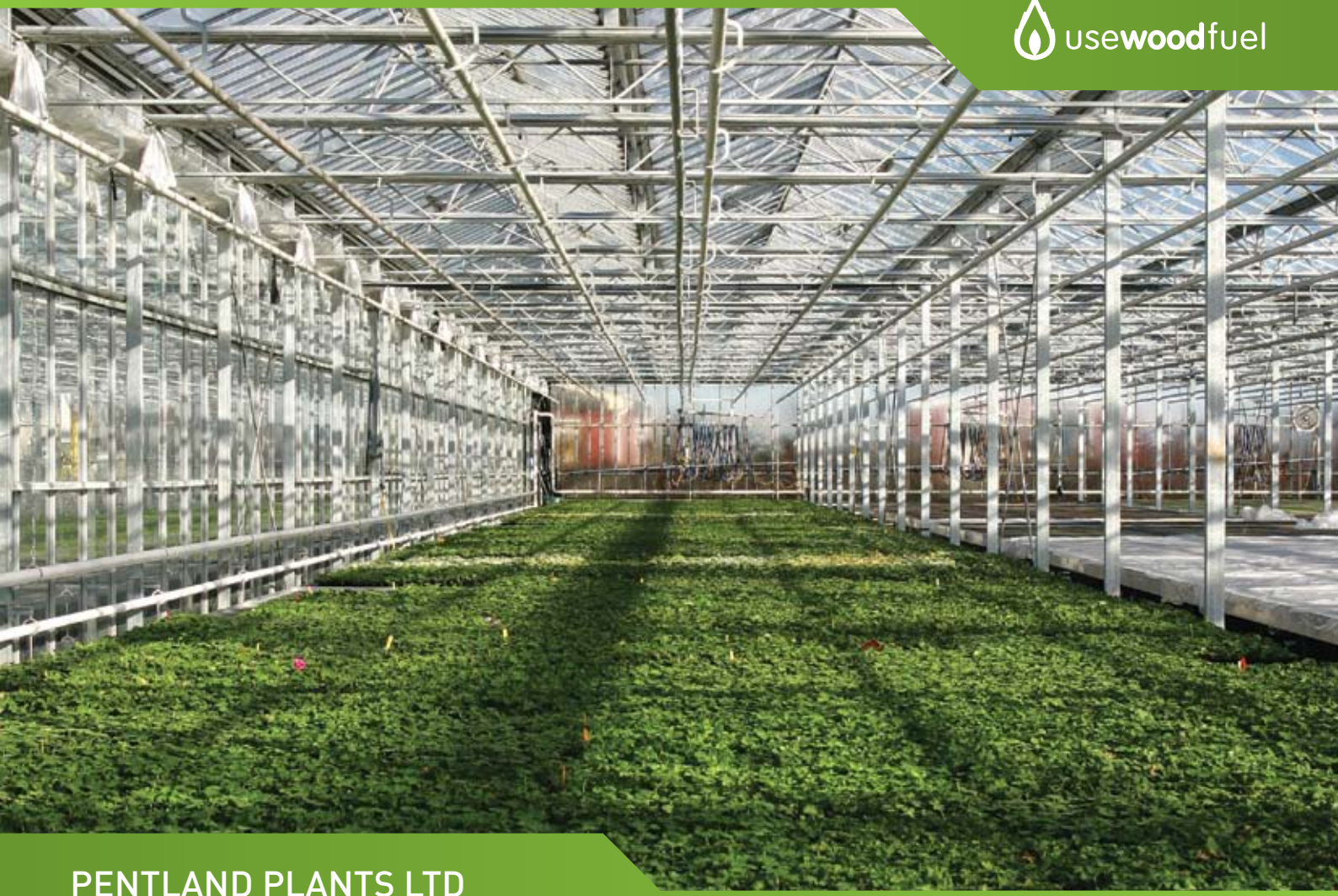
Forestry Commission Scotland

usewoodfuel



PENTLAND PLANTS LTD

Loanhead, Midlothian

Why change to woodfuel?
This site was the first horticultural business in the UK to switch to woodfuel and at the time of installation it was the biggest privately funded biomass project in Scotland. A woodfuel boiler was connected to the existing heating system in the company's glass houses to supersede the existing oil boilers as the primary source of heating. In conjunction with the Carbon Trust, a business energy audit and evaluation of the site requirements was undertaken and a range of renewable technologies was considered. Biomass was judged to be the easiest and most cost effective method of meeting the business energy needs. The decision to change to woodfuel was taken in an attempt to reduce the annual heating costs of £300,000.

The audit identified that the business required a robust and simple system. The company directors undertook several site visits to Austria, Denmark and Germany to research and investigate European technologies that would be most suitable for their needs. They also sought advice from professional organisations, which combined with their personal research, has ensured a reliable installation.

Key Benefits of this Installation
// Significant financial benefits over oil alternative
// Secure fuel supply chain – self-reliant
// Investment in woodfuel production machinery possible through fuel savings

System Accolades
Pentland Plants sources and produces its own woodfuel through its woodfuel business Pentland Biomass. Roundwood is purchased directly from local forests and stacked to dry for a year to bring down the moisture content before it is chipped into fuel. The annual woodfuel consumption warranted the company's own investment in woodfuel processing equipment, which has been funded through the significant fuel cost savings and the Scottish Biomass Heat Scheme. This self supply fuel model further reduces the costs of their heating as well as creating a potential new income stream from sales of woodfuel to third parties.

The fuel storage shed contains a robust walking floor system that efficiently moves the large quantities of wood chip to the boiler. Walking floor systems in the fuel store can more reliably deliver fuel to the boiler, handling larger particle size material, though are mainly only suitable for large systems due to their size and cost.

Very little modification was required to the existing heat distribution system due to spare pipe work previously installed in advance of business expansion. This made the retention of the original oil boilers simple. Although the oil boilers are not required for daily heating, space allowed their retention and they were in good serviceable condition, so it was sensible for them to be retained to provide extra capacity and security for the future.

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Lessons Learned?

// Underground fuel storage would allow more space for increased on-site roundwood storage capacity
// Agreeing to dealing with the same boiler manufacturer representative throughout the installation process can smooth the process
// A large area is required to produce and store a large volume of woodchip for self-supply, plan accordingly
// Large enough chip storage to run your system for a suitable time, in case of breaks in production, ensures continuous operation of your boiler
// Planning issues should to be addressed at the earliest opportunity to reduce delays
// Planning permission for the fuel storage shed and boiler house proceeded without delay, but the flue height requirement for the boiler slowed the process. Plan for and allow the appropriate time to gain planning approval for your development, if required.

What is a walking floor?

// Hydraulically-driven conveyance system for moving material
// Floor is divided into 3 sets of narrow slats which move forward and backwards
// When slats move in unison the fuel is moved in the direction required
// Can be used within woodfuel storage shed or in delivery trailer
// System can quickly unload material without having to tip or tit the trailer, between 5 to 15 minutes to unload a 13.6m trailer.

BOILER	
Application	Heating for Horticultural Glass Houses
Max output	2 MW (2,000 kW)
Manufacturer	Reka
Fuel Type	Woodchip
Fuel specification	Particle size: P45 (80% of chips are 45mm or less) Moisture content: M40 (less than 40% moisture)
Installation date	November 2006
Backup system	Existing 2 MW oil boilers retained
Energy consumption	8 million kWh per annum
Woodfuel Store capacity	800m3 (180 tonne)
Fuel delivery interval	Weekly
Roundwood	Roundwood is bought and stored outside in rows and chipped one year later,once moisture content is 35 - 40%
Woodfuel supplier	Pentland Biomass
Source radius	Primarily within one hours haulage of Edinburgh
Weekly woodfuel use	900m3 at peak/ 150m3 during summer
Annual woodfuel use	2500 tonnes
BUILDING	
Heated area	21,000 m2
Heated volume	75,000 m3
Building fabric	Glass and aluminium
Building use	Commercial glass house
INSTALLATION COSTS	
Boiler System	£260,000
Funding Support	Private finance
COST SAVING	
CO2 savings pa	2500 tonnes
Woodfuel cost	£125,000
Annual fuel cost saving	£256,000 during 2008
Payback period	1 year (due to high oil prices during 2008)