The Living Rainforest

Greening the greenhouse?

Forestry Commission England

Part of the Trust for Sustainable Living, The Living Rainforest in Berkshire is an eco-centre dedicated to educating people about threatened ecosystems and to exploring the relationship between humanity and the world's rainforests through education and research. The centre features a tropical rainforest-inspired ecological garden, which requires a large amount of heat to replicate the rainforest environment. Over 75,000 people visit The Living Rainforest each year, including over 18,000 children through school tours and educational trips. The centre completed installation and commissioning of a woodfuel boiler in summer 2006.

objectives

- To replace one of the existing oil-fired boilers with a small-scale wood-burning boiler in a redeveloped building complex, to provide a sustainable energy source for the Living Rainforest and a focus for education.
- To help ensure that the centre has a minimal energy or carbon footprint, which is an essential prerequisite to getting its message across.
- To test the hypothesis that the environmental impact of greenhouses can be significantly reduced through integration with other buildings and use of sustainable design, construction and operation.
- To develop in-depth dialogue with visitors about the environmental challenges facing society.

actions

- In 2004, Econergy carried out a detailed specification of a wood-fuelled boiler system based on a Thames Valley Energy feasibility study. The study showed that, with a continuous need for heat throughout most of the year, a wood-based system was ideal to replace the fossil-based oil system.
- The first phase of the Integrated Greenhouse (IG) project involved the design and construction of a prototype visitor centre building, known as the Human Impact Building (HIB), which incorporated integrated biomass heating.
- Wood fuel is supplied to the Living Rainforest through TV Bioenergy and sourced from local estates, growers and tree surgeons. Sourcing fuel from adjacent businesses provides diversification, income and employment on the local estates for local people.
- It is anticipated that the boiler will utilise in the region of 200 tonnes of woodchip per year supplied in at 30% moisture.

achievements

- As the first public, indoor rainforest attraction to convert from fossil fuel to renewable biomass heating, TLR has reduced its carbon footprint by about 200 tonnes of CO_2 each year since 2006 as a direct result of the project.
- Before installation, over 100,000 litres of oil was consumed annually at a cost of around £37,000 per year. At current oil and woodfuel prices a payback on the total cost of installation, taking into account grants received, of 1.7 years is expected.

background

- The boiler is a Fröling Turbomat 220 kW automated woodchip boiler. This provides the base load supply to The Living Rainforest of at least 80% (610 MWh) of the year-round heating requirements.
- Using optimised control technology the Turbomat boiler is over 90% efficient. The Lambda control system guarantees perfect combustion.
- All functions are fully automatic, from the fuel feed and combustion control, right through to cleaning and ash removal. The high-tech Turbomat is designed to be easy to use and even easier to service and maintain.
- The fuel store is integrated into the boiler house and is filled with woodchip via a chip blower. The fuel is then fed into the boiler by a spring arm outfeeder with integral fuel auger system.
- The fuel store is approx. 48 m^3 and is designed to accommodate a full load of woodchip delivered in an agricultural tipping trailer. Woodchip is sourced from within a 10-mile radius, from local growers and tree surgeons.
- Visitors can view the heating system via the 'Exploration Walkway' as they enter the Living Rainforest via the main entrance. Tours of the woodchip boiler house can be arranged for specialist visitors.

quotes

"The Living Rainforest is an excellent example of 'thinking global and acting local' – linking local sustainable energy use to maintaining an ecosystem of global importance – in particular demonstrating the value to the very many young visitors to the site."
Keith Richards, TV Energy Ltd

"As an eco-centre, it's important for the Living Rainforest to walk the talk of sustainability. Our wood chip boiler does exactly that, reducing greenhouse gas emissions and future heating costs. The project has already become an important flagship for the SE region of England, encouraging others to follow in its footsteps and turn to wood." Karl Hansen, CEO, The Living Rainforest

partners

Econergy Ltd
TV Energy Ltd
Plant Research International
Forestry Commission

funding

The European Commission
Life Programme
SEEDA
Clear Skies Community Fund

lessons learnt

- Switching from oil to wood chip has reduced The Living Rainforest's running costs by about 40%.
- Integrating the new wood chip system and the old oil boiler system proved to be challenging. This highlighted the importance of systems integration in the early design phase.
- Wood chip boilers can be a surprisingly popular educational resource. The Living Rainforest incorporates its heating system into a popular 'Sustainable Future' tour.

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