

## conference & training building summary design and construction credentials

The Pines Calyx conference and events venue was conceived of as a carbon neutral catalyst for rural and urban sustainable development and for grass roots responses to the challenges of 'peak oil' and climate change.

The building, in a stunning parkland location nestled in the White Cliffs of Dover, acts as the centrepiece in the ongoing development of a Centre for Sustainable Living. The building's developers and designers are all members of the Carbon Free Group, a consortium working to make zero carbon living a practical and economical reality. The international team collaborated in delivering an award winning commercial building which demonstrates a successful fusion of historic construction techniques with 21st century technologies, design and analysis. The key features of the building include its earth-sheltered and curved design with all the main walls being constructed in rammed chalk excavated from its own site. One of the most stunning features is the use of 'timbrel-vaulting' ('Catalan vaulting'), a centuries' old method of construction successfully revived

on this project. The technique delivers optimum sustainability and economics in creating the building's shallow domes (no concrete, no formwork and swift to construct) and is now being further developed and applied on a range of low carbon construction projects both in the UK and overseas.

Other features include natural ventilation systems, 'virtual daylight' lighting, fully sustainable water management systems including reedbeds naturally treating waste water. Unique for an earth sheltered building is the minimal use of concrete with a very high percentage of the building being constructed from local waste and recycled materials resulting in the building having the lowest embodied energy of any modern commercial building in the UK. Operational energy requirements are modest due to the high thermal efficiency of the design

and an ongoing programme for delivery of site-wide renewable energy technologies (being installed in Spring 2011) that will enable it to be the first commercial building in the UK to operate in a fully carbon neutral manner with its overall surplus energy supplying other nearby buildings. Commissioning these technologies will represent the final step towards the objective for the building to attain the 'CarbonLite Gold Standard', the UK's highest independent building sustainability measurement.

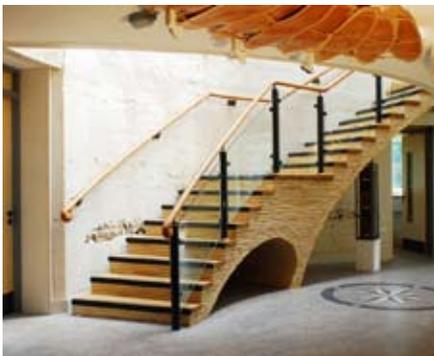
The outcome of the construction of the building has also been an overall enhancement in on site biodiversity and general enrichment of local community initiatives in alignment with the building owner's local environmental and community focus



See [www.pinescalyx.co.uk](http://www.pinescalyx.co.uk) for further information on the building as a venue.

# Pines Calyx Construction and Operations: Energy Consumption and CO2 Emissions Data

			Pines Calyx	Conventional Construction	Savings 2007–2011	
Embodied Energy & CO2	Construction Materials	Embodied Energy	299 MJ/m <sup>2</sup>	1393kg CO <sub>2</sub> /m <sup>2</sup>	79%	n/a
		Embodied Carbon	33kg CO <sub>2</sub> /m <sup>2</sup>	147kg CO <sub>2</sub> /m <sup>2</sup>	78%	n/a
			Pines Calyx	UK 'Best Practice'		
Operational Energy & CO2	Building Operations	Target Energy Consumption	35kWh/m <sup>2</sup> /yr	97kWh/m <sup>2</sup> /yr	66%	100%*
		Target CO2 Emissions	11.3kg CO <sub>2</sub> /m <sup>2</sup> /yr	33.6kg CO <sub>2</sub> /m <sup>2</sup> /yr	67%	100%*



## Carbon Neutral Operation\*

A photo voltaic thermal ('PVT') system is planned to be operational in 2010-11. The input of the technology will result in the building surpassing its operational zero carbon target with the PVT system allowing net feedback to energy needs for surrounding buildings and energy sales back through

the grid. In March 2009 Local and County Councils funded a feasibility assessment into a community wide renewable energy scheme that is designed to provide for the complete energy requirements of the local community (3000 inhabitants) providing a viable pathway for the village to become a net

renewable energy exporter within a few years. The energy source that was identified as being the best option at a community level is a Biomass power plant. Proposals for this option are being progressed with the aim of the new plant being operational in 2013.