

Home grown Welsh eco house

The need

Around 40,000 new homes are needed in England and Wales every year and the industry is seeking new technologies to allow higher environmental building regulations, without increasing the costs of construction.

The Welsh Assembly Government is one of only a handful of administrations in the world to make sustainable development a statutory obligation, and one of its priorities is to find new ways of building low carbon, affordable homes.

The idea of creating houses from home-grown timber started from a small feasibility study carried out by Coed Cymru, Wales's woodland management charity. It looked into the possibility of producing low-carbon housing from Wales's own forests. It had not been done before and one of the challenges faced by the consortium was to find ways of engineering the material for strength and stability, to meet the quality of other imported construction materials.

The results

The result is a house, Ty Unnos, designed to meet Level 5 of the Code for Sustainable Homes (the system for measuring the sustainability and carbon reduction in the construction of sustainable homes). In just two years of development from initial feasibility to market, the current Ty Unnos build system has the potential to meet the UK's future housing needs as well as the environmental regulations needed to create sustainable communities.

Built at the top of the South Wales Valleys, the Ty Unnos house is based on a modern re-interpretation of the traditional Welsh longhouse. It is constructed from Welsh timber, using local suppliers and labour, and is carbon negative through the carbon bound

into the timber materials. It is highly insulated, easy to manufacture, and transport distances for the locally grown crops are short.

The technology is based on converting locally grown Sitka spruce (a high volume low value crop) into a high value whole house system. This is done by incorporating a laminated structural box section timber frame and infill panels which can be easily assembled on site. The simple and rapid assembly process ensures high levels of insulation, reduced thermal bridging and heat loss through the building fabric, and comfortable internal conditions. Initial funding from the Technology Strategy Board was given to develop, test and certify the box sections to meet British building standards.

As well as the Sitka spruce timber frames, the floors are made from Welsh slate and the stairs and first floor finish from sustainably grown Welsh sycamore. The sustainably produced Warmcel and Rockwool insulation come from Wales and it also boasts triple glazed, insulated and double sealed windows with Welsh sweet chestnut frames that were designed and manufactured locally. The only non-Welsh part of the house is the heat recovery and ventilation system, which is Swedish.

The consortium took on initial technical work including design, prototyping and component testing. This has proved the structural performance of the basic engineered component and is being extended to a complete certified system.

The project benefitted from the expertise of its contractors: Burroughs Engineers, Cowley Timberwork and TRADA. Funding included the building of a demonstrator two-bed four-person house to be used as a visitor centre on the site in Ebbw Vale until 2011. The house was constructed in 14 weeks, with the superstructure erected in 10 days.



‘Thanks to the investment from the Technology Strategy Board we have been able to develop a fully certified product from home-grown materials, which puts Wales and the UK firmly at the cutting edge of sustainable house building.’

DAVID JENKINS, COED CYMRU.



Competitive advantages

Those behind the Ty Unnos design say the idea is to provide local homes to local people by local organisations. Commercial production of the Ty Unnos build system started in summer 2010 and the consortium is creating a local supply chain. Funding from the Technology Strategy Board helped take forward the results of a

feasibility research and contributed to the development of a unique housing community that could regenerate one of Wales's most deprived towns.

It has already captured the interest of global manufacturers and Coed Cymru was asked to build a demonstrator house at the prestigious Smithsonian festival in Washington DC in 2009.

Technology Strategy Board Driving Innovation

Collaborative research and development projects are one of the tools that the Technology Strategy Board uses to drive innovation in the UK. The Technology Strategy Board is a business-led executive non-departmental public

body, established by the Government. Its role is to promote and support research into, and development and exploitation of, technology and innovation for the benefit of UK business, in order to increase economic growth and improve the quality of life. It is sponsored by the Department for Business, Innovation and Skills (BIS).

Tel: 01793 442700 www.innovateuk.org

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Project partners

Coed Cymru, Design Research Unit Wales, Welsh School of Architecture, Pomtrilas Timber, Kenton Jones, Blaenau Gwent County Borough Council

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Technology Strategy Board investment

£205,680

Total project investment

£403,520

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