

Powerhouse to PassivHaus

The coal mines and the industry they fuelled have long stood idle, but now green housing is giving Welsh industry a new lease of life. Chloë Stothart reports

The hills and valleys of Wales were once the country's industrial heartland. Its steel mills and coal mines served the world for decades and employed thousands of people until the the closures in the 1980s under Margaret Thatcher's Conservative government. Today, the legacy of unemployment still remains – as do many of the old pits and factories, haunting the landscape with memories of Wales' once glorious industrial past.

But now, an old steelworks site outside Ebbw Vale has become home to a new, green direction for Wales' manufacturing sector. It is the location for two 'PassivHouses' – the first ever built in Wales.

The PassivHaus concept originated in Germany and refers to a construction standard for houses which are designed to use very little energy for heating and cooling, relying instead on insulation, ventilation systems and heating from sunlight to keep them at a comfortable temperature. They are notoriously hard to build owing to their high insulation standards, and requirements to use no more than 15 kilowatts per square metre per year for heating, and no more than 120 kilowatts per square metre per year for power, including electric lighting.

Ordinary buildings in the UK use about 10 times that, says Justin Bere, director of Bere Architects, which designed the Ebbw Vale properties. One of the homes is already certified as a PassivHaus and the other one will go for certification when completed in November but is expected to pass (see box: Green credentials).

One of the most striking aspects of the building of the houses, for United Welsh Housing Association and building research body BRE Wales, is the attempt to avoid importing their components.

While most PassivHaus schemes in the UK to date – of which there are still very few – import materials from northern Europe, both the Ebbw Vale



Ebbw Vale PassivHouses: three-bedroom Larch House (above) is clad with Welsh larch. Two-bedroom Dragonboard House (left) is clad with Welsh lime render

houses use mostly Welsh-made materials. Both houses use timber frame systems made of Welsh spruce, Rockwool mineral insulation in the walls from Bridgend, photovoltaic panels from Sharp in Wrexham, and solar hot water systems made in Carmarthenshire. The two-bedroom house, which also meets level five of the code for sustainable homes, is clad in lime render, while the three-bedroom property, which meets level six of the code, is clad in Welsh larch. The two-bedroom house even has the first ever UK-produced PassivHaus-certified windows.

Not all components could be found in the UK, however. The three-bedroom house has windows from Germany. Both homes use German-made PAUL mechanical heat recovery

Nick Tune, director of BRE Wales, are talking to green building materials firm Natural Building Technologies, about setting up a factory in Wales to make the wood fibre board insulation. Mr Bere would also like to work with UK firms to produce mechanical heat recovery ventilation systems that would meet the exacting PassivHaus standards.

Furthermore, Mr Tune wants to buy an automated laminating machine, like those used in Germany, and set up a factory to supply PassivHaus windows to the UK, having had to ask local joinery firms to shoulder the costs of hand-building the Welsh windows.

BRE's motivation for sourcing the components locally was to boost UK industry rather than to reduce the carbon footprint. 'We are trying to develop an industry and help the local economy by doing it,' says Mr Tune. 'We are talking about sustainability in the round: social, environmental and economic. By sourcing products locally you have full sustainability.'

The Ebbw Vale pilot scheme is only a snap-shot of the growing Welsh green economy. Wales is home to the UK's largest programme to improve the energy efficiency of private sector and social homes in some of Wales' most deprived areas. The £30 million scheme will retrofit 6,000 homes with improvements by March 2011.

Environment, sustainability and housing minister Jane Davidson hopes that introducing tighter building regulations and big retrofit programmes before England does could give Welsh firms a head start. 'We see the changes to building regulations as a major business advantage for companies to get early experience of these standards and technology,' she says. 'We know those Welsh companies will be able to work elsewhere.'

So far, Wales' green housing industry is a very long way from filling the shoes of the economic powerhouses of its past, such as coal and steel. But changes already taking place on its building sites and in its government are helping it grow a small, but burgeoning sector, which may finally exorcise the industrial ghosts that haunt its already green valleys.

Green credentials

- 0.076 u value floor
- 0.095 u value walls
- 0.074 u value roof
- 0.8 overall u values for both German and Welsh windows, including frames
- No thermal bridging
- Airtightness in the three-bed home is 0.2 air changes per hour at 50 pascals (Pa) (or 0.24 metres cubed/hour/square metre).

The two-bed house is not yet tested.

Source: research for Bere Architects

ventilation units and Pavatherm wood fibre board insulation from Switzerland. Overall, the two-bedroom house gets 87 per cent of its components from Wales, with the remaining 13 per cent taken up by the German heat recovery ventilation unit.

Mr Bere is keen to get the UK to manufacture equivalents of the foreign-made components. He and