Case Study

Homegrown Homes Sarn, Powys

LOWFIELD
TIMBER FRAMES

Case Study

Project Name

Clos Caebitra

Location

Sarn

Project Type

Residential

Specification

Passivhaus
Homegrown Timber

The Project

Commissioned to provide much needed council homes for social rent as part of the Council's Corporate Improvement Plan 'Vision 2025'. Lowfield Timber Frames designed, manufactured and installed a Larsen Truss timber system for the development.

Located in the centre of the popular rural village of Sarn, the 628m2 development comprises two bedroom bungalows and two & three-bedroom homes. Each is designed to offer affordable, environmentally sustainable accommodation for those on the Common Housing Register. The building palette of healthy and ecological timber materials forms a sustainable system for long-term efficiency that meets Passivhaus standards.

This project proves that the combination of a sustainable approach and local skills/materials does not limit design innovation. The project was one of the pioneers for the Home-Grown Homes projects, utilising Welsh timber as the core structural material for the build. This scheme could evolve design standards in social housing to improve quality and wellbeing long-term while creating net zero carbon homes and creating a circular economy.

The Details

0.27ach

Airtightness for bungalows

0.10

U-value achieved

0.49ach

Airtightness for houses

628m2.

Size of development

Scope of Services

To meet Powys County Council's need for a sustainable solution to develop low-energy housing stock, Lowfield Timber Frames worked with the Architects to develop a timber system for Sarn that minimises energy impact and facilitates maximum airtightness.

Sarn is an exemplary Passivhaus residential scheme that minimises energy consumption and costs, providing net zero carbon homes in Powys. As the most stringent energy standard in the world, Passivhaus certification secures economic, environmental and social sustainability. The scheme was officially certified shortly after the build was completed, guaranteeing ultimate performance and certifying that there are no gaps between predicted and actual results – reassuring residents.

This is an excellent example of collaboration between a local authority, developer and specialist contractor. Lowfield Timber Frames translated the architect's designs to create a fully bespoke timber system, applying a fabric first approach that requires minimal energy. The fabric first approach enables comfortable lifestyles for residents while minimising operational costs with the MVHR system recycling up to 90% of the heat being extracted which heats the incoming fresh air. All properties achieved an EPC- A rating scoring between 95 and 98.

Outcome

Lowfield Timber Frames specified precision-engineered timber for the design, manufacture and installation of the Larsen Truss system to allow for maximised insulation. Certified timber products minimise carbon footprint (and associated heating costs) when integrated into sustainable building solutions, achieving robust insulation and airtightness. The timber frame designed for this project promotes the council's aim for carbon reduction and a cohesive, circular economy in Powys.

The wall thickness is increased to provide a fabric first approach with increased insulation. This is achieved by using a lightweight external frame with a breathable wood fibreboard attached, this is suspended from the internal structural frame with slim, compressed timber webs to minimise thermal bridging. Measured by monitoring how often the air pressure changes within one hour, Passivhaus standards allow for a maximum of 0.6 air changes per hour. For this particular development, the final air tests in the bungalows revealed just 0.27 air changes an hour, and 0.49 for the houses.

Results

By adhering to requirements stipulated by Powys County Councils Corporate Improvement Plan, construction methods were enforced to manufacture a low-energy timber system that meets the client brief with U-values of 0.076 W/m2K for the roof - 0.1 W/m2K for the walls.

As well as being extremely energy efficient, these buildings also feature a number of renewable energy technologies. The 4.2 KW solar photovoltaic roof panels generate electricity, while the heat recovery units reuse any excess heat to warm the properties. The aim was to reduce energy consumption as much as possible through high-level design, insulation, triple glazing, airtightness, mechanical ventilation, heat recovery, considered orientation and window sizes to maximise solar gain and minimise overheating risks. These factors were calculated through the Passivhaus Planning Package (PHPP) to create accommodation that requires virtually zero energy.

The project worked closely with Woodknowledge Wales who were appointed by Powys County Council to pioneer the Home-grown Homes Project. The project encouraged the forestry, timber and construction industries to work closely together, this project has been designed to help streamline the entire supply chain. The overall aim of this is to expand the forest sector, finding better ways of using home-grown wood for a sustainable society with a greener future.

Case Study

Client

Powys County Council

Main Contractor

Paveaways

Architect

Hughes Architects

Home grown homes pioneers

Woodknowledge Wales

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