



**PROSIECT
CARTREFI O
BREN LLEOL**

**THE
HOME-GROWN
HOMES
PROJECT**

**CASE STUDY:
TAI AR Y CYD**

Social landlord collaboration success

TAI AR Y CYD - DELIVERING NET ZERO (DNZ)

Tai ar y Cyd harnesses the power of 23 Welsh social landlords collaborating to build new zero carbon homes that will unlock wellbeing benefits for families, communities, and local economies

SUMMARY

Tai ar y Cyd harnesses the power of 23 Welsh social landlords collaborating to build new zero carbon homes that will unlock wellbeing benefits for families, communities, and local economies.

The critical project outcome is a standardised next generation pattern book for high performing, timber-based, off-site manufactured homes. A shared performance specification will help these homes target net zero operational carbon and a significant reduction in embodied carbon emissions. This will be invaluable for social landlords, driving the creation of new affordable homes.

Ultimately, the aims of the project are to maximise efficiency; minimise waste through thoughtful material use; protect against the Welsh climate; design maintainable

homes; and consider the availability of materials and components.

Integral to the success of this project is the strategic use of the aggregated demand for these homes to unlock a robust, sustainable, and local supply chain. This strategy will increasingly rely on Welsh timber, nurturing the growth of Welsh SMEs and green skills. This will ensure a strong foundation for quality, whilst enhancing affordability.

A project priority is designing homes with sufficient thermal performance to achieve resilience to energy price fluctuations, safeguard against overheating, and protect against future climate scenarios. The homes will be comfortable, contributing to the holistic well-being of their occupants.

INTRODUCTION

Tai ar y Cyd is a project which aims to support Welsh Government's ambition to decarbonise the housing sector by 2050 as well as support the need for more new homes in Wales. This will be achieved by developing a pattern book of house types delivering on low carbon targets.

Timber based materials will be crucial in delivering this, alongside the development of the supply chain and green skills base to support.

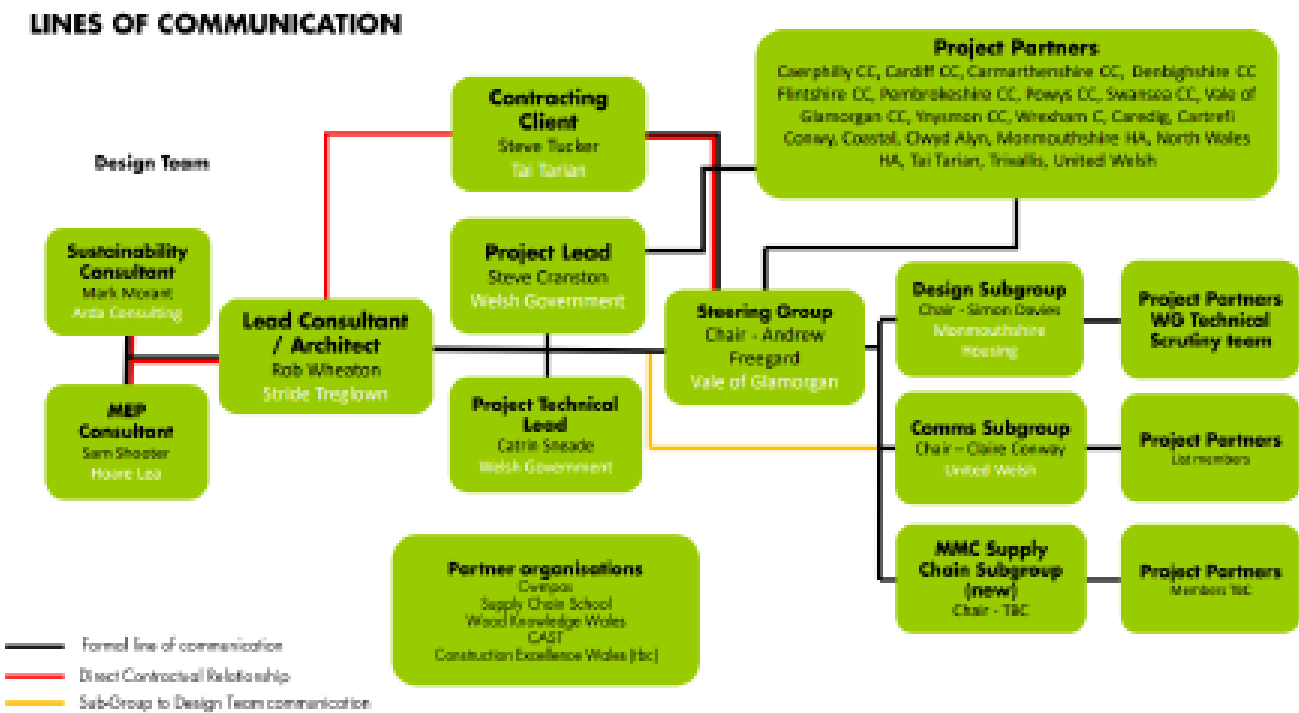
Essential to success of this project is a partnership with 23 Welsh social housing organisations (Local Authority and Housing Associations) supported by the right technical team and wider stakeholders.

KEY PLAYERS

Tai ar y Cyd is a social landlord led collaboration that is supported by Welsh Government. The key players are 23 social landlords: both Welsh Local Authorities and Housing Associations. The project is largely self-funding with each of the 23 members making a one-off financial contribution to fund the development of the pattern book and project support staff. Project members have stepped forward to lead on supporting key strands of the project.

Tai Tarian is the project contracting client and has engaged the design services of Stride Treglown architects who provide architecture, sustainability, and MEP support. Project lead staff have supported the development of the project with key partners – Wood Knowledge Wales, CAST, Supply Chain Sustainability School, Construction Excellence Wales and Cwmpas.

Governance of the project is summarised below:



BACKGROUND

Originally named Delivering Net Zero (DNZ) the roots of the rebranded Tai ar y Cyd project originated from work completed through the first phase of Woodknowledge Wales' Home-Grown Homes project. This included an investigation which addressed the question: what is a zero carbon timber housing solution for Wales? This work explored a range of timber build solutions. Results were based on the analysis of an appropriate and future-proofed definition for 'whole-life net zero carbon', followed by design and calculation to develop an understanding of the quantifiable factors of embodied and operational carbon. Using a fabric first approach, an examination of existing and alternative timber construction methods, materials and systems offered a range of developed timber solutions that can meet the target fabric specification. These include information on whole carbon emission and offsetting calculations for a range of key typologies demonstrating the routes to net zero.

The detailed report presented findings including actions for further detailed design, training and skills, technical development and testing, design, and modelling tools.

This, combined with work to develop a standardised manufacturing solution paved the way for a subsequent technical exploration of a low-carbon townhouse funded via Welsh Government's Innovative Housing Programme (IHP).

All of these initiatives acted as the catalyst for the Tai ar y Cyd project which has now grown to include 23 social landlords and is reaching across the Welsh supply chain, supported by skills delivery partners to develop the growth required in Green Skills to support this growing industry. A technical design team was commissioned to support the development of the resultant pattern book, which was launched at an event in Swansea on 5 January 2025.

The collaboration understands that, to deploy the innovative pattern book designs across all member landlords requires new approaches to engage main contractors and supply chain – especially timber frame manufacturers.

The pattern book was therefore co designed with timber frame manufacturers to bring on board their experience and learning – especially from delivering pilot projects commissioned through the Innovative Housing Programme.

This early engagement is opening opportunities to explore what optimum procurement relationships will be needed in the future to unlock supply chain potential for mutual benefit. These conversations will be informed by collaborative approaches being developed in other part of the UK – particularly Edinburgh Homes Demonstrator, Build Better, OSHA and Kit of Parts.



A forest canopy

NARRATIVE

TAI AR Y CYD

As part of Welsh Government's ambitions to make the transition to Net Zero, all housing associations and social landlords are tasked with building the next generation of net zero carbon homes. That's a big challenge because the way we build most homes in Wales has not changed much over decades. To ask social landlords to do so on their own is a big ask, so the Tai ar y Cyd project is looking to maximise the benefits of collaboration and travel that journey in partnership. Tai ar y Cyd is also harnessing the power of social landlords who are working in collaboration to build new zero carbon homes in ways that will help unlock

wellbeing benefits for families, communities, and local economies.

The aim is to develop a standardised specification for the next generation of homes. The designs will be tested and prototyped and achieve a system warranty, so the landlords can be confident that they can raise finance and get insurance on them. Guided by assured performance specification these homes will aim to achieve net zero operational carbon, and a significant reduction in embodied carbon emissions. Crucially these pattern books will serve as a tool for social landlords, propelling the creation of new affordable homes.

In designing these homes, the aim is to prioritise resilience against future energy price fluctuations, with sufficient thermal performance. The homes will be designed to safeguard against overheating, in alignment with anticipated future climate scenarios. The programme seeks to achieve multiple outcomes and create comfortable, happy homes which support the well-being of future occupants.

TIMBER

Integral to the vision is the strategic use of an aggregated pipeline of demand for these homes, unlocking a robust, sustainable, and local supply chain. This supply chain will increasingly rely on timber, fostering the growth of Welsh SMEs and nurturing development of green skills. The use of timber products as building materials will be central to the Tai ar y Cyd house building programme. If the Welsh Government's proposed Timber Industrial Strategy (TIS) aims to ensure the use of more timber products that are grown (e.g. timber studs) and manufactured (e.g. timber frame, windows, and doors) in Wales, then the Tai ar y Cyd programme provides some important context to understand the types of timber products needed, where timber products will be used, quantities, and product requirements to meet specifications.

Tai ar y Cyd will support the development of demand-led growth in the use of sustainable timber products. The project, with the help of the second phase of the Home-Grown Homes (HGH2) project team has mapped the supply-chain in Wales, particularly in terms of timber-frame manufacturers. These are not a heterogeneous group, with each manufacturer supplying variations in timber frame products. This is a challenge for the Tai ar y Cyd team but is being met by aiming to develop a specification that can be delivered via different timber frame solutions. How this

aligns with the call for a standardised approach to timber frame manufacture and construction (and the benefits that come from this) has yet to be tested.

The Tai ar y Cyd project aims to use more Welsh grown timber products. This is a significant challenge that is being addressed in the HGH2 project. These products include sawn wood, boards, and insulation material. Sawn wood refers to timber that has been processed by sawing logs into standardised shapes and dimensions. The sawing process involves cutting the logs lengthwise along their grain to create pieces of wood with flat surfaces and uniform thickness. Sawn wood in timber frame use is usually derived from specific tree species – mostly Sitka spruce – and comes in a variety of grades, and sizes to suit different needs and preferences. Sawn wood also undergoes further processing, such as planing, sanding, or treating, depending on its intended use and desired finish. Currently (March 2024), the timber frame sector in Wales use sawn wood that is imported from Scandinavia or the Baltic States. This timber is fit-for-purpose in terms of price; strength; delivery and payment terms; and dimensional stability. If timber frame manufacturers supplying the Tai ar y Cyd project are to use Welsh-grown sawn wood, then they require a product that is viable in use particularly in terms of stability and price. The HGH2 project is exploring ways of achieving this by working with the supply chain and testing new approaches. The Tai ar y Cyd project will be pressing the case to be involved in piloting alternative ways for Natural Resources Wales to sell their timber with the aim of increased usage in social housing. It is hoped that the first round of affordable schemes that deploy the pattern book will have the opportunity to proactively test the use of alternative timber sales methods to understand challenges and opportunities and help ensure more Welsh timber finds its way into higher value, longer life applications.



Timber for timber frame construction

IMPACT

The Woodknowledge Wales mission is the purposeful development of Wales's forest industries, from tree to product to benefit the economy, the environment and the people of Wales. A forest industry that delivers public good.

The forest and wood supply chain in Wales is under-developed, fragmented, lacks strategic focus and is poorly aligned to deliver public good outcomes. The Tai ar y Cyd project could support a substantial increase in the quantity, value, and purposeful use of home-grown timber. This would also support a greater ambition to create a renewed wood culture in Wales. Tai ar y Cyd will contribute significantly to this mission, creating sustainable demand for a renewable and sustainable construction material.

The study outcomes will provide a guide through which Welsh Government and social landlords in Wales can deliver the building of 20,000 new low carbon, high quality social homes for rent. Delivery through wide-ranging social housing partners, across the geography of Wales, will enable the delivery of good quality sustainable homes supporting supply chain, jobs and skills development

opportunities across the country. They will also contribute positively to achieving Welsh Government's Well Being Goals.

The study will help define the role of social landlords in providing stable demand for and demonstrating good practice in the use of timber as a key product in decarbonising the construction industry. It will also help develop priority markets for Welsh timber in construction. This in turn will help define the supply chain's role in supporting these aims. Involvement of partners across the social housing sector combined with technical advisers, skills advisers and industry bodies will support innovation and drive demand.

The study outcomes will inform the next generation of good, sustainable and efficient homes in Wales providing high quality environments and homes that are a joy to live in. Development of the supply chain will provide skills demand and jobs for many years to come for people in Wales.

CONCLUSIONS

Solutions are required to enable the delivery of high quality, affordable and low carbon housing solutions to reduce carbon emissions whilst providing warm, comfortable and efficient homes for people in Wales. We have witnessed the impact of energy insecurity upon increasing levels of fuel poverty. At the same time levels of homelessness are at an all-time high in Wales. The Tai ar y Cyd study will support the delivery of multiple objectives shared by Welsh

Government, local authorities, housing associations, trade bodies, skills delivery bodies and the timber industry. The resultant pattern book specifications will be available to guide the delivery of low embodied carbon and energy efficient comfortable homes, alleviating housing pressures and delivering net zero targets, housebuilding targets and fundamentally good quality wonderful places for people to live.

Author: Woodknowledge Wales

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Woodknowledge Wales Limited
Ffarm Moelyci, Felin Hen Road, Tregarth, Gwynedd, LL57 4BB

