Decarbonisation Strategy for New Build Homes 2025-28

Strategies, Standards, and Innovations
for a Net Zero Carbon Future

codigroup.co.uk

Our Decarbonisation Strategy for New Homes

Executive Overview

Codi Group's Decarbonisation Strategy for New Build Homes, updated in 2024 and further detailed in 2025, marks a significant evolution in our journey towards Net Zero Carbon. Our strategy outlines a comprehensive plan to align with fast-evolving regulations, industry best practices, and Codi's own ambitions of achieving net zero carbon by 2050. We recognise the dual challenge of balancing ambitious carbon reduction targets with the need for economic viability and the delivery of affordable homes.

Background and Rationale

The built environment is a major contributor to carbon emissions, and the pathway to net zero by 2050 requires a transformation in both operational and embodied carbon associated with homes. Codi's approach is multi-faceted, addressing emissions from running the business, existing homes, and crucially, new build homes. The strategy is driven not only by regulatory expectations (such as the adoption of the Welsh Development Quality Requirements (WDQR) 2021 and updates to Building Regulations) but also by our own values and ambitions, stakeholder pressure from investors, Welsh Government, local authorities, and customers.

Evolution of the Strategy

The strategy builds on lessons from the initial Codi Zero Carbon Plan of 2022, which proved commercially unsustainable in the face of rising costs. Subsequent revisions led to a more affordable and streamlined standard that still met regulatory obligations but allowed for future ambition and flexibility. Key drivers for change have included economic pressures, the introduction of WDQR 2021, and updated Building Regulations (Part L 2022 and forthcoming 2025 amendments).

Regulatory Context and Future Readiness

Future changes in Building Regulations—especially Part L (energy), Part O (overheating), Part F (ventilation), Part S (EV charging), and anticipated Part Z (embodied carbon)—are comprehensively addressed. The strategy ensures that Codi remains ahead of compliance and positions the organisation to exceed regulatory minimums through voluntary best practice adoption.

- Design measures to limit overheating and improve air quality (Part O and Part F).
- Preparation for embodied carbon reporting (Part Z).
- Government, local authorities, and customers.

The Future Homes Standard will come into force in Wales for all new homes – via Part L 2025 and other approved documents. Another major change will be the introduction of the Home Energy Model to replace the current SAP modelling approach.

With the advent of these changes, at some point in the next 18 months it is anticipated that we will need to change the specification of our homes for sale to align with our homes for social rent.

Improvement Plan

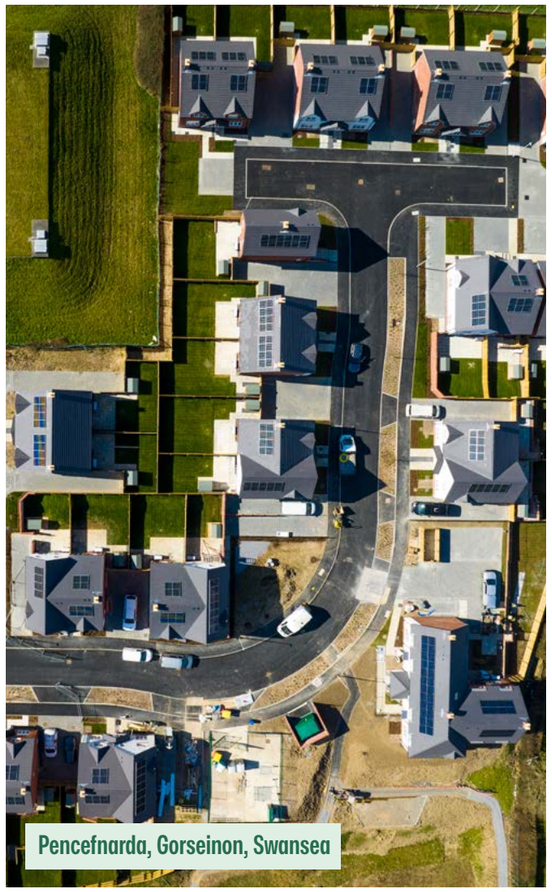
The strategy concludes with a timetable of actions to improve our specification for reducing embodied carbon and other measures to reduce environmental impact whilst improving customer experience.

Placemaking

Codi is committed to the principles of great placemaking as set out in the Placemaking Wales Charter - **dcfw.org/placemaking**

Creu Lleoedd Cymru
Placemaking Wales

Gwynfaen, Penyrheol, Swansea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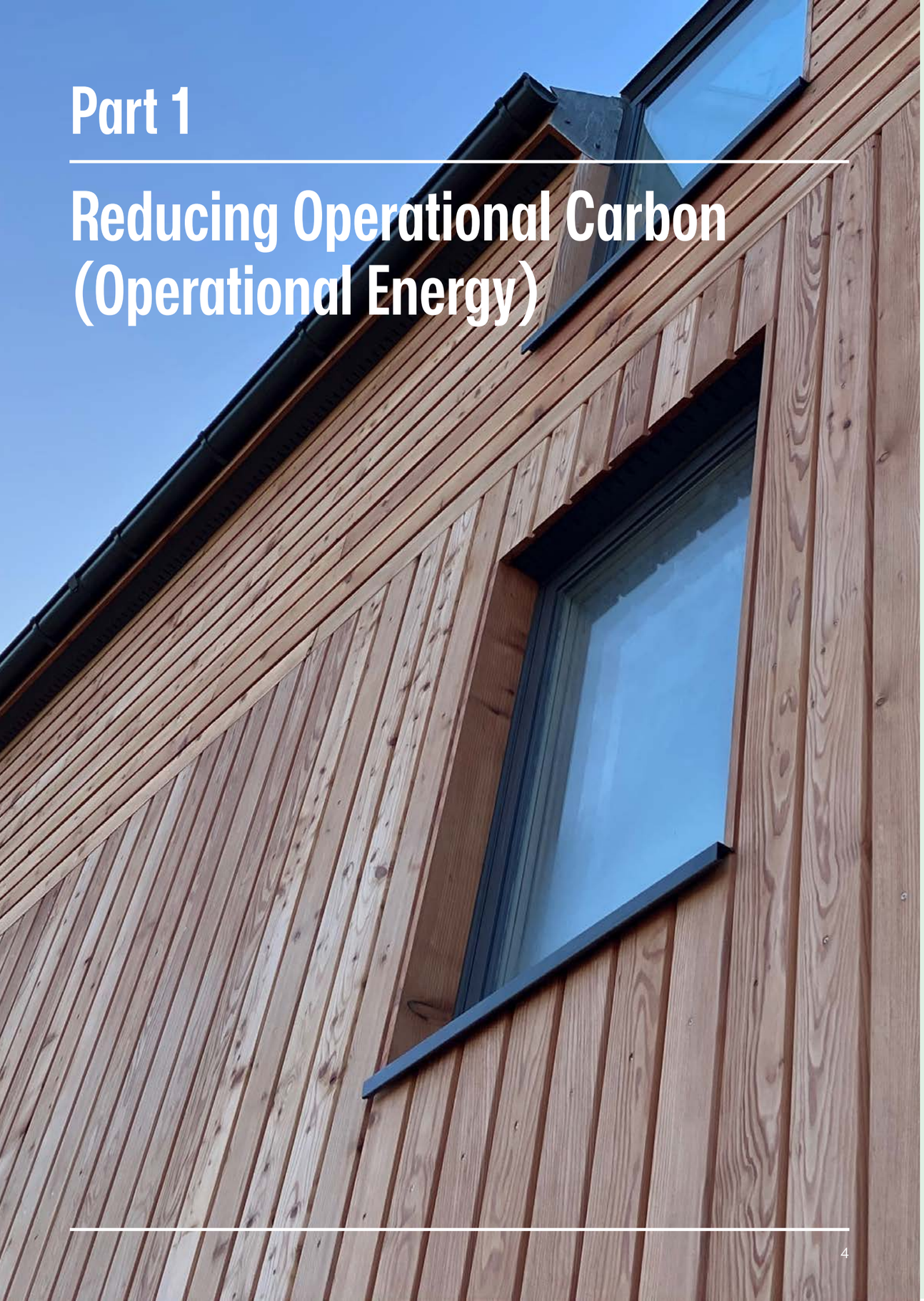


Part 1

Reducing Operational Carbon (Operational Energy)

Our Actions To Reduce Operational Carbon

Operational carbon emissions are generated during the occupancy stage of building life cycle for space and water heating, space cooling, lighting, running the equipment and appliances, etc. It is directly linked to energy consumption and household energy bills, although occupant lifestyle choices also influence energy consumption.

They are also associated with maintenance, and the replacement of building services and other components such as windows, roof materials and kitchens. Codi is committed to lowering Operational Carbon and energy consumption during the lifespan of our new homes. Our Strategy will address this in various ways listed below.

1 Fabric First

Building homes to an excellent energy efficient standard is the most important investment choice.

2 Reducing the Performance Gap

To reduce carbon and energy use homes must be built correctly, by improving training and switching to off-site manufacture.

3 Form Factor

Simple compact house designs will reduce heat losses and future maintenance issues.

4 Passive Design

Natural ventilation, shading, orientation and the right fenestration design can reduce energy bills and overheating.

5 Baseline Standard

A fossil-fuel free solution with heat pumps, PV panels and smart cylinders to provide a low carbon home that's easy to control and affordable.

6 Advanced Standard

We need to upscale to a better standard with improved airtightness and an MVHR system to further reduce heat losses and improve air quality.

7 Monitoring Dashboards

We will monitor the home environment to identify households that need support. Real time data will enable us to diagnose and fix issues more effectively to ensure peak performance.

8 MCS Accreditation

We will introduce a requirement for MCS Accreditation for low carbon technologies in the home. We will also require MCS Accreditation for the designers, installers and Servicing Engineers for these systems.

9 Resident Engagement

A comprehensive Handover Guide is key to reducing carbon emissions and energy bills. We will explore new and better ways to engage with residents.

Codi Group Standards: Baseline and Advanced

Our strategy establishes two principal standards for new homes:

Baseline Standard

Aligned with WDQR 2021 and Part L 2025, it mandates features such as an EPC A rating, non-fossil fuel heating (typically air source heat pumps), stringent fabric U-values (e.g., walls at 0.13 W/m^{2}K), and airtightness targets (5 m^3/h.m^2@50Pa for houses, 3 for flats).

PV panels are sized for EPC A compliance, with options for batteries to further reduce bills. The Baseline is set as the immediate requirement for all social rent homes and, from 2026 (Part L 2025 compliance), also for homes for sale.

Baseline Standard for Houses

Fabric Values (W/m2K)

Walls 0.13
Floor 0.11
Roof 0.11
Windows 1.3
External Doors 1.0

Air tightness: 5 m^3/h.m^2@50Pa

Heating and Hot Water Systems

- Air Source Heat Pump:Vaillant, Daikin, Ariston
- Wet System: Radiators flow temperature 45ºC
- DHW Storage: Mixergy Smart Cylinder
- Alternative DHW Storage: HWC with solar diverter

Other Efficiency Measures

- PV Panels: Sized to achieve EPC A / SAP 92

Optional Battery 5Kw: Can potentially reduce annual energy bill by £400

Baseline Standard for Flats

Fabric Values (W/m2K)

Walls 0.13
Floor 0.11
Roof 0.11
Windows 1.3
External Doors 1.0

Air tightness: 3 m^3/h.m^2@50Pa

Heating and Hot Water Systems

- Radiant Heating
- Air Source Cylinder: Mixergy IHP, Dimplex Edel, Vaillant aroStor

Other Efficiency Measures

- MVHR System – Nuaire, Vent Axia
- PV Panels: Sized to achieve EPC A / SAP 92

Optional Battery 5Kw: Can potentially reduce annual energy bill by £400

*Batteries are not part of our standard specification, but can be added on individual projects subject to funding

Baseline Standard Performance, Cost and Carbon Metrics

			Battery included	
	House	Flat	House	Flat
Annual Energy Bill**	£1121.90	£938.90	£693.57	£626.70
Cost Uplift - Social Above Part L 2020	£0	£3,400	£4,000	£7,400
Cost Uplift - Sales Above Part L 2020	£12,500	£11,900	£16,500	£15,900
Operational Carbon $kgCO_2/year/m^2$	0.85	1.42	0.83	1.39

** Based on average resident usage, average outdoor temperatures and 2024 electricity tariff

Gwynfaen Show Home, Penyrheol

Advanced Standard

Based on the AECB Carbon Lite Standard, this option features even lower heating demand (as low as 27 kWh/m^2/year for houses, 24 for flats), superior airtightness (<1.5 m^3/h.m^2@50Pa), and incorporates MVHR systems as standard which will reduce heating demand whilst improving air quality.

It is recommended where viability allows, particularly for social rent homes, and focuses on further lowering both operational and embodied carbon.

Spec changes are highlighted below.

Advanced Standard for Houses

Fabric Values (W/m2K)

Walls 0.13
Floor 0.11
Roof 0.11
Windows 1.3
External Doors 1.0

Air tightness: 1.5m^3/h.m^2@50Pa

Heating and Hot Water Systems

- Air Source Heat Pump:Vaillant, Daikin, Ariston, Mitsubishi
- Wet System: Radiators flow temperature 45°C
- DHW Storage: Mixergy Smart Cylinder
- Alternative DHW Storage: HWC with solar diverter

Other Efficiency Measures

- MVHR System - Nuaire, Vent Axia
- PV Panels: Sized to achieve EPC A / SAP 92

Optional Battery 5Kw: Can potentially further reduce annual energy bill by £300

Advanced Standard for Flats

Fabric Values (W/m2K)

Walls 0.13
Floor 0.11
Roof 0.11
Windows & External doors 1.25

Air tightness: 1.5m^3/h.m^2@50Pa

Heating and Hot Water Systems

- Radiant Heating
- Air Source Cylinder: Mixergy IHP, Dimplex Edel, Vaillant aroStor

Other Efficiency Measures

- MVHR System – Nuaire, Vent Axia
- PV Panels: Sized to achieve EPC A / SAP 92

Optional Battery 5Kw: Can potentially reduce annual energy bill by £400

*Batteries are not part of our standard specification, but can be added on individual projects subject to funding

Advanced Standard Performance, Cost and Carbon Metrics

			Battery included	
	House	Flat	House	Flat
Annual Energy Bill**	£686.26	£834.79	£338.72	£550.09
Cost Uplift - Social Above Part L 2020	£5,000	£4,400	£9,000	£8,400
Cost Uplift - Sales Above Part L 2020	£17,000	£11,900	£21,000	£16,400
Operational Carbon $kgCO_2/year/m^2$	0.35	0.91	0.33	0.89

** Based on average resident usage, average outdoor temperatures and 2024 electricity tariff.

Annual Energy Bills: Significant reductions are achievable with advanced standards and battery storage (£1121.90/year baseline vs £338.72/year advanced with battery for houses).

Ladyhill Court, Newport

Preferred Technologies

Based upon our experience of delivering low carbon homes under the Innovative Housing Programme (IHP) and more recently homes to meet with WDQR 2021 – we have identified a preferred list of solutions and manufacturers to complement our specification.

Low Carbon Solutions

Ground Source Heat Pumps
Kensa and Mastertherm

Smart Cylinders and Air Source Cylinders
Mixergy, Mixergy IHP, Valliant aroSTOR, Dimplex Edel

Batteries
Duracell, Sonnen (Subject to availability)

Other Technologies
Radiant Heating: Curv 360, Ambion, ASTECtherm
Graphene Underfloor Heating: Haydale ‘ Just Heat’

MVHR Systems
Nuaire, Vent Axia (with Summer Bypass mode to reduce overheating)

Air Source Heat Pumps
Vaillant, Ariston, Daikin, Mitsubishi

Continuous Improvement
We will continuously monitor during post-occupancy to ensure that our technology and system choices are refined by lived experience.

We will review the above list every 2 years to ensure that we maintain pace with product development, customer service levels and changes in regulations.

MCS Accreditation

The Microgeneration Certification Scheme (MCS) is an independent body that certifies low-carbon products and installations used to produce electricity and heat from renewable sources. The MCS quality assures and provides consumer protection (Consumer Code) for microgeneration installations and installers. These consist of small-scale renewable electricity technologies such as solar PV, biomass, wind, heat pumps and heat products.

It creates and maintains standards that allows for the certification of products, installers and their installations. Associated with these standards is the certification scheme, run on behalf of MCS by Certification Bodies who hold UKAS accreditation to ISO 17065.

Codi and our customers will benefit from requiring MCS Accreditation for our low-carbon and renewable energy technology products and installers. MCS is a mark of quality. Membership of MCS demonstrates adherence to these recognised industry standards, highlighting quality, competency and compliance.

MCS CERTIFIED

We will introduce a requirement for MCS certification for Heat Pumps, Battery Storage, Photovoltaic Panels, and other small-scale renewable products. We will also require MCS certification for the designers, installers and Servicing Engineers for these systems.

Modern Methods of Construction (MMC) and Standardisation

Codi will embrace Modern Methods of Construction (MMC), especially 2-Dimensional panellised off-site construction – known as Category 2 in the Welsh Government MMC Strategy for Social Housing. This forms a core part of our decarbonisation strategy. Benefits include improved quality, consistency, reduced performance gaps, and potential cost efficiencies from standardisation.

We will establish a dedicated framework with local MMC suppliers, standardising approaches, and developing a series of "MMC-ready" house types to streamline off-site manufacturing.

Panels for Gwynfaen being constructed at SO Modular Factory, Neath

Timetable for implementation

1 – Dec 2024
Invite expressions of interest

2 – Mar 2025
Form group of local MMC manufacturers

3 – Apr - Jul 2025
Agree a single preferred wall build-up / panel option

4 – Aug - Sep 2025
Pricing excercise

5 – Feb - Jun 2026
Redesign house types so that they are 'MMC Ready' using the agreed single approach

6 – Feb - Jun 2026
Agree procurement options

7 – Jun 2026
Go live for all new products

Codi Collections

Our Homes for Sale

Codi also build homes for sale via our in-house company. Our homes for sale are often built alongside our homes for social rent reinforcing our philosophy that favours mixed-tenure communities.

Historically, our homes for sale have been built to a different specification from our homes for social rent – largely because they do not need to comply with WDQR 2021 in terms of energy efficiency, space standards and being 'fossil-fuel free'. Our homes for sale compete with other housebuilders on the open market who also do not need to comply with WDQR 2021. For this reason, our homes for sale have been based on a gas central heating solution.

Part L 2025: Future Homes Standard

The Welsh Government is aligning the Building Regulations in Wales with the decarbonisation objectives set out in the Future Homes Standard. They are currently out to consultation on amendments to Part L (Conservation of Fuel and Power) which will have implications to the specification for our homes for sale.

Under the proposed Part L 2025, it will be prohibitively difficult to achieve compliance with a gas central heating system. There are also other criteria which require an improvement in building fabric and the installation of renewable energy solutions compared to the 2022 standards. The implications for our homes for sale points to an alignment between the sales and social rent specifications.

We can either adopt the same Baseline Standard as our social rent specification, or model more cost-effective alternatives that do not need to achieve EPC A and WDQR 2021 compliance.

Baseline Standard for Houses

Fabric Values (W/m2K)

Walls	0.13
Floor	0.11
Roof	0.11
Windows	1.3
External Doors	1.0

Air tightness: 5 $m^3/h.m^2$@50Pa

Heating and Hot Water Systems

- Air Source Heat Pump:Vaillant, Daikin, Ariston
- Wet System: Radiators flow temperature 45°C
- DHW Storage: Mixergy Smart Cylinder
- Alternative DHW Storage: HWC with solar diverter

Other Efficiency Measures

- PV Panels: Sized to achieve EPC A / SAP 92

Optional Battery: 5kW Duracell

Possible Alternative Approach for Sales Homes

Alternative Heat & Hot Water Systems

- Radiant Heating Panels
- Air Source Cylinder for Hot Water

Other Efficiency Measures

- PV Panels: Sized to achieve EPC A / SAP 92

Gwynfaen, Penyrheol, Swansea

Part 2

Reducing Embodied & Whole Life Carbon

Operational Carbon only accounts for around 10-30% of a home's total emissions. To obtain the full picture, we must factor in Embodied Carbon which represents 70-90% of the home's total emissions. Millions of tons of carbon are released every year during the lifecycle of building materials, including extraction, manufacturing, transport, construction, and disposal. There are many better choices we can make.

Our strategy emphasises the importance of considering not just operational, but also Embodied and Whole Life Carbon. While the UK currently lacks mandatory embodied carbon reporting for new homes, we will trial measurement, setting provisional targets (1,000 $kgCO_2e/m^2$) and a pathway for future reduction (500$kgCO_2e/m^2$).

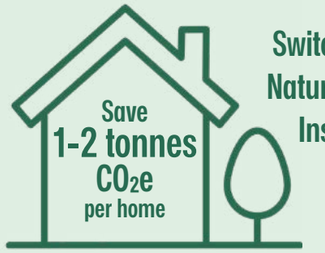
Hempcrete in use at Pearson Way, Neath

Our Improvement Plan sets out a timetable of actions and targets for measuring and reducing embodied carbon along with other measures such as contractor awareness raising and training.

70-90%

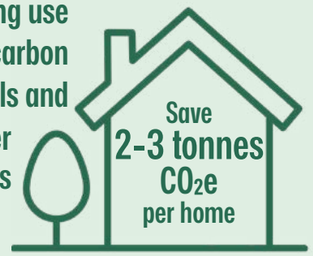
of a home's carbon emissions are released prior to occupation

We will reduce the upfront carbon emmissions by...



Switching to Natural Fibre Insulation

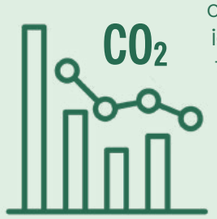
Maximising use of low carbon materials and apply all other measures



Our Actions To Reduce Embodied Carbon

1 Carbon Measurement and Targets

Carbon measurement tools such as One Click LCA in combination with Building Information Modelling (BIM) will enable us to measure and plan the embodied carbon emissions associated with our new homes and identify what needs to change to achieve our long-term target. We will require our designers to use these tools.



2 Early Stage Embodied Carbon Toolkit

Woodknowledge Wales has produced an easy-to-use online toolkit to helps housing developers model the carbon emissions potential of new sites being considered. We will trial this tool and its incorporation into project approval stages.

Visit: **esect.co.uk**

3 Materials

We will transition to low carbon materials for our housebuilding. Timber, Natural fibre insulation, Hempcrete and other low carbon alternatives offer lower carbon emissions and better indoor air quality than current materials. We will explore the adoption of Environmental Product Declarations (EPDs) as a specification and contractual requirement for our new projects.

4 Contractor Training

To reduce embodied carbon emissions, we need to radically change the way we build. Over the next 3 years, the new focus will be on measuring carbon, using lower carbon materials and harnessing off-site construction. We will engage with our contractors and supply chains to ensure that they can evolve at the same pace with the training programmes and tools they need.

5 Reduce On-site Carbon Emmissions

Carbon emissions that result from site-based operations need to be reduced. We will undertake analysis and training to identify measures that can be adopted by our contractors – with a view to bringing this into our contracts by 2028.

6 Re-use existing buildings

Many development sites include existing buildings such as offices, chapels, schools, or other facilities. Early consideration should be given to upgrading and reusing these buildings for new residential apartments, as it is often the least carbon-intense approach.

Lessons Learned, Monitoring, and Resident Engagement

The "performance gap"—the difference between theoretical and actual energy use—is a recurring theme. Strategies include rigorous quality control, commissioning checks, post-occupancy evaluation, and use of building performance dashboards. Occupant behaviour is identified as a major variable in in-use energy and carbon; therefore, the strategy stresses the importance of clear, accessible Home User Guides (HUGs) and ongoing tenant engagement.

Home User Guides

Providing residents at handover with the best information on how to use their home and its technologies to ensure a comfortable environment at an affordable running cost is key to improving resident experience and reducing carbon emissions.

The quality and delivery of guidance is the single most influential factor to improve upon if we are to reduce both carbon emissions and energy bills.

We will explore and adopt new and better ways of engaging with residents. Techniques such as explanatory videos are proving to be popular.

Monitoring and Dashboards

We will explore monitoring solutions that discretely enable us to monitor:

- Temperature
- Relative Humidity
- Air Quality

To identify any households that need support. Real time performance data from the systems we install will enable us to diagnose and fix issues more effectively to ensure peak performance.

Dashboards linked to monitoring can help us identify the environmental conditions and the performance of key systems in the home. This can also reduce the need to enter the home.

Maintenance and Lifecycle Costs

Innovative and low carbon technologies bring new maintenance considerations. Projected annual servicing costs for our new homes are competitive with existing homes, and the strategy details requirements for all key systems (including heat pumps, MVHR, batteries, and hot water cylinders). A focus on remote monitoring and diagnostics will further reduce costs and improve satisfaction over time.

Implementation of our Improvement Plan

The approach is deliberately incremental, balancing ambition with practicality:

- Immediate Measures: Adopting the Baseline Standard, setting soft targets for heating demand (≤40 kWh/m^2/yr), energy intensity (≤75 kWh/m^2/yr), and embodied carbon. Introducing improved user guides and working with MMC supply chains.
- Short-Term (12–18 months): Trialling the Advanced Standard, adopting Whole Life Carbon measurement tools, prioritising local materials, piloting sustainable materials and biodiversity standards, and refining water and waste strategies.
- Medium-Term (18–36 months): Requiring EPDs and MCS certification for low carbon technologies, further reducing upfront carbon, and exploring community heat networks.

1 Immediate Measures

- Adopt the Baseline Standard for new social homes
- Begin trialling the Advanced Standard for new social homes
- Trial One Click LCA and Early-Stage Carbon Measurement Tool on key projects
- Financial modelling of lowering Embodied Carbon target from 1000 to 500 kgCO_2e/m^2
- Home User Guides – adopt the Gwynfaen approach for all new projects
- Form MMC Group and adopt the One Wall Approach
- Set soft targets for heating demand, and energy intensity

2 Short-term Measures (12-18 months)

- Adopt the Baseline Standard for new sales homes
- Set provisional Carbon Budgets for new social homes and trial this on pilot projects
- Trial the introduction of EPDs and sustainable materials for new social homes
- Work with contractors and local supply chain on embodied carbon reduction and targets
- Refine biodiversity, pollution, water and waste strategies

3 Medium-term Measures (18-36 months)

- Adopt the Advanced Standard for new social homes
- EPDs become a contractual requirement for new social homes
- MCS Accreditation for building services designers, products, and installers
- Embodied Carbon budgets set for new social homes projects

Other Sustainability Measures

Codi's strategy extends beyond energy and carbon, recognising the broader sustainability agenda. We will work with our designers to introduce further improvements into the design of our homes:

Biodiversity Net Gain:

Adoption of a framework to deliver measurable improvements in site biodiversity post-development, following Building for Nature principles and the Welsh planning approach.

Pollution, Waste, and Water Efficiency:

Construction Environmental Management Plans (CEMPs) for all sites, alongside a robust waste hierarchy (eliminate, reduce, reuse, recycle, dispose). Water efficiency will be improved with flow-regulated fittings and a maximum of 125 litres per person per day.

Community Heating Networks and Micro Grids:

Codi acknowledges the potential benefits of district/community heating schemes. Our strategy highlights the need for further research into their technical and economic feasibility, aligning with national ambitions for low-carbon local energy systems.

Parc Eirin, Tonyrefail

Conclusions and Recommendations

The Codi Decarbonisation Strategy is a living document, designed to be responsive to regulatory, technological, and market changes. It combines clear standards and targets with innovation, a focus on occupant wellbeing, and an integrated approach to carbon, cost, and quality. Key recommendations include:

- Adopt the Baseline Standard for all new social homes immediately, with enhanced standards where viable.
- Invest in battery storage where possible to deliver substantial bill reductions for residents.
- Continuously measure and report on embodied and operational carbon, setting increasingly stringent targets over time.
- Drive standardisation and MMC adoption through local supply chain partnerships.
- Engage residents through clear guidance and feedback mechanisms to ensure homes perform as intended.
- Prepare for future regulatory requirements by proactively adopting best practices in energy, materials, biodiversity, and waste management.

Final Reflection

Codi's 2025 strategy positions the organisation as a leader in Welsh and UK housing decarbonisation. By combining robust standards, technological innovation, supply chain engagement, and resident-centred design, Codi is charting a pragmatic, scalable, and future-ready path towards a zero-carbon built environment.

If you'd like to know more about anything in this document please contact:

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