



Llywodraeth Cymru  
Welsh Government

# Collaborative Project to Develop a Warrantied Design System for the Delivery of Zero Carbon Homes from Timber, at Scale

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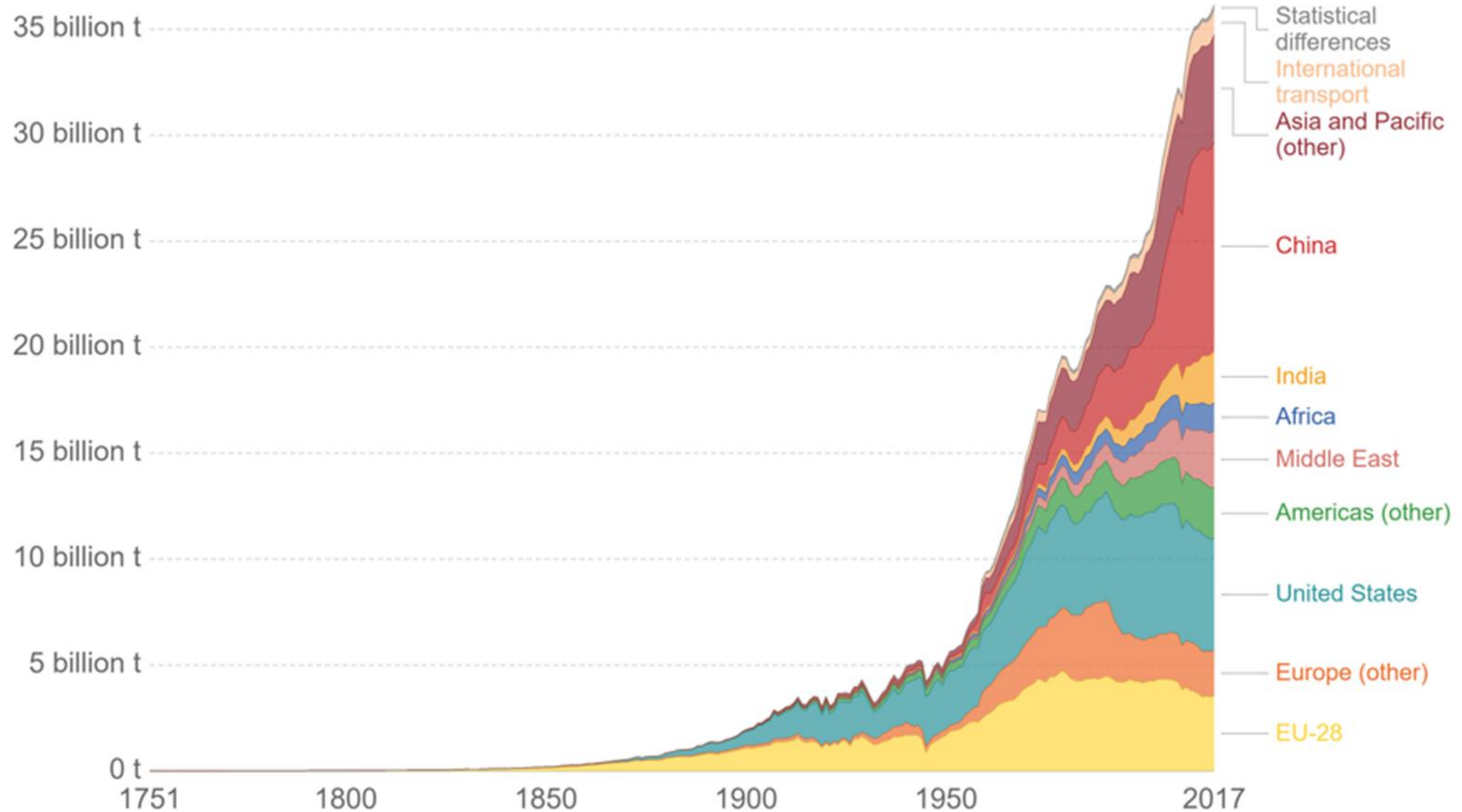
Presentation to CHC Webinar

17<sup>th</sup> February 2021

## Introduction

- Background to the project
- Explain the 3 stages of the project
- Extend an invitation from the 11 councils

# Annual total CO<sub>2</sub> emissions, by world region

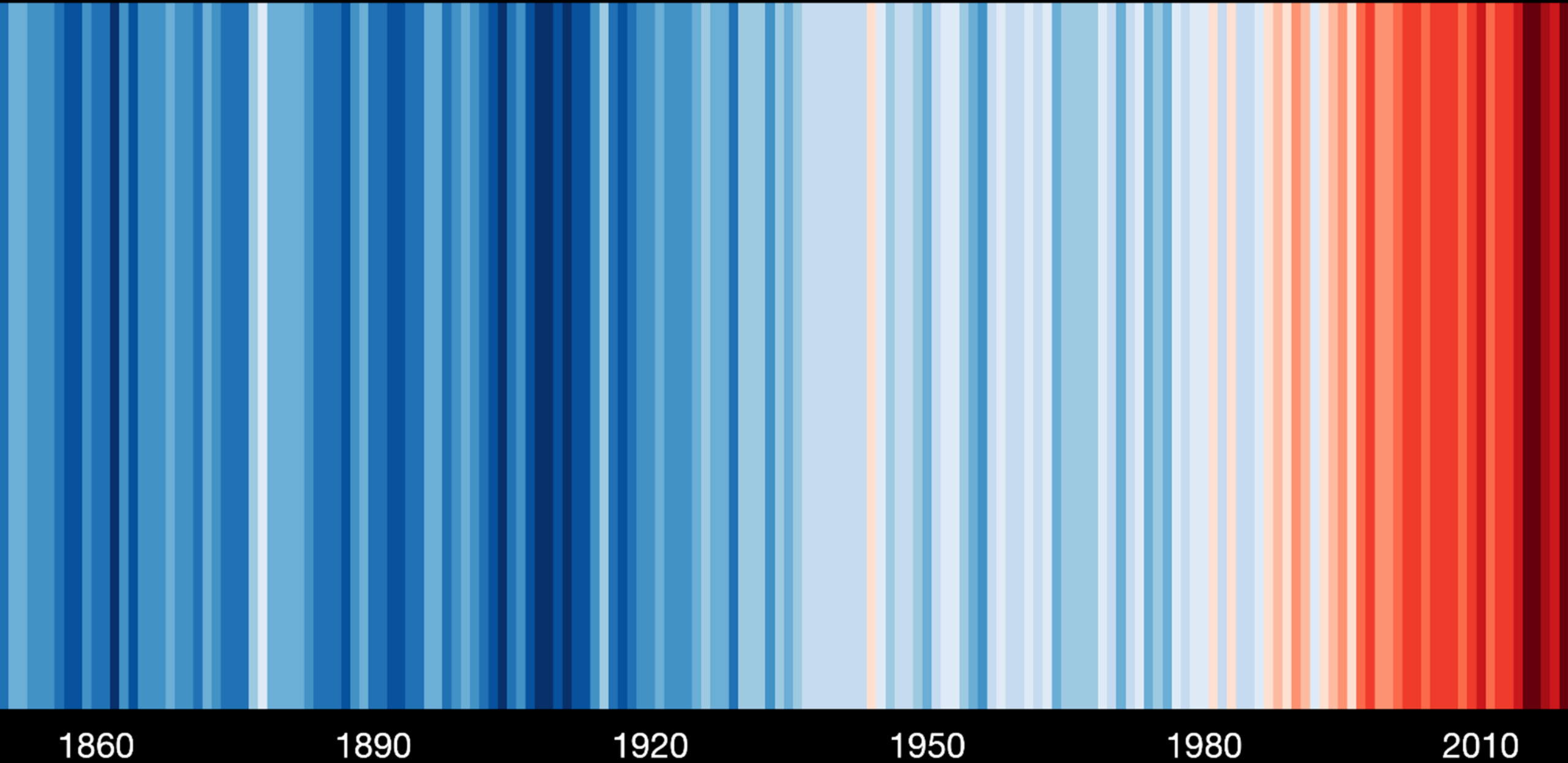


Source: Carbon Dioxide Information Analysis Center (CDIAC); Global Carbon Project (GCP)

Note: The difference between the global estimate and the sum of national totals is labeled "Statistical differences".

OurWorldInData.org/co2-and-other-greenhouse-gas-emissions • CC BY

# Global temperature change (1850-2019)



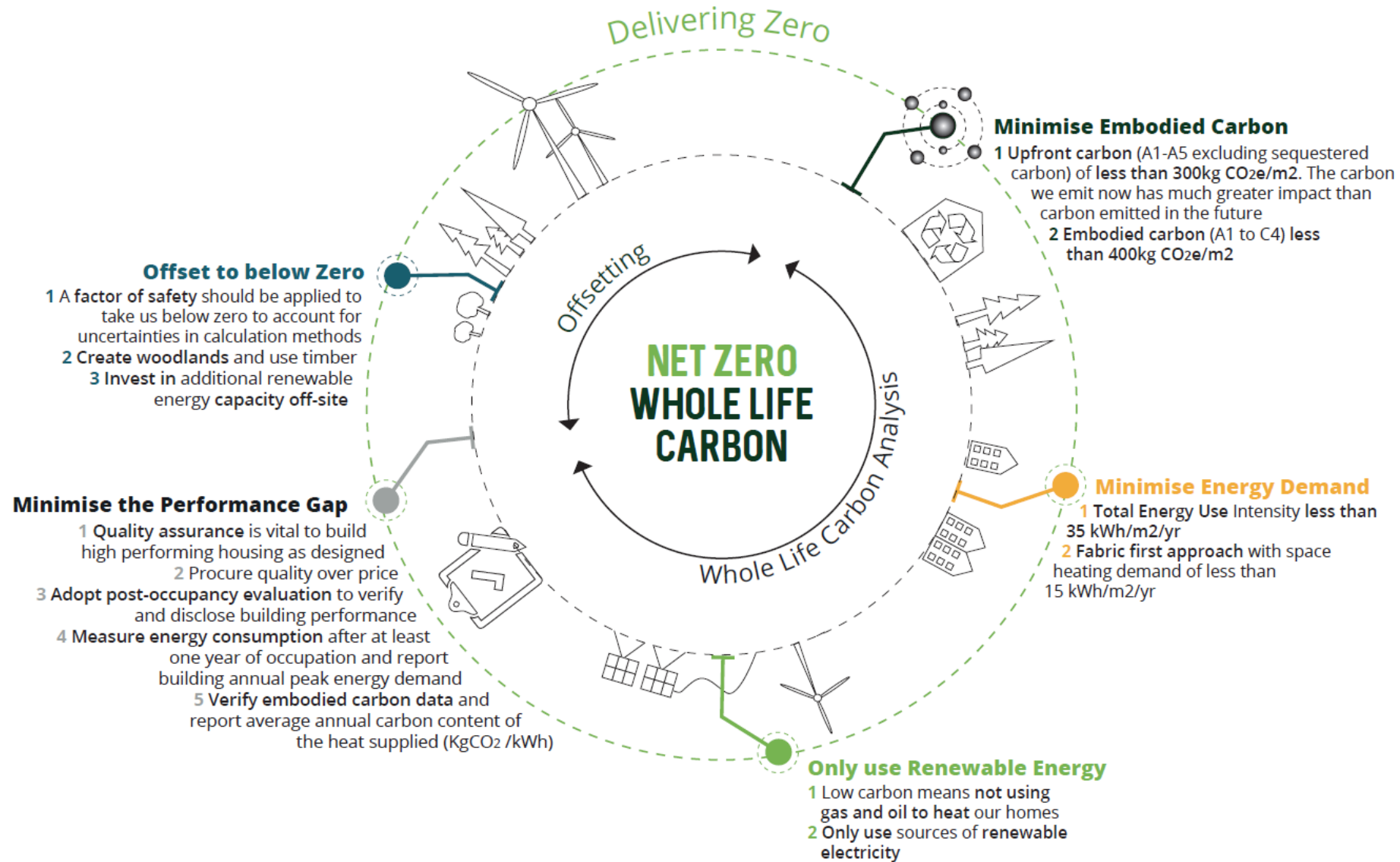
## Background

- Purpose of Council Housing Development Forum Wales (CHDFW) is learning & collaboration
- Idea follows survey of 11 councils and builds on work undertaken in Home Grown Homes project and developed in discussion with 11 councils
- Proposal
  - Collaborate in design of zero carbon timber frame home
  - Collaborative approach to procurement (buyers club)
  - Upskill DSO's or partner SME's to safely erect and fit out homes
- Support for proposal given at the CHDFW meeting in October
- Powys County Council (PCC) made successful application for Innovation Funding to support Stage 1 of the project

## Progress to Date

- Architect and design team appointed
- Design Sub Group established
  - Met on 4 occasions
- Outcome of stage 1:
  - Design of a short terrace of 2 bed 4 person houses to RIBA stage 4
  - Ultra low carbon but achieve zero carbon by offsetting
  - Identified fabric solution (advanced panel system)
  - Detailing to eliminate cold bridging
  - Stage 1 complete by end of March 2021

# Key principles in the design of a zero carbon home

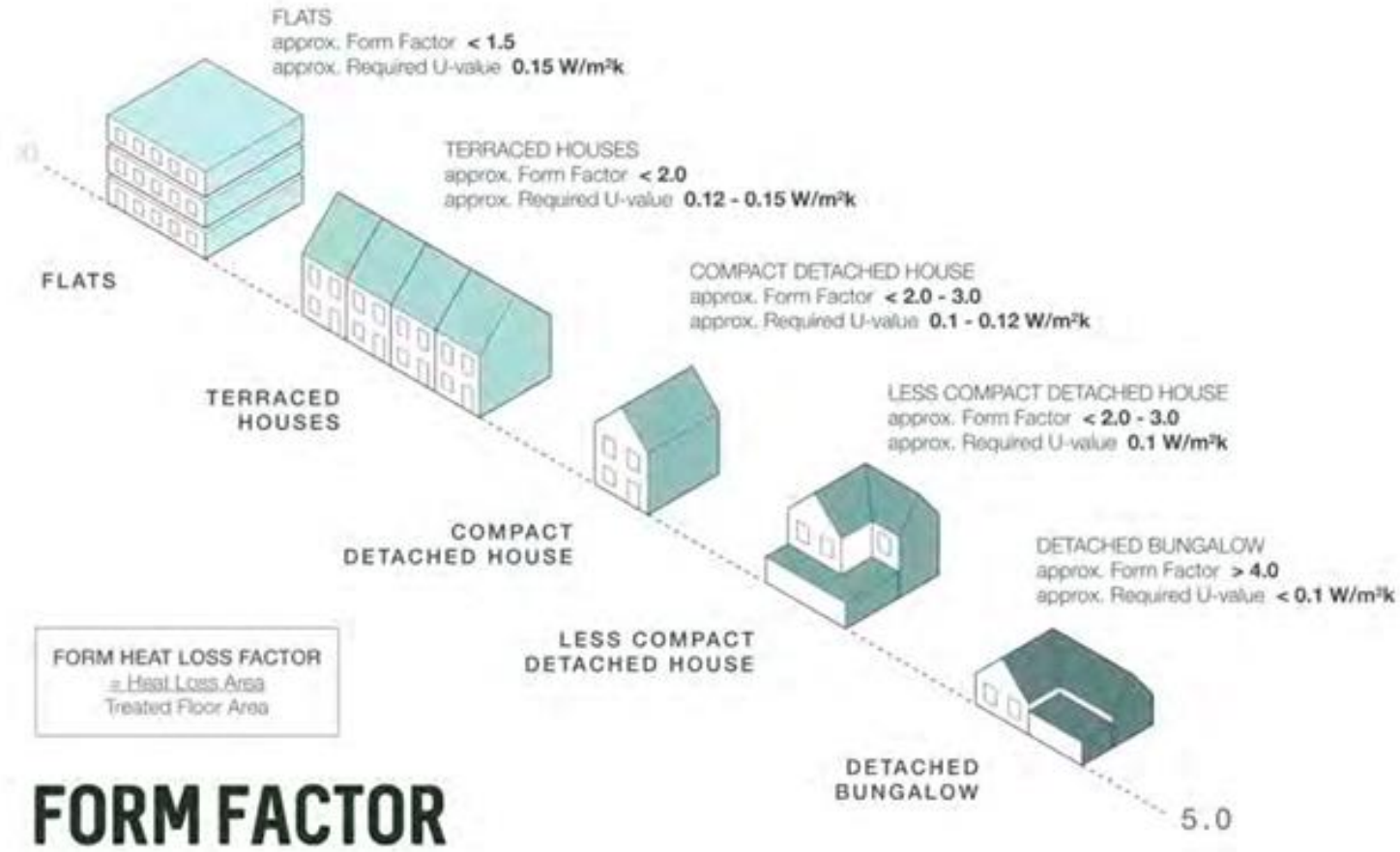


## Findings from the research

- Upfront/embodied carbon changes everything
- Use of high performing advanced panel system
  - use of natural insulation materials - wood fibre/cellulose
- Form factor essential to achieve net zero – will fundamentally change housing design



# The importance of form factor



# Stage 1 - what's being designed

## House Type 07

A 2 bed 4 person house type with compact form factor when arranged in a mews or town house style arrangement

### Features

- Compliant with Design Quality Requirements in Wales and Lifetime Homes
- Single aspect arrangement suitable for terracing with habitable rooms faced to the secondary elevation and entrance and minimal openings to the primary elevation.
- Roof proposed as a pitched arrangement with low eaves. Roof insulated and airtight at rafter level.

### Wall Area

Primary Elevation	7.7sqm
Secondary Elevation	12.7sqm
<b>Total :</b>	<b>20.4sqm</b>

### Gross Internal Area

Ground :	36.4 sqm
First :	31.6 sqm
Second :	29.0 sqm
<b>Total :</b>	<b>97.0 sqm</b>

**GIA : Glazing Ratio** 21%

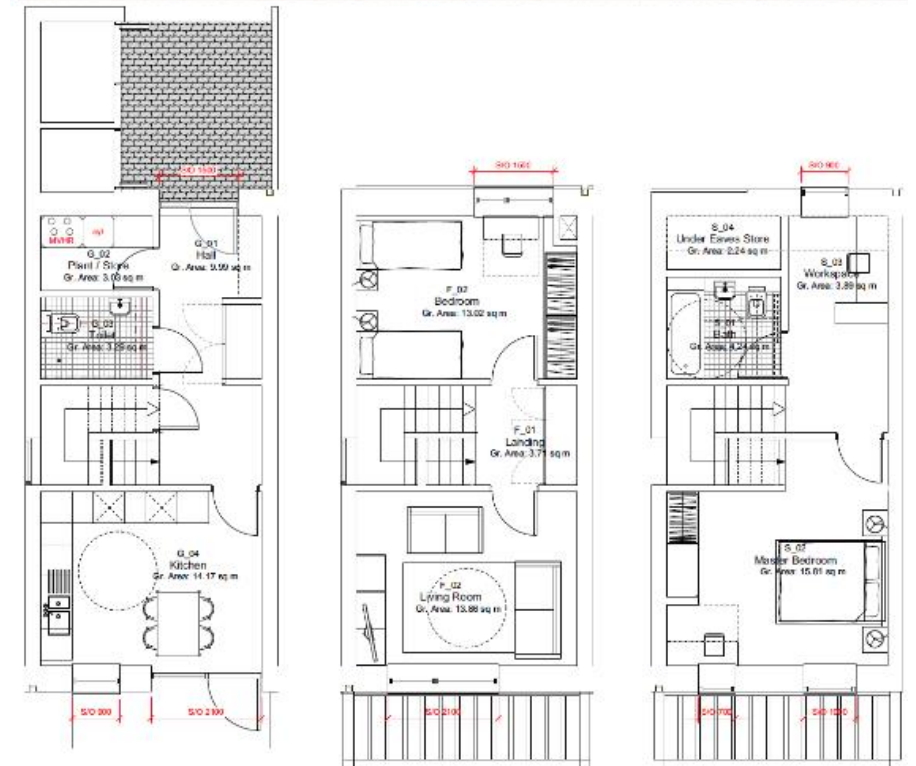
### Wall : Glazing Ratio

Primary Elevation	23.6%
Secondary Elevation	33.25%
Side Elevations	0%

**Treated Floor Area** 90.5 sqm

### Form Factor

Detached	3.06
Semi Detached	2.49
Terraced	1.92



## Stage 2

- Design of additional property types
    - 1 bed 2 person flats, 2 bed 3 person flats, 3 bed 5 person houses
  - Proto-typing and testing the build system
    - fire, structural stability and buildability
  - Achieving warranties for the build system
  - Whole life carbon modelling
  - Development of a manual for the manufacture and assembly of homes
  - Achieving BM TRADA Q-Mark accreditation
- 
- Most effective way forward is to establish and seek partners to form an Innovation Partnership (both designers and manufacturers)

## Next Steps

- Development of brief for Innovation Partnership
- Advertise opportunity on Sell2Wales (Late Spring 2021)
- Appoint supply partner(s) (Summer 2021)
- At conclusion of Innovation Partnership let contact to supply homes (Late Summer 2022)
- Support work with Wales based timber framers to form collaboration to win both the IP and the supply contract
- Identify volume of homes to be supplied via contract
- Work with council DSO's and/or partner SME's to ensure skills in place to erect and fit out homes

## Why is this project important

- Addresses climate emergency
- Will produce a high quality, high performing build system with low levels of upfront carbon
- Scale of potential orders should allow economies of scale and affordable price
- Benefits the foundational economies of all regions of Wales
- Creates opportunities for DSO's and/or partner SME's to grow
- Demonstrates the benefits of collaboration

## Questions and discussion

Over to you

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