

# GREEN HOME FESTIVAL

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# Edinburgh Home Demonstrator

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## The City of Edinburgh Council

- A just transition
- Preventing future emissions and adapting to unavoidable climate change
- Place based, 20-minute neighbourhoods
- Energy efficiency
- Electrification first
- Progressive policy



**EDINBURGH  
NET-ZERO  
2030**

## Start

- Jan 2020 Research published by Edinburgh Napier University and Glasgow School of Art
- July 2020 Edinburgh Home Demonstrator Programme formed
- July 2020 – April 2022 development of programme objectives
- April 2022 onwards testing and refining delivery model



# Partners

## PROJECT

- Scottish Government
- BE-ST
- Offsite Solutions Scotland
- Scottish Futures Trust
- Edinburgh Napier University
- The University of Edinburgh

## INDUSTRY

- CCG (Scotland) Ltd
- Robertson Timber Engineering
- Donaldson Timber Systems
- Connect Modular
- MAKAR

## HOUSING DELIVERY

- The City of Edinburgh Council
- East Lothian Council
- Midlothian Council
- East Lothian Council
- Fife Council
- The Scottish Borders Council
- Berwickshire Housing Association
- Eildon Housing Association
- Wheatley Group
- Link Housing Association
- Kingdom Housing Association

## Vision

- Support design and delivery of high performance, affordable, net zero housing
- Provide flexibility in procurement to support local, regional and national economic growth
- Provide choice and mass customisation to house design within embedded MMC efficiencies to deliver great places.



## Progress

- Review of regional housing pipeline
- Developed a regional housing brief
- Developed regional housing types
- Community Carbon
- Implemented regional delivery partner
- Developing procurement routes

10

Housing  
Types

16,929

Homes

80%

Lower  
Emissions\*

3

Pilot Projects

\*when compared to the current building regulations

# EDINBURGH HOME DEMONSTRATOR



Pilot 1

Mixed use development of 75 affordable homes & shops which is being specifically delivered to provide post occupancy monitoring and evaluation of the EHD process using a digital twin



Pilot 2

Development of 130 affordable homes & will be used to refine and prototype the housing typologies and their use under interface with different manufacturers



Pilot 3

Piloting the delivery of homes across the region through collaborative procurement whilst setting pre-manufactured value targets



A current portfolio of 34 live new build sites operational across 12 local authority areas currently delivering 1250 affordable homes per annum .

To March 2021 we turned over £194 m despite losing 3 months to Covid .

84% of current workload is negotiated.

A pipeline of 1170 homes under delivery to net zero & passiv standards with 5 key partners.

**“One of Scotland’s most innovative and dynamic manufacturing & construction organisations.”**

The Scottish Government



CCG has a 781-strong workforce spread across a fully-integrated group structure.

Construction capabilities extend to :

- Affordable housing
- Private housing & BTR
- Care Homes
- Early Years Centres
- Primary Schools
- Commercial premises

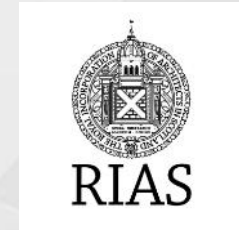
Company	Total Number
CCG (Scotland)	478
CCG OSM	123
CCG Manufacturing	46
Hampton & Steel	7
Arc-Tech (Scotland)	120
Arc-Tech MU	7
<b>Total for Group</b>	<b>781</b>

CCG (Scotland)	Total Number
Board of Directors	6
Management Team	17
Professional & Technical Staff	77
Contracts Managers	5
Project Managers	4
Site Managers	46
Assistant Site Managers	14
Trainee Assistant Site Managers	9
Foreman	19
Customer Care	7
Apprentices	44
Bricklayers	41
Joiners	25
Plumbers	5
General Operators	112







## CCG has been mainstream in Off-Site MMC for over a decade .

Change was an evolution rather than a revolution driven by our desire to :

- **Improve quality**
- **Productivity**
- **Reduce site based waste & inefficiency &**
- **Enhance Profitability**

Business culture is one of continuous improvement ....our product & our people.



## Sector Drivers

Housing need – more & faster

Sector growth – PRS

Sustainability & Climate Change

Increased regulation

Skills shortage

Brexit

Pandemic

Inflation

Risk!!



## CCG OSM launched in 2010

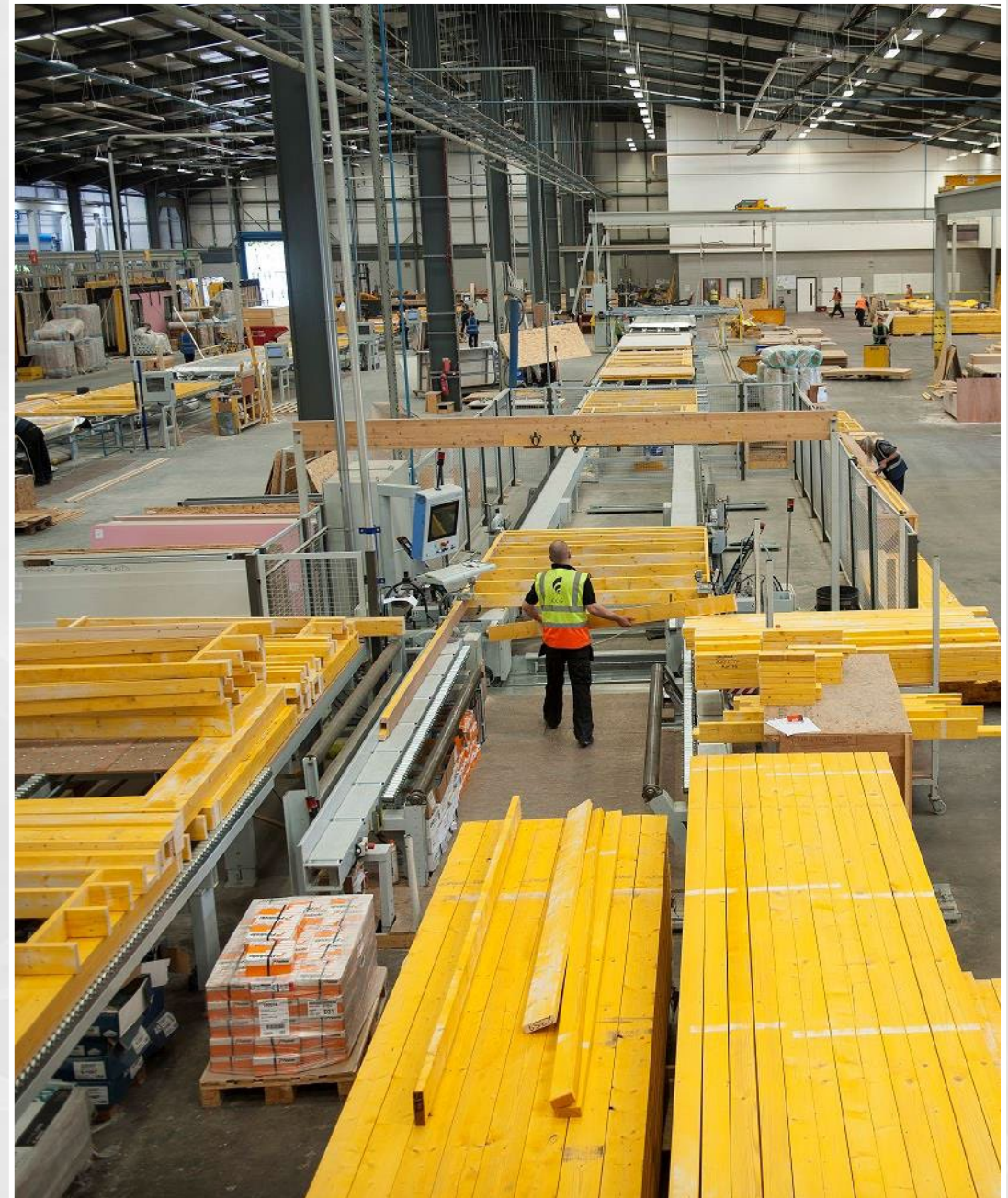
**£12m private investment from CCG Board of Directors**

**120 direct employees**

**Plant is 130,000 ft<sup>2</sup>**

**3 Lane cad /cam interfaced platform delivers our 'iQ' product a closed panelised wall system with insulation , wall linings , windows and doors pre-installed , with floor and roof cassettes CCG OSM delivers a superstructure at a rate of **1 home every 3hrs.****

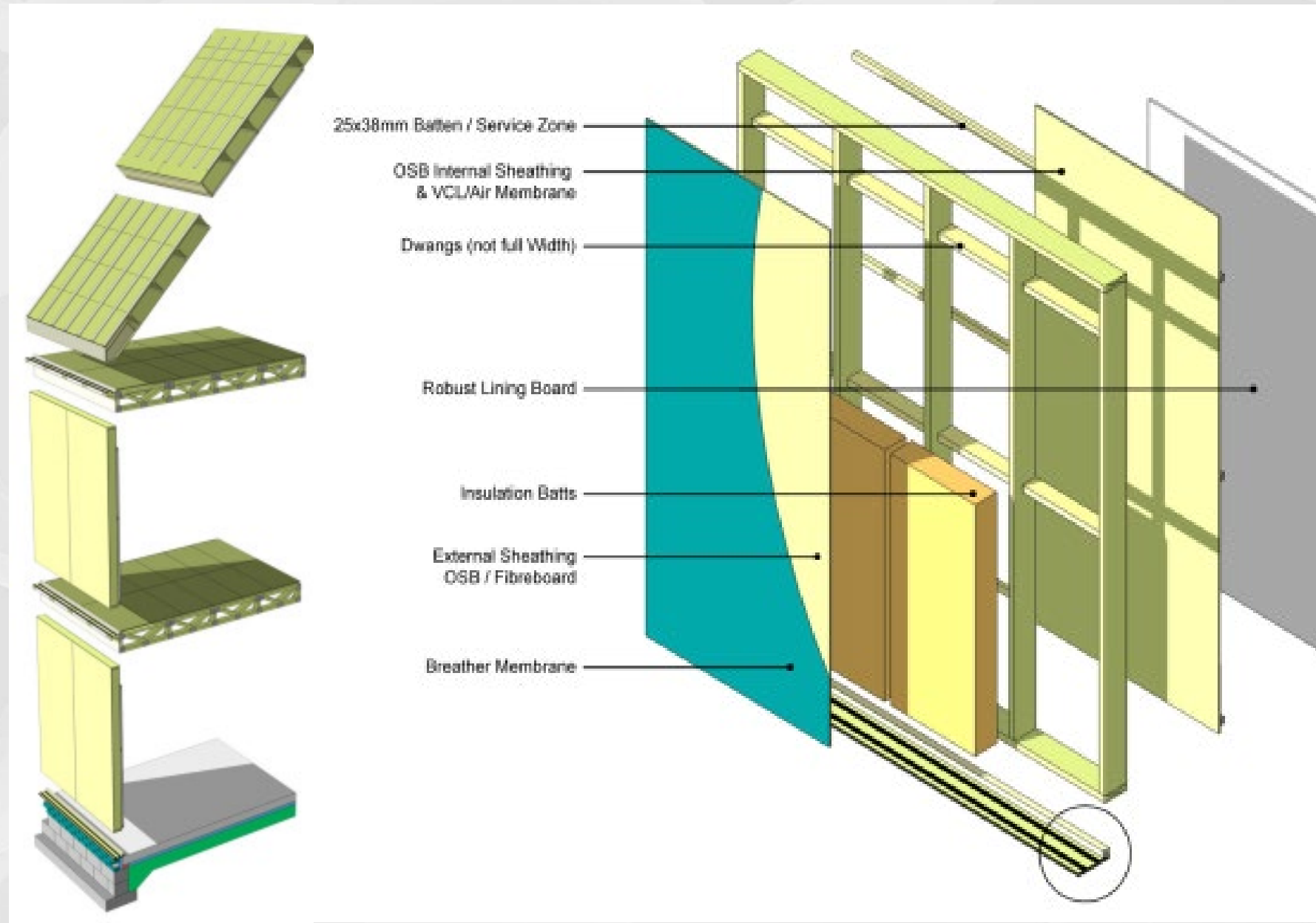
On a two shift pattern , it currently feeds in excess of 1500 homes per year as well as care homes, early years centres and primary schools.





Fully enhanced closed panel timber system inclusive of insulation, wall linings service zones, windows and external doors .

The system is manufactured to consistent quality standards with fewer panels, junctions & thermal bridges delivering better airtightness and improved thermal performance.



- ISO 9001 Quality Management System
- Fabric First Design
- Factory Controlled Conditions
- Precision engineering
- Greater Consistency
- Less on-site damage
- Fewer post completion defects



- Responsible material sourcing
- Zero material waste
- Recycling of waste products
- High level of Carbon sequestration
- Excellent thermal properties
- Air tightness detailing (+34 % on SG AD)
- Lower fuel bills
- Fewer vehicle movements – lower emissions



## Programme Efficiencies

- 20% Time Saving
- Weather protected
- Less trade interfaces
- Fewer wet trades
- Simplified management

## Safer Working:

- Fewer people and vehicle movements on site
- Improved working conditions – warm, dry and well lit



- Offsite is a mind set demanding a project wide procurement strategy from day one.
- Offsite is integral to process rather than a bolt-on element .
- Early supply chain engagement
- **Warning : Offsite will not make inefficient or poor design better or cheaper !!**



**Government targets and market foresight led us to create the Net Zero Home, Scotland's first mass-market net zero housebuilding standard.**

The strategy was defined by the undernoted objectives :

- Establish a fabric strategy based on CCG's off-site manufacturing capabilities;
- Avoid the need for mechanical ventilation with heat recovery (MVHR);
- Focus on non-gas solutions to provide space and water heating; (ASHP )
- Reduce space heating energy demand below 30kWh/m<sup>2</sup>/year for all house types;
- Minimise the risk of overheating;
- Demonstrate a reduction in energy costs to the end user;
- Achieve operational Net Zero as a standard.

**Our key interest lies in creating a platform for collaborative procurement & the sponsoring of offsite mmc .**

**As innovators, CCG want & need to participate in the drive for change – if only ...to help mitigate the arising cost effects of changing regulation , Brexit , the Ukraine crisis and arising inflation.**

**Never before has the phrase ‘time is money’ had more relevance and critically if savings are to be delivered , collaborative procurement is underpinned by early manufacturer & contractor involvement.**

### **The benefits :**

- **Value engineering inherent to process** .....not at the end !!
- Design & build optimisation – IMPROVING PLOT EFFICIENCY & M2 COVERAGE & ENABLING DFMA
- **Less abortive design - RFT !**
- Reduced design period – Reduced fees
- **More thorough review of optioneering** (more informed decision as to where to spend money – brick detailing, larger units, etc.)
- Reduced build Period & Earlier Rental Income
- **Buildability of product**
- Access to supply chain
- **Information on material availability issues**
- Information on market and price movement

## Brief

- Consideration of the Grade B listed former Granton railway station building .
- Community focussed regeneration of the site.
- Delivery of new high quality, contemporary affordable homes.
- Promote active travel and public transport.
- Provide & test zero emissions heating.
- Advance Net Zero Carbon sustainable design.

The homes will be constructed using the programme's design output, which is **centred around the use of offsite modern methods of construction (MMC)**.

The predicted performance will be analysed and validated by **Edinburgh Napier University** based on reviews at the design stage and 12 months post-occupancy.





## Energy Strategy

The energy strategy for D1 is largely based on CCG's **Net Zero Home Standard** for the fabric and ventilation.

Heating is provided by a communal Air & Water Source Heat pump district heating system.

The project has a significant amount of PV panels on the roof (302 panels), which generate 82,935 kWh/year of renewable electrical energy.

CoEC will offset any residual carbon emissions associated with the project until the grid decarbonises.



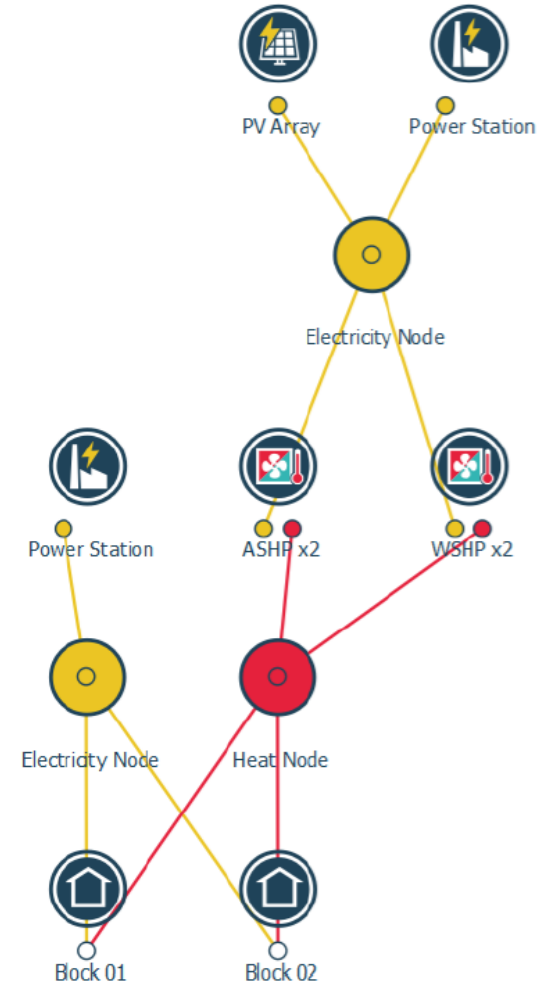
## Pilot 1 , Granton D1: Zero Emissions Heating

The CO<sub>2</sub> emissions produced by these homes are, on average, 80% lower than the 'Target Emission Rate' (TER) set in the Scottish Building Standards.

With emissions of 5.16 kgCO<sub>2</sub>/m<sup>2</sup>/year, these homes are achieving Section 7 Gold level Aspect 1 under the Regulations and are close to zero carbon emissions from regulated energy,

Concerning space heating, these homes are projected to consume 33% less energy than the Section 7 Gold level Aspect 2 of the Regulations with an average score of 19.5 kWh/m<sup>2</sup>/year compared with the Gold level target of 30 kWh/m<sup>2</sup>/year.

Fig. 8-3



**Post occupation monitoring  
will evaluate :**

- Heating and appliance electricity
- Internal air temperature
- Carbon Dioxide (CO<sub>2</sub>) levels
- Internal humidity levels
- As built U-values
- As built air tightness
- Local weather conditions
- Occupants trends



Pilot 1 , Granton D1:  
Placemaking







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ANY QUESTIONS?

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THANK YOU

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