Delamare Park – Looking to the Future

Bristol Planning Law Conference 2024

BARRATT DEVELOPMENTS PLC

Delamare Park, Nunney

AGENDA

- Challenges & Drivers
- Delamare Park Case Study
- Thinking About The Future:
  - The ZED House
  - EHome2
- Key Learnings

CHALLENGES & DRIVERS

- Meet Future Homes
- Zero Carbon (Regulated) by 2030
- Net Zero Carbon by 2040
- Commercial viable & scalable solution to delivering zero carbon homes to our customers

- Regulation
- Embodied Carbon
- Material Shortages
- Waste
- Build Speed
- Skills Shortages

BARRATT DEVELOPMENTS ZERO CARBON & MMC JOURNEY

First national house builder to deliver Code 6 Zero Carbon House using MMC

2009

Hanham Hall completed. The UK's first housing development to achieve the **2016 Zero Carbon Standard**

Over **80 suppliers** brought together to consider **innovative MMC applications**

2015

MMC innovation day with current suppliers (200 attendees)

Barratt Developments executive team, NHBC and Industry Partners visit Germany and the Netherlands as part of a **European Study tour**

2018

First national house builder to publish **science-based carbon reduction targets**

2020

Barratt Developments participates in the **AIMCH Project**

2022

MMC Journey – Barratt Developments have reviewed 42 systems comprising 155 suppliers

2014

Review of **Offsite Manufactured Solutions** established

MMC strategy developed 20% by 2020

Group agreement with Stewart Milne Timber Systems to deliver timber frame across the UK

2016

Large Format Blockwork first trialled with Roofspace at Bottesford

2019

20% of homes built with MMC achieved **one year early**

Oregon Timber Frame acquired

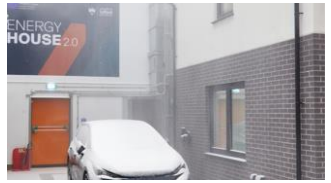
2021

The Zed House is complete, achieving **125% reduction** in carbon emissions

Building regulations are updated for ventilation, energy, overheating and EVCP

2023

eHome2, a zero-carbon home, created to test the impact of climate change and how homes can deal with extreme weather



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Delamare Park - Case Study

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Delamare Park, Frome

PROJECT OVERVIEW:

- Delamare Park is the Group's first development in the country with no gas supply or connection, utilising Air Source Heat Pumps.
- The site has a total of 82 units, including 74 low-rise houses and 8 apartments built in traditional masonry construction.
- Upgraded build specification results in a 40% reduction in carbon emissions compared to 2013 building regulations.

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SITE LAYOUT

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KEY CONSIDERATIONS: ASHPs

- Mitsubishi's Ultra Quiet Ecodan Air Source Heat Pumps (ASHP) specified on all units.
  - Can operate in temperatures as low as -20c (SCOP begins dropping at -7c).
  - Mitsubishi are able to connect to customers ASHPs remotely and diagnose any potential issues and adjust settings if required.

- Incorporating larger Hot Water Cylinders into all house types.

- Positioning of external ASHP unit

- Larger Radiators c.30% bigger than standard.

- Pipework to radiators increases from 10mm to 15mm due to lower flow temperature.

- Lower flow temperature of 45c to radiators, different heating experience for customers.

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QUALITY ASSURANCE:

With ASHPs being a new technology to our site teams, ensuring correct installation and commissioning of the heating system is essential, therefore the following measures were taken:

- Gregor contractors were selected as installers due to their extensive experience of installing ASHPs within the new build sector.

- Fairheat Energy Consultants were commissioned to support the project team in the following areas;
  1. Full design & specification review of the proposed ASHPs, ensuring correct sizing and positioning.
  2. Installation & commissioning inspections via regular site visits.
  3. Post occupancy monitoring of ASHPs on select plots.

- Fairheat typically spend 1 day per month carrying out installation and commissioning checks on ASHPs ensuring they are operating as designed.

Gregor
Heating, Electrical & Renewable Energy

FAIRHEAT

QUALITY ASSURANCE:

- ASHP best practice check guide has been developed following lessons learnt to date at Delamare Park.
- This includes simple checks that can be carried out by our own site teams to ensure best practice is being followed across key build stages.
- In depth performance analysis is to be carried out across five plots, this will provide data on;
  - How efficient the ASHP is across different seasons
  - How occupant behaviour affects performance of the ASHP
- Lessons learnt at Delamare, along with real world monitoring data, will help inform the design, specification and installation of ASHPs on future BDW sites ensuring best practice is applied.

LESSONS LEARNT: TECHNICAL

- SAP Calculations
- 150mm Cavity
- Electric infrastructure
- Cylinders
- ASHP
- Towel Rails & Radiators
- First Fix Pipework
- Cost

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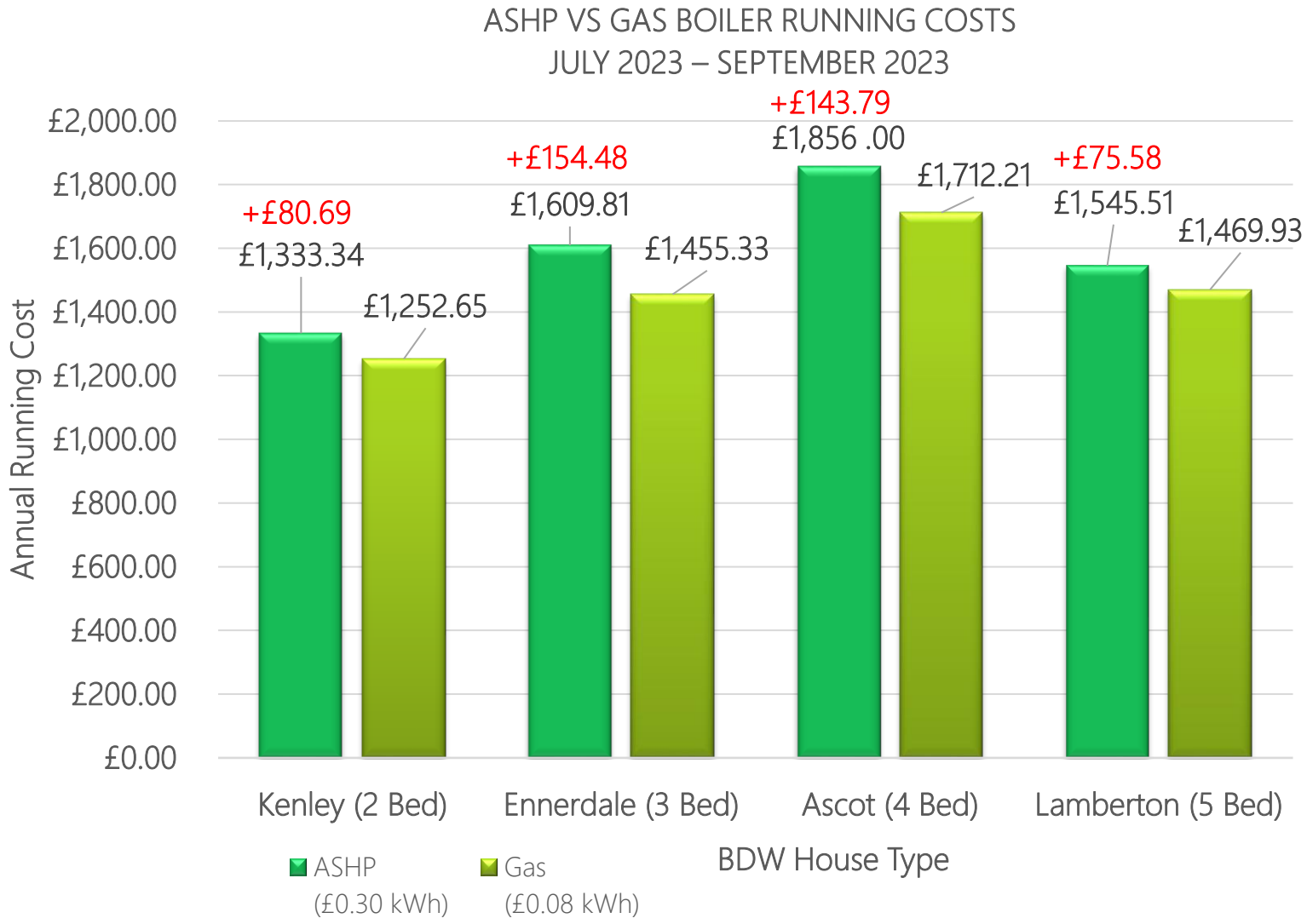
ASHP RUNNING COSTS: JULY 23 – SEPT 23 PRICE CAP

- The graph shows predicted annual running costs for Gas Boilers and ASHPs on a range of BDW house types for July 2023 to September 2023 price caps.
- Based on BDW 2025 fabric specification using 150mm cavities.



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Thinking About The Future

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Orchards Rise, Wichelstowe

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ZED House Prototype

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ADVANCED MMC SYSTEMS

- Insulated Precast Ground Floor Units
- Closed Panel Timber Frame
- Off-site Cladding Solutions
- Off-site Roofing with PVs

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LOW CARBON POWER & HEATING

- Photovoltaics (PV) Panels
- Battery Storage
- Air Source Heat Pump
- Underfloor Heating
- Wet Heated Skirting
- Infrared Heating Panels

EHome2

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eHome2, University of Salford

ENERGY HOUSE 2.0

- Known as Energy House 2.0, the specially-built climate chamber recreates temperatures ranging from -20˚C to +40˚C, as well as simulating wind, rain, snow and solar radiation to replicate the climate in 95% of the earth's environments.

- Energy House 2.0 features two chambers, each big enough to fit 24 double decker buses.

- Energy House 2.0 will research and test, in tightly controlled conditions, new ways of powering heating and insulating homes, whilst cutting water usage. They will inform the sector about achieving a significant reduction in carbon emissions for new build homes from 2025.

EHOME2

- Fabric – high-performing timber frame system achieving 'Future Homes Standard' thermal values.
- Ground floor is Weberwall Brickslips on British Gypsum Glasroc X
- First floor is WeberRend render

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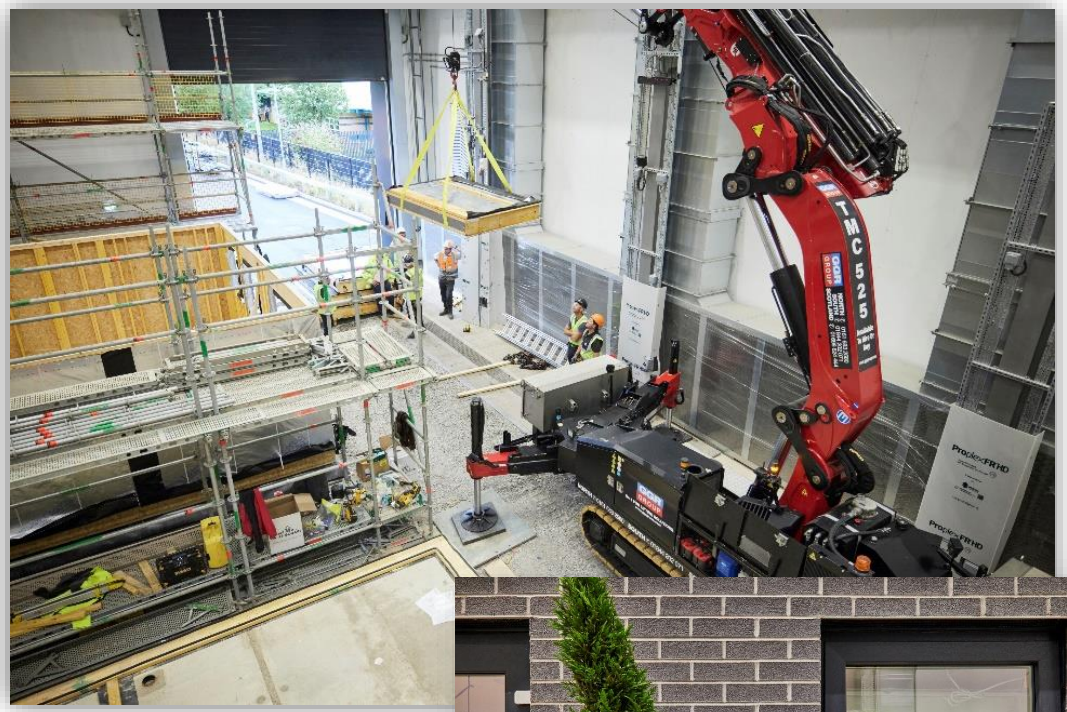
ADVANCED MMC SYSTEMS



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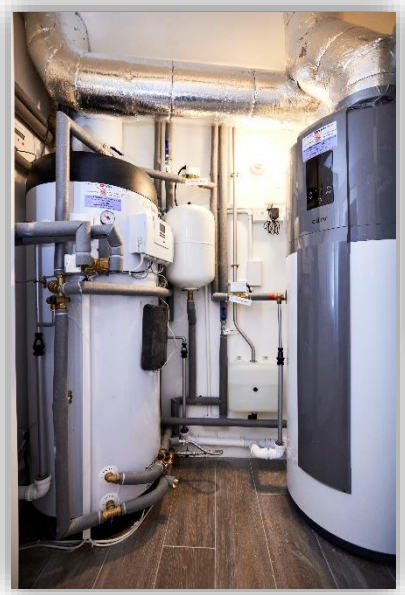
ACHIEVING NET ZERO CARBON AT SCALE



- The eHome2 build project has enabled us to test the product (a full house rather than a collection of house components) to understand how to deliver a home with this level of performance. It also enabled us to isolate and test the impact of individual parts to ensure we continuously develop and improve homes moving forward, see the performance and benefits to consumers, as well as looking at how we can roll these out at scale, whilst keeping homes affordable

- This is not easy, a lot of the technology is being used for the first time.

KEY LEARNINGS

- The greatest challenge is ensuring that the skills exist through the entire construction process (from early design, planning, manufacturing, site, financial, warranty, through life etc) to deliver zero carbon housing at scale.

- Alongside this, it is essential to ensure that installation is correct and solutions are designed in a robust and considered way.

- Minor errors in installation and product commissioning have much greater impacts when delivering a highly efficient zero carbon home. (under performance is amplified in high performing buildings, so minor errors which may never have been identified or caused an issue in the past will become more evident).

- In future buildings the products and time needs to be given to ensuring products and systems are properly designed and KEY LEARNINGS: tested so that they work in harmony together and that the correct skills are available with the right level of knowledge and training to deliver the solutions in real application.

KEY LEARNINGS

- In high performing low carbon buildings, the Mechanical and Electrical Services (M&E) are critically important. Greater service space is required, and a greater level of building service entry points require specific expertise and attention in construction. The design and balance of key building elements needs to be coordinated and understood to ensure the right outcome is achieved.

- The key elemental factors to a highperforming building operating beyond the Future Homes Standard are: Building fabric, M&E systems, glazing, occupancy profiles, location and orientation of the building.

- There are gaps and a lack of clarity in the current Building Regulations, and tools that need further work to ensure we do not store issues for the future. Building regulation, planning and warranty providers need to consider and address any issues which may delay or restrict delivery of high performing sustainable housing.

- It is possible to deliver a home to the new 2025 Regulations but there is still a lot of work needed to ensure we can do this at volume and consistently. The challenges in traditional process, planning, product, skills and customer knowledge should not be underestimated.

THE END