

ZED

HOUSE PROJECT

BY BARRATT DEVELOPMENTS

Welcome to the home of the future

Climate change is the greatest challenge facing society. It will affect how we live and work and will fundamentally change the places that we call home. The housebuilding industry has a critical role to play as we adapt to and mitigate the impacts of a changing climate. We must design and build our homes sustainably, creating places that will thrive long into the future.

The Zed House project aims to do just that – bringing more than 40 leading organisations together to find solutions and to create a blueprint for the housebuilding industry. It will demonstrate what is possible, showcasing how to build the high quality, zero carbon and nature-friendly homes that the country needs at the scale required.

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David Thomas

Chief Executive, Barratt Developments

“ We want to showcase what can be done to deliver zero carbon living using the latest technologies and working with the best industry partners. Ultimately, the aim is to find solutions to enable the industry to build high quality, zero carbon homes that customers love, at scale. We can then share this knowledge to help the industry deliver the future of sustainable housing. ”

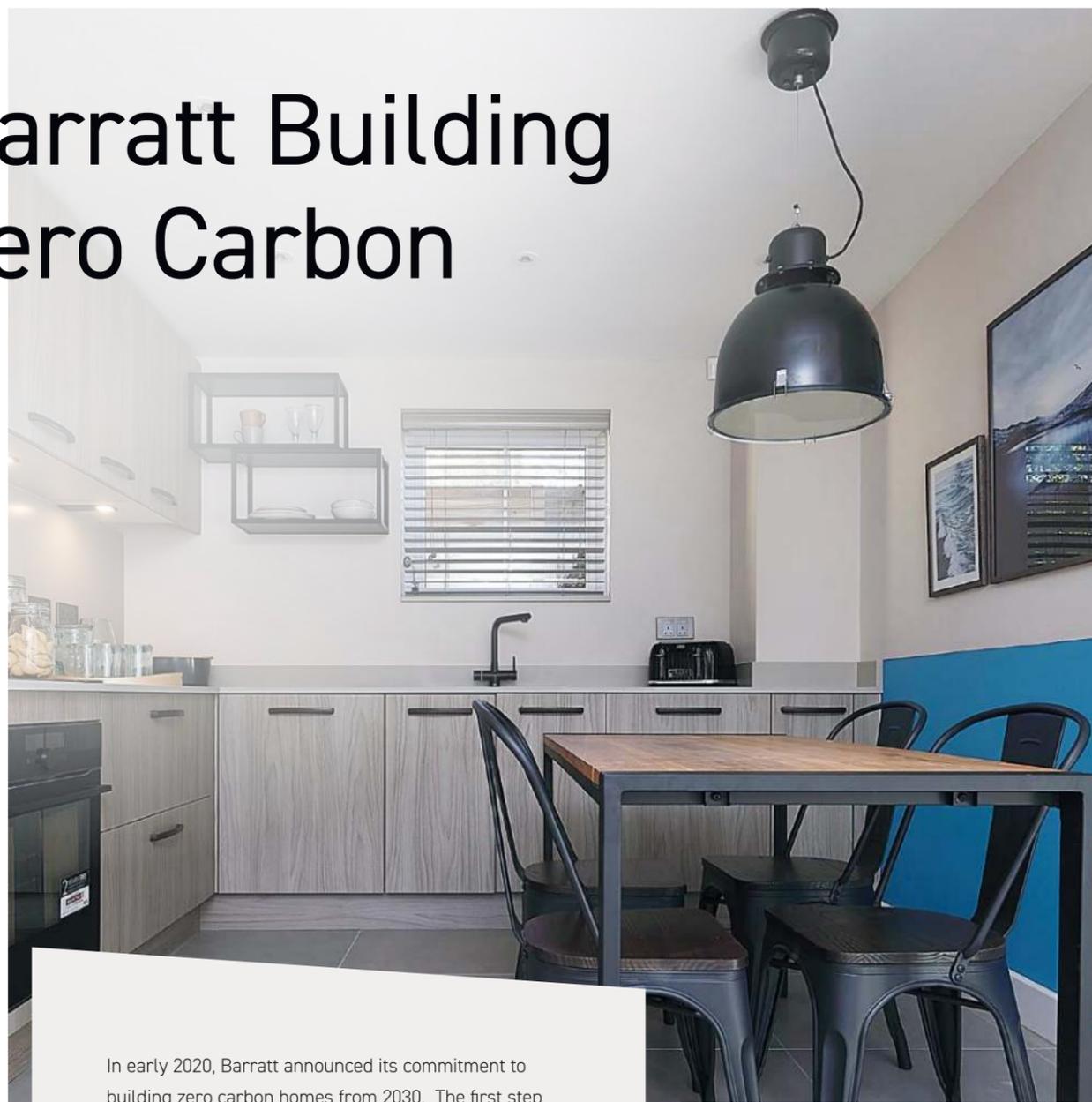
Barratt Developments is the UK’s largest housebuilder, leading the future of housebuilding by putting the customer at the heart of everything that it does. Barratt is determined to do the right thing and to be the leading national sustainable housebuilder. It was the first national homebuilder to set ambitious science-based carbon reduction targets, is part of the United Nations’ Race to Zero campaign and has committed to building zero carbon homes from 2030.

The Zed House project builds on a reputation for innovation and a strong track record of building high quality, sustainable homes. In 2007, Barratt built the Green House, the first zero carbon prototype home by a major housebuilder, before building England’s first zero carbon community at Hanham Hall, near Bristol.



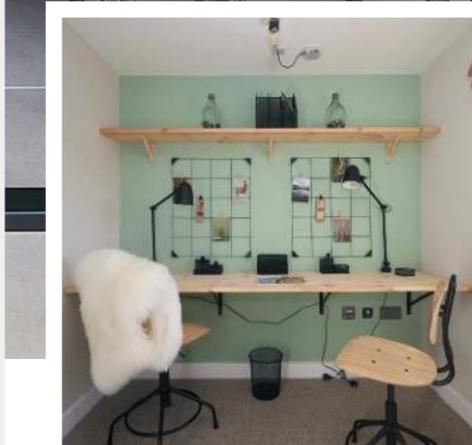
BARRATT
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Barratt Building Zero Carbon



In early 2020, Barratt announced its commitment to building zero carbon homes from 2030. The first step in achieving this ambitious target was to build a concept home of the future – the Zed House.

This is the first home built by a mainstream housebuilder that goes significantly beyond the government's Future Homes Standard, delivering a 125% reduction in carbon emissions. Working in partnership with the University of Salford and more than 40 innovative organisations, Barratt assembled a team of leading experts from key disciplines such as renewable heating systems and advanced Modern Methods of Construction (MMC) to ensure the highest standard of delivery in all key building performance and process criteria.



The Zed House team began detailed design coordination in early 2021, using our popular Alderney housetype as the basis for the Zed House design. The footprint and internal layouts of the standard Alderney were adapted to incorporate the Nationally Described Space Standards (NDSS) and Category M4(2) accessibility standards as well as increased thermal performance criteria.

Advanced Modern Methods of Construction (MMC) were integrated into the design, working with partners such as Bison Precast and Barratt Developments' own in-house timber frame division Oregon, to develop a coordinated super structure design following Design for Manufacture and Assembly (DfMA) principles. This coordination process ensured the manufacture and site assembly of the MMC elements was seamless, by considering key tolerances and interfaces throughout the design.

Meanwhile, a specialist team of mechanical, electrical and plumbing consultants led by GTC and Metropolitan established a detailed specification for the energy and heating of the Zed House. Partners such as Mitsubishi, Eco2Solar, Polypipe and Octopus Energy worked collaboratively to integrate their respective technologies to form a coherent, smart heating system that uses the latest renewable technologies.



Two key aspects of the project are to understand the consequential impacts of integrating so many new technologies in one home, as well as to find out what a house of the future will be like to live in. Two academics from the University of Salford will live in the home and their views, alongside data from 95 sensors and over 1km of cables, will help inform design and technology decisions in the future. This will help us to develop homes that are simple to use and meet the needs of our customers.

The future of homebuilding

Barratt has been at the forefront of modern construction practices for more than twenty years.



The Zed House is a key milestone in developing and integrating the next generation of modern housebuilding practices.

Leveraging advanced MMC and integrating them in to a product that delivers next generation performance with sustainable materials, will allow Barratt to better understand and develop processes and best practice to deliver the houses of the future.

The Zed House combines the latest offsite construction products from the ground up, including insulated pre-cast concrete floors, offsite masonry panelised walls, closed panel timber frame and factory applied external façade and windows to deliver a fabric first approach to a zero carbon home. All elements have been meticulously detailed with key interfaces and building performance at the forefront of the coordination process.

The modern construction processes coupled with the next generation of renewable technologies mean the Zed House has set a new benchmark in the roadmap to building zero carbon homes at scale.



Tackling the carbon challenge

Many sectors will need to work together if the UK is to reduce its carbon emissions and achieve its target of net zero by 2050.

The Zed House is the home of the future. It not only exceeds the Future Homes Standard, but is also highly water efficient, is packed with smart technology to encourage sustainable living and aims to be nature-friendly too.

Importantly, the Zed House is the culmination of a partnership with more than 40 leading supply chain partners. Working together, we can better understand how to integrate such a wide variety of technologies, measure the benefits and performance, as well as understand the potential challenges of integrating so many of the technologies into a single zero carbon home.



Heating the home of the future

The energy crisis is the biggest factor affecting home energy bills. Modern technologies can help to reduce them.

Recognising this challenge, as well as future changes to regulatory standards, the Barratt Technical and Innovation team began detailed research into the next generation of heating and energy technologies as early as 2016 when Scotland introduced the need to install photovoltaics (PVs) panels.

The learning and deep understanding of the available systems has allowed Barratt to engage with key supply chain partners to develop both current and future relationships.

By integrating 25 PV Panels, two batteries, an electric vehicle to grid EV charger, air source heat pump, infrared heating technologies, underfloor heating and waste water heat recovery, the Zed House not only meets, but far exceeds, the recognised Future Homes Standard.



Air source heat pump

We need comfortable indoor environments, but as the biggest consumers of energy, buildings must be made more efficient and less carbon intensive to help meet the challenge of climate change. Mitsubishi Ecodan air source heat pumps can reduce running costs and offer reliable and sustainable heating and hot water all year round.



Heated skirting boards

ThermaSkirt from DiscreteHeat is an energy efficient radiant heating system, cleverly designed to look just like a traditional skirting board. By combining two elements in one, it saves valuable wall and floor space, improves the aesthetics of the room and reduces energy bills.



Infrared heating panels

Infrared panels provide a modern heating system that is energy saving and combines efficiency with a high heating quality. In addition, the uniform temperature control of a room promotes a pleasant and healthy indoor climate.



Carbon cutting features



Materials

The Zed House is made from carefully selected and sustainable materials, while keeping waste to a minimum. The kitchen worktops are made from 100% recycled chipboard while the drawer handles are made from coconut fibres. The bathroom tiles are 20% thinner, which means less raw materials were used in the manufacturing process.

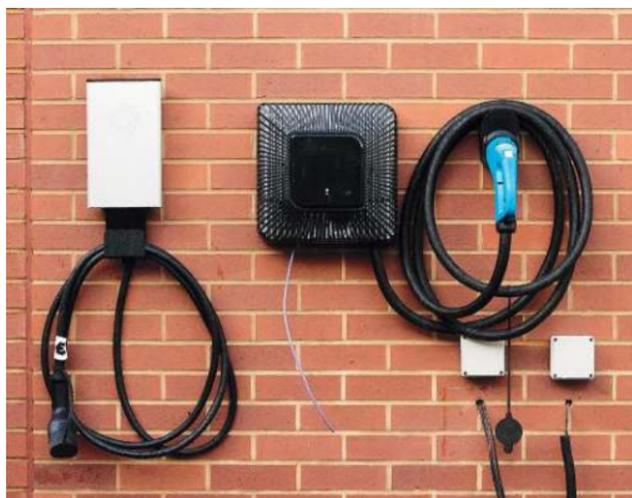
Healthy air

The Zed House has partnered with Dulux to have Sterishield Diamond Matt on all walls. Sterishield is a quick drying, water-based coating containing an in-film bactericide, which inhibits bacteria and reduces populations of MRSA and E. coli. When combined with appropriate cleaning practices, Sterishield Diamond Matt from Dulux Trade helps to promote a more hygienic environment.



Electric vehicles, batteries and smart charging

Tribe incorporates machine-learning technology, which learns consumption profiles of the home and uses weather forecast and tariff information to automatically select the best operating schedules for each device to help minimise customers' bills. This means there is no longer the need to manually schedule car chargers or tumble dryers to take advantage of zero- or low-cost electricity – Tribe will do all of this automatically, even using dynamic tariffs such as Octopus Energy's Agile tariff.



Smart Agile Energy Tariff

Octopus Energy is the energy supplier for the Barratt Zed House demonstrator, delivering 100% green electricity to customers who want to live in a carbon free home. The Zed House will also get access to Octopus Energy's pioneering smart tariffs, which incentivise energy usage outside of peak times when energy is greener. The house will also be equipped with smart home technology such as EV chargers, solar and battery systems and air source heating all optimised against Octopus's smart Agile tariff.



Water

Highly efficient air-powered Kelda Showers reduce water use by around half, while smart Aqualisa showers helps users change their behaviour via a timer function. Recoup have provided a waste water heat recovery system that uses the heat from waste shower water to reduce the energy required per shower use by around 55%. Not to mention the smart water butt in the garden that maximises the capture of rainwater for reuse, whilst at the same time preventing stormwater from overloading the drainage system.



A home for nature

Private gardens cover approximately 450,000 ha of land in the UK. Therefore, collectively, the potential to create amazing places for wildlife in gardens is huge.



At Barratt, we build over 17,000 new homes every year, most of which have their own private gardens. We have worked with the RSPB to maximise the potential of the gardens we create by installing gardens into our show homes that are packed with features that attract and support wildlife. In the Zed House garden, Golby + Luck have designed a garden that builds on this

wildlife friendly ethos and ensures that sustainability is integral to the design and build process.

The design team worked with key partners such as Marshalls to secure recycled materials and incorporate innovative building techniques that reduce building operations, materials, and energy. Plants have been sourced from a local supplier, J A Jones, using a range of native and non-invasive species to maximise diversity and nature conservation value. Hedgehog homes and highways, swift bricks, bat and bee boxes provide homes for nature.

We have extended the green environment wherever possible through green walls and green screens supplied by Hedera Screens. These features not only extend the range of habitats available within a small space, but also provide attractive features within the garden setting.

The Zed House garden showcases the potential to create valuable habitats within new housing development, as part of our journey towards zero emissions and a net gain in biodiversity.



Shaping the future of zero carbon living



To test what it is like to live in a zero carbon home, members of the University of Salford team will live in the Zed House. It is important that we can better understand zero carbon living so we build high quality, low carbon homes that customers love.

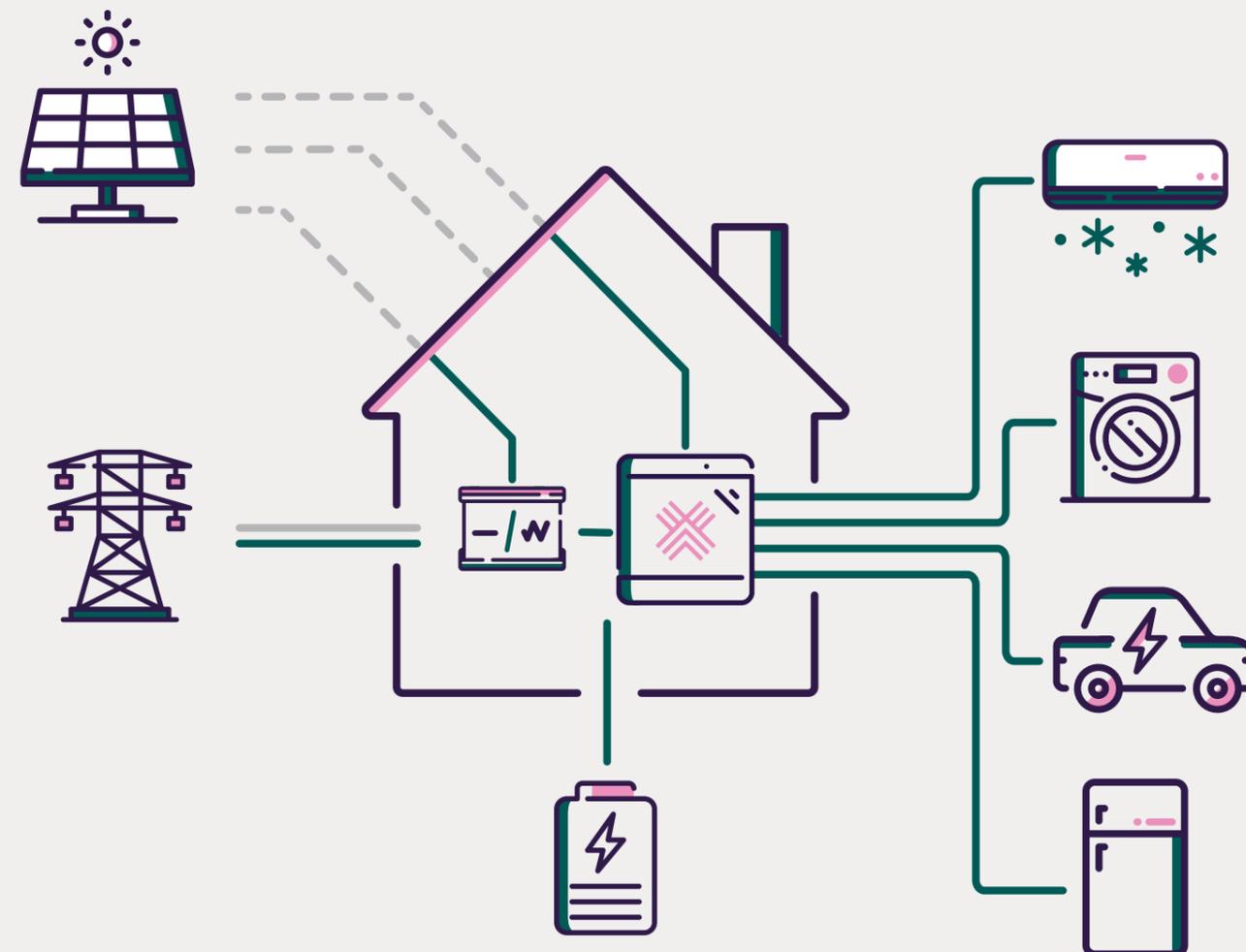
The house will be monitored to obtain real world data on key parameters. Integrated sensors and heat flux plates through external walls, floor and in the roof will capture continuous data, while aspects such as indoor air quality, thermal comfort, hot water and heating and renewable regeneration will all be meticulously assessed. The data and the insight will help inform future decisions.

The University of Salford are a leading establishment in Energy Performance in the Built Environment. Led by Professors Will Swan and Richard Fitton, they have designed and installed an advanced monitoring system into the fabric of the Zed House incorporating 95 sensors and over 1km of cabling. The experts at the University of Salford will collate and assess the data from the Zed House, and report on all key areas of building performance.

We will share the findings of the project to help shape the future of sustainable housebuilding.



University of
Salford
MANCHESTER



Zed House

The future of sustainable living

The first zero carbon house by a major housebuilder to substantially surpass the Future Homes Standard, delivering over 125% improvement in carbon emissions.



It brings together over 40 leading industry partners from across the housebuilding, sustainability and technology sectors, all helping to broaden knowledge in zero carbon living.

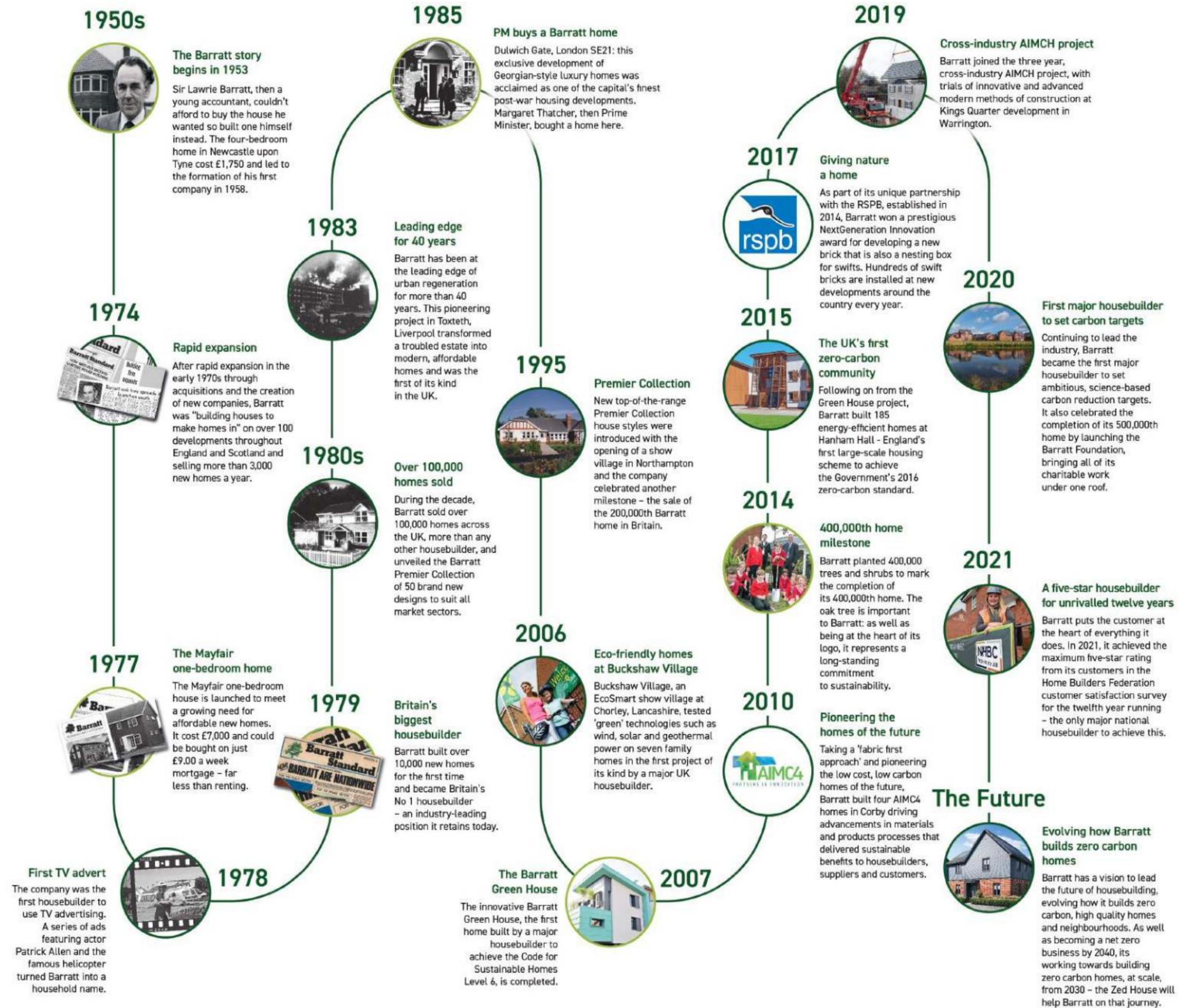
The lessons learnt from the Zed House will be shared across the industry, benefiting everyone – from customers to other housebuilders.

The Zed House features cutting edge technology such as:

- Overhead infrared panels that can provide instant zero carbon heat
- Air-powered and smart showers will save families hundreds of pounds per year in water and heating bills
- Plaster which eliminates pollutants giving cleaner, healthier air
- Appliances which reduce food wastage and water consumption
- Heated skirting boards delivering 10% more heat than traditional radiators while also saving space
- Artificial intelligence (AI) which optimise when devices consume electricity, ensuring customers maximise use of either free solar energy or low-cost electricity from the grid
- The first car on the market which has Vehicle to Grid technology, meaning electricity can be fed back into the grid
- It will measure how people use the house in the real-world, helping make sure that all new zero carbon homes in the future are easy to use for customers



The History of Barratt Developments



Our partners

The Barratt Zed House Project would not have been possible without the support of our trusted partners

At Barratt Developments, we know that the next few years will see unprecedented change as the UK and the world take action to reduce our impact on the environment.

This will affect the materials we use to build new homes, how we heat them, as well as new, smart technologies to reduce energy use and carbon emissions.

We believe that the only way to understand how these technologies interact, impact and influence each other is to build them into a home.

The Zed House is our first step in a three-year research and development programme, supported by AIMCH and Innovate UK, that will ensure Barratt leads the future of housebuilding, working with our partners and stakeholders to identify the right technologies and processes to build healthy, sustainable and well-designed homes that customers love.

Barratt is committed to building sustainably, having pledged that all of its new homes will be zero carbon from 2030 - the Zed House is the first step in achieving that ambition.



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Barratt Developments is Britain's largest and best-known housebuilder, trading under the Barratt Homes, David Wilson and Barratt London brands. It builds over 17,000 new homes each year across the UK, and has built over half a million homes since it started in 1958.

Barratt is widely acknowledged as the market leader in quality and customer service, being rated 5 Star in the HBF Customer Satisfaction Survey for 12 years in a row. It also aims to be the UK's leading national sustainable housebuilder, being the highest scoring national housebuilder in both the CDP and NextGeneration sustainability indices.

The Barratt Zed House Project

www.barrattdevelopments.co.uk



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