

# The Volume Dealers Part II

Are we seeing the first ever Code for Sustainable Homes Level 6 building by a major housebuilder? Following on from our article in Issue 11, we hear from architect **Gaunt Francis** and panel provider **H+H UK**, on why Barratt's Green House may hold the answer to some important construction and environmental questions.

**T**he new kid on the block at BRE's Innovation Park in Watford is a house that could prove to be the blueprint for future housing stock here in the UK. The Barratt Green House is a family home designed to provide a solution to the need for low energy, high density volume housing of the future and is a direct response to the Government's target for zero carbon housing. It is also the first home to be built by a mainstream housebuilder to be so environmentally friendly that it meets the criteria for zero stamp duty and is the first to achieve Level 6 of the Code for Sustainable Homes (CSH). Barratt's North London Division has now completed construction of the house as a prototype at the Innovation Park. Housing Minister, Caroline Flint officially opened the home on 15 May, saying: "Our goal is to build not just more homes, but better homes. That's why all new homes must be zero carbon from 2016, with progressively tougher standards being introduced over the coming years. This is the most ambitious

programme anywhere in the world. And the UK housebuilding industry is at the forefront - not only signing up to the target but coming up with the innovation that will make this happen. "That's why I am delighted to see what Barratt have achieved with this project - one of the first low-carbon projects in the country. Not only does this house showcase what is already technologically possible, it shows that greener living doesn't have to mean expensive design. I hope other builders continue to follow their example, and I look forward to a continuing strong partnership as we work together towards 2016." A true seal of approval also came from the highly respected (and much missed ex-Minister for Construction) Nick Raynsford, who added: "The Barratt Green House sets the standards that others must now match." As part of an open competition and shortlisting by an expert panel, and a public vote through the *Mail on Sunday* and Real Estate TV, as the design for the Home of the Future, Gaunt Francis Architects won out, with the Green House design receiving more than 22,000 votes. The award-winning home comprises a blend of

modern technology and well-proven design principles with the aim of resolving some of the issues of living in a more sustainable way, but without compromising quality of life. Gaunt Francis' design is a three-storey, three-bedroom family home with living-dining-kitchen space, downstairs cloakroom, games/play room, home office, family bathroom and ensuite to the main bedroom. All rooms are 'reasonably' sized and serviced from a central hallway, which starts from the front door and covered carport area and terminates at the second floor external terrace. Inspiration for the award-winning design has been drawn from contemporary and historical housing in both the UK and Europe. "The materials used in the structure and high-performance insulation will help keep the house warm in winter and cool in summer," says architect Andrew Sutton. "We have taken a pragmatic view of sustainability, rather than trying to convert people to a different style of living, by giving people all the facilities they are used to, but meeting the same needs using lower-energy solutions. For similar reasons, unlike other houses at the Innovation Park, the Barratt Green House

is conventional in appearance. We believe that this house represents a significant step towards greener living, which is easy for the homeowner to accept and which is not unreasonably complex." Innovative eco-friendly features include offsite construction technology in the shape of a solid aircrete shell for the house, constructed using storey-height aircrete panels from H+H UK. "We selected H+H's aircrete wall panels because the lack of joints using them offered an excellent opportunity to meet the airtightness target. They proved themselves in this respect," added Andrew. The panels are 600mm wide and 200mm thick and, together with Jumbo Units, are all 'glued together' with Celfix thin layer mortar for rapid construction. These panels are widely used in Scandinavia but are not yet marketed here in the UK. The single skin of aircrete masonry is enveloped in approximately

180mm of high performance (phenolic) insulation, achieving a U-value for the walls of 0.1W/m<sup>2</sup>/K. "The excellent insulation provided by the solid H+H wall panels is a result of aircrete's aerated structure comprising thousands of tiny bubbles," adds Cliff Fudge, Technical Director for H+H UK. "This is combined with thin-layer mortar joints, which reduce thermal bridging, and internally the walls are dry-lined to allow services to run in the void between the wall and the plasterboard." In addition to very high insulation levels, the storey-height aircrete wall panels significantly reduce the number of thermal bridges. The structure results in a projected airtightness of 1 m<sup>3</sup>/hr/m<sup>2</sup>, some ten times in excess of current Building Regulations. This building envelope provides a good guide to achieving the Government target of Level 6 of the Code for Sustainable Homes. A positive decision was made to use

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aircrete with concrete floor slabs within the thermal envelope to provide high thermal mass that mitigates the peaks and troughs of temperature change within the home and prevent overheating. Solar photovoltaic panels on the south-facing roof and the adjacent building simulate a district power supply. These elements are provided on the test house to achieve the Code Level 6 performance, but would be replaced in volume housing with development-wide local heat and power supplies. This is a more efficient and more cost-effective means of achieving the same Code Level 6 targets. The Barratt Green House achieves an Energy performance Certificate rating of A (part of the domestic HIP) as well as Lifetime Homes and Secured by Design standards. With no let-up in a tough vetting process, the prototype building will be the subject of rigorous scientific testing over a two-year period to assess every aspect of the design construction and materials success. Barratt plans to take the most successful aspects of the design and apply them to homes it builds in the future. Mark Clare, Chief Executive of Barratt Developments PLC sees the scheme as a real testing ground for future developments. "Building this home has provided us with valuable insights into how zero-carbon homes can be constructed and is giving us the opportunity to evaluate specific materials and technologies for future developments. The most exciting aspect is that this is not designed as a one off: we will take what works and apply it to housebuilding across the country. The challenge now is to ensure that zero carbon is genuinely affordable and not just available to those who can afford it. I believe that the Barratt Green House is one step towards realising that goal."



● IMAGE: The exterior has been made conventional in appearance and easy for homeowners to accept

## ● The Green Gauge

Many services match those intended for volume housing construction. Heating and ventilating is via a background forced air ventilation system that extracts heat from the kitchen and bathrooms and pumps it into other areas. All ventilation is run through a heat exchanger to minimise losses. The air-source heat pump is powered by PV-generated electricity and is controlled by a computerised building management system, which can be overridden manually, to warm the house in winter and cool it in summer. Hot water is provided from a 215-litre tank that draws its heat from the heat pump, a solar thermal tube collector or, as a last resort, an electrical element. Clothes drying is achieved using the warm air rising through the house to the head of the stairs, so doing away with the need for a tumble-dryer. Automatic window shutters help prevent over-heating of the house in summer. Rainwater is harvested from the roof and surrounding paving to provide an alternative to potable water to flush toilets, supply the washing machine and for irrigation.