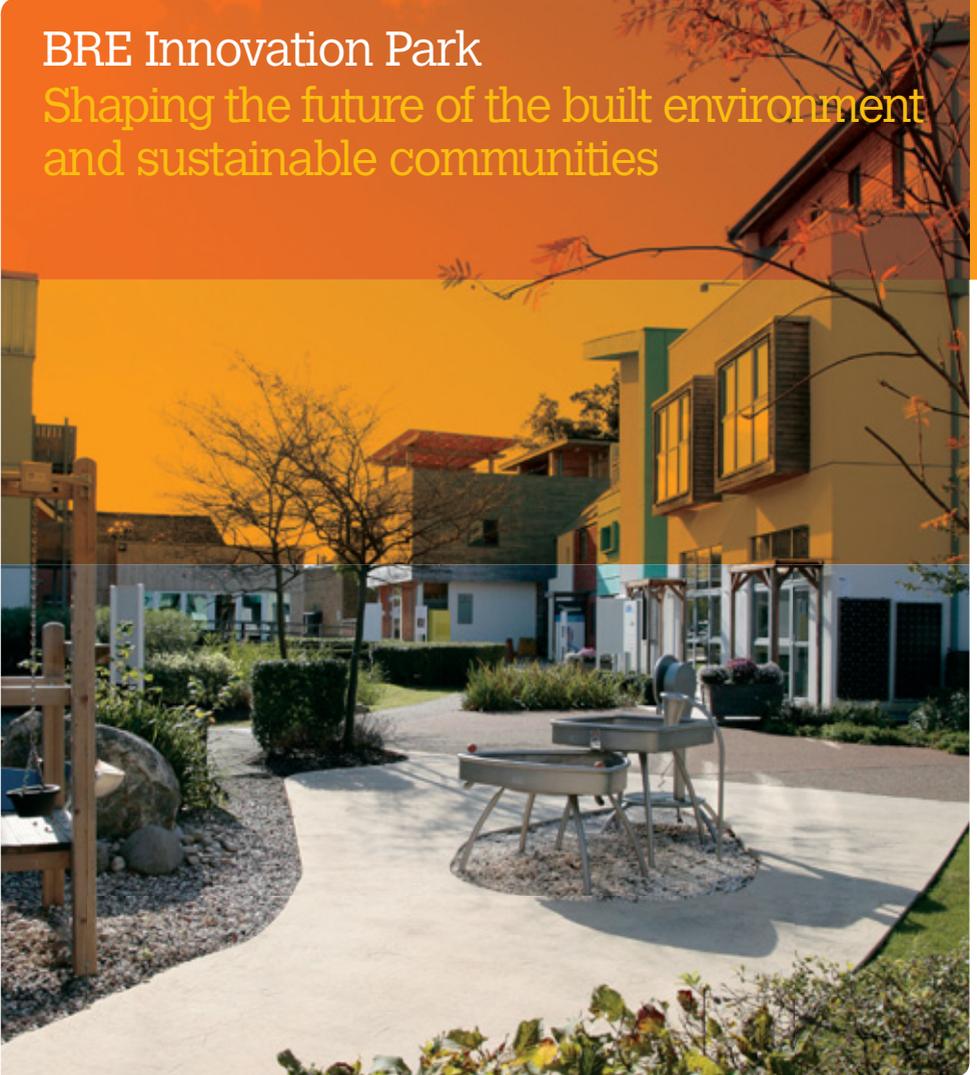


# BRE INNOVATION PARK

Part of the BRE Innovation Parks Network

[www.bre.co.uk/innovationpark](http://www.bre.co.uk/innovationpark)

BRE Innovation Park  
Shaping the future of the built environment  
and sustainable communities



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# Welcome

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Welcome to the BRE Innovation Park, home to some of the world's most sustainable buildings, landscape designs and a host of innovative low carbon products, materials and technologies.

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The park was created by BRE in 2005 with the aim of trialling and testing the pioneering ideas of architects, developers and manufacturers before applying them to real communities. It represents a remarkable response to the myriad of challenges faced by the built environment, not least the drive to reduce carbon emissions.

With a range of unique and diverse approaches to sustainable design, construction and refurbishment, the park's aim has been to push the boundaries of current knowledge and practice; to educate stakeholders, form new collaborations and ultimately drive change across the built environment.

The park is testament to the power of partnership, involving over 400 companies who have invested their creative energy and company resources in the fantastic projects you will see here today. This collaborative spirit has extended to research and development projects outside the park that continue to put the UK at the forefront of knowledge in this arena.

To date, over 60,000 people have visited and learnt from the BRE Innovation Park including the Prince of Wales, Prime Minister David Cameron and the Vice Premier of China, Li-Keqiang. It has been so successful that countries around the world are adopting this model as they grapple with their own built environment issues - BRE is currently collaborating with partners in China,

Brazil, the US and Canada to establish a global network of Innovation Parks.

We look forward to engaging you in our Parks Network and hope you take time to enjoy your visit.

**Jaya Skandamoorthy**  
*Director of Enterprise  
and Innovation, BRE*



## What is the BRE Innovation Park?

- A low to zero carbon demonstration community
- An outstanding showcase of innovative construction and technologies
- A future look at sustainable buildings and communities
- An educational facility supporting delivery of the National Curriculum for local schools
- A unique venue for events and away days
- A networking and knowledge exchange hub
- A test bed for innovative ideas and products, including those which have not yet reached the marketplace
- A gateway to BRE's world-leading expert advice, testing and certification

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It is a gallery, a testing facility, a hub of innovation, an educational resource, a marketing opportunity, a collaborative enterprise, a catalyst for change.

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## The history of the BRE Innovation Park

### 2003

- The idea of the park is born during OffSite03; an event to demonstrate modern methods of construction

### 2005

- The park is officially opened by the then Deputy Prime Minister John Prescott during OffSite05
- Three full demonstration houses are built for the occasion

### 2006

- The Osborne house is built (the first EcoHomes *Excellent* on the park)

### 2007

- The Hanson EcoHouse, The Sigma Home and the Kingspan LightHouse are built and assessed under the new Code for Sustainable Homes standard
- The Kingspan LightHouse is the first certified zero carbon home in the world
- The Willmott Dixon Re-Thinking School was built

### 2008

- The Barratt Green House is built to Level 6 of the Code for Sustainable Homes

### 2009

- The Renewable House is built
- New landscape scheme is launched
- The Willmott Dixon school is refurbished as a healthcare campus
- The BRE Innovation Park wins the Edie Award for Environmental Excellence for Best Sustainable Construction Project

### 2010

- The Cub House is built
- The Welsh Future Homes Project Innovation Park in Ebbw Vale, Wales is launched

### 2011

- The Prince's House is opened and the refurbishment of the BRE Victorian Terrace is completed

### 2012

- Plans for new Innovation Parks are underway in Scotland, China, Brazil and Canada as part of the BRE Innovation Parks Network

# About BRE



**BRE is an independent and impartial, research-based consultancy, testing, certification and training organisation, offering expertise in every aspect of the built environment and associated industries.**

The BRE Group of companies is wholly owned by the BRE Trust, a charitable organisation representing interests across the built environment sector. The Trust uses the profits made by its companies to fund new research and education programmes that will help to meet its goal of 'Building a better world together'.



### Please note:

The BRE Innovation Park is subject to constant change and all information is correct at the time of printing.

This brochure is for guidance only. All technical specifications and performance data relating to products and building services have been provided by manufacturers and suppliers, and BRE is not responsible for any inaccuracies.

# The BRE Innovation Park: leading the way

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The buildings and technologies on the Innovation Park will continue to be updated, refurbished, added to or replaced, keeping them at the cutting edge of innovative sustainability.

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A number of other initiatives are planned for the park, including:

## **Making the park zero carbon**

Over the coming years, we are planning a stepped approach to make the park zero carbon in order to ensure that it remains a truly exemplar demonstration project. We will do this by quantifying exactly how much energy is required to operate the park and then working with industry partners to provide this through clean energy sources.

## **Monitoring and connecting the park via a global network**

We plan to fully monitor the real performance of every building on the park via simulation and real-life occupancy. This data will be shared through a global network linking the BRE Innovation Parks.

## **Building a new Passivhaus dwelling**

The Passivhaus building competition (launched at the UK Passivhaus Conference in October 2011) challenged designers to create a demonstration building that is both affordable and Passivhaus certified.

The winning design will be built on the park in 2012 and take the form of two semi-detached dwellings: one complete and the other left unfinished to showcase the technologies employed.

## **Key achievements**

Since its launch in 2005, the BRE Innovation Park has achieved the following key milestones and outcomes:

- Over 60,000 visitors including 4000 children through BRE's Educational Visits Programme
- Over £10 million of industry investment plus £15 million in research and development on the park
- Over 400 organisations showcasing innovation in materials, products and technologies
- Over 20 awards and prizes including the Edie Award for Environmental Excellence
- Informed government policy and standards and directly influenced over 100 projects in the UK



### **Building an assisted living smart house**

In conjunction with the 2012 British Homes Awards, we are looking to construct a full-scale demonstration building that enables the inter-operability of smart systems and controls.

The house will also feature technologies such as telecare, telehealth and remote monitoring, enabling residents to live independently in their homes for longer.

### **Building new non-domestic exemplary buildings**

We plan to diversify the building types currently on site and look to welcome new additions such as commercial buildings, retail units and educational facilities, including the refurbishment of a 1960s office building in collaboration with higher education institutions.

### **Incorporating sustainable transport options and street furniture**

We plan to incorporate a range of sustainable transport elements on the park including green vehicles and sustainable bus shelters. A range of sustainable street furniture and public art will also be included to create the feel of an inclusive community where people would choose to live and work.

**We welcome interest and participation from industry partners and other organisations to help shape the future of the built environment on the BRE Innovation Park.**

### **BRE Innovation Park Membership Scheme**

Become a member of the BRE Innovation Park and you will enjoy a host of benefits such as:

- Access to the park's facilities and buildings
- Learning and networking opportunities with the UK's most forward-thinking manufacturers, architects, designers, developers and innovators
- Access to meeting and conference facilities in an inspirational, unique location
- Special offers on a range of BRE events, publications and with some of the park's supply chain partners

Visit our website to find out more:  
[www.bre.co.uk/ipmembership](http://www.bre.co.uk/ipmembership)

# The BRE Innovation Parks Network

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**Providing an essential bridge between countries to exchange knowledge and enable collaborations.**

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The BRE Innovation Park is a flagship development that is part of an international network of innovation parks being established by BRE in China, Brazil, Canada and the United States.

The objective of the Parks Network is to provide an essential bridge between countries to exchange knowledge and enable collaborations. Currently in different stages of development, the BRE Innovation Parks Network comprises:

## **Ebbw Vale, Wales**

This Welsh Future Homes project is a partnership between BRE Wales, the Welsh Assembly Government, Blaenau Gwent Council and the United Welsh Housing Association. It comprises a unique development of three affordable, sustainable houses and a visitor centre located on the site of an old steel works at Ebbw Vale, Wales.

The aim of the project is to stimulate the development of a low carbon built environment in Wales and to kick-start the country's green economy.

## **Ravenscraig, Scotland**

The BRE Scotland Innovation Park @ Ravenscraig occupies two acres on an 1100 acre site of another former steel works. The site is being regenerated into a new town featuring 10,000 houses, sports facilities, community spaces and transport links.

Currently under construction, the Innovation Park will comprise up to 12 demonstration buildings

showcasing products and technologies to help meet the future energy requirements for Scotland.

The aim of the project is to follow a 'ground-up' approach to sustainable planning and development and it is supported by the Scottish Government. The site will feature porous road surfaces and paving, 3-stage SUDS system, native planting and landscaping, and a natural play area.

## **Beijing, China**

BRE has been commissioned to develop a masterplan for the Beijing Green Building Park, a 450,000 m<sup>2</sup> site in Beijing.

It includes an Innovation Park which will comprise 20 innovative buildings, sustainable landscaping, exhibition and entertainment space along with a visitor centre featuring an integrated energy hub. A number of these buildings will showcase the best of British design and construction.

The aim is to bring together the latest technologies and innovations in the built environment to help the Chinese Government support the country's booming growth in the most sustainable and efficient manner possible.

## **Brasilia, Brazil**

The Park of Innovation and Sustainability for the Built Environment (PISAC) will showcase new methods of construction and technologies that are innovative, affordable, efficient and sustainable.

The aim is to bring together new methods of construction and technologies that are innovative, affordable, quick to build and sustainable, to help the Brazilian Government provide a robust infrastructure at this time of unprecedented growth.

## Ontario, Canada

In October 2011 BRE opened an office in Ontario, Canada. One of its key business objectives is to locate a suitable site for a BRE Canada Innovation Park.

The aim is to facilitate partnerships with other Canadian organisations to innovate, test and showcase new construction methods and materials to enhance and future proof the Canadian built environment.

## Portland, USA

BRE, in collaboration with the Portland Development Commission, is developing a series of demonstration projects to enable the incorporation and testing of new clean technology products in the region.

The aim is to enhance the city's reputation as a leader in clean technology. Projects include a Green Innovation Park as well as the Oregon Sustainability Centre, the first Innovation Park in North America.



## Opportunities for involvement

There are a number of ways to get involved in the BRE Innovation Parks Network:

- Build a state-of-the-art demonstration building on one of our Innovation Parks
- Showcase your most innovative products on a site that is visited by thousands of industry professionals and decision-makers every year, with an opportunity to test, monitor and independently certify products and technologies for the market
- Become a member of the BRE Innovation Parks Network and demonstrate your commitment to advancing knowledge and sustainability in the built environment

If you would like to get involved, please contact us.

# Making the most of your visit

This guide has been designed to provide further information about the buildings and landscape projects on the BRE Innovation Park.

The buildings and landscape are numbered as follows:

- 1 About BRE
- 2 BRE Environmental Building\*
- 3 BRE Mohne Dam\*\*
- 10 Visitor Centre
- 20 BRE Victorian Terrace
- 30 Willmott Dixon Community Healthcare Campus
- 40 Hanson EcoHouse
- 50 Barratt Green House
- 60 Sigma Home
- 70 Cub House
- 80 Renewable House
- 90 Prince's House
- 100 Osborne Affordable House
- 200 Landscape

There is also an accompanying audio guide  which contains a more detailed commentary on each individual building and the products and sustainable innovations contained within.

Full instructions on how to use the audio tour handset can be accessed by pressing button **0**. Volume and pause options are available and commentaries can be de-selected at any time.

Further information can be accessed by selecting one of the coloured buttons:

-  Yellow for design
-  Green for sustainability
-  Red for construction

 **2** \* The BRE Environmental Building is located adjacent to the Innovation Park and incorporates a number of innovations in energy efficient design. More information can be found in the audio guide.

 **3** \*\* The Mohne Dam is located in the woodland behind the Prince's House on the Innovation Park and was used for testing prior to one of the most famous operations of WWII. More information can be found in the audio guide.

## Health and safety

- When crossing the Innovation Park 'homezone' please be aware that it is a road and neither pedestrians nor traffic have right of way
- If you hear a fire alarm on the park, please make your way to the visitor's car park, fire assembly point 'F' and wait for a member of BRE staff
- If you are in the Victorian Terrace and you hear a fire alarm, please make your way to the front of Building 16, fire assembly point 'G', and wait for a member of BRE staff
- In the event of an emergency, please dial 3333 from a BRE phone or 01923 664333 from any other phone. Do not dial the emergency services direct as security will not know where to send them

### Please:

- Keep to the pathways to protect the ecology
- Do not use the toilets in the demonstration houses
- Do not make adjustments to the controls in the houses
- Do not take food and drink into the houses

If you need any advice or assistance, please contact a member of staff in the Visitor Centre.

**Thank you and enjoy your visit.**

# Site plan



# Visitor Centre



The Visitor Centre is a modification of the first Innovation Park house built by Hanson in 2005.

The house is built on a pre-cast basement and foundation system with prefabricated ground floor walls and thin-joint blockwork on the upper floor.

It houses the Digital Community Centre by Open Hub which provides a range of innovative community services to the buildings on the park, including monitoring instantaneous energy consumption.

## Key features include:

- An EcoDan air source heat pump by Mitsubishi providing underfloor heating and hot water
- A 1500 litre capacity rainwater recycling system by Polypipe
- EDF smart monitoring display
- DuPont™ Corian® antimicrobial surfaces
- Innovative glazing solutions by Pilkington

## Innovative technologies on display include:

### In\*flexor Window Insulator

Originally developed by NASA, this insulation material has been adapted for use as window blinds to control heat throughout different seasons.

### Ensto Electric Vehicle Charging Station

A solution for charging electric vehicles that is suited to different urban environments. Includes possible user identification and data link to external information systems over a GPRS connection.

### Minus 7

An endothermic roofing system that incorporates standard-looking tiles which act as solar collectors. Connects to a solar energy processor and thermal stores to provide buildings with hot water and heating.

### Victaulic Piping Systems Solutions

Grooved and plain-end mechanical pipe joining systems which require minimal installation time (and costs) compared to welding, threading or flanging.

### Confluence By Komfort

Precision interface between gypsum and glass walls which can be installed more quickly than traditional methods. Product is 100% natural comprising 85% gypsum, 5% glass, 5% water and 5% wooden laths.

**The Visitor Centre is used as an innovation showcase. If you would like the opportunity to display, test, monitor and independently certify your innovative technologies and products, please contact us.**



## Technical specification

Year of construction	Design standards	Fabric U-values (W/m <sup>2</sup> K)				Air tightness
		Walls	Glazing	Floor	Roof	m <sup>3</sup> /h/m <sup>2</sup> @ 50 pascals
<ul style="list-style-type: none"> <li>Built 2005</li> <li>Extended 2008</li> </ul>	<ul style="list-style-type: none"> <li>Constructed to 2002 Building Regs</li> <li>BREEAM Pass (Refurbishment)</li> </ul>	0.35	2.2 – Extension: 1.0	0.25	0.25	Not tested

Construction type	Window type	Building services strategy		Renewable energy		Rainwater harvesting	Greywater recycling
		Heating	Ventilation	PV	Solar thermal		
<ul style="list-style-type: none"> <li>Prefabricated thin-joint blockwork</li> <li>Composite panel system</li> <li>Structural insulated 'SIPS' roof panel system</li> </ul>	<ul style="list-style-type: none"> <li>Double glazed</li> <li>Timber frame in original building</li> <li>Aluminium frame in extension</li> <li>Self-cleaning glass</li> </ul>	ASHP	Natural	Yes	No	Yes	No

**Key:** ASHP: Air source heat pump; CSH: Code for Sustainable Homes; DHW: Domestic hot water ; GSHP: Ground source heat pump; MVHR: Mechanical ventilation with heat recovery

# BRE Victorian Terrace 20

The BRE Victorian Terrace was built in 1855 as a stable block and servants quarters for the Bucknalls Estate that was later to become home to BRE.

Like most Victorian houses, it had single skin brick walls, draughty sash windows, a clay tile roof in poor condition and was prone to damp and poor thermal performance.

Now at the heart of BRE's Rethinking Refurbishment initiative, the building has been transformed into three highly-efficient terraced houses (the BASF Zone, the Saint Gobain Zone and the British Gas Zone) which still retain the original character of the stable block.

Each zone highlights modern innovative refurbishment techniques and materials and is an exemplar of sustainable refurbishment for pre-1919 solid wall buildings.

The aim of the project was to improve the EPC rating from band F to band B whilst creating a 'living laboratory' to demonstrate the latest processes, materials and technological advances in sustainable refurbishment.

## Key features include:

- Several types of insulating materials, including spray foam, PIR foam board and Aerogel
- Refurbished and replacement windows including timber, UPVC and composite systems
- A digital communication infrastructure that will monitor the condition and performance of the building and provide tele-assisted care
- Material specifications selected from the BRE Green Guide to Specification

## Other innovative technologies include:

### The BASF Zone

- BASF Micronal® phase-changing ceiling tiles which absorb latent heat to moderate the room temperature
- Pilkington Spacia™ vacuum glazing which offers the thermal performance of conventional double glazing in the same thickness as single glass, fitted to original sashes

### The Saint Gobain Zone

- Weber Floor 4310 Fibre Flow, a pumpable self-levelling floor compound
- Weber Therm XP External Wall Insulation, a one-coat system requiring minimal installation time (and costs) that improves energy efficiency

### The British Gas Zone

- Smart metering
- Electric vehicle charging points
- Solar PV

The British Gas unit is part of the SmartHomes Project which aims to reduce the energy consumption of domestic customers.

**The BRE Victorian Terrace refurbishment project was made possible with support from DECC and EEDA.**



## Technical specification

Year of construction	Design standards	Target fabric U-values (W/m <sup>2</sup> K)				Air tightness
		Walls	Glazing	Floor	Roof	m <sup>3</sup> /h/m <sup>2</sup> @ 50 pascals
<ul style="list-style-type: none"> <li>Built in 1855</li> <li>Extended in 1878 and 1903</li> </ul>	To improve the EPC rating from an 'F' to a 'B'	0.25	Various - 0.9 to 2.9	0.20	0.16	7.00

Construction type	Window type	Building services strategy		Renewable energy		Rainwater harvesting	Greywater recycling
		Heating	Ventilation	PV	Solar thermal		
<ul style="list-style-type: none"> <li>Solid brick walls</li> <li>Clay tile roof</li> <li>Different types of insulation (PIR spray foam, external EPS, PIR floor insulation, mineral wool, Aerogel)</li> </ul>	<ul style="list-style-type: none"> <li>Single glazed sash windows replaced by vacuum double glazed units</li> <li>New timber or magnesium oxide frames</li> <li>Triple glazed rooflights</li> </ul>	<ul style="list-style-type: none"> <li>Gas combi</li> <li>ASHP</li> </ul>	MVHR in some parts	Yes, above British Gas Zone	Yes, above BASF Zone	No	No

# Willmott Dixon

## Community Healthcare Campus



The Willmott Dixon Community Healthcare Campus was originally constructed as a sustainable school in 2007, using a laminated solid timber building system.

Converted to a healthcare campus in 2009, the building provides an evolving showcase for the latest innovations in construction and healthcare.

Its main objective is to demonstrate the importance of retrofit in improving the sustainability and energy efficiency of hospitals and health centres, with the aim of helping the NHS to reduce operational costs.



### Key features include:

- BREEAM *Excellent* rating
- Step powered kinetic energy harvesting system developed by The Facility
- Transparent building integrated photovoltaics by Polysolar, delivering around 3000kWh of electricity each year
- Low energy, natural ventilation e-stack system by Breathing Buildings, also used in the UK's first BREEAM *Outstanding* healthcare facility in Houghton-le-Spring, Sunderland
- A modular hospital room by Integrated Medical Interiors which mimics changes in daylight to support the human circadian rhythm
- An Ecophon hanging sound absorbing baffle
- Assisted living technologies
- Innovative solar wall by Corus which preheats ventilation air
- Wood fibre insulation
- Green roof



**WILLMOTT DIXON**

SINCE 1852



## Technical specification

Year of construction	Design standards	Fabric U-values ( $W/m^2K$ )				Air tightness
		Walls	Glazing	Floor	Roof	$m^3/nm^2$ @ 50 pascals
2007	BREEAM Excellent rating	0.25	1.80	0.20	0.18	1.80

Construction type	Window type	Building services strategy		Renewable energy		Rainwater harvesting	Greywater recycling
		Heating	Ventilation	PV	Solar thermal		
Solid timber panel system	<ul style="list-style-type: none"> <li>Double glazed Argon filled</li> <li>Some windows with safe vents</li> </ul>	ASHP	Predominantly natural with some MVHR	Yes	Yes	Yes	Yes

# Hanson EcoHouse



The Hanson EcoHouse was the first masonry house designed to Level 4 of the Code for Sustainable Homes.



Its aim is to address the combined challenges of offsite construction and climate change impacts.

The building is shaped like a kiln. It draws hot air up through a roof-light which opens automatically according to the indoor temperature, while simultaneously drawing in cool fresh air at a low level from vents in the ground floor bedrooms.

This system helps to enhance natural air currents, minimising the reliance on energy intensive cooling systems.

## Key features include:

- Brick and block wall panels manufactured offsite in a controlled factory environment, optimising quality and reducing onsite build time
- Thermal mass enabling the house to store heat in winter and remain cooler for longer in summer
- Structherm external insulating render which was retrofitted to deliver extra levels of thermal efficiency, vapour permeability, impact resistance and flexibility of colour and texture
- Underfloor heating



## Technical specification

Year of construction	Design standards	Fabric U-values (W/m <sup>2</sup> K)				Air tightness
		Walls	Glazing	Floor	Roof	m <sup>3</sup> /h/m <sup>2</sup> @ 50 pascals
2007	CSH Level 4	0.18	0.78	0.16	0.14	4.83

Construction type	Window type	Building services strategy		Renewable energy		Rainwater harvesting	Greywater recycling
		Heating	Ventilation	PV	Solar thermal		
Pre-fab cavity wall construction with the Hanson 'Quickbuild' walling system	Triple glazed Krypton filled	GSHP	Natural	No	Yes	Yes	No

# Barratt Green House 50

The Barratt Green House was the winner of the 2007 Home for the Future design competition run by the Mail on Sunday and the British Homes Awards.



Created with urban living in mind, it was the first home by a mainstream house builder designed to Level 6 of the Code for Sustainable Homes.

## Key features include:

- High levels of thermal mass in the aerated concrete panel structure, reducing the heating and cooling demand
- High performance triple glazing and window shutters which optimise solar gain, control overheating and prevent glare
- Mechanical ventilation system with heat recovery by Vortice
- A computerised control system ensuring optimal operation of building services and providing a central data storage facility
- Solar PV, solar thermal and an air source heat pump by Daikin
- FSC timber used throughout
- Rainwater harvesting
- Sedum roof





## Technical specification

Year of construction	Design standards	Fabric U-values (W/m <sup>2</sup> K)				Air tightness
		Walls	Glazing	Floor	Roof	m <sup>3</sup> /h/m <sup>2</sup> @ 50 pascals
2008	CSH Level 6	0.11	0.68 (triple glazing in windows) to 1.4 (double glazing in doors)	0.11	0.11	1.00

Construction type	Window type	Building services strategy		Renewable energy		Rainwater harvesting	Greywater recycling
		Heating	Ventilation	PV	Solar thermal		
<ul style="list-style-type: none"> <li>- Aerated concrete planks</li> <li>- 180mm external wall insulation</li> </ul>	Triple glazed Argon filled	ASHP	MVHR	Yes	Yes	Yes	No

# Sigma Home



The Sigma Home was the first home in the UK designed to Level 5 of the Code for Sustainable Homes.

Comprising two units, one complete and one left unfinished to demonstrate the innovations, the Sigma Home benefits from modern methods of construction with closed-panel timber frame construction at its heart.

It was occupancy tested by a local family who lived in it for two weeks each season over the course of a year. Findings from the project were used to evolve future home designs from the Stewart Milne Group.



In 2011, Rexel Energy Solutions and the Stewart Milne Group formed a partnership to refurbish the Sigma Home. Rexel are refitting it to showcase and test the most innovative low energy products and technologies.

This is an evolving project which will be constantly updated to incorporate the latest advances in the marketplace.

## Key features include:

- High levels of insulation and air tightness
- Rainwater harvesting and greywater recycling systems
- Air source heat pump by Dimplex and solar PV
- Electric car charging point
- DuPont™ Energain® phase change wall board to regulate indoor temperature



## Technical specification

Year of construction	Design standards	Fabric U-values (W/m <sup>2</sup> K)				Air tightness
		Walls	Glazing	Floor	Roof	m <sup>3</sup> /h/m <sup>2</sup> @ 50 pascals
2007	CSH Level 5	0.15	0.68	0.18	0.15	1.00

Construction type	Window type	Building services strategy		Renewable energy		Rainwater harvesting	Greywater recycling
		Heating	Ventilation	PV	Solar thermal		
Closed panel timber frame system	Triple glazed Argon filled	– Underfloor solar thermal – ASHP	MVHR	Yes	Yes	Rainwater butts	Yes

# Cub House



The Cub House was launched at the Ideal Home Show in 2010. It is designed to meet Level 5 of the Code for Sustainable Homes.

The modular home is made in England by FutureForm and requires 16 days offsite manufacture, with seven days onsite construction and installation. It is commercially available as a one, three or five bedroom home.

The Cub House is Secured by Design certified, Lifetime Homes compliant and NHBC Building Control Type approved.

## Key features include:

- Modular 65-90% recycled steel frame with high levels of insulation and glass-fibre rainscreen cladding guaranteed for 60 years
- MVHR with an air source heat pump by Nilan, taking heat from the exhaust air for greater efficiency
- 41 m<sup>2</sup> of solar PV panels
- Rainwater harvesting system for garden irrigation

## PODPASSIV Prototype Home

PODPASSIV is a prefabricated kit house located next to the Cub House on the BRE Innovation Park. It offers a semi-permanent solution to a range of housing requirements.

Manufactured in the UK from a composite glass-reinforced plastic, the structure is resistant to extreme temperatures and weather conditions which makes it ideal for disaster zones where supplies of water and electricity are unavailable.

## Key features include:

- Rainwater collection
- Solar lamps

Pods can be easily dismantled, sanitised and recycled for another use, thereby reducing costs and materials wastage.

**PODPASSIV**  
SUSTAINABLE SOLUTIONS





## Technical specification

Year of construction	Design standards	Fabric U-values (W/m <sup>2</sup> K)				Air tightness
		Walls	Glazing	Floor	Roof	m <sup>3</sup> /h/m <sup>2</sup> @ 50 pascals
2010	CSH Level 5	0.21	1.25	0.22	0.16	2.90

Construction type	Window type	Building services strategy		Renewable energy		Rainwater harvesting	Greywater recycling
		Heating	Ventilation	PV	Solar thermal		
Modular steel frame, 65-90% recycled	Double glazing with e-coating	Combination ASHP, MVHR and DHW	MVHR	Yes	No	Yes	No

# Renewable House



The Renewable House is an affordable home that meets Level 4 of the Code for Sustainable Homes through the use of renewable materials.

The National Non-Food Crops Centre (NNFCC) built this house in 2009 with support from the Department of Energy and Climate Change (DECC).

InCrops Enterprise Hub has recently taken over the Renewable House from the NNFCC and is planning to retrofit and extend the building to further demonstrate the full potential of renewable materials. The house will also be used to pilot new materials.



## Key features include:

- Timber frame and Hemcrete® walls with lime render by Lime Technology
- Thermafleece™ roof insulation made from the wool of British sheep
- SmartStrand® carpet by Mohawk with DuPont™ Sorona® renewably sourced polymer made from corn sugar
- Electric floor heating by Warmup Plc, organised into six zones using the Warmup 3iE energy monitor thermostat
- Hot water provided by solar thermal collectors from Warmup Plc in partnership with Tisun
- Monitoring of heating and air provided by Warmup Plc using 30 temperature sensors and two humidity sensors sending data back to the local data logger every minute



## Technical specification

Year of construction	Design standards	Fabric U-values (W/m <sup>2</sup> K)				Air tightness
		Walls	Glazing	Floor	Roof	m <sup>3</sup> /h/m <sup>2</sup> @ 50 pascals
2009	CSH Level 4	0.19	1.30	0.10	0.16	2.00

Construction type	Window type	Building services strategy		Renewable energy		Rainwater harvesting	Greywater recycling
		Heating	Ventilation	PV	Solar thermal		
Timber frame and Hemcrete® with external lime render	Triple glazed Argon filled	Electric underfloor heating	MVHR	No	Yes	No	No

# The Prince's House



The Prince's House demonstrates a simple, low-tech and easy to build alternative for volume housebuilders seeking to meet increasingly stringent low carbon targets for new homes.

Designed by the Prince's Foundation for Building Community, the house is constructed from natural materials to produce a home that is comfortable, attractive, healthy and adaptable.

It comprises two separate units: one complete and one left unfinished to demonstrate how traditional design principles need not be compromised to make low carbon homes.



## Key features include:

- Simple construction which can be realised with conventional skills and more quickly than traditional brick and block
- Solid walls made from strong, lightweight clay blocks by NBT with external lime render, high levels of thermal insulation and lower embodied energy than conventional bricks
- Wood fibre and sheep wool roof insulation
- Use of natural, non-toxic materials providing a healthy indoor environment
- Passive ventilation system that modulates airflow according to the local relative humidity levels
- Materials sourced with view to maximising end of life recyclability - includes floors and windows made from FSC certified timber and clay roof tiles
- Organic garden





## Technical specification

Year of construction	Design standards	Fabric U-values (W/m <sup>2</sup> K)				Air tightness
		Walls	Glazing	Floor	Roof	m <sup>3</sup> /h/m <sup>2</sup> @ 50 pascals
2011	Aiming for CSH Level 4	0.20	0.75	0.11	0.11	1.00

Construction type	Window type	Building services strategy		Renewable energy		Rainwater harvesting	Greywater recycling
		Heating	Ventilation	PV	Solar thermal		
<ul style="list-style-type: none"> <li>Single skin walls of aerated clay block</li> <li>Rendered in lime and hemp</li> </ul>	Triple glazed Argon filled	Wood burning stove with gas boiler backup	Natural	No	No	Rainwater butts	No

# Osborne Affordable House



The Osborne Affordable House was designed as a low cost, quick build system for the social housing market.

Built in 2006 using the i-SIP structural insulated panel system by Innovaré, it is designed to consume a third of the energy required for heating a house constructed to 2006 Building Regulation standards.

The Osborne Affordable House was built before the Code for Sustainable Homes was established. It achieved an *Excellent* rating under the BRE EcoHomes scheme.



## Key features include:

- Reduced onsite assembly time: the structure can be erected and weather-proofed in one and a half days with minimal site waste
- Sustainable external materials including Siberian larch, Eternit boarding and recycled plastic slates for cladding
- A data delivery system that displays energy consumption, live public transport information and also has the ability to manage an onsite car club
- An early demonstration of an MVHR system by Greenwood
- A design that can be easily adapted to suit the changing needs of residents



## Technical specification

Year of construction	Design standards	Fabric U-values (W/m <sup>2</sup> K)				Air tightness
		Walls	Glazing	Floor	Roof	m <sup>3</sup> /h/m <sup>2</sup> @ 50 pascals
2006	Ecohomes Excellent	0.14	0.80	0.16	0.10	1.80

Construction type	Window type	Building services strategy		Renewable energy		Rainwater harvesting	Greywater recycling
		Heating	Ventilation	PV	Solar thermal		
SIP system	Triple glazed Argon filled	<ul style="list-style-type: none"> <li>- ASHP</li> <li>- Electric skirting board heating</li> </ul>	MVHR	No	Yes	No	No

# Landscape 200

The Innovation Park landscape was designed in two phases by MacFarlane Wilder Landscape Architects and PRP Landscape.

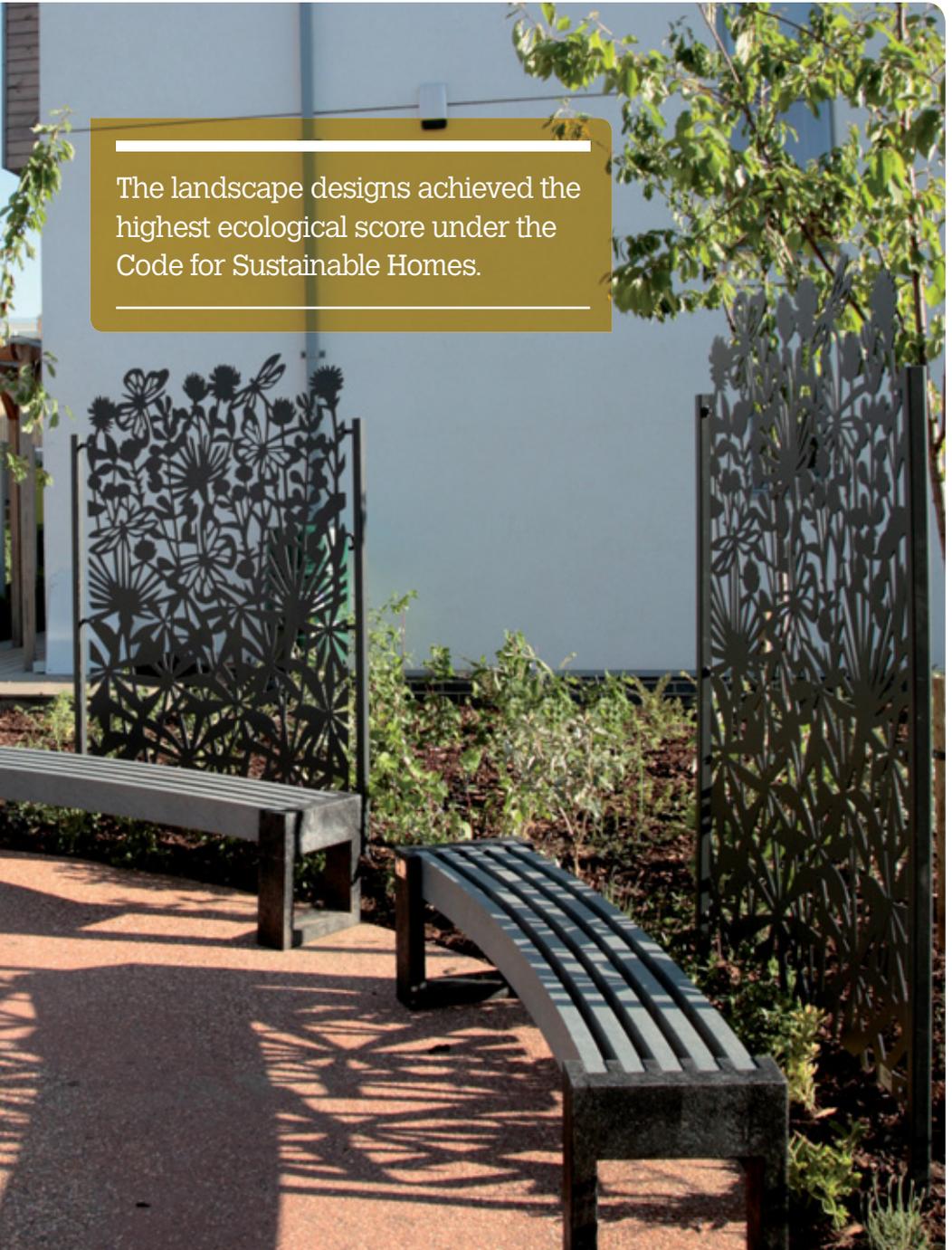
As the park expanded, a competition was held in partnership with the Landscape Institute and the British Homes Awards, to design a landscape solution to better integrate the buildings on the park. PRP's winning design was revealed at INSITE 09.

## Key features include:

- A streetscape creating a seamless journey through all key features and buildings on the park
- A pedestrian-friendly 'home zone'
- A central open space plaza
- A green gym community garden
- Imaginative play space for children
- A variety of porous paving to provide SUDs
- Swale which regulates the flow of excess water that might otherwise cause flooding
- A reed bed / wetland which, along with areas of meadow and scrub, is home to many indigenous plant species and provides habitats for birds, bats and reptiles
- Ecologically diverse planting including semi-mature trees and fruit-bearing species
- Green walls / instant hedges
- Street furniture made of recycled materials
- Soil recovered from sugar beet processing



The landscape designs achieved the highest ecological score under the Code for Sustainable Homes.



# Contact us

Get involved or become a member  
of the BRE Innovation Park.



*The BRE Innovation Park was officially opened in June 2005 by the then Deputy Prime Minister, John Prescott*

For more information on the BRE Innovation Park or to discuss how you can get involved in the BRE Innovation Parks Network:

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*Prime Minister David Cameron on a tour of the BRE Innovation Park in December 2010*

## Acknowledgements

The BRE Innovation Park was made possible by the expertise and generous support of our sponsors and partners. Visit our website for more details.



*Vice Premier of China, Li Keqiang visiting the BRE Innovation Park in January 2011*

# bre

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