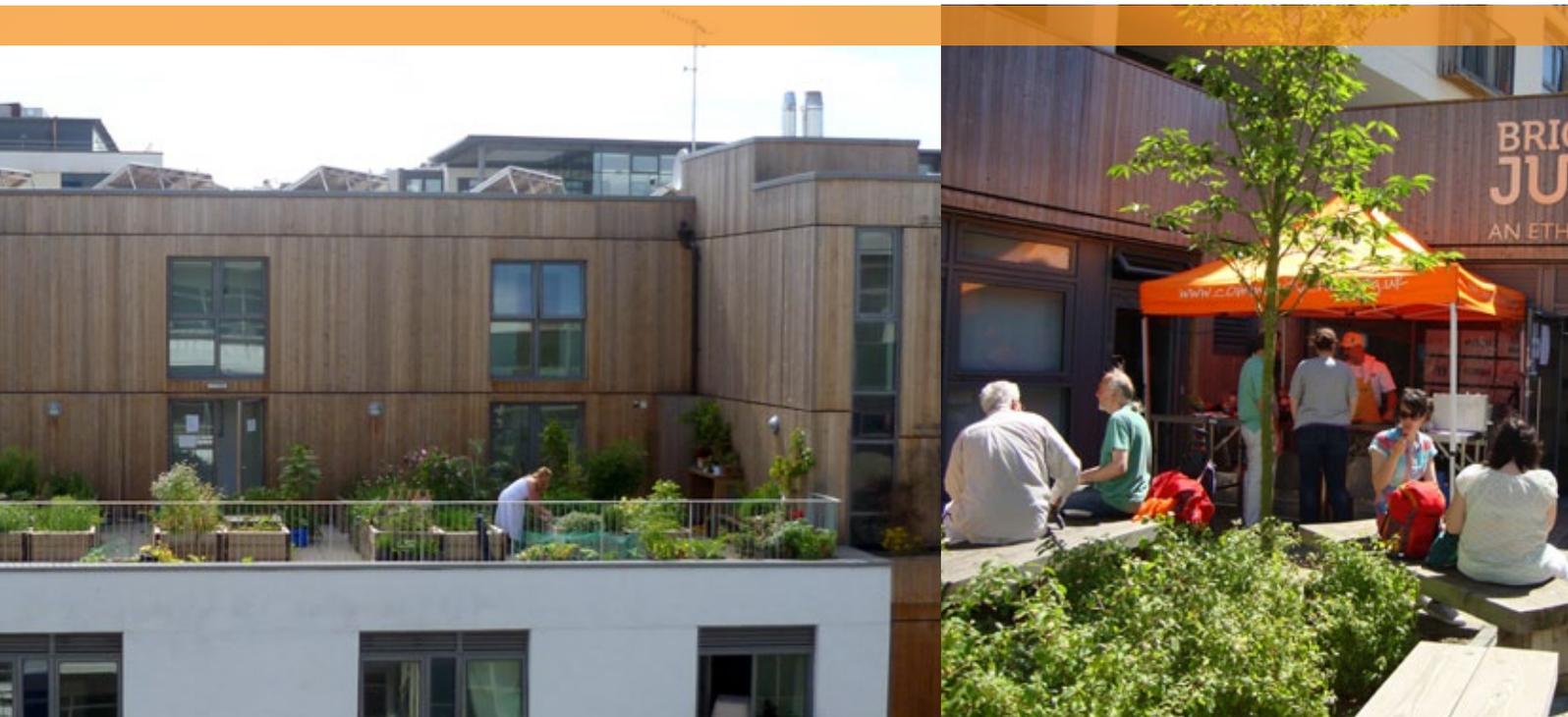


BioRegional

ONE BRIGHTON

Impact Report 2007-2014



Including independent carbon lifecycle report by eTool



ONE PLANET

ONE BRIGHTON



New England Quarter
New England Street
Brighton, East Sussex BN1 4GH

ISETTA SQUARE





Foreword from Sue Riddlestone

The opportunity is now clear. We can create great places to live, healthy profits and drastically reduce carbon emissions at the same time. This is the first project to comprehensively prove this in the UK at scale. We want to share our learning with the industry.

One Brighton is a new benchmark for the UK and internationally. It is the first One Planet Community to have been constructed in a growing international network

of communities rising to the challenge of One Planet Living (OPL).

Our first project, in partnership with The Peabody Trust, BedZED in south London, set the aspiration back at the start of the century. One Brighton has taken this forward another step, not only exceeding BedZED's environmental performance, but generating a profit during the worst property market in a generation.

We were delighted to partner with Crest Nicholson through BioRegional Quintain Ltd in developing One Brighton. Although BioRegional Quintain was itself a casualty of the property downturn, we are pleased to have this striking and successful project as a major legacy. The development has been an inspiration to many. It inspired Brighton and Hove City Council and its residents and businesses to become a One Planet City. One Brighton helped us contribute to setting the standards for the Ecotowns initiative launched by the previous government – and practically inform new projects we are working on, such as the 400 unit Exemplar One Planet Community in Bicester with A2Dominion as part of their Ecotown development. It has international status, for example being cited by the United Nations as one of eight trail-blazers globally, helping inform policy-makers attending the United Nations Rio+20 World Summit on Sustainable Development in Rio de Janeiro in June 2012.

Sue Riddlestone

Sue Riddlestone, OBE
Co-founder and Chief Executive, BioRegional

*We want to share our learning...
One Brighton has taken this forward
another step, not only exceeding BedZED's
environmental performance, but generating
a profit during the worst property market in
a generation.*



Foreword from Stephen Stone

One Brighton is a very real example of how working with willing partners we have been able to really push the boundaries of housing delivery to create not only a great place to live for our customers, but also achieve value for wider society, the environment and our business. One Brighton provides an enduring legacy which everyone involved can be proud of.

This report discusses some great examples of the positive impact the development has had on people's lives, from those working on site during construction to those who live there - in every case helping to support lifestyle changes leading to better health and wellbeing. It is these anecdotes, backed up with robust evidence, which demonstrate

that through high quality design and the right supporting infrastructure we can genuinely improve people's quality of life. As a pioneering project, One Brighton has attracted much interest and has been subject to considerable research and evaluation to really understand the long-term effects of the One Planet Living Principles on both people and our planet.

As a pioneering project, One Brighton has attracted much interest and has been subject to considerable research and evaluation to really understand the long-term effects of the One Planet Living Principles on both people and our planet.



The learning from this project has helped to inform our own approach on future developments and has influenced aspects of our 10-year sustainable business strategy. We continue to develop and foster a culture of learning within Crest Nicholson to support continuous improvement and innovation across the business. With BioRegional we have also shared the outcomes and lessons more widely across the industry to help drive a more sustainable approach across the sector. I invite you to be inspired and I hope you will enjoy learning about both the challenges and the successes of One Brighton.

Stephen Stone, Chief Executive, Crest Nicholson Plc

THANKS TO:

One Brighton and this report could only have come about with the support of all the stakeholders including Crest Nicholson, BioRegional Quintain Ltd (Pete Halsall, Nick James and Daniel Vilisied), Quintain Estates and Development (Adrian Wyatt, Nick Shattock and Rebecca Worthington), Brighton and Hove City Council, Fielden Clegg Bradley Architects, Fulcrum (Mott Macdonald), MLM engineers, Denne Construction, Natural Building Technologies, eTool, SHW and One Brighton Energy Services.



CONTENTS

Introduction	7
Summary of headline results and key lessons	8
Chapter 1	10
Introduction	
Chapter 2	16
Sustainability in construction	
Chapter 3	25
Energy and sustainability in use	
Chapter 4	32
Financial performance	
Chapter 5	34
Life Cycle Assessment of greenhouse gas emissions	
Chapter 6	39
Wider impacts, lessons learned and wants needs to be done to hit 2020 targets	
Conclusions	41

INTRODUCTION

Five years after first residents moved into the 172-apartment mixed-use development, One Brighton, BioRegional and Crest Nicholson are reporting on experiences to date on what set out to be one of the greenest and most sustainable urban communities in Europe.

The report aims to:

- Meet the commitment to report on the development as part of the international One Planet Communities programme and continue to support the initiative;
- Act as a reference document for BioRegional and Crest Nicholson PLC to spread learning within their organisations and for academic institutions and students; and
- Disseminate information in the wider industry.

As a One Planet Community, the targets set for One Brighton are due to be achieved by 2020. This review summarises progress to date towards these targets. It starts by considering the sustainability targets set at the design stage and those covering the construction of the

development. Then it considers sustainability following the completion of the building in 2010, after which residents began moving in. This review also summarises an in-depth life cycle assessment of One Brighton's embodied and operational greenhouse gas emissions. Details of the results benchmarked against original targets and planned activities are provided so that readers can draw their own conclusions.

Overall, we are happy with achievements to date, having managed to deliver almost all construction-related targets and having made good progress on operational/estate management targets. Satisfaction levels from residents overall are good. Financially the development has outperformed benchmarks both in terms of development returns despite the fact that the units were being marketed during a very difficult period for the property market (2008-2010), but also in terms of re-sale values and returns to investors from rental incomes.

SUMMARY OF HEADLINE RESULTS AND KEY LESSONS

Headline results:

- Successful planning consent and marketing of UK's largest private car free development
- First major use of low temperature fired clay block in the UK
- Pouring of greenest concrete frame in UK – post-tensioned concrete comprising 50% ground granulated blast furnace slag (GGBS) and use of 100% secondary aggregates
- Induction of over 1,300 design, development and construction staff in One Planet Living
- A 67% reduction in operational carbon emissions over the UK's existing housing stock – with good potential to achieve a reduction of 89% or more by 2020, approaching the (near) Zero Carbon target for One Planet Communities
- On a carbon lifecycle assessment basis (operational and embodied impacts), One Brighton is achieving a 60% carbon reduction over existing housing stock with the scope to achieve a 78% carbon reduction if the biomass boiler utilisation increases from 30% to 90%
- 79.7 points on the BRE Eco-Homes rating scheme at design stage and 79.9 points after completion, the highest score achieved by an apartment development at a post-construction evaluation
- Introduction of first designed-in rooftop mini-allotments, inspiring the planning authority to introduce an award-winning Planning Advisory Note on Food and Planning
- Introduction of a green facilities management service
- Establishment of a community owned Energy Services Company to bulk purchase guaranteed green electricity (Renewable Energy Guarantee of Origin) and operate an on-site communal heating/biomass system and PV panels ; overall delivering a green energy package cost-effectively
- Energy bills in 2013 were 19.7% lower than we had predicted in 2010, even without taking into account inflation
- Very good sales rates, considering the prevailing recession, with a 10% Return on Capital Employed despite being delivered during the worst property market in living memory
- Opening of a vegetarian café in the community centre
- Helping to inspire the City of Brighton and Hove to become a One Planet City
- Evidence of higher investor returns with yields in the region of 6%, which is higher than the yield of around 5% in immediate surrounding area
- Anecdotal evidence of better health outcomes for residents

- Two-thirds of residents changing to more pro-environmental behaviour based on design and information

Key lessons learned include:

- A consistent application of One Planet Living (OPL) principles assisted the process of design, development, sales and estates management
- Using OPL in an authentic way helped reposition the relationship between developer and planning authority into a more constructive rather than adversarial one
- Pioneering use of a 'Sustainability Integrator' throughout the project was highly successful
- Location and price fundamentals are critical in marketing the apartments, but selling a greener, healthier lifestyle strongly supported sales
- The building is very energy efficient with energy consumption in the apartments less than predictions, but the district heating system is less efficient than predicted (work can be done to improve efficiency of the district heating system in the coming months)
- A private wire, communal heating and energy services company can operate technically, financially and legally
- Further efficiencies in energy supply and costs to residents are achievable and will be sought in future developments

- Estates management and community engagement could be improved, even with the constraints of having a high proportion of transient residents due to the large student population
- A summary 'traffic-light' table showing progress to date against the ten OPL principles is given below

One Planet Living Principle	Design	Build	Estates Management
 Zero Carbon	●	●	●
 Zero Waste	●	●	●
 Sustainable Transport	●	●	●
 Sustainable Materials	●	●	●
 Local & Sustainable Food	●	●	●
 Sustainable Water	●	●	●
 Land Use & Wildlife	●	●	●
 Culture & Community	●	●	●
 Equity and Local Economy	●	●	●
 Health and Happiness	●	●	●

- Substantially delivered or on track
- Partially delivered or more work required
- Substantially undelivered

CHAPTER 1

Introduction

In 2007, construction started on One Brighton; the first development in the world to be designed, constructed and operated using the One Planet Living framework. Learning the lessons of the ground-breaking BedZED eco-village in south London, it aimed to set a new benchmark in delivering a zero carbon community in a commercially successful manner.

One Brighton is a mixed-use, city centre development in Brighton on England's south coast. Developed by joint venture company Crest Nicholson BioRegional Quintain (CNBQ), it comprises 172 apartments – from “eco-studios” to 3-bedroom units – plus office and community space. Accommodation is split between two adjacent blocks, the 12 storey ‘Brighton Belle’ and 8 storey ‘Pullman Haul’ very close to Brighton's main railway station.

One Brighton is part of a wider eight hectare regeneration plan, The New England Quarter, which included 355 residential units, new railway station car park, a Sainsbury food store, community facilities, training centre, office and workspace, two hotels and a language school.

The organisations behind One Brighton – Bioregional and Crest Nicholson

BioRegional is an award-winning social enterprise and charity which works with partners around the world to demonstrate that a sustainable future can be easy, attractive and affordable. In particular, lessons learned from the development, construction and operation of the Beddington Zero (fossil) Energy Development (BedZED) in Sutton, south London, led BioRegional to create the One Planet Living framework.

BioRegional, together with co-founder Pooran Desai and industry construction expert Pete Halsall, established BioRegional Properties Ltd to demonstrate how One Planet Living can be delivered in a commercially successful

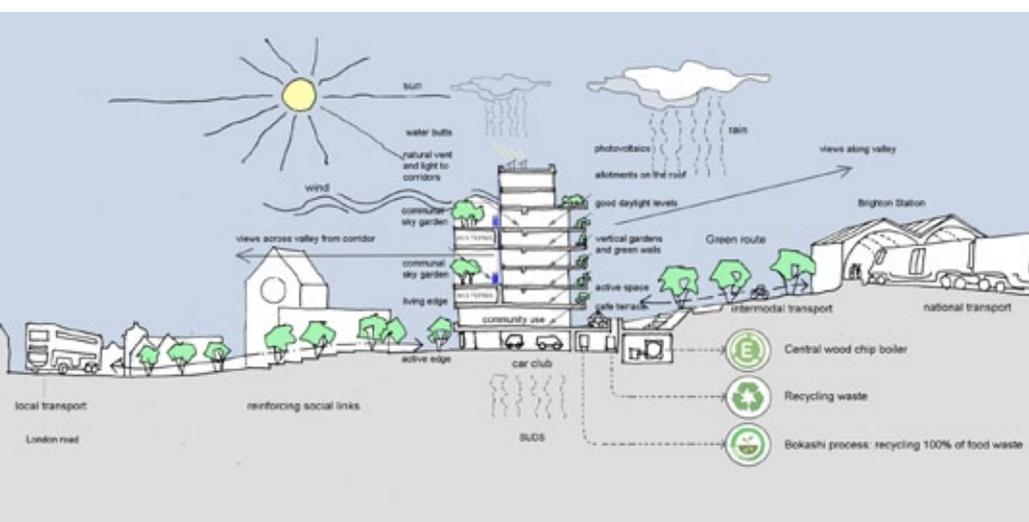
way. Investment from London Stock Exchange-listed Quintain Estates and Development PLC led to the creation of BioRegional Quintain Ltd which in turn established a joint venture vehicle, Crest Nicholson BioRegional Quintain Ltd (CNBQ Ltd).

Crest Nicholson PLC is a leading UK residential developer. Over the last 50 years the company has built a solid reputation through the delivery of high quality, design led sustainable communities, which leave an enduring legacy for future generations. The company's mission is to improve the quality of life for individuals and communities by providing better homes, workplaces and retail and leisure spaces.

History of One Brighton

In 1999, BioRegional were contacted by a local community group opposing re-development of large site next to Brighton station as a supermarket with a large car park. With Bill Dunster, the architect of BedZED, BioRegional proposed that a more sustainable solution would be a mixed-use development creating a smaller supermarket underground, with housing, offices and other commercial development above.

This submission helped start a new process led by the planning authority and urban planning specialists Urbed and the agent for the landowner which resulted in the ‘New England Quarter’ proposal. Specialist property investment company Ethical Property Company PLC (EPC), which rents space to social change organisations at low cost, was given the contract to operate the community space for the New England Quarter. EPC suggested BioRegional should put together a proposal to develop the residential and other commercial elements of the block in which a community centre would be based. BioRegional secured a small grant from the South East England Development Agency for a feasibility study which BioRegional used to secure investment from Quintain and Crest Nicholson to jointly purchase and develop the site as a One Planet Community.



One Brighton Residential accommodation mix

Type of Unit	Private	Shared equity	Social Rent	TOTAL
Eco Studios	19	-	-	19
1 Bedroom	39	15	14	68
2 Bedroom	60	10	11	81
3 Bedroom	-	-	4	4
TOTAL	118	25	29	172

Apartments range in size from 30.5 m² for the Eco-Studios up to 77 m² for 3 bedroom units. All apartments (private, shared ownership and social rent) were designed with the same space and quality standards. Social housing and social rent units amounted to 31% of the total, enabling a substantial number of lower income households to live in a city centre area with high residential prices and rents in line with the equity and local economy principle of the OPL framework (see below). While the initial intention was to have a “pepper-pot” mix of private and social housing, Moat, the housing association we partnered with, preferred that the social housing units be located in one block (Pullman Haul) for ease of management. However, open spaces and other amenities are available to all residents of One Brighton, regardless of the type of tenure. There are also 1,913 m² of community and office space, located in the ground floor of the two blocks.



Zero carbon	Making buildings more energy efficient and delivering all energy with renewable technologies.
Zero waste	Reducing waste, reusing where possible, and ultimately sending zero waste to landfill.
Sustainable transport	Encouraging low carbon modes of transport to reduce emissions, reducing the need to travel.
Sustainable materials	Using sustainable healthy products, with low embodied energy, sourced locally, made from renewable or waste resources.
Local and sustainable food	Choosing low impact, local, seasonal and organic diets and reducing food waste.
Sustainable water	Using water more efficiently in buildings and in the products we buy; tackling local flooding and water-course pollution.
Land use and wildlife	Protecting and restoring biodiversity and natural habitats through appropriate land use and integration into the built environment.
Culture and heritage	Reviving local identity and wisdom; supporting and participating in the arts.
Equity and local economy	Creating bioregional economies that support fair employment, inclusive communities and international fair trade.
Health and happiness	Encouraging active, sociable, meaningful lives to promote good health and well being.

One Planet Living

Understanding of our environmental impacts and how to best support sustainable lifestyles has greatly informed the development of the proposals for One Brighton. Rooted in the science and metrics of greenhouse gas and ecological footprinting, One Planet Living re-frames the sustainability challenge powerfully: If everyone on earth lived like Europeans, we would need three planets to support us.

CNBO’s vision for developing One Brighton was to create a place which would enable residents to lead sustainable lifestyles from day one. The vision for One Planet Living is to make it easy, attractive and affordable for people to live within the environmental limits of the planet – and that includes designing communities where One Planet Living is enabled. In these, the commuting distance between home and work, where food comes from and how waste is

dealt with will be as important as the energy performance of the buildings. Communities need to be provided with clean and efficient infrastructure such as zero carbon district heating solutions (the hardware of sustainability) and provision of services supporting behaviour change such as car clubs (the software of sustainability).

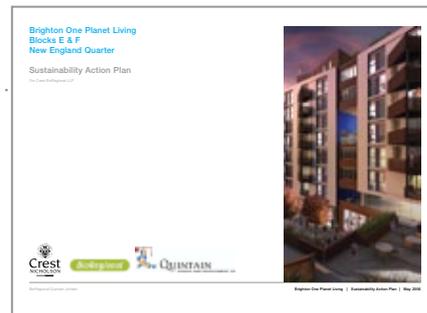
Ten guiding principles underpin One Planet Living and are used to inform a holistic response to the challenge of sustainability. The principles provide a broad and flexible framework to help organisations and project teams examine the sustainability challenges faced, develop appropriate solutions and communicate the actions being taken to key stakeholders such as colleagues, the supply chain, clients, customers and local and national government. The principles are backed by a set of ‘Common International Targets’ which all ‘endorsed’ One Planet Partners need to adopt in order to carry the One Planet Communities brand.

The Sustainability Action Plan

A key element of the process to deliver One Planet Living was to create a Sustainability Action Plan based on the 10 One Planet Living principles. This involved:

- Creating a set of imaginary future residents and using the 10 One Planet Living principles to envision how they could be supported to lead happy and healthy lives within the environmental limits of the planet
- Using the lifestyles and 10 principles to inspire and, with the widest possible set of stakeholders, co-create the Sustainability Action Plan for One Brighton for all three stages of the project: design, construction and estates management
- Ensuring that the Common International Targets could be met by the development by 2020.

The Sustainability Action Plan (later called the One Planet Action Plan) was always conceived as a working document which would be updated and added to as the development process unfolded, but always retaining the Common International Targets as the end point. The full One Planet Action Plan can be downloaded from www.oneplanetcommunities.org/onebrighton



Innovative Eco-Studio Concept

Envisioning the needs of future residents and as a response to the Equity and Local Economy principle, the Eco-Studio concept was developed within One Brighton as a new 'first rung' on the property ladder. These studios serve the so-called intermediate market of people who do not qualify for social housing but are unable to afford to rent or buy on the open market. Research by the Joseph Rowntree Foundation demonstrated that Brighton had one of the largest percentages of people falling in this intermediate category¹.

The Eco-Studios were designed as self-contained apartments. Their compact form allows them to be sold in a price band below contemporary 1-bed units and offered at a price below the threshold for Stamp Duty, enhancing their affordability. They were also designed to benefit from the wide range of communal spaces and amenities at One Brighton (including six sky gardens, roof terrace, community centre and Isetta Square). The Eco-Studios also retain all of the standard sustainability features found in other One Brighton units such as energy efficient lights and fittings and mechanical ventilation with heat recovery.

These 19 Eco-Studio units comprised 16% of the total private units, complementing the 32% social rent and shared-equity housing provision in the development.

No private car parking

In a first for a development of this size, One Brighton has no private car parking. Located close to Brighton station, the famous North Laine and other commercial and cultural areas, the aim was to encourage walking, cycling and using public transport and to minimise the need to use private vehicles, responding to Brighton and Hove City Council's sustainable transport ambitions. There is ample, secure bicycle storage space inside One Brighton and cycle parking immediately outside the building too. Stops on many bus routes are located nearby.

A planning agreement was reached with the council to provide nine parking spaces for disabled users and five for car-club vehicles. City Car Club was engaged to provide an on-site car club service. The idea behind the car club is that it offers "mobility insurance". Even though the development is near public transport services, there are times when residents may need a car; such as when visiting someone and returning late or picking up some shelving from the local DIY store. Car clubs, sometimes described as pay-as-you-go motoring, are like car hire but with a nearby vehicle available for as little as 15 minutes at a time giving residents access to a car when they occasionally need it. The cars are serviced, insured and valeted, removing these inconveniences and the expenses of car ownership. The car club was heavily promoted through the sales and marketing as an integral part of the One Brighton lifestyle with two years free membership offered.

Incorporating references to the heritage of the site

The site has a rich industrial history and we wanted to pay homage to this. The Brighton Main Line railway was completed in 1841 and the site became Brighton's steam locomotive works with the first locomotive produced in 1852. Brighton grew in popularity with Londoners and day-trippers to the coast. Particularly famous in transporting these day trippers was the Brighton Belle, hauling the luxurious Pullman carriages. In 1957, Isetta of Great Britain began producing Isetta 300 models, popularly known as bubble cars, at their factory on the site. In 1962 the firm ceased production of the little cars but continued to produce Isetta engines until 1964. The two buildings that make up One Brighton were named Brighton Belle and Pullman Haul, with the square between them named Isetta Square.



EcoHomes and BREEAM

Overall, under the BRE EcoHomes assessment system, One Brighton achieved 79.7% of available credits at design stage, the highest achieved by an apartment building at the time. Areas of opportunity included windows and floors where some credits were not awarded. Post-construction evaluation yielded a score of 79.9, also the highest ever achieved for an apartment building under EcoHomes which went on to be superseded by the Code for Sustainable Homes. All commercial space was constructed to BREEAM Excellent for Shell and Core, the highest rating available at the time.

Summary of main OPL strategies at Design Stage

		Delivered?
 Zero Carbon	<p>Green power for construction:</p> <ul style="list-style-type: none"> 100% Renewable Energy Guarantee of Origin electricity <p>Green generators on-site</p> <p>Generate zero carbon energy:</p> <ul style="list-style-type: none"> Biomass-fuelled boiler On-site electricity generation via array of photovoltaic panels and/or roof mounted turbines (decision to go with PV for all on-site power generation) 	<p>Yes</p> <p>Yes</p> <p>Yes</p>
 Zero Waste	<p>Facilities and services to make recycling easy:</p> <ul style="list-style-type: none"> Provide carefully designed recycling facilities Provide an on-site in-vessel composter for food waste using a 'Big Hanna' system 	Yes
 Sustainable Transport	<p>Aim for zero private car parking:</p> <ul style="list-style-type: none"> Only disabled user and car club parking provided 	Yes
 Sustainable Materials	Comprehensive materials strategy	See Construction Stage summary
 Sustainable and Local Food	<p>Design in opportunities for on-site food-growing:</p> <ul style="list-style-type: none"> Rooftop mini-allotments Balconies with integrated planters suitable for growing selected plants for food External areas include 'edible landscaping' 	Yes
 Sustainable Water	<p>Water efficient fittings and appliances:</p> <ul style="list-style-type: none"> No 'power' showers All washing machines installed to be higher performing water-efficient models <p>Rainwater management:</p> <ul style="list-style-type: none"> Rainwater collection system to be used for irrigation of rooftop mini allotments Soakaways, porous paving and other landscaping treatments to facilitate high levels of surface water attenuation 	<p>Yes</p> <p>Yes</p>
 Natural Habitats and Wildlife	<p>Interventions to enhance ecological biodiversity:</p> <ul style="list-style-type: none"> Bird and bat boxes and feeding points to be incorporated into buildings and the surrounding environment Areas of wildlife planting to be included using native species where appropriate Incorporate living 'brown roofs' with depleted soil fertility, planted with cliff top seed mix Protect existing ecologically-valuable features: Accredited ecologist issued a report confirming the site had a low ecological value 	Yes
 Culture and Heritage	<p>Community consultation and cohesion:</p> <ul style="list-style-type: none"> Intensive community consultation process during design involving local environmental, heritage and residents' groups <p>Culture of sustainability:</p> <ul style="list-style-type: none"> Induct everyone working on design in One Planet Living <p>Reference history of the site</p> <ul style="list-style-type: none"> 'Brighton Belle', 'Pullman Haul' and 'Isetta Square' used as names. 	<p>Yes</p> <p>Yes</p> <p>Yes</p>
 Equity and Local Economy	<p>Increase affordability:</p> <ul style="list-style-type: none"> Developed concept of Eco-Studios to create a new entry rung on the property ladder 32% social housing – mix of shared equity and social rent. <p>Accessibility:</p> <ul style="list-style-type: none"> All of the homes are to be designed in accordance with the Lifetime Homes standard 	<p>Yes</p> <p>Yes</p>
 Health and Happiness	<p>Buildings and infrastructure to be designed to promote wellbeing:</p> <ul style="list-style-type: none"> Issues of minimising noise pollution, access to daylight and indoor air quality are drivers of the building design 	Yes

CHAPTER 2

Sustainability in construction

Often in the design, development and construction process, initial ambitions are lost as the process unfolds. Property development that leads to the creation of a sustainable community will be the result of a series of complex and interconnected processes running through design and planning negotiations, construction, estates management and community engagement. The product and outcome is the result not only of a few big decisions but of millions of 'micro-decisions' and chains of decisions – from large ones such as the specification of the energy system, and procuring an innovative concrete frame, to individual micro-decisions such as a site worker deciding whether to put a bit of wood in the recycling skip or the general waste.

With One Brighton, our aim was to have One Planet Living properly integrated in the DNA of the project. Everyone working on the project needed to understand the reasons why CNBQ wanted to do things differently, how and why sustainability targets and actions had been incorporated into the One Planet Sustainability Action Plan. They also had to be given the opportunity to contribute to ideas and delivery.

To ensure as many of the decisions as possible were oriented towards the desired outcome three main strategies were adopted:

- Engagement and encouragement through One Planet inductions and workshops
- Contractually requiring everyone working on the project to attend the One Planet Living induction
- Including the One Planet Sustainability Action Plan as a reference document in tender information

It was an approach based as much, if not more, on changing culture as on managing sustainability. Everyone

working on the project - over 1,300 in total and including planners, lawyers, architects, sales advisors, financial analysts, construction workers and sales staff - were inducted. With site workers, as with Health and Safety, no one was allowed to work on site unless they had attended the induction (receiving a sticker on their helmet confirming that). The onsite induction explored, in an interactive way, what workers thought about environmental issues, how they might take the principles of One Planet Living into their own lives, how One Planet Living was being incorporated in the construction process, and inviting ideas on how this might be improved.

Engaging the construction industry

Taking time to explain and discuss sustainability helped enormously. Nicholas Fowler, Business Improvement Manager for the lead construction contractor, Denne, said "The One Planet Living principles provided us with an excellent framework to plan our sustainability strategy." The ease of communication resulted in one worker proclaiming. "Number of planets! I can now talk about sustainability down at the pub!" With more people wanting to do their bit for the environment, it was the general feeling that One Brighton gave partners and contractors the opportunity to make a contribution in their working lives.

Sustainability Integrator

In order to ensure that all sustainability measures, both construction and non-construction related, were effectively implemented, CNBQ appointed a 'sustainability integrator', Daniel Viliesid. He was dedicated to the project full-time and was tasked with convincing, persuading, enforcing, and helping everyone to achieve their goals without jeopardising or minimising the sustainability



Construction Process - One Planet Living in the project's DNA

Sustainability Integrator Daniel Viliesid

strategies designed to deliver the first One Planet community. According to Daniel, the greatest challenge of being a Sustainability Integrator is to persevere and push hard and long enough so that the team would realise *it is possible*, it just takes a little extra work, time, and going the extra mile.

A few other initiatives led by the Sustainability Integrator at One Brighton included:

- Coordinating a field trip to see how the proposed walling system, new to the UK, had been used for decades in Germany
- Convincing the contractor that a “green canteen” would not only be possible but should be a success (as it turned out to be)
- Encouraging the contractor to accept that having a Sustainability Coordinator on-site would not only help them achieve their commitments towards One Planet

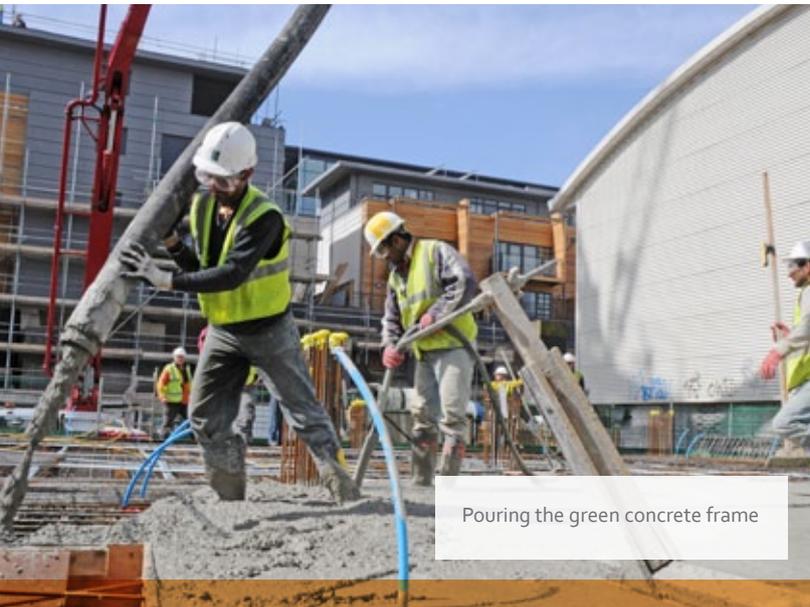
Living at One Brighton, but would be able to position them as green contractors in future.

Sustainability Integrators face challenges not only with external parties but also with colleagues and partners. Daniel summarises his role as a “just-do-it” job. “You have to push hard and you have to find creative solutions and literally walk the unbeaten track all the time”.

Materials strategy

The criteria for selecting materials included embodied energy and water, recycled content, recyclability at end of life, local sourcing, and affordability.

Special attention was placed on the key elements of the building, such as the concrete frame which represents a significant part of the whole in terms of volume, weight, cost, embodied energy and CO₂e emissions.



Pouring the green concrete frame



“Recycled, low embodied energy materials in the building envelope can reduce total life cycle CO₂ emissions and produce an attractive modern-looking apartment block. For example, concrete uses 50% GGBS (cement replacement) and 100% secondary (recycled) aggregates while the Bakor bitumen roof membrane uses at least 25% post-consumer recycled content.”

The Zero Carbon Hub, Profile of One Brighton, 2009

Concrete frame

A special concrete mix was specified, developed, and sourced jointly by CNBQ, contractor Denne (together with their sub-contractors), and the concrete supplier. A minimum of 50% GGBS (Ground granulated blast-furnace slag) was to replace cement in the concrete mix; and a high percentage of recycled aggregate to be integrated to the mix. The contractors faced several challenges, as most suppliers either charged a premium for this product or simply would not supply the mix. CNBQ and its partners in the project managed to secure a deal with Mexican-owned concrete manufacturer CEMEX and one of the greenest concretes mixes was used for the frame: 50% GGBS, 100% recycled aggregate, transported by barge to the nearby Shoreham Harbour. This mix represented

a recycled content of over 47% (by mass) and a reduction of embodied CO₂e (see Carbon Life Cycle Assessment summarised later in this report). The finished surfaces provided by using this mix were better than those from regular concrete and the strength achieved after 28 days was higher than expected. Curing times were longer but once construction reached above the first floor this was not a critical path problem and did not slow the overall construction process.

Most suppliers would demand a substantial premium for this concrete, arguing that it was difficult to produce but actually taking advantage of a perceived opportunity to harvest a “green premium”. This was one of the most complex challenges for the Sustainability Integrator. Having to mediate between developer, contractor, architect and engineer; trying to negotiate directly with concrete suppliers seeking a reasonable price (and trying not to create tension in the developer-contractor relationship) and ultimately delivering what was later to become one of the greenest concretes ever supplied for a residential building proved a complex task. The result was a cost-premium on the concrete of less than 2%. This residual cost premium was levied by the concrete supplier arguing that should circumstances prevent delivery of

the mix on site on a particular day, it would be difficult to supply that same mix to another customer.

The specific mix used at One Brighton was designed for the particulars of this project. Several criteria must be used to assess the right mix for each project including local availability of materials, transport, and the technical feasibility of using a particular mix in a particular structure. For this reason, planners should avoid an over-prescriptive approach to requiring green concrete when negotiating and deciding on applications.

External walls and glazing

The project used low-temperature fired clay (terracotta) blocks with a highly-insulating honeycomb structure within them for in-fill walls on the building's envelope. Outside of these blocks was a layer of wood-fibre insulation followed by an outermost layer of mineral render. As well as being highly insulating, this system has low embodied energy and carbon emissions compared to concrete block alternatives and significantly improves indoor air quality due to the breathability of the walls.

CNBO and its contractors carried out the intensive training required to install this type of wall, including visits to construction sites in Germany and Austria where the walling system was developed and is widely used. Suppliers in the UK faced important challenges, such as validating tests and certifications which were valid in Germany and continental Europe but not in the UK. With support from CNBO the suppliers carried out the required tests in order to obtain the necessary UK certificates.

Early on in One Brighton's construction, the contractors were sceptical about the technical performance of the system and the installation procedures and speed. Block work sub-contractors required training in order to build using the 'thin-jointing' required with this blockwork, but the site workers responded well and developed the necessary skills and abilities to install the system

efficiently. Ultimately this provided a better outcome than other more traditional methods of construction.

During the construction process UK brick and block manufacturers were contacted to encourage them to establish manufacturing of the terracotta block system in the UK so that future projects could secure a more local source of these blocks.

The block work was insulated with wood fibre insulation and rendered or, on some parts of the building, faced with FSC certified, heat-treated weatherboarding. This provided the required performance, such as salt-resistance, for the maritime conditions. For the windows, triple glazing was used throughout, with FSC-certified softwood with an aluminium fascia making up the frames.

Internal fitout

All timber used at One Brighton was FSC or PEFC certified including all kitchen fittings. Marmoleum flooring was selected for as a natural, low impact material being based on linseed oil. As an option, residents at One Brighton could select a countertop made of crushed oyster shell collected from restaurants in Brighton or recycled glass made from bottles from Brighton.

Local materials

Selection of a low impact building system which was not manufactured in the UK meant that major construction elements could not be locally sourced. Even glazing had to be imported from Germany as UK manufacturers did not produce glazing to a sufficient level of quality or environmental performance. We looked at using local chestnut for weatherboarding, but unfortunately it was unable to meet the requirements for insuring our building in the maritime climate (the salt spray in Brighton means that high performance guarantees are needed). Instead FSC certified heat-treated softwood from Finland was selected.

Summary of the Sustainability Action Plan at Construction Stage

	Zero Carbon	<p>Green electricity for Construction:</p> <ul style="list-style-type: none"> Purchase 100% Renewable Energy Guarantee of Origin electricity <p>Run generators on waste cooking oil biodiesel</p> <p>Energy efficient site cabins</p>	<p>Yes</p> <p>Partial – 61% reduction</p> <p>Yes</p>
	Zero Waste	<p>Reduce levels of construction waste:</p> <ul style="list-style-type: none"> Value of construction waste to be less than 0.2% of total construction costs. Target for <15 m3 of construction waste per 100 m2 of floor area developed <p>Community Recycling:</p> <ul style="list-style-type: none"> Promote the sale and or exchange of used and/or unwanted construction materials/equipment 	<p>We were unable to collect data on value of waste materials</p> <p>Plywood shuttering reused. We used the WRAP best practice methodology for reducing construction waste. Kitchen units were brought to site wrapped in reusable fabric rather than single-use packaging</p> <p>Waste from the construction site canteen went to community composting. Paper and card, plastic and glass waste collected by a local recycling cooperative</p>
	Sustainable Transport	<p>Transport aggregates by barge to nearby port</p> <p>Cycle parking for construction workers</p>	<p>Yes – reducing emissions by 30%</p> <p>Yes</p>
	Sustainable Materials	<p>Materials with low embodied energy:</p> <ul style="list-style-type: none"> Life cycle methodology and 'whole life costing' approach Embodied energy/CO2 audit to be undertaken <p>'Healthy' and non-toxic materials:</p> <ul style="list-style-type: none"> Materials with Ozone Depleting Potential or a Global Warming Potential >5 to be prohibited <p>Use 100% FSC-certified timber</p> <p>Maximise use of recycled materials</p> <p>Use Local Materials</p>	<p>Partially achieved – embodied energy/CO2 audit done for key elements of building</p> <p>Yes</p> <p>Yes</p> <p>Partial, achieved with secondary aggregates and small items such as kitchen worktops</p> <p>No – key construction materials to achieve broader sustainability drivers were not available or, as in the case of chestnut weatherboarding, were unable to provide sufficient guarantees to meet insurance requirements</p>
	Sustainable and Local Food	<p>Establish One Planet Canteen:</p> <ul style="list-style-type: none"> on-site, using local, seasonal and organic produce <p>Offer vegetarian options for all meals</p>	<p>Yes</p> <p>Yes</p>
	Sustainable Water	<p>Install water efficient washroom facilities for site workers:</p> <ul style="list-style-type: none"> waterless urinals and water efficient toilets and water taps for all construction staff 	<p>Yes</p>
	Natural Habitats and Wildlife	<p>Protect existing ecologically-valuable features:</p> <ul style="list-style-type: none"> Accredited ecologist issued a report confirming the site had a low ecological value <p>Organise talks and activities by local conservation group for site workers:</p> <ul style="list-style-type: none"> 'Toolbox talk' by local conservation group. Apprentices made bird boxes 	<p>Yes</p> <p>Yes</p>
	Culture and Community	<p>Culture of sustainability:</p> <ul style="list-style-type: none"> Engage through inductions and toolbox talks everyone working in One Planet Living and the 10 principles <p>Outreach to local community:</p> <ul style="list-style-type: none"> Newsletter School visits and other group visits 	<p>Yes – 1,300 professionals and workers inducted</p> <p>Yes</p>
	Equity and Local Economy	<p>Construction-skills related student placements:</p> <p>The main contractor was required to provide</p> <ul style="list-style-type: none"> 10 student weeks per year of work experience placements; 1 x 1 year-long placement <p>All tea and coffee to be Fairtrade</p>	<p>Yes</p> <p>Yes</p>
	Health and Happiness	<p>Healthy living and eating promoted:</p> <ul style="list-style-type: none"> toolbox talks organised on men's health and culture of discussion on health issues fostered 	<p>Yes</p>



Wood being collected for recycling and reuse

Zero Carbon in the construction process

Reducing CO₂ emissions during the build was a key element of the construction section of the Sustainability Action Plan. The main strategies employed were to: use energy-efficient site cabins; ensure all electricity used on site was from guaranteed renewable sources; and use biodiesel to power the on-site generators.

The design and build construction contractor, Denne Construction, sought out greener site cabins which were insulated and had doors with airtight seals to prevent heat loss. Green electricity was sourced by Bioregional Quintain through Good Energy Ltd, a company which guarantees all electricity comes from renewable sources, mainly large-scale wind turbines.

During the first months of site work, all the energy to power the tower cranes and site accommodation was supplied from on-site generators running on biodiesel. The biodiesel was sourced from a local supplier and the vast majority derived from waste cooking oil. A reduction of over 97% of net CO₂ emissions was achieved compared to standard diesel. The use of biodiesel also reduces sulphur and particulate emissions which have been linked to respiratory illnesses. The fuel was delivered to the site using a biodiesel powered fleet. There was a zero tolerance

policy in place for biodiesel derived from palm oil and rapeseed oil. While Denne started at 100% biodiesel when construction began in autumn 2007, during a very cold winter it had a tendency to solidify and clog the pumps. We therefore moved to 50% biodiesel/50% mineral diesel. Overall, 54,000 litres of biodiesel were used and 34,000 litres of red diesel during construction, achieving a 61% reduction in use of mineral diesel for the generators.

Zero Waste

A best practice Site Waste Management Plan was developed and implemented jointly by CNBQ and Denne Construction. Several programmes were put in place with suppliers to reduce packaging and implement take-back schemes; for example, kitchen units were brought to site wrapped in reusable fabric instead of one-use plastic packaging.

Specific targets were put in place for less than 15 m³ of waste to be produced in total per 100m² floor area and for the total value of waste to represent less than 0.2% of construction cost. However in practice it was not possible for the waste data to be collected in m³.



Kevin McCloud visits One Brighton and commented: "All urban projects must follow this exemplar".



On-site Green Canteen during construction

Sustainable transport

There was support for cycling and walking to work – making operatives aware of policy on sustainable transport including the Green Travel Plan and providing secure and sheltered cycle storage, changing facilities, and space to store tools and equipment on-site.

A green supply chain travel plan was implemented ensuring that all suppliers adopted best practice as set out in the Green Supply Chain Travel Plan. Denne was responsible for monitoring origin and mode of transport of most materials and provided regular reports to CNBQ.

Local and sustainable materials

If designed well, a concrete frame can provide "thermal mass" to balance fluctuating external temperatures throughout the year, keeping the homes warmer in winter and cooler in summer and saving energy long term. Nonetheless, the energy and carbon emissions associated with the manufacture of concrete are high.

CNBQ therefore worked hard to create a concrete mix that met the structural requirements and had a much lower environmental impact. CNBQ replaced 50% of the Portland cement with Ground Granulated Blast Furnace Slag (GGBS) – a by-product of the steel industry. In addition, all of the aggregate used was a waste by-product of the china-clay industry in Cornwall transported by barge to Shoreham, our nearest port. In this way, CNBQ built possibly the greenest concrete frame in the UK and a CO₂ audit showed emissions were reduced by over one third.

CNBQ aimed to provide high levels of insulation to the homes in One Brighton – not only to reduce heating requirements in winter, but also to keep heat out in summer. CNBQ worked closely with Natural Building Technologies (NBT) to introduce a German walling system based on a clay block, wood-fibre insulation and a lime render. This combination of materials delivers a building envelope with high levels of insulation (low U-values) but it has a relatively low density. The materials are fired at a low temperature reducing the amount of embodied energy in manufacture by 60% compared to conventional concrete



Ashley, a young man who started as an apprentice at One Brighton, said he had not eaten vegetables since he was a toddler. After a few weeks of Wendy opening the canteen, and with Janice encouraging everyone to embrace the One-Planet lifestyle, Ashley decided to try healthy food. Feta-cheese Greek Salad became a favourite of his and a best seller at Wendy's outlet.

Another construction worker said he did not like any fish. But when "the lads" organised a local fishing trip and Wendy baked her famous fish pie he not only ate it but also ordered one to take home. Wendy is now operating the café at the Community Centre in One Brighton.

blockwork. The insulation boards are made up of 95% post-manufacturing waste wood and use natural resins from within the wood instead of glues as the main bonding agent. All three elements, the block, the insulation and the lime render, allow the building to breathe, ensuring that there is no trapped moisture in the building fabric and balancing humidity. This significantly improves the quality of indoor air and reduces the growth of moulds and house dust mites. Although they were imported from Germany, Natural Building Technologies are working to get the blocks manufactured in the UK. These blocks are as well suited for single homes and terraces as they are for apartment blocks.

Local and sustainable food

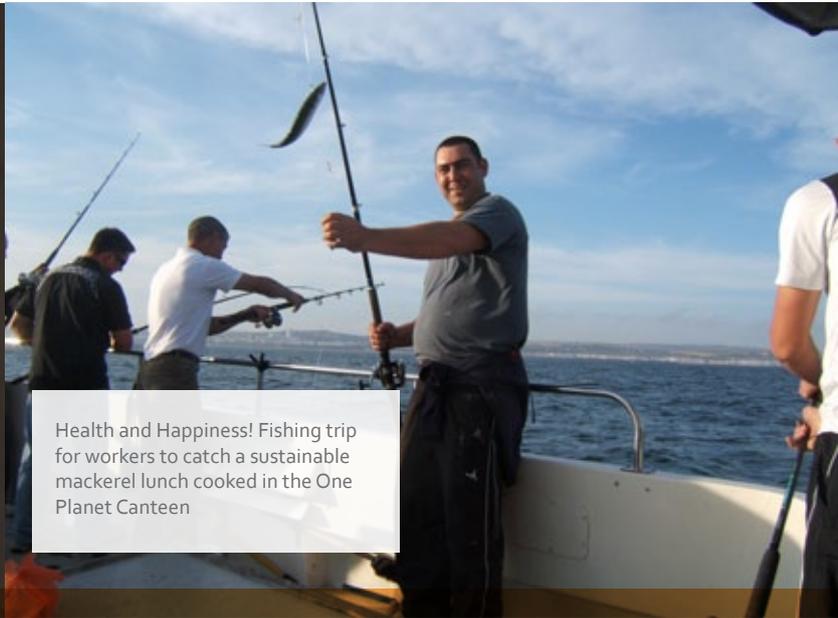
Development partners CNBQ, together with Denne Construction, set out to find a caterer who would embrace the One Planet Living principles and provide healthy, local, organic and exciting meals to the staff at the One Brighton construction site. The concept behind the One Planet Living Canteen was to offer healthy and affordable

meals to workers, to reduce the environmental impact of the food offered and to promote the local economy by partnering with local farmers and suppliers.

Wendy Armitage was selected as the Canteen Operator. One Brighton's construction works enjoyed food in their site café – arguably rivalling that served in many of Brighton's trendier restaurants!

Janice Al Baden, Sustainability Co-ordinator for Denne Construction at the One Brighton site, explained the impact the canteen had on the site staff. "The canteen proved really popular. Some were unconvinced about getting the workforce buying in to this, but there has never been such a demand for healthy food from a site canteen."

Workers could still get a Full English Breakfast but it was with local organic Sussex sausages, free range eggs and grilled rather than fried tomatoes. A vegetarian option was always available; Greek salad was a popular option in summer.



Health and Happiness! Fishing trip for workers to catch a sustainable mackerel lunch cooked in the One Planet Canteen

Sustainable water

During the construction period, the strategy to manage water sustainably focused initially on monitoring water use. Additionally, Denne Construction installed waterless urinals and water efficient toilets and water taps for all construction staff. Strict controls were put in place to prevent pollution of ground sources during construction.

Culture and community

Several site visits were organised for various local groups including schools, explaining the sustainability and One Planet thinking behind One Brighton to local people.

Equity and Local Economy

The main contractor was required to provide: 10 construction-skills related student weeks per year of work experience placements; one year-long full time placement ; advertise all job vacancies in a local paper, on the site noticeboard and to local colleges teaching construction skills; provide information on home location (town and area) for all operatives working on the site in order to monitor local job creation and to foster opportunities for transport-sharing.

CHAPTER 3

Energy and sustainability in use

CNBQ and its partners placed special attention to the materials and energy strategies that would make One Brighton a truly sustainable community and particularly to ensure that CO₂ emissions reductions could be achieved in the future, once the development was handed over and managed by residents.

Energy

The aim for One Brighton was to be 'Zero Carbon' by 2020, to be in-line with the Common International Targets for One Planet Communities. This was to be achieved through a combination of energy efficiency measures, together with on-site and off-site energy generation from renewable sources, all managed via an Energy Services Company (ESCo).

The approach to Zero Carbon includes:

Reducing demand

The development would be designed and constructed to achieve high levels of energy efficiency through carefully considered building fabric specification, the use of efficient lights and appliances and a programme of support to residents providing information and guidance on reducing energy demands.

Space heating and hot water

The optimised thermal demands are met via an on-site communal biomass boiler burning FSC –certified wood pellets. This boiler is backed up with a natural gas boiler to ensure continuity of supply in the event of planned or unplanned maintenance. The biomass boiler supplies a communal hot water accumulator tank designed to act as a thermal store to 'smooth out' the energy load profile and optimise the capacity of the boiler required. Hot water distribution pipes run from the accumulator tank to each apartment.

Electricity

A small proportion of One Brighton's electricity demand is met through on-site renewable generation. An array of photovoltaic (PV) panels with a 9.6 kilowatt peak output were installed on the rooftop of Pullman Haul. These were proposed in part to communicate sustainability to a wider audience. The panels were co-funded by CNBQ and the government's Low Carbon Buildings Programme. The remainder of the electricity demand is met through the bulk purchase of renewable energy generated off-site.

Ofgem acknowledges energy generated from verifiable renewable sources with REGO (Renewable Energy Guarantee of Origin) certification. At One Brighton, CNBQ - via the established ESCo - ensures that the bulk purchased electricity is from new capacity REGO-certified sources. On this basis, it is considered that the electricity provided to the development is zero carbon.

Originally, CNBQ had intended to install small wind turbines on the rooftop of One Brighton (in addition to the PV panels array). However, following research from the BRE and advice from the Low Carbons Building Trust – which provided grant funding and financing for the low-carbon strategy at One Brighton- it was decided to use the funds allocated to wind turbines to increase the capacity of the PV panels array. The BRE research concluded that micro-wind turbines in urban environments, even coastal environments like Brighton, underperform.

Other features of the energy strategy include:

- 100% energy efficient lights and fittings, including CFL and LED where appropriate
- Mechanical Ventilation with Heat Recovery system that uses hot water from the biomass system
- Triple glazing windows
- Super insulated walls achieving air tightness of less than 5 m³/m²/hr @ 50Pa and U levels of 0.21, 0.19, and 1.4 W/m²K for walls, roof and ground floors, and

windows respectively

- Energy efficient (A-rated) appliances supplied by the developer

The Energy Services Company



Carbon reduction and ultimately (near) Zero Carbon emissions from the buildings are achieved by centralising the production of heating energy with a biomass boiler and by using off-site wind power through a green power purchase agreement. These both fall outside the experience of managing agents for residential estates so it was necessary to set up a community Energy Services Company (ESCo) to supply the energy to residents and bill them. The ESCo also provides the mechanism for monitoring the on-going carbon emissions neutrality of the development and for generating a sinking fund for plant replacement.

The community ESCo at One Brighton (One Brighton Energy Services Ltd or OBES) has the management and operational responsibility for the biomass, gas and PV generation on site. It is also responsible for the bulk purchase of primary fuels such as electricity, wood fuel and gas, and the on-sale of heat and electricity. OBES is a wholly owned subsidiary of the One Brighton Management Company (the 'ManCo') which in turn is owned by the leaseholders in the building.

Some of the key actions required to establish the energy system and to run OBES included:

- Incorporation prior to completion of the first residential and commercial units
- Construction is carried out by the main contractor overseen by CNBQ
- Specialist items (e.g. biomass boiler system) installed and commissioned by suppliers
- Ownership of the energy generating plant transferred to the ManCo
- Residential and commercial leaseholders are required to enter into an Energy Supply Agreement with OBES as a condition of the lease along with a Direct Debit mandate
- OBES establishes contracts for fuel supply and purchase, operation and maintenance services, sale of energy, billing and metering services, etc. The risk of underwriting operation and maintenance of the plant is contractually passed back to specialist service providers e.g. boiler operation and maintenance, billing and metering etc. with sufficient protections e.g. performance criteria with penalty clauses and step-in rights placed in the contracts
- Billing, metering and debt recovery are provided by a specialist billing and metering company. Customers are provided with a helpdesk number which provides general advice during office hours with an emergency 24 hour call-out facility
- Day to day checks on the system and ash emptying are carried out by the development's green caretaker/facilities manager
- Green electricity is supplied by a Licensed Supplier.

The tariff structure is set a year in advance. The power is Renewable Energy Guarantee of Origin certified

- Reinvestment decisions on replacement plant made by directors of OBES under terms of Articles of Association and Memorandum of Association
- OBES, working with the ManCo, draws up a financial plan so that bills can cover energy supply, ongoing maintenance costs and boiler replacement after 15 years

Energy Bills

In 2010, total energy bills for 2-bedroom apartments in One Brighton were predicted at £1,111 per annum compared to a like-for-like benchmark of an existing 2-bedroom home of £ 1,560. These energy bill estimates included estimates of costs for maintaining the communal boiler at One Brighton and a gas boiler in the case of the benchmark home (see 'Energy Cost Fact Sheet' in Appendix).

In reality, bills for 2-bedroom apartments at One Brighton averaged £892 in 2013, a reduction of 19.7% on predicted bills. This was largely due to lower consumption of energy than predicted.

	One Brighton Predicted (2-Bedroom apartment)	One Brighton Actual (2-bedroom apartment)
Heat (kWh/year)	4,398	1,984
Electricity (kWh/year)	3,419	2,821
Total energy bills including standing charge and boiler replacement	£ 1,111	£ 892

The green caretaker/facilities manager

One Brighton's green caretaker/facilities manager is an innovative, full-time role combining traditional

caretaking duties with a new set of duties supporting residents in sustainable living. The job holder is employed by the community management company and paid for via residential and non-residential service charges. One Brighton has had two green caretakers/facilities managers since it was completed, firstly Peter Commane followed by Andrew Breary.

As well as undertaking standard duties, the job holder is the day-to-day face of the Community Governance Organisation and ensures the provision of support and guidance to residents on green lifestyles issues, including transport, food and purchasing choices. He is the day-to-day point of contact for enquiries, helping to support the operation of services such as the car club, recycling collections, the onsite composter, the cycle storage and car park and communal areas. It is a job which requires good community-building and people skills.

The green caretaker/facilities manager helps to monitor performance in achieving the targets set for the One Planet Community. He also plays a critical role in integrating the sustainability ethos by encouraging and helping residents to recycle, use the car club, run their energy-efficient appliances correctly and organise community events. And he welcomes new residents, introduces them to One Planet Living and issues Green Lifestyle Packages and Handover Packs to new residents.

Finally, the green caretaker/facilities manager takes an active role in the day-to-day management of the renewable energy technologies on site, taking in wood pellet fuel on a weekly basis, ensuring that the fuel storage is adequately maintained, carrying out basic maintenance on the biomass boiler and ensuring that the energy-generating technologies are running adequately.

Interview with green caretaker/facilities manager Peter Commane



“Although in previous jobs I had responsibility for the management of buildings it was the community development aspect combined with the caretaking that interested me. I have actively engaged with residents and talked to them. I know a large percentage of residents on first name terms and know what the issues are that need addressing and try to get them resolved quickly. I suppose it’s different from others in the sense that I’ve built a small team who share the same sensibilities towards caretaking. We work collectively to ensure all the caretaking aspects are undertaken. It has also been important to try and promote that sense of collective responsibility to residents.”

To comment on changes in lifestyle behaviour I need to speak about the demographics here at One Brighton. We have residents who own their property and fully bought into the ethos of the development. We have a third of social/ key worker housing so a mixture of those bought into the ethos but [this] may not have been their priority. And of course, a large percentage of flats were snapped up as “buy to let”. As a result there is a regular roll over of tenants, especially language students most of whom don’t care! I have done a lot of work with letting agents to try and address this which has helped reduce this to an extent. There have been changes in lifestyle behaviour especially with regards to the care and upkeep of the premises. We have a recycling system for glass, dry recyclables and food waste. However, when I first came here furniture was being dumped or cut up and wedged into the bins. There were also a lot of electrical goods being dumped, most of them working. This may be a factor of people just moving in. I’ve been working with three local charities which come and collect for free and I have publicised this to residents. They now do regular collections and the dumping has greatly reduced.

I believe that a development of this size can work and be successful based on the BioRegional One Planet Living principles. I have done a lot of publicising of resources, facilities, arts and leisure activities and of services that are on our doorstep that residents knew nothing about.”

Food Growing

Although a range of opportunities for on-site food growing were facilitated at the development (including roof-top mini-allotments, balcony planters and communal drop-off points for local food box deliveries), the high density urban characteristics of One Brighton considerably limits the volume of produce in relation to the food needs of the community.

To further encourage residents to their own food, there was a commitment to support establishing a community garden in Brighton and Hove which would be ‘twinned’

with the proposed development. However, it proved difficult to secure the necessary arrangements so several extra food growing planters were eventually placed in Isetta Square, adjacent to One Brighton.

Governance, management, community

CNBQ was committed to the establishment of a community governance body from the outset of the development project. The One Brighton (New England Quarter) Management Ltd (ManCo) and the One Brighton Neighbourhood CIC (the Community Body) were set up in order to provide long-term governance for the



Anne Swithinbank of BBC Radio 4 Gardeners' Question Time at One Brighton – the rooftop allotments have featured in several episodes.



The Big Hanna Composter

Big Hanna is 'fed' twice daily and each year approximately 480L of compost is produced from about 4800L of food waste. Residents are provided with biodegradable sacks which they can use for the food waste. Compost from the Big Hanna is used on the roof top allotments and the planter in Isetta Square with any surplus going to Brighton's Whitehawk Community Food Project, which also collects biomass ash from One Brighton's wood pellet boiler. The picture shows the collection shoot for compost (green) and shoots for other recyclables.

management of the development and foster a sense of community at One Brighton.

One Brighton Neighbourhood CIC (the Community Body)

The property ownership, estate management and energy management solutions of One Brighton were all devised to support sustainable living. However, there was a perceived need for a mechanism to unite these measures, to act as the social "glue" and the sustainability "software". This is where the One Brighton Neighbourhood CIC (the Community Body) came in. Its social purpose was to enable and support people living and working within the One Brighton development, as well as those within the wider New England Quarter of Brighton, in leading sustainable lifestyles. As a CIC, One Brighton Neighbourhood has a Community Statement as well as Memorandums and Articles of Association. All these constitutional documents make reference to the One Planet Living principles as a framework for sustainability

to be applied in the activities of the organisation.

The CIC has been working with local residents, charities and businesses . In 2012, a summer fair was organised in partnership with The Friends Centre (the adult education centre based in One Brighton). The fair included a local business called 'The Community Chef' showing people how to cook with local, seasonal and foraged ingredients and a demonstration on how to revamp old clothes. In 2013 a new community garden was completed, again working closely with the Friends Centre as well as One Brighton residents and volunteers from mental health charity Mind. New projects being explored include a local travel project and a food club.

An Extranet was established but because social media has rapidly developed since construction this has not been continued. Residents tend to keep in touch via an informal email group.

Personal experiences

Some comments from interviews with residents:



“We love the building and the way sustainable living is integrated into the way it is built and managed. The flats themselves are well designed and very comfortable and we appreciate the garden areas...”

“I was able to give up cars because we live opposite the train station (the location was a brilliant choice). I joined the CityCarClub for the rare occasions when I really do need a car, because of living here. I wouldn't have done it without the introductory incentive...”

“The temperature is a real problem, most else is fine...”

“In terms of food consumptions habits, we joined a vegetable box delivery scheme for the first time, which is made very easy by having the cupboards downstairs at drop-off points.”

“We carefully separate and dispose of our waste, which we have never done before and we really appreciate how easy it is to manage the waste here.”

“We are both fitter and healthier than when we moved here, although I am not sure if that's a direct effect of living in this building. We have certainly saved money on transport.”

“We love it!”

“It's a lovely, warm home.”

“My husband and I moved into One Brighton, sold our cars and adopted a healthier lifestyle. In 18 months we lost 35 kg between us.”

Residents' opinions

A Post Occupancy Evaluation was carried out by the Bartlett School of Graduate Studies, University College London and completed in September 2011. The aim of the study was to determine if One Brighton delivers a sustainable living solution to its occupants. In summary: “most individuals indicate that the development meets their needs well. A huge range of factors were mentioned that work well including: layout, allotments, bike storage, location, bins, the green caretaker, insulation, and transport links.”

Some negative comments included aspects of noise insulation, lack of car parking, intercom system and the heating/ventilation system. Residents are happy with internal temperatures in winter, but some residents find the temperature in summer too hot at times. Comments from occupants indicate that the lifestyle that One Brighton affords them benefits their health. Benefits cited include: Proximity to amenities, walking more often and access to allotments. However dust and dry air from the ventilation system and pollution and noise from the adjacent road are frequently cited as health issues.

Many individuals refer to the ease of walking to town or catching public transport. The proximity of shops and supermarkets is also rated highly. Not having a car was cited frequently as both an advantage and disadvantage.

There is great potential for reducing resource use using “soft” or behavioural strategies. Survey responses indicate that nearly 70% of residents have modified their behaviour. Between 40-56% of occupants said they would feel “good” if they knew they used fewer resources than their neighbours. These results suggest that if some positive pressure were applied to occupants (possibly by modifying the billing system and introducing smart metering), resource use could reduce further. It has proved difficult to engage many of the students who occupy a large part of One Brighton's apartments in recycling, but we will look to improve on this. Liaising with their places of study is one option. Another is to place more emphasis on recycling in rental contracts, with a stronger focus on the One Planet and One Brighton Sustainability Charter.

Summary of Action Plan at Operational Phase

 Zero Carbon	<p>Green electricity:</p> <ul style="list-style-type: none"> Purchase 100% Renewable Energy Guarantee of Origin electricity <p>Run district heating system on biomass</p>	<p>Yes</p> <p>Partial 30% operational in 2012 and 2013</p>
 Zero Waste	<p>On-site food waste composting</p> <p>Community Recycling:</p> <ul style="list-style-type: none"> Provide notice boards and space on extranet system, promoting the sale and or exchange of used and or unwanted goods 	<p>Yes</p> <p>No</p>
 Sustainable Transport	<p>Engage future residents in the idea of living in a development with no private car parking:</p> <ul style="list-style-type: none"> increasing saleability of a sustainable lifestyle <p>Car Club operating</p>	<p>Yes</p> <p>Yes</p>
 Sustainable Materials	<ul style="list-style-type: none"> Residents were offered the option of kitchen worktops made from recycled materials (glass and crushed oyster shells) Green lifestyle pack for residents included information on sustainable materials in home furnishings etc Residents are provided with biodegradable maize-based sacks for their food waste 	<p>Yes</p>
 Sustainable and Local Food	<p>On-site food-growing:</p> <ul style="list-style-type: none"> Roof-top mini-allotments Balconies with integrated planters suitable for growing selected plants for food External areas include 'edible landscaping' <p>Make connections to existing local farmers networks and food box schemes:</p> <ul style="list-style-type: none"> Residents to be able to receive trial membership of local food box schemes Foyer designed with drop-off cupboards for local food boxes 	<p>Yes</p> <p>Yes</p>
 Sustainable Water	<p>Water target set at 105 litres per occupant per day, representing a 30% cut on UK housing average of 150 litres per occupant per day (and subsequently in line with target set for Levels 3 and 4 of Code for Sustainable Homes)</p>	<p>In 2012 monitoring data suggested we were achieving 109 litres per occupant per day (based on estimate of 305 occupants)</p>
 Natural Habitats and Wildlife	<p>Interventions to enhance ecological biodiversity:</p> <ul style="list-style-type: none"> Bird boxes and feeding points to be incorporated into buildings and the surrounding environment Areas of wildlife planting to be included using native species where appropriate Incorporate 'brown roofs' (seeded with local 'cliff top' wildflower mix) 	<p>Yes</p>
 Culture and Community	<p>Community centre to be provided:</p> <ul style="list-style-type: none"> to support community cohesion and interaction <p>Community extranet:</p> <ul style="list-style-type: none"> to facilitate social interaction between the residents and within the local community and interest groups <p>Culture of sustainability:</p> <ul style="list-style-type: none"> Green Caretaker employed One Planet Living information point (Friends' Centre + Ethical Property Company) 'One Planet Living' training courses at The Friends Centre 	<p>Yes</p> <p>Yes, initially, but now redundant due to development of social media</p> <p>Yes</p>
 Equity and Local Economy	<p>Affordability:</p> <ul style="list-style-type: none"> Eco-Studios to be aimed at enabling young people in getting on to the first rung of the property ladder. <p>Accessibility:</p> <ul style="list-style-type: none"> All of the homes delivered in accordance with the Lifetime Homes standard 	<p>Yes</p> <p>Yes</p>
 Health and Happiness	<p>Promote knowledge exchange:</p> <ul style="list-style-type: none"> between communities around the world rising to the One Planet Living challenge <p>Promote healthy lifestyles:</p> <ul style="list-style-type: none"> through cycling and better eating 	<p>Yes – international visits to One Brighton</p> <p>Yes – two thirds of residents have been influenced to change their lifestyles</p>

CHAPTER 4

Financial performance

Development returns

The mission statement of One Brighton was to provide an EcoHomes Excellent and Zero Carbon development that meets the 10 principles of the One Planet Living Philosophy whilst maintaining usual commercial returns to the development partners.

In addition to the development standards alluded to above the original business plan target was return on sales of 20% of total GDV and a Return On Capital Employed (ROCE) in the region of 25%.

After a difficult start in the wake of the credit crunch (2008) sales picked up from February 2009 following a review of the type of purchasers that would appreciate the scheme and a revised marketing strategy was put in place. This change improved the average selling rate to five reservations a month over the following 22 months. Despite achieving some moderate price improvements over the duration of the project the average return on GDV was 12%. However because of the general market conditions the overall development programme did extend by 12 months over the original forecast which resulted in a lower than expected ROCE circa 10% - nonetheless, an exceptionally good performance during the worst property market in living memory.

Rental values, returns for investors and efficiency of design

Analysis of rental values was conducted with local agents, Callaways Estate & Lettings Agents, an independent, family owned firm operating across Sussex and established for over 75 years. They have been awarded 'Best Estate & Letting Agent East Sussex' for the last five years running at the UK Property Awards.

Brighton Belle/One Brighton - Rental prices

Analysis of rental values show uplift over properties in apartments in adjacent City Point development constructed approximately three years earlier than One Brighton. All are like-for-like figures and exclude service charge and utility bills.

Rental prices per calendar month	One Brighton (Brighton Belle)	City Point (Horsted Court, Sharpethome Court, Sheffield Court, New England Street)
Studio	£900 - £950.00	
One Bedroom	£1250 - £1350.00	£900.00 - £1000.00
Two Bedroom	£1450 - £1700	£1100.00 - £1300.00
Three Bedroom		£1650.00 - £1800.00
Four Bedroom		£1900.00 - £2200.00

Direct analysis of yields on seven properties on which real sales and real rental values were compared on a like-for-like basis suggest yields of 6.2% for One Brighton and 5.0% for Horsted Court in the City Point development. This differential (24% higher albeit on a small sample) reflects the general impressions of Callaways property management staff.

Rental Returns per m²

An insight into design efficiency was obtained by comparing rental values per m² for 23 properties in Brighton Belle and 12 properties in the City Point development. Average rentals values per m² in City Point was £ 20.27 / m² whilst the average in One Brighton was £26.76 /m² , some 32% higher.

Brighton Belle/One Brighton - Sold prices

These apartments sold as new builds in 2010 for between

£102,000 (Studio) and £335.000 (2 Bedroom). Few have been resold since then, but when they are put on the market Callaways has often been appointed as agents for the resale.

In late 2013/early 2014 One Brighton apartments were achieving the following valuations, dependent on size, aspect and the floor level within the 12 storey block. One Brighton's apartments are smaller than the comparators and are reaching higher values per square metre.

Sales values	One Brighton (Brighton Belle)	Horsted Court, Sharpthorne Court, Sheffield Court, New England Street
Eco-Studio	£150,000.00 - £165,000.00	
One Bedroom	£210,000.00 - £250,000.00	£210,000.00 - £250,000.00
Two Bedroom	£255,000.00 - £320,000.00	£255,000.00 - £325,000.00
Three Bedroom		£335,000.00 - £375,000.00

Melanie Hilder, of Callaways lettings and property management team

With its excellent commuter links and close proximity to Brighton centre and the famous North Laine, the New England Quarter has proven a very popular location with rental applicants and especially overseas students who come to study at University of Sussex and also at Bellerby's College, where secondary level international students study to access the UK's top universities.

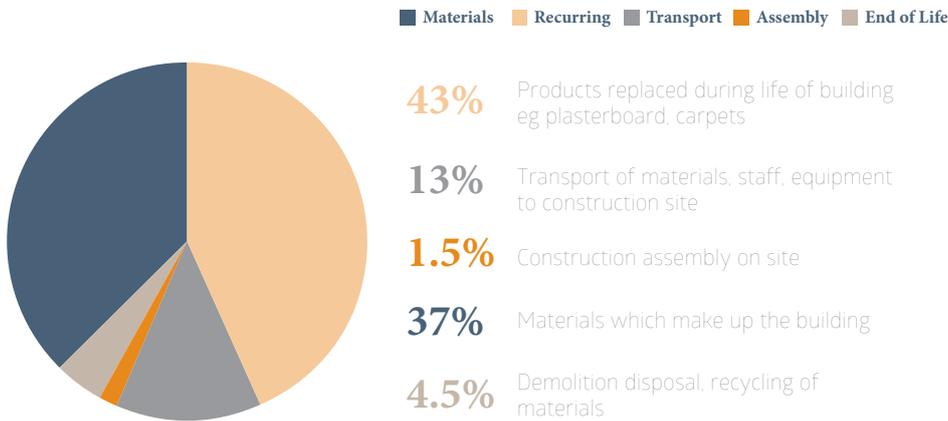
Having dealt with the lettings and property management and sales of over 30 apartments in One Brighton, as well as dealing with properties in the wider New England Quarter, Callaways is now considered to be a specialist in the developments for the area.

One Brighton outperforms the other developments in the area, such as City Point which was constructed by Barratts prior to Brighton Belle and which is located immediately adjacent. The ambience, starting with the foyer, and

continuing to the gardens and roof terrace, create a very good impression. There is also an additional option to have an allotment if one is available for rent. Feedback from our current clients database is that Brighton Belle has a hotel feel and is a very clean building. Although the apartments are smaller in size, they command higher rental values and are considered more desirable than the apartments in Horsted and Sharpthorne Courts in the City Point development.

Based on Callaways regularly attained rental figures within this prominent high rise property, the typical investment return landlords could presently expect to achieve on average is approaching a 6.5% yield on their assets. Void rates are below average for the area as a whole, so we do believe that the development does perform better than benchmarks.

In terms of sales values, although smaller than properties at City Point, they command equivalent or greater sale prices.



One Brighton's embodied emissions **382 kg**
CO₂e/occ/yr

CHAPTER 5

Life Cycle Assessment of greenhouse gas emissions

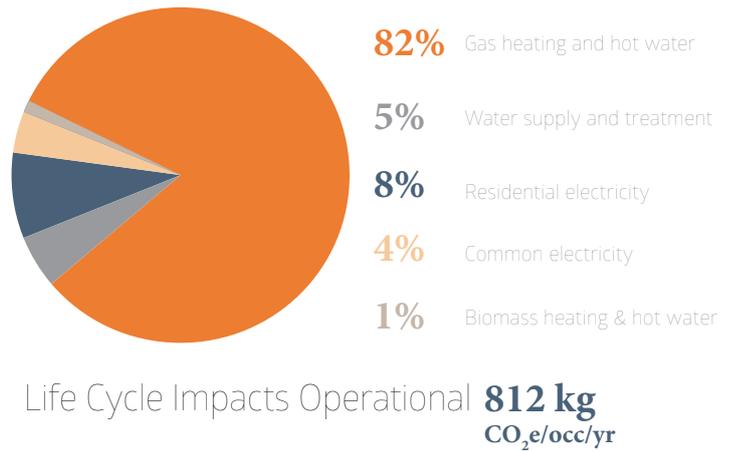
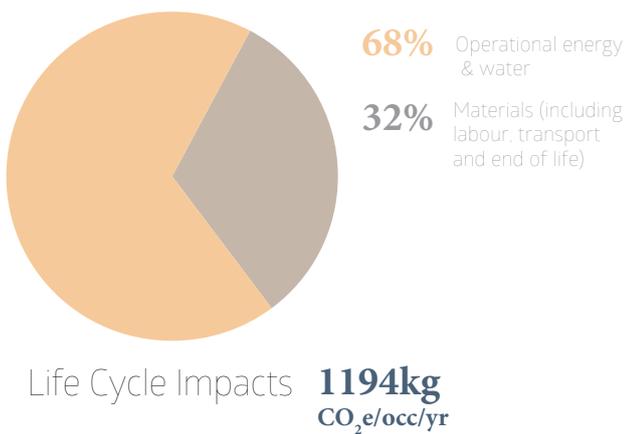
A Life Cycle Assessment (LCA) of One Brighton's operational and embodied emissions was commissioned. This was carried out by analysts eTool, based in Perth, Western Australia with BioRegional and multi-disciplinary design consultancy HTA, supported by One Brighton's designers FCBS.

This LCA has provided a credible "ballpark" estimate of the development's cradle to grave emissions. It included an estimate of the lifecycle emissions of typical UK housing, enabling comparisons to be made in terms of kilograms of carbon dioxide equivalent per occupant per year (kg CO₂e/occ/yr)

Key messages from this LCA are:

- One Brighton significantly reduces lifetime
- Operational emissions were reduced by 67% over existing housing stock
- In existing homes, the total lifecycle emissions are dominated by **operational emissions** which occur while the house is occupied. In One Brighton, the embodied carbon makes up a much larger part of the total emissions – even though these **embodied emissions** are lower than in conventional housing.
- One Brighton's current emissions performance is not yet achieving design targets. The gap is mainly because of the intermittent availability of the wood-pellet (biomass) burning boiler which supplies space heating and hot water. This has met approximately 30% of building's heat and hot water demand, the remainder being supplied by natural gas
- If BioRegional's target of meeting nine tenths of the

greenhouse gas emissions compared to the average UK home, by 60%



building's heat demand from biomass is achieved, One Brighton's lifecycle carbon savings would be 78% lower than the average UK homes while its operational emissions would be 89% below our UK average benchmark. This would be in line with achieving (near) Zero Carbon operational emissions by 2020, the target set for One Planet Communities.

One Brighton's embodied emissions

This LCA itemised and assessed greenhouse gas impacts associated with more than 600 building components, themselves made up of a variety of raw materials

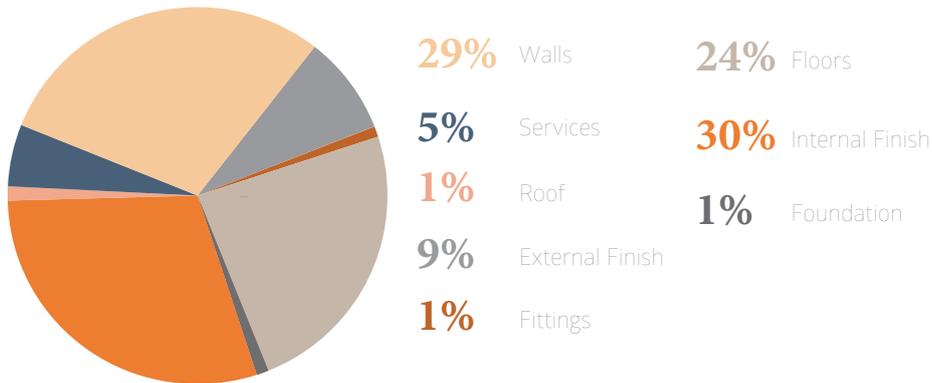
It took into account the emissions arising from the extraction of raw materials, processing and manufacturing of components, bringing them to site and constructing the building, then maintaining it through its estimated life of 100 years before dismantling One Brighton. The analysis also accounted for the fact that some components – such as plasterboard walls, carpeting and underlay – would be replaced one or more times during the life of the building.

Components that are replaced during the life of the building represent a large part of One Brighton's total embodied emissions. This could be reduced if lower carbon materials were used when replacements were being made, or if replacement intervals were stretched. The single biggest contributor to embodied emissions in One Brighton is concrete, even though a relatively low carbon concrete was used.

One Brighton's operational emissions, 'as designed' and 'as built'

Heat for space heating and hot water in One Brighton is supplied by the development's wood pellet-burning boiler or a gas-fired back up. The LCA covered this and included an estimate of the carbon footprint of the water used by residents. Mains water supplied to the building consumes significant amounts of fossil fuel-derived energy in being treated and pumped to the building, and then in being processed as wastewater.¹ One of One Brighton's carbon-saving features is a 9.6 kilowatt peak output array of

¹ The estimate of One Brighton's operational emissions was based on an assumption of 105 litres of water consumed per occupant per day. We are very close to achieving this – monitoring data for 2012 gave us an estimate of 109 litres per occupant per day.



Life Cycle Impacts Materials **382 kg**
CO₂e/occ/yr

rooftop PV panels which supplies a small percentage of the development’s electricity demand. Remaining electricity is supplied by One Brighton’s own energy services company purchasing power from a renewable energy supplier, all of it backed by Renewable Energy Guarantee of Origin (REGO) certificates.

This LCA developed an estimate of One Brighton’s ‘as designed’ operational emissions, using the standard SAP methodology to model its electricity, gas and biomass consumption for heating, hot water and lighting. An estimate of the electricity consumption associated with cooking, appliances and home electronics was then added, plus an estimate of the emissions associated with supplying water and then treating waste water.

Total ‘as designed’ operational emissions were estimated at 188 kg CO₂e/occ/year. Then, using a year’s worth of data (calendar year 2012) for the building’s actual electricity, gas and wood pellet consumption, an estimate was made of the building’s ‘as built’ operational emissions.(2) Both

estimates were based on an assumption of 305 people living in One Brighton.

These ‘as built’ operational emissions were put at 812 kg CO₂e/occ/year, significantly higher than ‘as designed’ emissions but much lower than the UK average (see below). This performance gap is mainly due to the fact that only one third of the building’s heating and hot water was supplied by wood pellets (biomass) during 2012 (and 2013), with natural gas supplying the rest.

However, the ‘as designed’ estimate was based on the biomass boiler meeting 90% of heating demand, which is BioRegional’s 2020 target for this One Planet Community. When this target is hit then, on a like-for-like basis, ‘as built’ operational emissions should fall to 264 kg CO₂e/occ/year radically shrinking the performance gap.

One Brighton’s total lifecycle emissions

Combining the estimate of One Brighton’s embodied emissions with its ‘as built’ operational emissions gives a

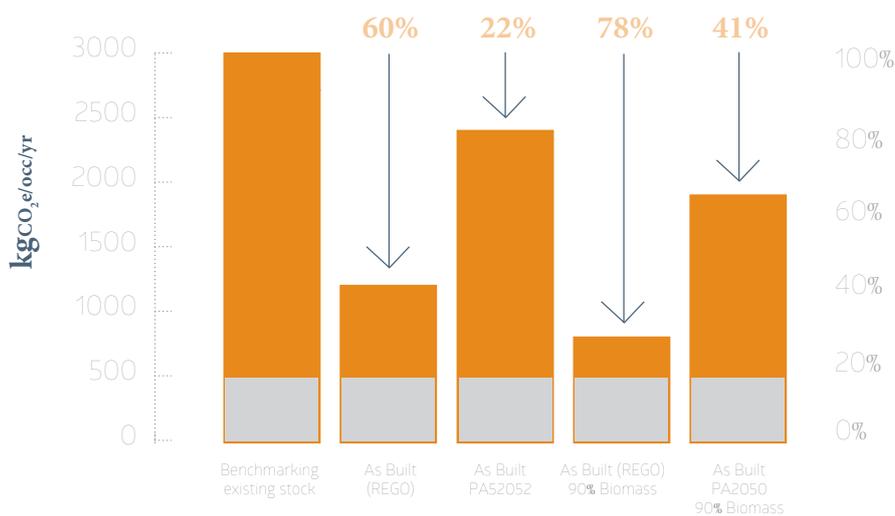


figure for total lifecycle emissions of 1,194 kg CO₂e/occ/yr. This would almost halve to 645 kg CO₂e/occ/year if the target of heating the building using 90% biomass and 10% natural gas is achieved. This compares with total UK per capita CO₂e emissions of 9,122 kg/yr in 2012 (based on emissions from within UK borders; UK per capita emissions would be considerably higher if consumption-based emissions were taken into account).

Comparison against a benchmark

One Brighton's low carbon performance can be assessed by comparing it to the life cycle emissions of more conventional housing. This LCA modelled the total emissions (embodied and operational) of the average UK home, taken across the entire housing stock.

For operational emissions, detailed figures for housing's energy consumption were taken from official UK energy statistics for 2011. An estimate for emissions associated with water supply and wastewater treatment were added, taking total operational emissions for this UK housing

stock benchmark to 2,436 kg CO₂e/occ/year.

For the benchmark's embodied emissions, the approach was to model these for a typical new apartment, terraced home, semi-detached and detached house being built in the UK in the first decade of the 21st century. These four figures were then combined into a single figure based on the share of these different types of housing among all new build homes. This benchmark has been assumed to last 70 years.² The benchmark's embodied emissions were 512kg CO₂e/occ/year, 36% higher than One Brighton's embodied emissions. Combining this with the benchmark's operational emissions figure gives a total of 2,948 kg CO₂e/occ/year.

This suggests that over its lifetime, One Brighton is achieving a 60% reduction in greenhouse gas emissions compared to the average UK home. If the target of using 90% biomass and only 10% natural gas to heat the building is achieved, these savings will grow to 78%.

37 ² One Brighton was assumed to have a longer, 100 year lifecycle. This was because its relatively high residential density and high quality make the economic case for redeveloping its site unfavourable for longer than would be the case for more conventional housing.

		Kg CO ₂ e Per Occupant Per Year		
		Embodied/assembly Impacts	Operational Impacts	Total
UK housing stock benchmark	Benchmark Existing Stock	512	2436	2948
One Brighton 'as designed'	As Designed (REGO)	382	188	569
	As Designed (PAS 2050)	382	1051	1433
One Brighton 'as built'	As Built (REGO)	382	812	1194
	As Built PAS2050	382	1904	2286
	As Built (REGO) 90% Biomass	382	264	645
	As Built PAS2050 90% Biomass	382	1355	1737

Comparing **operational** emissions, One Brighton's 'as built' figure is 67% below the figure for the UK housing stock benchmark. If, however, our 90% heat from biomass target is achieved then operational emissions should be 89% lower than the benchmark's – in line with the (near) Zero Carbon target for 2020 set out in the One Planet Action Plan. The analysis also demonstrated that using a near zero carbon electricity supply backed by REGO certificates makes an important contribution to One Brighton's low carbon performance. If we assume that the electricity used by the development has the standard emissions factor for the UK grid (as demanded by the PAS2050 reporting convention) then One Brighton's lifecycle emissions would almost double to 2,286 kg CO₂e/occ/year.

Even so, this is still 22% less than the emissions figure for the UK housing stock benchmark – and 41% less if the 90% biomass target for heating is achieved.



CHAPTER 6

Wider Impacts, lessons learned and what needs to be done to hit 2020 targets

One aim of building One Planet Communities is to influence the wider property and construction industries and the wider area in which the community sits.

Two key outcomes were achieved:

1. CNBO and Brighton & Hove City Council jointly funded a process to bring together stakeholders in the city – including community groups and businesses – to explore if and how the city might adopt the targets of One Planet Living. A five year long process culminated in the city formally becoming the world's first 'One Planet City' in 2013 with a One Planet Action Plan in place to have a sustainable ecological footprint by 2025.
2. Inspired by One Brighton's approach to integrating sustainable food into the design, in particular the roof-top allotments, the city council's planning department produced a Planning Advisory Note. This PAN acts as planning guidance to developers and stakeholders rather than a requirement, providing information on



Photo credit Feilden Clegg Bradley Studios

options to incorporate food-growing opportunities within planning proposals and signposting the way to further information. It encourages designated areas for food growing on development sites, including landscaping with herbs; planting fruit/nut trees and providing of allotment space within residential developments. For more information, please see <http://www.brighton-hove.gov.uk/content/planning/local-development-framework/planning-advice-notes-pans>

The key lessons from One Brighton and actions to hit our 2020 targets include:

- The One Planet Living framework is a powerful way to align design, construction, sales and estates

management

- The role of Sustainability Integrator is key to delivery, which ultimately supports cost effective delivery
- Good progress is being made on carbon emissions but more work can be done on the district heating system and biomass boiler to increase its efficiency
- Overall financial performance for developer, purchaser/investor and resident (in terms of energy bills) is good
- More can be done to foster a sense of community, although this faces the challenge of having with a transient community due to the large proportion of students among the residents.



Conclusions

We are pleased to be able to report comprehensively against the original targets set for the One Brighton development and to report progress towards the 2020 targets for One Planet Communities.

During construction, the targets set were in vast majority of cases achieved, and in some cases, such as on BRE EcoHomes, actually exceeded. In operational terms, the development is achieving many of its aims, but aspects such as overall carbon emissions still need work to achieve the 2020 target.

A major step forward has been to deliver such an ambitious project cost-effectively and provide better returns for both the developer and purchasers, as well as reducing energy costs for residents.

Appendix – energy cost fact sheet residents



Energy Costs Fact Sheet

Energy at One Brighton

The energy supplied to your home at One Brighton is provided by One Brighton Energy Services Ltd – also known as OBES.

As both heat and electricity from renewable energy sources are supplied to all residents of the One Brighton development via communal systems located on-site, a dedicated energy company is required to efficiently look after all the energy infrastructure and to operate it effectively to supply everyone with zero carbon energy. OBES is a company set up specifically to fulfil this role at One Brighton. More information on OBES and the energy systems at One Brighton can be found in the "Key Points" document and on the community website – www.onebrighton.net/utilities

As an OBES customer you will receive a single bill each month. Your bill will include both Fixed Charges and Variable Charges.

Fixed Charges

All customers pay the Fixed Charges which are calculated based on the size of your home. The table below shows what is covered by the Fixed Charges.

Element of Fixed Charge	Fixed Charges (correct at January 2010)				What does this pay towards?
	Home size				
	Studio	1 bed	2 bed	3 bed	
Capital Replacement Fund Contribution	£0.12	£0.17	£0.23	£0.28	OBES maintains this fund for the purposes of funding the cost of all repair and capital replacement of key parts of the energy system, such as the biomass boiler
Plant Operation and Maintenance	£0.20	£0.27	£0.37	£0.45	This element of the charge helps pay for the operation and maintenance of the on-site energy system. This includes; maintenance, servicing, insurance and safety inspections
Dwelling Maintenance Services	£0.29	£0.29	£0.29	£0.29	Each home has individual meters for measuring heat and electricity consumption as well as a thermal interface unit for providing your hot water. This charge covers inspection and servicing of these items as well as their repair and replacement if found to be faulty
Metering, Billing and Administration	£0.34	£0.34	£0.34	£0.34	Every day OBES automatically collects meter reading from every home. These are collated and checked and used to calculate your monthly bills. These charges contribute towards these billing and administration costs including customer account management and operating the help line.
Scheme Management	£0.17	£0.19	£0.21	£0.23	This element includes the management costs of tendering and managing the various supplier contracts, and dealing with legal and administrative requirements of running an energy company
Gas and Electricity Standing Charges	£0.11	£0.15	£0.20	£0.25	This element is a pass-through cost of the charges OBES pays to the gas and electricity companies supplying the development
TOTAL	£1.23	£1.41	£1.64	£1.84	
	Cost per day				

Variable Charges

The Variable Charges part of your energy bill covers the costs of the electricity, heating and hot water used by each household. This is calculated based on the readings taken from the individual heat and electricity meters in each home. All customers of OBES currently pay the same tariff rates for their heat and electricity.

Variable Charges (correct at January 2010)	
Heating	4.5 pence per kWh
Electricity	9.21 pence per kWh

BioRegional champions a better, more sustainable way to live. We create better places for people to live, and work and do business. Our ambition is simple – we want to inspire people to live happy, healthy lives within the natural limits of the planet – and we work with our partners to make this happen. We call this One Planet Living.

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