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Bill Dunster architects ZEDfactory Ltd - 'the ZEDfactory' is an award winning practice specialising in low energy, low environmental impact buildings. The ZEDfactory's projects range from private commissions to wholesale communities.

Within the wider context of sustainable development we are committed to good quality design based on careful analysis of end user needs.

Our approach is one of innovative use of tried and tested technologies to deliver buildings which are stimulating and practical on a daily basis, and distinctive, economic and reliable in the long term. Buildings are homes and places of work, and are a powerful influence on the quality of life of individuals and communities. The ZEDfactory gives high priority to achieving the right balance between human issues and technical disciplines.

Formed in 1999, the ZEDfactory has offices in BedZED, the unique carbon-neutral live-work community in the London Borough of Sutton, designed by the practice and completed in 2002.





Low-energy, low-environmental impact approach

BDa ZEDfactory believe that sustainable development is both affordable and achievable within current market constraints.

Our design approach integrates as many building elements as possible into construction. This results in fewer components and finishes being needed. The associated cost savings allow a higher specification for low-energy and low-environmental impact components.

Renewable energy devices and passive energy features are an inherent part of our design thinking.

Structural considerations and fixings are determined during design, so that components can be added later as required, rather than as an expensive after thought.

The practice keeps up-to-date with both the technologies and performance parameters that influence building design. This enables us to use appropriate energy-saving and low-environmental impact devices to suit our clients' practical needs. We aim to create beautiful structures that express the natural elements they seek to harvest.

title ruralZED™

client ZEDfactory MMC housing system

value various

dates onsite now

RuralZED™, a revolutionary new housing system that is the UK's first affordable, carbon neutral house. Built in three days at this year's annual EcoBuild exhibition at Earls Court, the ruralZED™ housing system is now available to house-builders and developers. The housing system, developed by ruralZED™, a consortium of architects and leading specialist manufacturers including your name, is the first of its kind capable of achieving Code 6 on most sites.

Starting from £1,275 / m2 for Code 4, ranging to £1,550 / m2 for Code 6 the ruralZED™ housing system is the first truly affordable and commercially viable product of its kind on the market that gives the volume builder or self-builder the opportunity to address the government's targets for carbon neutral new build housing eight years ahead of the 2016 target.

The kit is unique in that it has been designed to carefully integrate a full Code 6 specification, but enables a lower cost Code 4 version to meet current market requirements. Each home is provided with a residents' manual and full upgrade menu, allowing homeowners to choose their own level of environmental

performance - either before or after a sale is made. If a customer purchasing a Code 4 home today chooses to upgrade to zero carbon spec before the sales is completed, stamp duty relief will meet half the extra cost, with the remaining increase in mortgage funded by the savings made on not having to buy fossil fuel. Importantly a ruralZED™ home will retain its re-sales value as the new build market increases its environmental performance over the next decade.

RuralZED™ consortium member, Lex Cumber of mi-space, the company responsible for the construction of the ruralZED™ housing system comments:

"The great thing about the ruralZED™ house is that it has four years of Research and Development by one of the most talented design teams in the UK, sunk into the very fabric of the building. It's affordable, and has an integrated supply chain determined to drive costs out to make it even more competitive until finally there is no excuse for building new houses that don't hit these environmental standards."

Through selected supply partners





covering most of the UK, ruralZED™ is able to offer detached, semi-detached or terraced houses of up to six units. The timber frame can be adapted to three storeys with the same details and timber sections used for two storeys providing town houses and multiple resident occupancy units.

Bill Dunster, Director of ZEDfactory, the architectural firm behind the project, comments on the benefits of the ruralZED™ house to developers and end-users:

"The ruralZED™ house has overcome the myth that Code 6 is only possible on larger sites using advanced centralised heat and power technologies. ZEDfactory started with a blank sheet of paper, and chose a range of materials and industry partners that could deliver a reliable Code 6 home using well proven technologies that will last for five generations. ruralZED™ enables both private and public sector clients to offer a zero carbon lifestyle to the general public."

Website

All information including time lapse video showing the Earls Court build is available on www.ruralzed.com

About the ruralZED™ consortium
RuralZED™ is a consortium of companies specialising in eco-building. The consortium comprises Charcon, Hansgrohe, mi-space, Rationel, Rockwool, ZEDfabric and ZEDfactory.

About the DCLG - Code for Sustainable Homes

The Code for Sustainable homes was launched on December 13, 2006 by the Department Communities and Local Government to enable a step change in sustainable building for new homes and replaces the former EcoHomes ratings. Under the Code, homes are given star ratings at six levels, with Level 1 requiring thermal efficiency and Level 6 being 'zero carbon'.

title ZEDfabric Ltd

client offered to all clients

value NA

dates 2004 - current

- Uncertainty over cost and reliability are the biggest obstacles to change in the construction industry.
- We now understand how to build zero carbon homes and workspace in different climates all over the world working with renewable energy sources harvested on site. ZEDfactory has evolved a contemporary vernacular, searching to see what components and techniques could be common between nations, as well as providing the freedom to express local materials and cultural preferences.
- Working with some of the best engineers and physicists in the world over 20 years ZEDfactory has perfected a simple software program that enables design configuration and individual element specifications to be made in hours rather than months.
- This simulation software demands that common building components have a predictable environmental performance. We have simplified a broad range of construction components into a manageable supply chain with carefully defined and tested results applicable across as many climatic zones as possible. In an emerging international market, where

zero carbon buildings are rare - this strategy enables economies of scale to be reached far faster.

- This supply chain has been designed to maximize economies of scale in production separating out low tech, massive components that can be made as local to a project site as possible and high technology, smaller components that require investment in tooling processes.
- The smaller high tech components are then made in developing countries, as unless they use the latest energy efficient renewable energy harvesting technologies, very high carbon urban expansion is inevitable. China builds an area the size of London every year and has a more extreme climate in most places. It is far more important that a super insulated wall is built in Beijing than in the Home Counties.
- Encouraging volume production in countries like China, India, or South America gives these developing nations economies of scale faster, and helps move very large populations away from the fossil fuel economy.
- We then import these often lower cost components back to Europe,

making sure they meet all relevant construction codes and standards, and we often find many of these components are effectively half the current cost from more conventional alternatives. Creating a market for low carbon construction components in Europe brings valuable cash to fund the expansion of clean development mechanisms overseas.

- We check the carbon footprint of manufacture and transport, we check the working conditions in the overseas manufacture, and calculate the embodied carbon payback. On photovoltaic panels/cells this is around 3 ½ years.
- Using this clean development mechanism we then set up a buying club or consortium to import the components at the lowest possible price, to help UK projects achieve a step change reduction in carbon, and remove reliable or unreliable government grants with limited funding pots. One commercial supply chain initiative now gives carbon reductions in both China and the UK for the same initial investment.
- This supply chain can be used to upgrade existing buildings (ZED-UP) or build high performance ZED new build - achieving very significant reductions in capital cost and enhancing both embodied carbon and financial payback times. Very simple installation instructions and careful partial assembly of key components, remove much of the skills barrier to application, and enable enthusiastic DIY installations, with the potential to create new job opportunities. For semi skilled labour. Short training courses will be provided next year.

- By plotting the rising increases in fossil fuel prices due to peak oil and reducing capital cost (with electricity pegged to four times the price of gas, and a 7.5 % annual fuel price escalator) - it is now possible to more or less meet the regular payments of an energy mortgage (meeting the capital cost of the zero carbon specification) with the cash that would previously have been spent by the same building occupant buying fossil fuel. In the UK it is now possible to use the stamp duty relief on zero carbon homes, combined with our low cost overseas supply chain, and the energy mortgage - to change a code 4 project into code 6 without having any substantial impact on affordability to the customer or relying on the low carbon buildings program grant.

The argument is now over. The excuses have gone. Invest in our supply chain, use it to turn your projects zero carbon, and make code 6 your default specification today. The planet can't wait till 2016. (When the zero carbon Code 6 spec becomes mandatory.) The ZEDfactory are currently looking for industry partners to collaborate on one of the most forward thinking international construction industry supply chains in the world. Working together with other installers, contractors, clients, engineers and investors at all scales - we can build a zero carbon infrastructure that works off the limited supply of renewable energy available, before a mixture of accelerating climate change and peak oil make life as we know it impossible.

- Bill Dunster Aug 07



ZEDfabric was set up in 2004, together with Bill Dunster architects ZEDfactory Ltd, to develop a supply chain of components used in Zero Energy Development construction. Recognising that developing specialist components for each individual development can be extremely time consuming and costly, we try to identify the components that are common to meet ZEDstandards and the code for sustainable homes and develop them for a cross spectrum of ZED building typologies. We also cater for the more general sustainable building industry by identifying the gap that currently prevents a wider use of renewable resources to supply energy requirement for the urban built environment, and have worked closely with our suppliers in China and the UK in trying to bridge that gap within the microgeneration market.

We have gained a wealth of experience of renewable energy systems having specified them, seen them installed, been involved with their commissioning, and finally buying and installing them ourselves.

During this time we have met many European and Chinese manufacturers of renewable energy equipment and heard of their frustration that in the UK all the profit is going to the accredited specialist supplier / installer 'middle men' rather than paying for the actual equipment. As a result we formed some very beneficial relationships with manufacturers who are keen that more of their products find it onto the market place affordably.

Website

All information is available at www.zedfactory.com/zedfabric.htm

For further press information and images or to place an order please contact:

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title Beddington Zero (fossil) Emissions Development - BedZED

client Peabody Trust

value £14.5m

dates Completed June 2002

BedZED is the UK's largest mixed use, carbon-neutral development. When it was built in 2002, it set new standards in sustainable building. BedZED comprises 82 affordable dwellings in a mixture of flats, maisonettes and town houses, and approximately 2500 m² of workspace/office, and is built on a brownfield site. The BedZED urban system reconciles high-density with amenity, providing each dwelling with a sky garden or terrace.

A combination of passive measures and proven, cost effective active technologies form the strategy of an integrated, sustainable development. A rigorous specification process helped reduce the environmental impact of the construction process. The scheme includes a biomass combined heat and power plant, an on-site sewage treatment and rainwater recycling system, and natural wind driven ventilation.

The idea was to show how it was possible to combine workspace with housing whilst matching the residential densities of the surrounding dormitory suburb, and actually increasing overall standards of amenity - particularly gardens and public open space. This was achieved by matching south facing rows of single

aspect residential terraces with north facing live / work units or workspace. By placing gardens on the workspace roof, it was possible to give almost every home a garden or terrace, whilst achieving high levels of cool northlight within the office space.

Five years after full occupation, there has not been one complaint from residents about workers on the site, indicating that the combination of different uses has been complimentary on the whole. The design team tried hard to do the right thing in the right place. A complex mixed income residential brief from London's oldest housing association - the Peabody Trust asked for one third of the homes to be social rent, one third shared ownership and one third private for sale. A requirement for a mixture of both large and small family homes as well as one and two bed flats, led to a wide variety of different plan unit types, each changing to suit the position within the masterplan and cross section. North facing workspace can be divided up into small units each with its own front door to the street, or knocked through to create one large workspace the length of an entire terrace, with enough deskpace for a thirty to forty person office. This enables a mixture of fairly sizable and



Above: The section through the BedZED scheme underpins the whole ZED approach - Solar orientation with homes facing south & workspaces north with skygardens on their roofs. All upper roofs are green sedum and there is a full range of unit types and tenures





micro start up companies to integrate themselves in this community.

BioRegional reclaimed were very successful at reclaiming structural steelwork and softwood walling studs from local demolition sites for remanufacturing into useful new structural components. Most bulk materials and labour were sourced within a 50 mile radius of the site, enabling the completed embodied carbon to compare favourably with that of a volume housebuilder's industry standard product - despite having thicker walls and considerably higher thermal mass.

BedZED is just about large enough to merit its own on site water treatment plant and woodchip fuelled combined heat and power plant. Although the plant can be accurately sized to meet demand, staff maintenance costs on an isolated island site of this size can become prohibitive, although this problem will be overcome as both these community scale technologies become more commonplace in south London. Biomass chp works very well on mixed use zero heating specification developments, as the thermal demand is for hot water only, and remains consistent all year, with oversized hot water storage tanks that can meet peak demands whilst still allowing trickle recharging throughout the day. This allows the power plant to more or less match average electrical demand, exporting to grid when surplus power is generated on site - and importing to meet peak demand. On balance over a year, if the plant performs reliably, with only its planned maintenance downtime - then slightly more power is generated than is actually required on site. If this surplus

power is between 5 and 15 % of annual demand, it should be possible to pay off both the embodied initial construction carbon and the planned maintenance / replacement carbon footprint. The advantage of the biomass chp system is that very similar amounts of biomass are burnt compared to a conventional heat only boiler, as the electricity is generated from flue gases that would be unlikely to have been harnessed to the same efficiency in a more conventional combustion process. This makes it much easier to stay within the national biomass quota, whilst still inhabiting higher density urban infrastructure

title BowZED - Residential Units

client Yorklake Ltd

value £ 500 K

dates Completed August 2004

BowZED is a block of 4 flats, just off the Bow Road in East London. Each flat benefits from its own south-facing terrace and conservatory, which have enough photovoltaic cells incorporated into the glass to meet at least half of the occupants' annual electricity demand. The other half is planned to be met by a recently installed micro wind turbine mounted on the communal stair tower. This building will generate as much energy from renewable sources in a year as it consumes.

Finished to the high levels you would expect for a modern urban 'for sale' development, the building has also been built to ZEDstandards. This means the levels of insulation and thermal mass are such that no central heating system is required. The flats obtain enough heat from occupants, the solar gain from south-facing windows, and incidental gains from cooking and appliance use. This enables a single 15kW wood pellet boiler to supply the whole block with hot water and back-up heating.

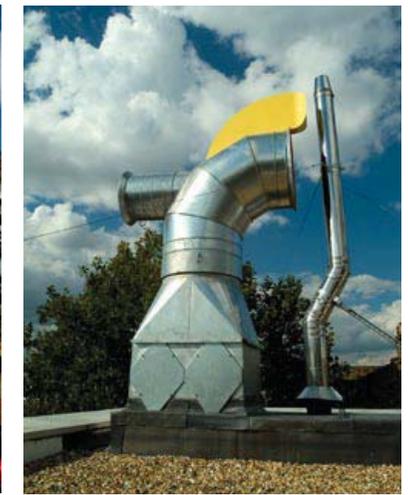
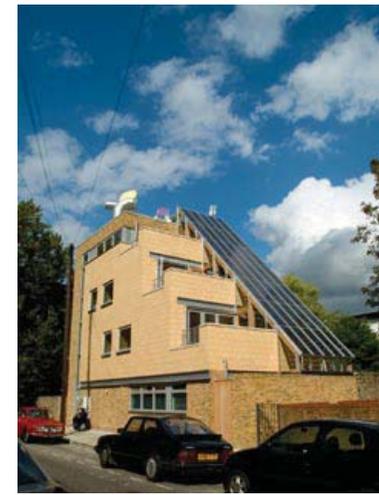
This building reconciles 21st century concerns for fossil fuel reducing use with those of fitting into an existing historic urban fabric. A pallet of materials has been chosen that attempts to meet

both these concerns. Yellow London stock bricks from the same brick works that would have supplied the Victorian builders of the area, have been combined with a modern yellow terracotta block that reflects the smooth render details seen on the terrace opposite. All other materials have been chosen for their robustness in a hard urban street and for their environmental performance and durability.

This building shows how a Zero (fossil) Energy Development (ZED) can be delivered on a tight urban site as a conventional development opportunity. The sales prices for the flats achieved by the developer were better than expected, and well above local comparable property showing there is a healthy appetite for eco-housing in the market place.

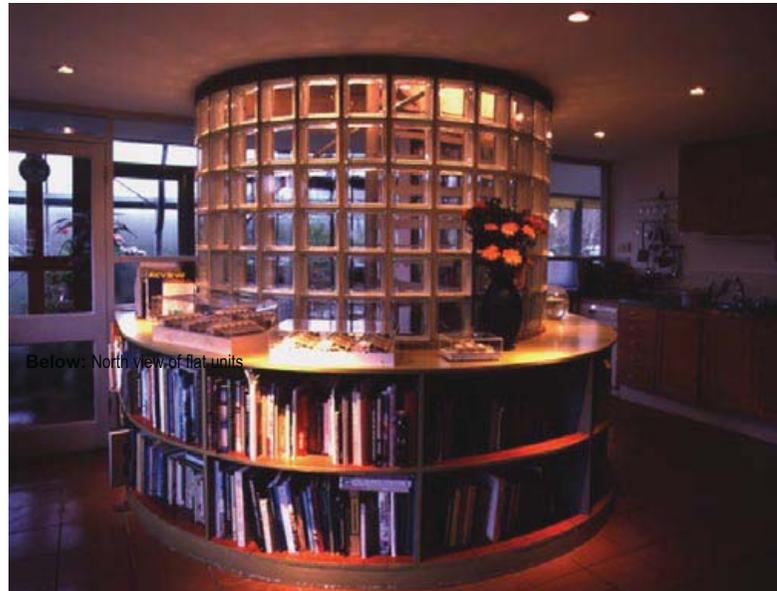


Clockwise from above: elevation showing local vernacular - windcowl - bowZED from street - glazz laminate PV sunspaces





Clockwise from above: A winter evening at Hope House - A second floor internal balcony in the sunspace allows year round use - A spiral staircase links all three floors and provides an interesting focal point in the main living room - Bridge walk way from the road level leads into the main entrance, next to the sunspace.



Below: North view of flat units

title Hope house, East Molesey

client Bill & Sue Dunster

value N/A

dates 1995

Hope House, built in 1995, was the first experimental 'ZED'. Regular upgrades improve energy use as the latest technology advances become available, this typology is now superseded by the ruralZED construction system.

The house was designed to facilitate homeworking, with the ground floor being designed with separate entrances, and was the original office for the ZEDfactory, with the future potential conversion into a granny flat.

Hope House was designed to sit in flood plain, with a thermally massive and flood resistant ground floor supporting a two storey timber frame. A two and a half storey high south facing conservatory with balcony terrace connects all floors, with the upper surfaces clad in solar electric panels and solar thermal collectors.

The house was built using locally sourced materials and labour, and provides an alternative aesthetic to the surrounding neo Georgian or neo Tudor architecture.

The house began life fifteen years ago with a small gas boiler, but accommodated a planned set of environmental upgrades as they were afforded by the household, culminating in a zero carbon specification by summer 2007.

The house was designed to both provide privacy from neighbours and harvest sunlight through the obscure glass sunspace for both people and plants, at the same time as providing easterly views to the garden and surrounding landscape.

Current technologies fitted include a small wood stove for space heating, an automated pellet boiler for domestic hot water in winter, evacuated tube solar thermal collectors providing all hot water from late spring to early autumn, a 1.1 kw peak photovoltaic array, and a 600 watt wind turbine.

title St Matthews Key Worker flats
Estate Regeneration (a PRPZEDfactorProject*)

client Presentation H A

value £1.5M

dates Completed 2005

Working under the name of our Joint Venture company PRP ZEDfactor St Matthews Key Worker flats is a block of 12 new build flats built on an infill plot as part of the wider masterplan to regenerate the St Matthews Estate.

The block has been designed to ZEDstandards and hence has zero space heating requirements. Domestic hot water is provided by a combination of a single wood pellet boiler and solar thermal panels. It also has a pre designed upgrade path to full Zero Energy status.

*PRP ZEDfactor was a joint venture company formed in 2002 with the large housing architectural practice PRP.



Clockwise from above: a sunspace and balcony providing additional living space - facade detail - 'elevation' to Brixton Water Lane





Clockwise from above: South view of Hockney Green - Rear of flats - Covered pedestrian walkway outside the terrace.



title Hockney Green Housing development
client Testway Housing Association (Aster Group)
value Approx. £2m
dates Completed Spring 2007

This small hill site on the edge of the town centre contains 5 terrace houses and 12 flats in a residential scheme. It is designed to be innovative and energy efficient, incorporating our ZEDstandards and ZEDfabric technologies to reduce the need for fossil fuels, while producing housing that increases the quality of life for its residents.

Hockney Green achieves an overall level of 4.75 in the Code for Sustainable Homes, with one unit reaching level 5 and one unit attaining Level 6, the highest possible standard. All the units have an upgrade path designed in to reach Level 6 as funds allow for fitting extra microgeneration kit.

title Jubilee Wharf, Penryn, Cornwall

client Robotmother Ltd

value £3m

dates Completed Summer 2006

Jubilee Wharf in Penryn, Cornwall was originally a derelict former coal yard site on the banks of the Penryn River, latterly even cleared of its sheds. Jubilee Wharf aims to contribute to community life and drawing attention to the ambient energies it harvests. It thus provides that enhanced quality of life at the same time as reducing the environmental impact of the activities that occur there.. The Client, Andrew Marston and ZEDfactory Ltd constructed a mixed-use community scheme with on site 24-hour surveillance in the form of residences. The project is built on the same ZED principles as BedZED.

The development comprises of two buildings. The taller building consisting of 12 workspace units and 6 duplex residential units with external balconies. The workspaces are rented to creative artists providing an outlet for local arts and crafts enlivening the development. The lower building contains a range of community facilities including a nursery (for low-income families), bar/cafe, offices (for local charities), hire out community hall (for fitness classes and functions). Also in the same building facilities for the existing boats moored around the site are provided including electrical outlets, water outlets and shower and toilet

facilities. Between the two buildings is an external public courtyard with the original public path to the waterside reinstated.

Completed in Autumn 2006, the scheme has received Sure Start funding, Objective One European funding as well as private funding. As with other ZED buildings the first objective was to reduce the energy the buildings consumed by super insulating the envelope, typical U value of 0.1 W/m²K, and high air tightness, units were tested to 1.5 air changes per hour at 50 Pascals. By this method the size of mechanical services is reduced the whole development requiring a 75kW wood pellet boiler for all its heating and hot water needs. Other systems such as evacuated solar hot water panels and the use of low temperature under floor heating helped the specification of such a small boiler. The wood pellets in keeping with the design were sourced locally with the silo sized for one heating season reducing the amount of deliveries, and hence vehicular movements in their delivery.

The same principles reduced water consumption by using low usage tap and shower fixtures. All electrical items were specified on their energy rating so



Above & below: Jubilee Wharf





Clockwise from above: Community space - Jubilee Wharf from the Estuary - Sheltered courtyard between the buildings



that all white goods, such as fridges and cookers were electrically 'A' rated or better and only low energy light fittings were used. By this reduction the four 6kW wind turbines provide the majority of the electricity the site requires during the course of a year.

The workshop windows on the court can serve as shop fronts. Ground floor units are accessed off the court and have a goods entrance from the rear parking court. First floor units are along a gallery overlooking the court. This gallery is reached via a bridge from stairs set into the lower block. The same route provides access to another stair behind the taller block; this climbs to the access gallery to the maisonettes animating the court, the social hub of the development.

Penryn was previously lacking in certain social facilities with this Jubilee Wharf aims to provide services Penryn requires within environmental low impact, socially inclusive buildings.

Jubilee Wharf hopefully has shown an intelligent way for small towns to develop, economically and socially. Crafts are important to the Cornish economy and that much of their production goes directly to clients elsewhere. Cornwall and its craftsmen could benefit if the latter and their products had greater local presence.

title Conference and Arrivals Buildings, Earth Centre,
Doncaster

client Taylor Woodrow

value £2.2m / £450k

dates Completed Jan 2002

The brief for the new building at the Earth Centre called for a state-of-the-art, naturally ventilated and overtly sustainable design solution, to complement the vision and aspirations of the Centre itself. It was procured under a design and build contract, and within the parameters of a strictly limited budget and tight programme schedule.

With a mostly transient occupancy, the building's design concentrates less on heat loss, and more on pleasing and functional space. The structure is contemporary, and maximises natural light and use of reclaimed materials.

Pictures of the Conference Centre are shown on the next page.

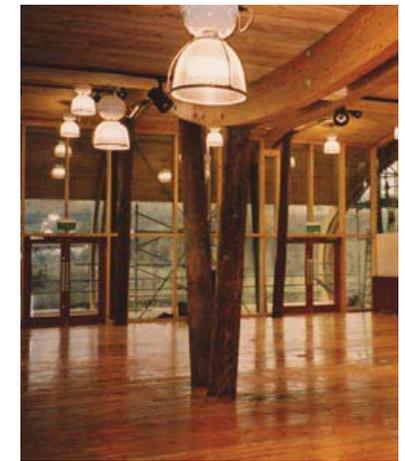
From the beginning, the design was driven by the functional demands of the Centre, addressing their needs in terms of access, image and education. The brief also called for an unique auditorium space to create a memorable and flexible venue. The design solution offers level access to all floors. Detailing and structural methods were such that local labour skills and local sources of material could be used.

The Arrivals Building (shown on this page) is located to the south of the site, across the river Don from main activities. It welcomes visitors arriving by train or car, and offers ticketing facilities, a shop, and a cafe area, as well as a viewing deck over the river.



Above: Entrance way

Below: Cafe balcony - retail space

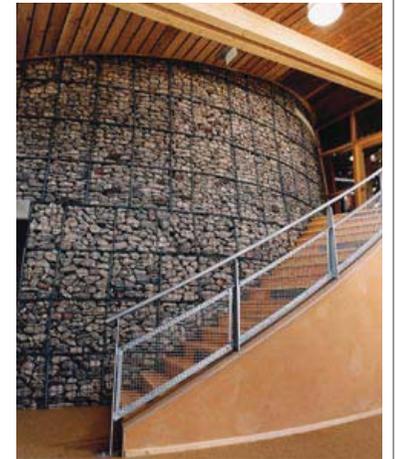




Above: Aerial view of Earth Centre
Below: 3 views of conference facilities



Above: Auditorium



title Changsha ZEDquarter demo building

client Modern Group

dates Summer 2007

Changsha ZEDquarter - is a new urban expansion in this regional city, capital of Hunan province. This is a new masterplan for about 14 ha. We are building a demonstration community building complete with sales area, exhibition, small hotel and bar, offices, showflats, a conference facility / cinema, bar, restaurant and sports facilities including a swimming pool.

The urban block enclosed reduces the urban heat island effect and allows the heat pump cooling system for the homes to be powered by solar electricity, with undulating landscape gardens covering mixed use commercial and community facilities including a covered farmers market. A biomass combined heat and power plant fuelled by rice husks will be installed as the number of completed homes provides sufficient critical mass.

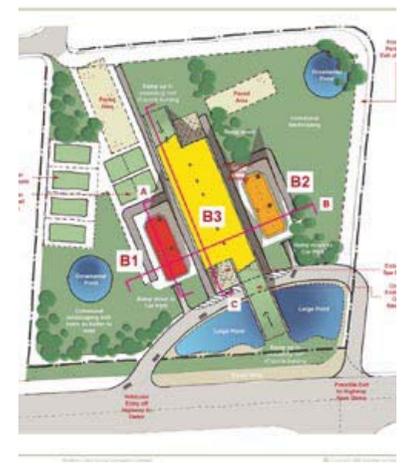
Specially modified wind driven ventilation cowls integrated into the balcony structures encourage cross ventilation without using electricity, with the passive heat recovery and superinsulation of the BedZED model used to achieve a step change reduction in demand for both summer cooling and winter heating.

The residential density will be between 120 and 150 large two and three bed homes / ha, with considerable commercial space and lively shop lined streets. All parking is below the residential blocks, with only zero emission pool cars above ground for convenience.

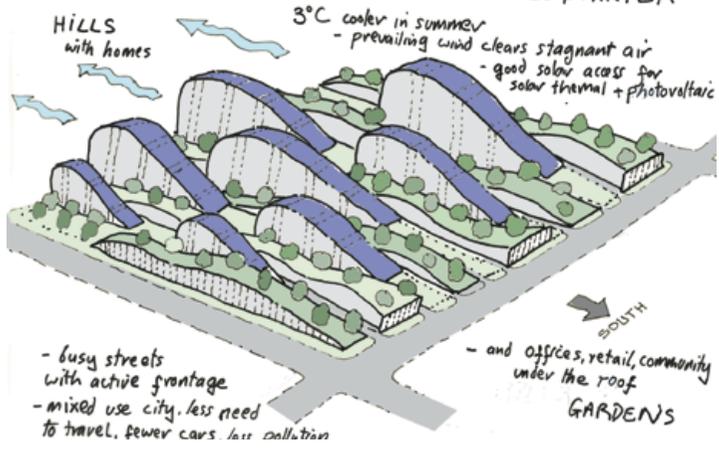
A mountain bike training track climbs over the roof gardens, showing how high densities good amenity and opportunities to take exercise can be achieved around public transport nodes, minimising the need for private car use. It is hoped that this type of alternative relatively low rise urban model will replace the energy intensive tower blocks prevalent in many Chinese cities.



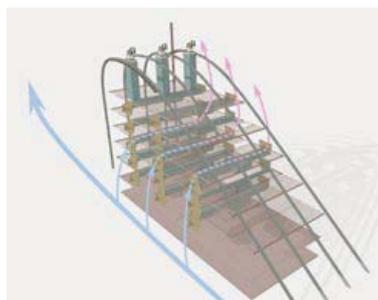
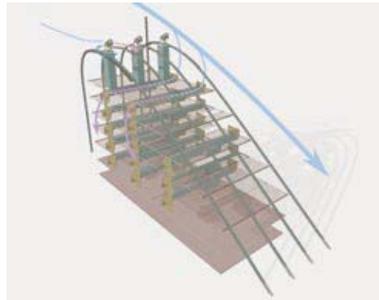
Clockwise from above : an aerial view from the south - Demo area masterplan - Southwest-cut away view



6 LANDSCAPE CITY FOR THE C21 - the 'ZEDQUARTER'



Clockwise from above: Defeating the urban heat island - View from roof garden - View of whole site - raised pedestrian access - Main entrance - Ventilation from South - Ventilation from North - Masterplan.



title Forest Forever Housing Development
Beijing, China

client Modern Group

dates Planning July 2005

This housing development is to set up the first carbon-neutral community in Beijing, China, within a spectacular environment between city and country. The project promises a community with a relaxing balance between working and living.

The basis of ZED design is to reduce the need of cooling and space heating by investing in a high performance building fabric. This includes super-insulation and thermal mass, and reduces energy loads by using integrated renewable systems relying on sun, wind and ground water.

Every home is south facing, creating a great feeling of space and light inside buildings. The sunspace serves as a solar heat collector in winter. All homes have a private exterior space, which may be a garden or terrace space.

The landscaping includes a 'forest' area, situated at the edge of site, in which residents are able to exercise and relax. A waterscape runs through the centre of site. Starting at high level on the commercial building, reed beds filter the water as it flows down into the recreational parkland and fishing pond between villas. The water is pumped back up-hill by a wind-pump.



Above: An image of the feature fishing lake and villas **Below:** A view over the central recreational area towards the townhouses





Clockwise from above: View of villas and the feature lake - View between two rows of apartment blocks, showing communal courtyard - Site entrance 'ZED Forest' - An aerial view of ZED Forest showing its setting.



title Upton Site D1, Northampton
Housing Development

client Metropolitan Housing Trust

value circa £36m

dates On site March 2007

This project was the result of winning a competition set by English Partnerships, with MHT as developer. The scheme is for the new town centre of Upton, with approaching 350 units in total, of which most will be private for sale.

The first terrace of 6 units has been specified to reach level 6 CfSH, once certified they will officially be the first and most environmentally sound homes in the UK available for sale.

The ZEDfactory is both 'sustainable construction' consultant for the whole site, and designing 25% of the units (around 90). All the units, the remainder being provided by local architects, are to be designed using ZEDstandards.

A competition requirement was for 25% of the units to be designed using Modern Methods of Construction (MMC). The ZEDfactory is designing all the MMC units using the RuralZED timber frame system. Approximately 50 will be a mix of family houses and mews dwellings, and the remainder are 1- and 2- bedroom flats.

Since beginning the project the UK government has launched the Code for Sustainable Homes (CfSH), a set of environmental targets for all new homes in the UK.



Above: The ruralZED timber frame system allows for fast erection on site Below: Finished ruralZED units





title Tamar Valley Visitors Centre

client Cornwall County Council

value £900k

dates Completed March 2009

Site setting

The site is sloping gently, and the building has been positioned so as to avoid the need for extensive retaining walls, whilst still maintaining reasonable access to the public open space behind. A fall of circa ½ a storey over the width of the building is used to generate a level site with decking to the front, and a local stone-faced embankment around the rear where the contours are simply sculpted to keep any ground away from the perimeter of the building. Both the stone-faced bank and the Cornish hedge use local killas stone and were erected by local craftsmen.

The design

As an organisation, the Tamar AONB wish to promote a sustainable tourism, and the building will reflect this in its design.

A CNC-cut (computer controlled router) prefabricated heavyweight timber frame has been designed to support the building fabric of a low energy, sustainable building. The two 'wings' to either side of the building are used to house the cellular aspects of the brief,

leaving a single double height space with mezzanine floor between for the exhibition area. Much of the frame is left exposed internally, expressing the heavyweight timber structure which was inspired by medieval timber frames. The size of frame is necessary to carry the weight of the thermally massive lining.

The more public, accessible spaces are located on the ground floor with a reception desk, sales counter etc; with a meeting room and the Parish archive on the first floor. The main office accommodation is also on the first floor. There is a lift to ensure the whole building is fully inclusive and accessible. The total internal area is 336 sqm, on a footprint of circa 200 sqm.

A large glazed facade captures the best views, and can be opened up to connect better with the timber viewing deck in front of the building.

The materials used, both in and out, are robust, and chosen for minimum maintenance, but as locally supplied materials they will also reflect local tradition and local resources. The materials chosen ensure a natural





external finish, designed to weather properly and thus blend with time into the surrounding vernacular.

The external timber cladding is Tavistock-grown Western Red Cedar, cut down the road at Crocadon sawmill. Internally the ceilings are clad in Douglas Fir, the mezzanine floor in UK Larch and the reception desk top is 'spolten' Cornish Beech. The stone plinth is again killas stone, from Yennadon Quarry.

As a building of this age, however, it will address all our concerns about the environment, and meet the ZED (Zero Emission Development) standards which BDa ZEDfactory have been working with for many years now. The Tamar Valley Centre will be designed as a low energy, zero fossil emission building, and it will benefit from both passive and active measures to ensure an excellent sustainability status is fully achieved. Full ZED status will be able to be achieved through a predetermined upgrade path.

To this end, the use of insulation, thermal mass and wind driven ventilation with heat recovery helps to reduce the energy loads of the building as far as possible using passive means. A biomass boiler and solar thermal roof mounted collector ensure a carbon neutral heating strategy is in achieved, where all the heating and hot water demands of the building are met from renewable sources. A forthcoming wind turbine together with the array of roof mounted photovoltaic panels are expected to provide about 75% of the average annual electrical usage.

Due to the site constraints in positioning

the building, there is a risk of overshadowing from the close proximity of the trees. The roof profile has therefore been designed with a south facing slope, with the highest ridge to the north clearing much of the overshadowing effect of the trees. At the same time, a counter slope to the north helps reduce the scale and visual impact from the approach, and also provides a 'sheltering' porch at this end of the building.

The aspiration for the architecture would be to create an inspiring addition to the Tamar Valley experience, using familiar materials, and robust detailing in line with the context and the history of the site, to create a functional venue for staff, but also a memorable destination point for visitors.

title DWCT Visitors Centre

client DWCT

value £5M

Essential to the scheme is that the centre is easily accessible and its spaces rationally organised. The planning carefully reflects the many types of visitors

- Paying visitor.
- Non-paying.
- school groups.
- Eco-lodge residents.

who will use the Centre in different ways. ZEDFactory therefore designed the buildings with these flows in mind. The central avenue between the buildings acts as a congregational area, where queuing, eating and experiences can take place. The timber ramp is heavily landscaped and allows for disabled access. A glazed canopy with clearly visible renewable services attached will give an iconic message to visitors of a highly sustainable building in Jersey.

The concept for the Durrell Visitors Centre is to create a series of building components that can be analysed individually in terms of cost, sustainability and environment. These components include structure, cladding, roofing and services.

This process guarantees that Durrell builds the best value specification and design within its predetermined budget, without unnecessarily resorting to a stripped down concept prior to tender.

About 85 % of the total structure is timber. Some steel was chosen in this case to enable larger column free spans, and avoid very chunky downstand glulam beams. The faceted roof offers a larger volume of hot air well above head height which can be vented directly by opening windows in the vertical plane of the truss. The truss also offers improved daylight levels deep in the centre of the plan provided by the same glazing. The roof has visible flowing sedum planted roof surfaces, and blends with the flowing landscape. The covered terrace allows cheap translucent sides to be added to create a conservatory type space for larger functions in bad weather. Holes in the roof structure allow for uncovered vantage points.





title **landARK™** THE OFF GRID CABIN

client Zedfactory

value N/A

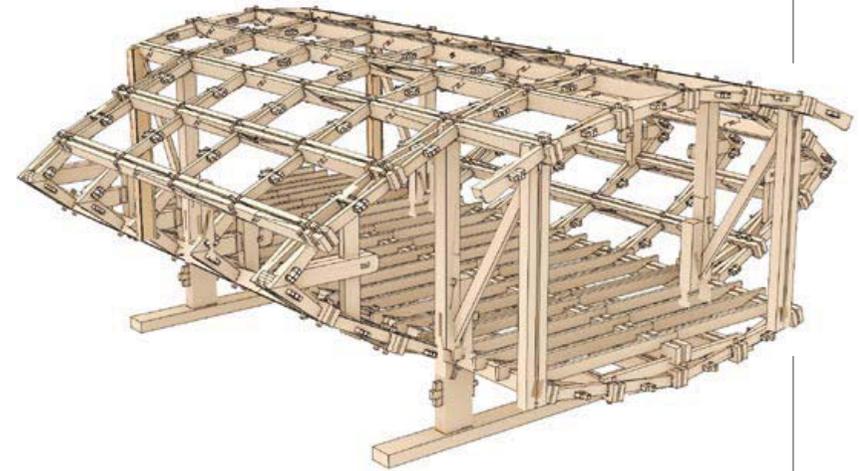
dates 2009

landARK™ - the ZEDfactory 60k zero carbon off grid home kit for individuals

sunlight for most of the year, or mid winter wind .

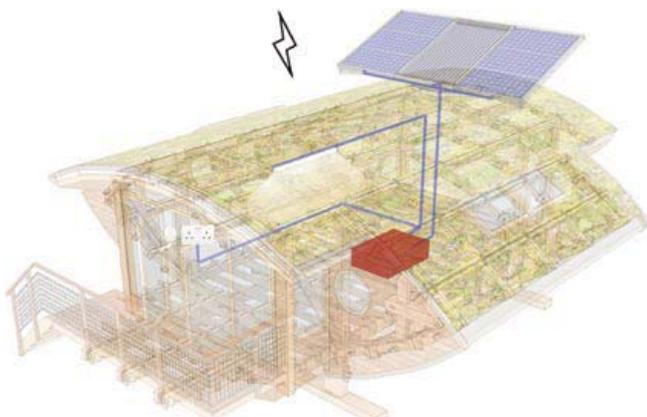
- If you have a scrap of land, maybe a backgarden, a hillside, a coppice clearing, or maybe even a corner of somebody's car park, and you have a spare few weeks holiday, or some good friends.
 - and you want an aspirational interior with space to relax.
 - you need affordable, comfortable accommodation that works well as a home or an office or sleeps up to 8 people as a shorter stay cabin.
 - which is cosy in winter and cool in summer made from healthy natural materials such as FSC timber.
 - which perches on the land without needing expensive foundations or concrete.
 - running off logs in winter or using the summer sun to provide a hot shower with the lights and radio powered from
- which doesn't need a connection to the drains or the meter unless you do
 - which includes water tanks with options to connect to a standpipe
 - and blends into the landscape with weatherboarding and a sedum roof
 - and which will last many generations if it is loved



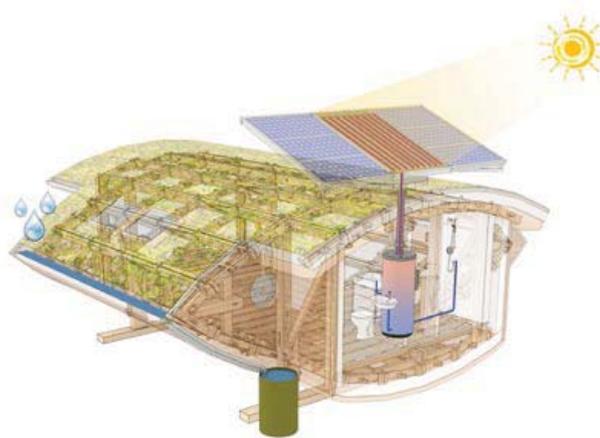


Using traditional / medieval timber joining the frame comes in small man handleable pieces. which can be delivered on pallettes. The main structure is held together using a locking wedge system which holds together the arch components into sections and even the

purlins. This allows the manufacture of a free standing timber structure without any metal components.



A PV array with battery backup provides lighting and a small power source to run a radio.



Solar thermal provides hotwater backed up by the range.



The composting toilet is vented through the range flue.

title Knutton Village Farm

client Knutton Village Farm

value £650k

The design was conceived as a series of vaulted barns to provide a flexible space to meet the needs of a wide and changing range of end user groups. The building is of a contemporary design which responds more directly to the surrounding rural landscape than to the local vernacular.

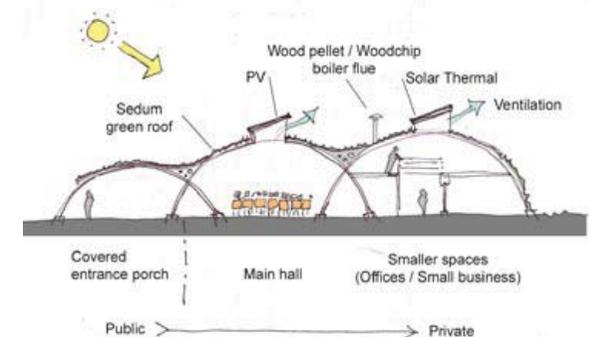
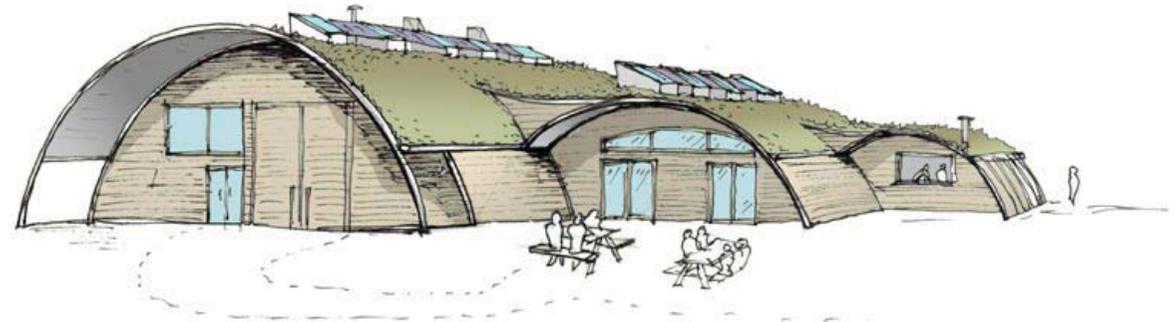
The three vaulted barns increase in size in a northerly direction. The smallest of the vaults provides kitchen, bathroom and storage facilities. The middle vault houses the café and shop with some space potential for exhibition space or local information. The largest of the vaults houses the main toilet block including shower facilities, boiler room, training spaces and office space on the upper level mezzanine. The main open spaces are left deliberately open to provide maximum flexibility for a wide range of training courses, workshops, community events and other local activities aimed at larger groups.

It was intended that the functions of the building and its services were also expressed in the design. This is partly out of an aesthetic of architectural honesty, but also the intention to demonstrate and celebrate the technologies and strategies

that reduce the environmental impacts of the built environment.

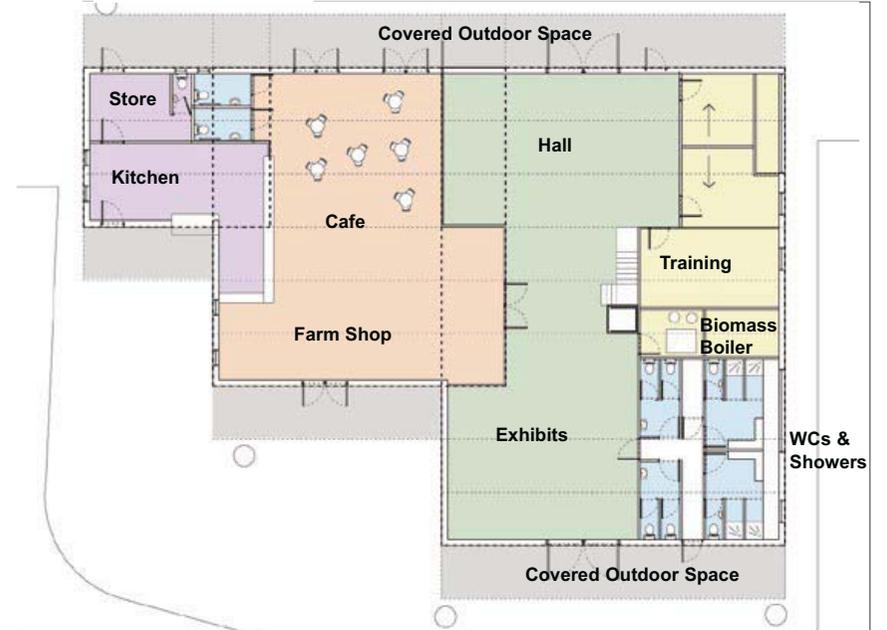
Although the primary structure is a curved steel frame, external materials have been selected to give the building a natural and organic feel. At ground level the building is clad in local timber weatherboarding. The rooftop is a cost effective standing seam metal roof with a green sedum mat topping.

Standing seam offers other benefits in that microgeneration equipment is easily attached with scope for expansion.

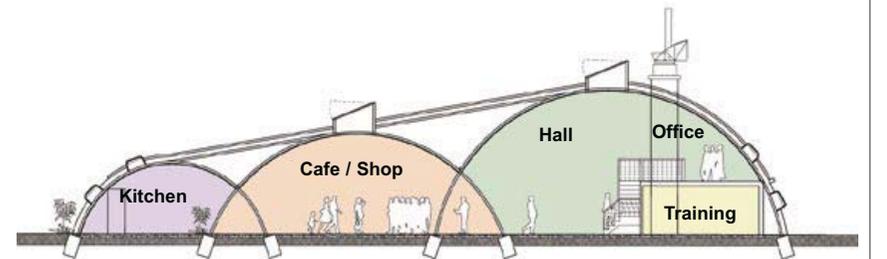




Floor Plan - 1:200



Cross Section - 1:200



title Dove Lane Tower

client

value £90m

The tower of hope

- stroll beside the canal
- wander up the ramp over Dove Lane
- watch the woodchips slide into the glass vault
- sunbathe on a park bench within the hanging gardens
- sit and have a cup of tea in the rooftop café
- look out over old Bristol and be optimistic
- long distance views of the channel and harbour
- some flats shutters twitch shut as the afternoon advances
- browse in the community art gallery
- leave the kids in the creche
- sign up for yoga
- book an evening meal in the organic cafe
- lean over into the atrium
- watch the buskers for a while
- descend to the performance space
- watch the conference delegates flow in and out of the hotel reception
- catch the turbine blades furling through the glass roof
- love the sun warming the timber beams as it filters through the photovoltaics
- the reclaimed bricks are now warm, catching the last of the day
- the atrium bar is now filling up with workers
- the LEDs start to twinkle in the fading light
- time to catch a pool car before the rush
- perhaps the future could be fun after all
- and the city waits for your answer





Clockwise from left: 3 blade wind focus towers - Atrium and garden sketches - Darrieus wind focus tower - entrance



title ZED2

client Nottingham University Ningbo Campus, China

value N/A

dates August 2008

ZEDsquared - the most important urban best practice demonstration in the world

The first international example of a replicable zero carbon / zero waste urban block

Embracing the placemaking agenda whilst achieving a plot ratio of 1.5 but still including parks, full size football pitch, schools, markets and workspace.

The idea is to show how a typical city block can generate its own energy needs at the same time as achieving reasonable density and achieving a higher quality of both private and public amenity than a conventional development approach.

An innovative funding strategy using the ZEDfactory energy mortgage concept enables residents to meet the capital cost of durable solar microgeneration and heating and cooling systems, using the household cash previously spent on escalating fuel bills to service a 25 year loan.

The masterplan provides each home with good solar access and correctly orientated solar panel mounting surfaces complete with building integrated wireways and fixing rails. This allows the developer to build out the passive building fabric and utilities connections without having to fund expensive up front centralised electric and heat distribution infrastructure.

Most low or zero carbon urban developments all over the world use unreliable biomass combined heat and power plants using extensive biomass feedstock sourced from outside the site boundaries. Many parts of the world are now short of biomass, and growing urban populations are exerting pressure on agricultural production increasing the conflict between energy and food crops. There are also no examples of reliable small scale (0.25 to 5 MW) biomass plants suitable for urban integration with reasonable electric to heat outputs.

A central pedestrian prioritised square provides the focus for converging homezone streets. A with a large glass / glass photovoltaic canopy built into a high density 35 storey tower plinth





Clockwise from top of opposite page: ZED² North - ZED² South elevation - ZED² West elevation - ZED²



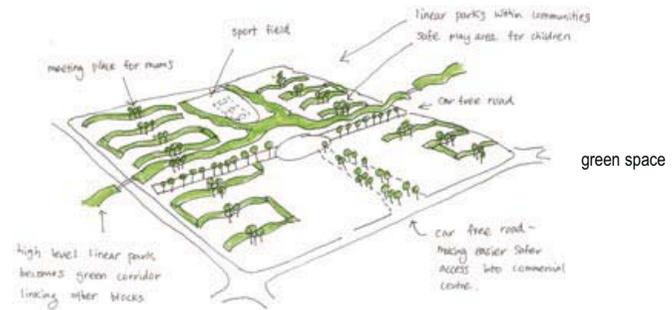
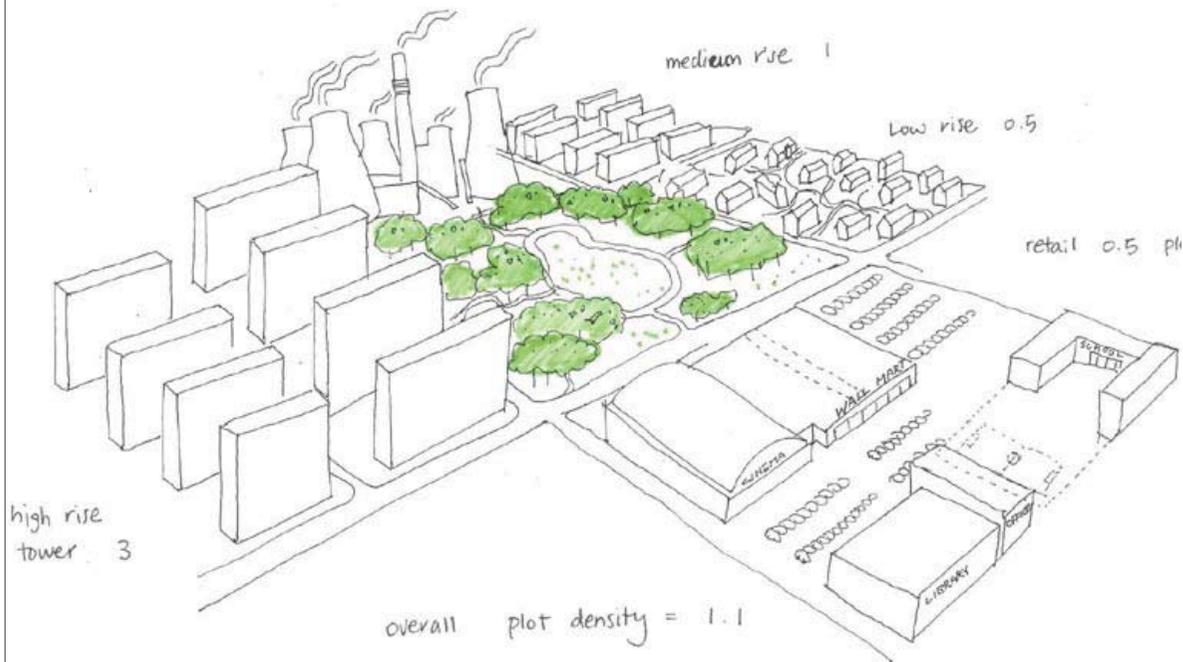
providing a shaded external community focus with small shops, bars and food stores.

Open air lifts and a generous stair allow the public a panoramic view of the Zed urban quarter from a roof terrace served by a family restaurant with seasonal open air dining.

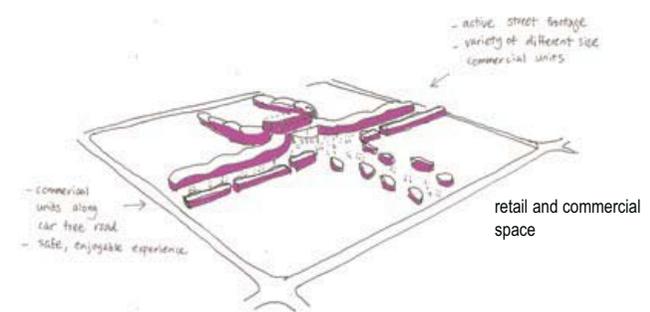
Above the diners, 28 storeys of high density solar apartments maximise the number of homes within easy walking distance of the centralised community facilities, with the shadow cast over the playing field for the majority of the summer.

Cascading roof terraces planted with lawn, shrubs and small trees provide undulating linear parks that descend to the pitch to the north and become pedestrian paths bridging over busy perimeter traffic, and encouraging children to play outdoors safely.

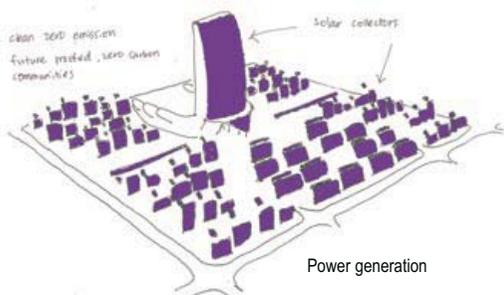
A tree lined pedestrian promenade joins the central square to the sheltered bus stop, with the gable ends of lower rise family blocks housing small businesses and shops to provide a vital and active street frontage.



green space

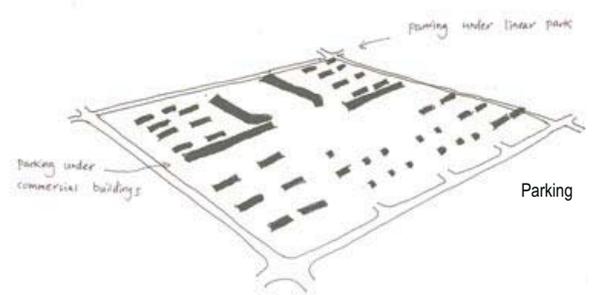


retail and commercial space

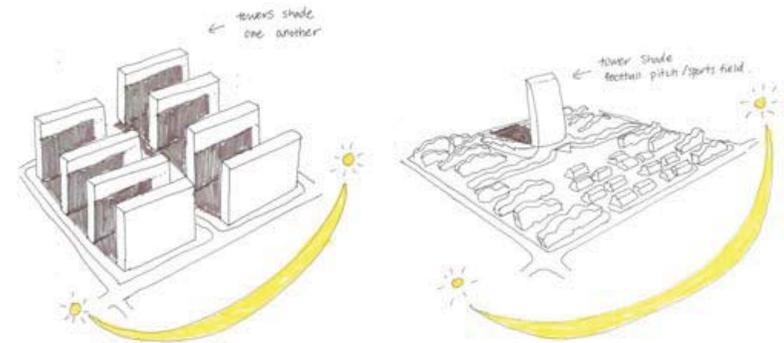


Power generation

ZED²



Parking



Although a high value plot ratio can be achieved on a discreet plot of land when combining different functions it can be seen to have a lower value on a city wide scale due to the space requirements for power generation, green space, retail, and commercial space.

The ZED² plot combines all these functions and can be shown to have an equivalent plot ratio when mixed use functions contained within the block are taken into account.



ZED² comprises of 3 building typologies A residential tower block on a retail unit plinth, a solar apartment block, and a solar urban block.



Based on the well proven mixed use Bed Zed urban blocks, this district is destined to become the artists quarter, the fine urban grain encouraging micro business initiatives.

Larger undulating blocks of flats around the edge of the urban block provide a varied roofscape - punctuated by intimate mews streets tucked in below the linear public landscape, again housing live / work units with some covered parking and workshops.

The zed squared urban block tries to show how a step change reduction in carbon footprint can be achieved at the same time as genuinely increasing the quality of life in mixed use urban extensions.

title Leicester Abbey Park Road
Solar Urban Blocks

client Metropolitan Housing Trust

value £15m

dates On site Jan 2006

The latest government Energy White Paper proposes a 60% reduction in national CO2 emissions from mid-1990 levels by 2050.

The redevelopment of the old Leicester bus garage site will set new standards for affordable homes by meeting this target on completion of the final phase. This assumes that the project is successful in attracting appropriate grant funding for some of the building integrated photovoltaics. Even if this is not the case, the building design facilitates the future on-site installation of low-carbon power generation technologies, as they become commercially viable. This is expected to be within the next 8 to 10 years.

The concept is to reduce heat and power requirements, to the point where it becomes affordable to meet 60% of the building's energy use from renewable energy sources, generated within the sites boundaries. The site will do this by using ZED passive standards for airtight, super-insulated building fabric with heat recovery ventilation. Zero-heating specification homes will then incorporate a mixture of biomass fuelled

heating, photovoltaic electric generation, domestic scale micro wind turbines, passive solar gain, thermally massive passive cooling technologies, and wind driven ventilation with heat recovery.

The masterplan allows future upgrades to site-wide biomass combined heat and power, or fuel cell generation systems.



Above: Solar urban block. **Below:** Canal side elevation.





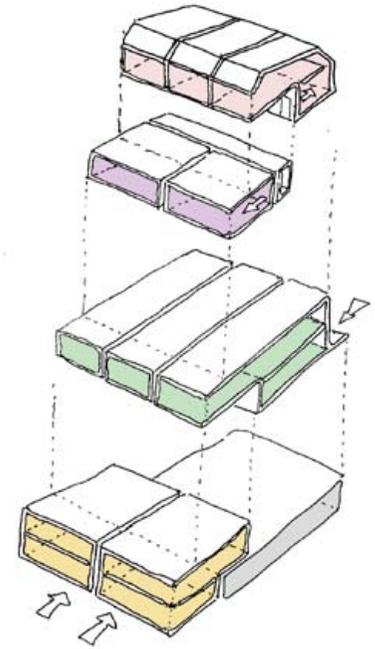
Clockwise from left:

View from South

- Sketch of separate dwellings in each block

- Cutaway of single unit

- West view showing parking



Every home has a southfacing living room



title Tongshan Masterplan

client Future House Real Estate Company

value NA

dates 2008

Tongshan is a commuter suburb serving XuZhou a city in North East China.

The masterplan has been developed to utilise the natural topography of the site and optimise the potential to harvest renewable energies.

The gentle slope across the site has been used to channel and pool rainwater run off to provide both amenity and a supply of non potable water. This landscaped drainage also provides visual amenity and promotes biodiversity across the site.

Buildings have been orientated to promote the free flow of prevailing winds through the development combined with the added cooling effect of the pooled water to prevent the urban heat island effect.

Solar orientation of all buildings will provide sufficient PV mounting space to meet annual electricity requirements.

Streets between buildings have been raised to provide car parking with linear

parks above ,again providing amenity for residents whilst hiding the visual pollution of parked vehicles.

A 'high street' has been created with residential blocks over 2 storeys of retail leading to a central plaza with communal facilities.

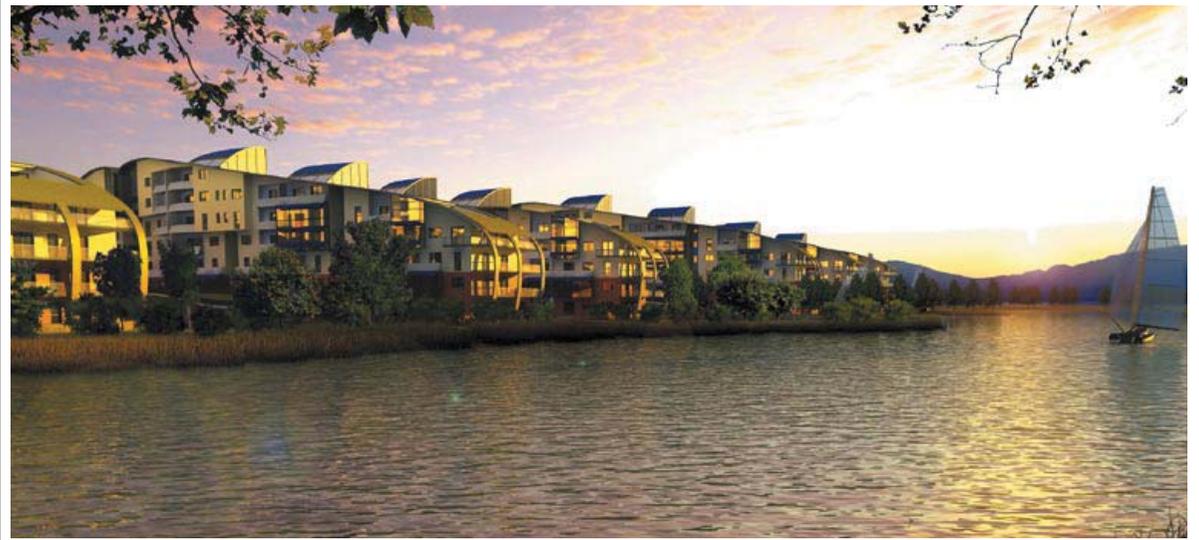
The development comprises 4 typologies 2 multi storey apartment blocks and 2 villa types.

All of the apartment blocks are well serviced by public transport links and villas have easy access to the perimeter roads preventing traffic build up within the development.

A centralised biomass boiler running on rice husk and heat main provides top up hotwater and minimal space heating during winter months.



Clockwise from above: Masterplan - apartment type 1 - apartment type 2 - Fan house villa -





Clockwise from above: Linear parks with parking underneath - Residential of retail high street - High street opens into broad communal plaza.



title SkyZED

client ZEDfactory

value NA

dates NA

A new approach to affordable housing for the new millenium

Most social housing providers in the worlds larger cities have no option but to build high to maximise density given the limited availability and high cost of new sites in the inner cities for affordable homes. This situation is particularly true in the South East where there is a desperate housing shortage. There is an acute need for affordable key worker housing as well as homes for first time buyers.

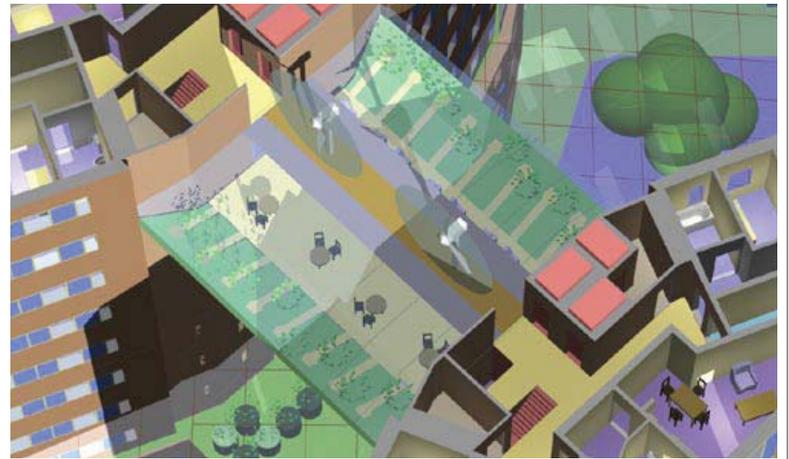
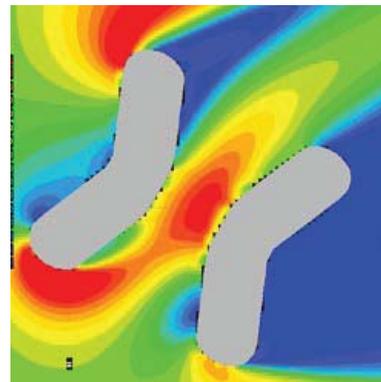
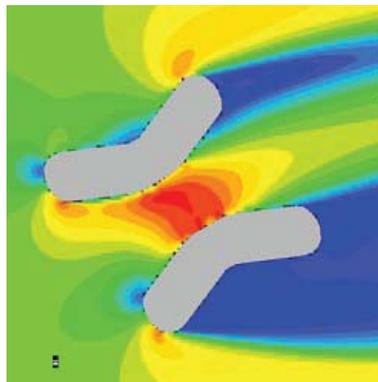
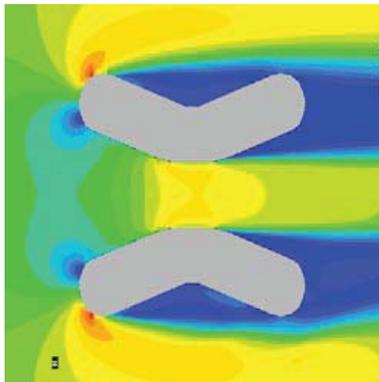
We are concerned that many conventional residential schemes achieve high densities with amenity for the private quota and a reduced standard for the affordable housing. This sets up an exclusive neighbourhood. Further, traditional development generally has a negative environmental impact , so we propose a mixed use high density community that actually generates its own energy on site, and incorporates most of the green strategies implemented at the award winning BedZED scheme in south London.

Through a combination of Wind turbines, and Photovoltaic cells mounted on the roof and building profile, the tower generates all of its own electricity over a year, and can be heated by a modest wood pellet boiler. The tower will be built from materials sourced locally with low embodied energy - using reclaimed sources whenever possible. Each tower petal contains a mixture of one and two bed flats with good views and daylight to all rooms. There is an option for a larger family unit tower. A seasonably openable glazed balcony opens out onto most living rooms on the leading edge of each petal, where wind velocities are slowest, and privacy greatest. All windows are triple glazed, set in walls with 300 mm of insulation, providing both excellent thermal and acoustic protection against both winter heat loss and traffic noise. Every nine floors all petals are joined with a link floor, a greenhouse space with keyhole gardens and communal sitting area





Clockwise from above: Atrium community space providing year round public space - microgeneration - link floors - CFD analysis on optimum wind flow between towers.

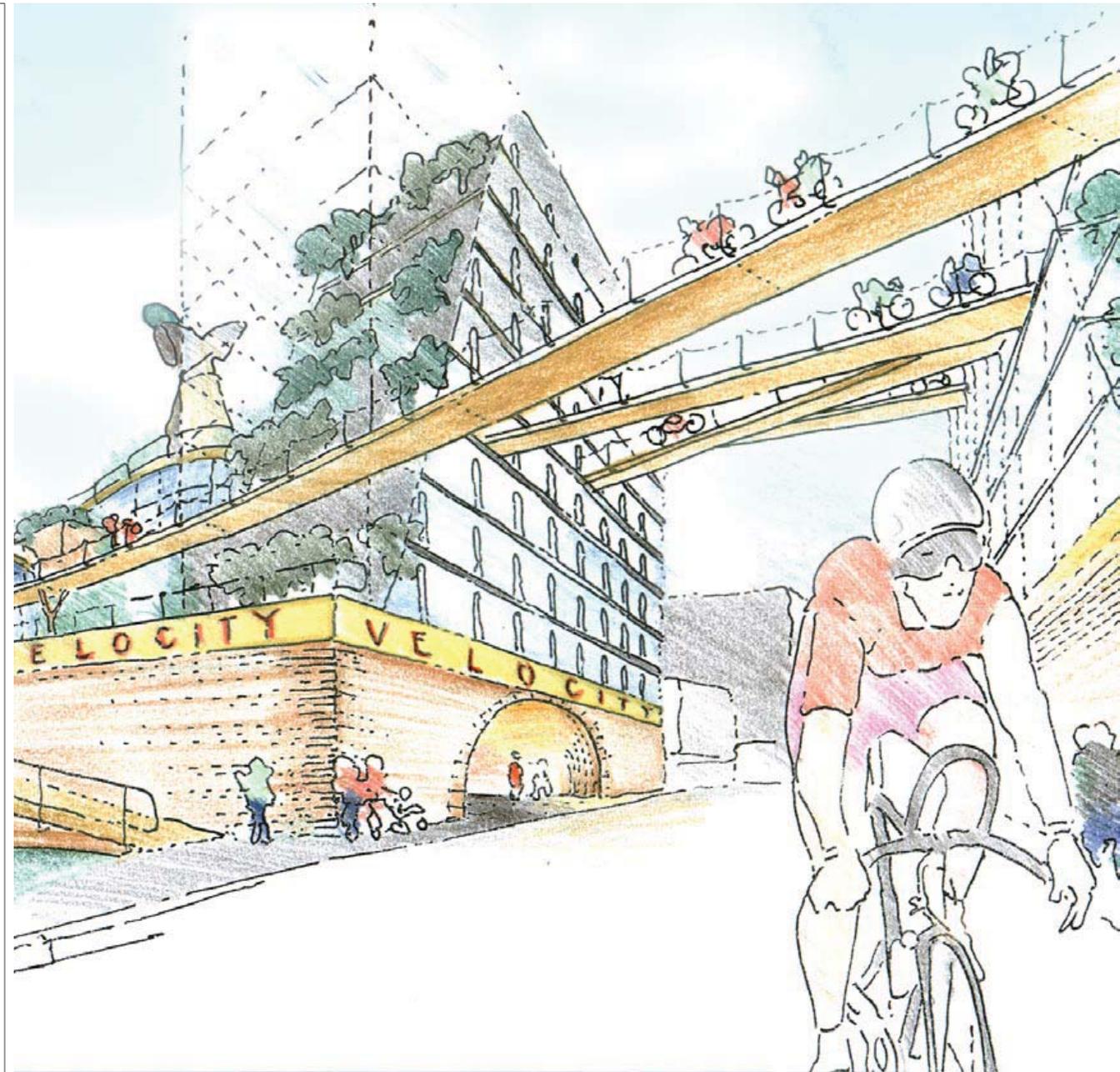


title Velocity
client Competition
value NA
dates NA

Velocity - life in a solar urban village

Sunny cold morning - woke up early enough to catch breakfast in the trackbar before work - watched the windvents twitch as they catch the breeze - freewheeling down the hillside - amazing view over the city - watched the first training riders shoot down the hairpins - colourful shapes half glued, half sliding down the rubber sports track - for once no traffic on the cycle highway to Bishopsgate - why do solicitors always ride full suspension - I can hardly wait to pick up my new recumbent from the vault works - I still envy Sue lying in bed - watching butterflies in the sunspace - breakfast on the roof garden and a stroll to the studio under the hill - the nursery is sunny and the children can play on the grass - perhaps we shouldn't worry so much - looking forward to the weekend - my teams' reached the semi final of the Peabody cup - the veterans might win - must book an Espace for Sundays trip - car pool seems to work well - lift goes straight to the car vaults and the electric Smart Cars have free parking in Westminster - these things are totally silent, zero emissions - running off solar electricity - it's a crime to drive anything else - even the heating and power is run off chip fat collected locally - our fuel

bills are so cheap, I think I can increase the mortgage - the vaults are starting to make Camden market look tired - the space seems affordable enough to encourage experimental goods - and the workspace under the hill is now occupied by anyone from city dealers to graphics studios - managed to book help looking after the kids tonight - visiting some friends in the skyflats - its exciting watching the wind turbines - its fun just going home - weary commuters chat on the bikelift - before freewheeling down the suspension bridge and back to No 56 Hill Place.



title Nottingham Jubilee Campus

client Nottingham University

value NA

dates Completed

Bill Dunster was responsible for designing this competition-winning scheme while at Michael Hopkins and Partners. He saw the project through all phases of design and construction.

(Awarded the RIBA sustainability prize 2002)



Clockwise from above: Atrium - exterior view of campus - Model of site - Library building



title SchoolZED

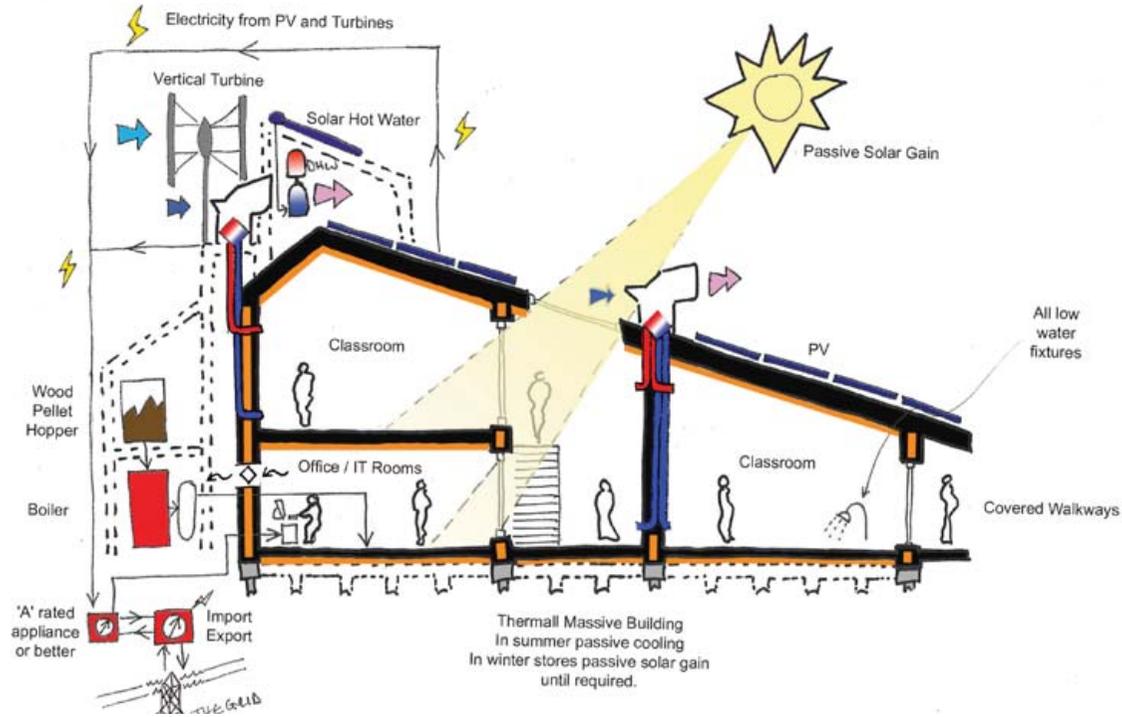
client R & D

value NA

dates NA

The ZED building physics model and associated supply chain is the lowest cost route to procuring zero carbon schools and university accommodation. The passive superinsulated building fabric with heat recovery ventilation has worked well for seven years at BedZED, and the latest developments in building integrated renewable energy microgeneration - mean that smaller sites can achieve carbon neutrality without requiring additional power purchased from outside the site boundaries. This demonstrates the effectiveness of zero fossil energy development to students on a daily basis - supplementing academic curriculums using the classroom enclosure and wider school environment. A very simple central corridor layout maximises circulation efficiency, and allows a variety of single and double height accommodation. Large central halls can be easily added for assembly, reception or sports facilities - and the concept can easily adapt to most urban, suburban and rural sites.





title Gallions Reach

client Metropolitan Housing Trust

value NA

dates NA

A proposal to transform a hostile island site surrounded by dual carriageways beside the City Airport into a zero carbon Zedquarter. The same turbine that had run for four months without objections on central London's Southbank cultural quarter in Christmas 05, now forms the southernmost anchor to the site. A photovoltaic clad wedge shaped accommodation block rises to the east, whilst a new village square connects to the adjacent Docklands Light Railway. A south facing residential tower rises from the square, with a café, electric and vegetable oil car pool and community facilities embedded in its base. An undulating central communal garden joins the southern square to the existing northern woodland copse, with a terrace of family homes and back gardens contributing to the wide range of different sized homes. A central shop stocking the produce from a local ZEF [zero fossil energy farm] enables residents to lead a wholistic zero carbon lifestyle if they choose.

Each homeowner with southern aspect has the opportunity to purchase an energy mortgage and eliminate their electricity bills for life. Even without the biomass chp - the total renewable energy generated on site approached

20 % of total annual electric demand. A small biomass powered combined heat and power plant completes the zero carbon technologies, with the woodchip consumption kept well below the national personal biomass quota of 500 kg/ person / year for this density of 181 homes / ha. A communal glasshouse for growing flowers and herbs out of season - sits above the power plant on the northernmost edge of the site.

The building form, massing and aesthetic has carefully evolved to maximise the amenity and energy benefits from the sun, wind and diffuse daylight falling across the site, whilst minimising its reliance on scarce national biomass reserves. Summer overheating and zero winter space heating have been achieved with superinsulation, high mass, and heat recovery ventilation. Every home has a generous outdoor balcony or terrace, and the urban heat island has been minimised by a mixture of sedum roofs, roof gardens and generous space for large mature plane trees

The first Carbon Negative building in the world replaces - Extra power generation

Although the extra large and small wind





and photovoltaic microgeneration are not required to achieve zero carbon status, they can be funded by residents or sponsoring companies wishing to offset other personal carbon intensive lifestyle or work related carbon footprints. This produces valuable local microgeneration using building integrated renewable energy systems, and offsets both the embodied CO2 in the original construction, and the future CO2 that will be invested in maintenance and replacement cycles for some of the building fabric. This fits neatly into future GLA / govt initiatives for personal tradeable domestic carbon quotas. Even if every large scale green grid renewable concept was realised nationally - there would only be enough communal green grid energy available nationally to meet 30 % of current demand, and all of this will be required by our stock of existing buildings. This design shows how new urban regeneration can have a negative carbon footprint without stealing more than its fair share of limited national biomass reserves.



title West End Milton Keynes

client Metropolitan Housing trust

value NA

dates NA

This scheme celebrates the rigorous Masterplan grid of Central Milton Keynes. The perimeter blocks facing the road are sheer sided with stone skins, eroded at pavement level to allow for the colonnade and retail activities, and indented at higher levels to provide the recessed balconies for the residential. Towers pierce the smooth skin as glazed crevices, with the corner further eaten away to persuade visitors to enter the inner courtyard square.

These polite, permanent and somewhat inscrutable blocks rise towards the corner of the site, signalling the gateway to the new CMK 'Green Quarter'. A specially designed vertical axis with spherical blade configuration spins in the lightest wind- special LEDs on its vane creating an image of the earth generated from real time satellite images. The LED's are dynamically tuned into the 'green quarters' electrical consumption changing colour from green to red via orange as the communities power consumption exceeds it's allocated allowance.

This is a community planning it's own future. Rigorous weather and calendar compensated CO2 targets are set, and the LED globe provides immediate feedback on whether there are being exceeded in real time with the beacon

signalling this achievement to the wider city.

Passing under the glazed canopy, collecting window shoppers from both the arcades on Witan Gate and Avebury Boulevard reveals an intimate relaxed urban square flanked by pavement cafes and lime trees. The pedestrian prioritised square provides a more intimate social focus to the Green Quarter, with parking giving way to cobbles, benches, market stalls and in one corner the new Community Hub. This houses the zero CO2 transport hub, the carpool administrations, and mechanics to repair bicycles and small electric scooters, as well as receiving food box deliveries from the local organic farm. As the new community grows, activities could include childcare, telecommuting shared facilities and possibly even a 'green tomato' taxi service running off locally produced bio fuel.

A timber staircase climbs from the market square over the double height biomass square CHP wood chip loading bay doors - leading into a new hidden courtyard- the informal heart of the Green Quarter. Now the perimeter housing blocks step and stagger to catch the sun. Every roof





surface becomes a terrace or garden. Each flat peers around or over its neighbour to catch a snatch of sunlight. Oiled FSC cedar cladding wooden patio doors and the colours of earthen lime render create a more relaxing urban landscape.

A lush cascading garden with edible plants, and ponds covers the underground car park, with a skateboard ramp and a long distance vista out of Central Milton Keynes downhill towards the adjoining housing estates.

Each ground floor home opens out onto its own garden framing the communal parkland, and each common stair connects to the central promenade route allowing upper floor residents easy access to the outdoor space. The same glazed stairs feed small clusters of single aspect flats with each corridor leading onto communal roof gardens.

Oval towers roofed in solar electric panels break up the southern terrace, following the landscape downhill, a visitor arrives in an open courtyard of terraced three storey town houses. South facing bay windows and roof terraces give privacy and long distance views over Milton Keynes with a secure Children's playground completing the sequence of increased relaxed and private communal gardens. From the roof terraces the cascading diamond shaped solar panels framing the penthouses along Witan gate give the Green Quarter a re-assuring city wall, further emphasised by the sentinel vertical axis turbines spinning between each oval tower.

The transition from low carbon specification to carbon neutral has been achieved by replacing the off site gas powered chp plant with three on site biomass powered Talbot CHP units. The three Talbot units generate approximately 8 % more electrical energy than the community requires over a year, which over a 60 year period, should offset the CO2 embodied in the original construction, together with the carbon footprint of planned maintenance and replacement. The biomass furnaces, hot air turbines and chip store have been carefully planned into one corner of the inner courtyard square, with a double height woodchip loading bay and a small section of underground car park converted into a compact plant room. Special chimney flues integrated into the massing of the corner residential block deliver the non toxic aromatic woodsmoke high enough to avoid the adjacent urban blocks. Ten years after the teams' experience with the first urban woodchip CHP at BedZED, the team are now confident that this technology represents the most cost effective way of producing a zero carbon high density urban quarter - with the efficiency of the building fabric and mixed uses ensuring efficient loadmatching with modest amounts of excess summer heat potentially used to provide trigeneration cooling using absorption chillers for the retail units. If the central Milton Keynes power plant concept is still pursued at a later date - it is both sensible and economic to connect the biomass CHP units into the central CMK district heating main and private wire network - using the Woking precedent to encourage a complimentary range of different microgeneration technologies working within a coordinated and future proofed framework. All the large scale microgeneration devices including large

scale communal rooftop photovoltaics and micro wind generation are linked into one Energy Services Company with remote billing facilities and overall responsibility for both the private wire electric supply and the district heat main supply predominantly domestic hot water. Woodchip deliveries from three medium sized 15 tonne tipper trucks could be required once a week, and these would take place on weekday mornings - freeing up the market square for the weekend stallholders.

Awards List

Royal Institute of British Architects - Presidents Award 2008

The ZEDbook - Outstanding Professional Practice-located Research

Sustainable Housing Awards 2008

St Mathews key worker flats

Housing Design Awards 2007

Future Proof Award - Jubilee Wharf

Sustainability Awards 2006

Low energy building of the year - St Mathews

Housing Design Awards 2006

Highly commended - Hockney Green

Housing Design Awards 2005

Highly commended - BowZED

Exhibition of Excellence - Leicester Bus Garage

Stirling Prize 2003

Shortlisted Main Prize & Winner of Sustainability Award - BedZED

RIBA London Awards 2003

Winner Special Awards - Sustainability - BedZED

Housing Design Awards 2003

Winner - Best Project & Sustainability Award - BedZED

EU prize for contemporary architecture 2003

Nominee - Fundacio Mies van der Rohe Award

Evening Standard Lifestyle Award 2002

Winner

Energy Globe Award 2002

Winner

Eurosolar Award 2002

Winner

The World Habitat Awards 2001

Finalist

Other Citations

Prime Minister's Better Public Building Award

The Conference Building, Earth Centre,

Finalist in 2002

Design Sense Award

Hope House shortlisted 1999 by the Design Museum

RIBA Downland Award 1996

Hope House shortlisted

British Council Delegations

⌘ China, Beijing

⌘ China, Shanghai

⌘ Los Angeles

⌘ Japan

Bill Dunster's CV

Date of Birth July 9th 1960

Nationality British

Higher Education MA Hons Edin.
Degree Course at Edinburgh University

Following several years of research and development into high-density sustainable housing, Bill presented the BedZED scheme, a carbon neutral live/work community, to the Peabody Housing Trust. In early 1999 suitable land was found in the London Borough of Sutton, and both the BedZED project and Bill Dunster architects (BDa) were born.

Since 1999 the practice has completed a number of award winning building projects.

Prior to setting up BDa, Bill was an Associate at Michael Hopkins and Partners, and was with the practice for 15 years, specialising in low energy and sustainable development.

July 95 - July 1999 Nottingham University New Jubilee Campus was the final project Bill completed as an associate for MHP. He took the scheme from the initial competition bid through to completion. Opened in December 1999 by HM the Queen, the campus has since been awarded the Stirling Prize, Sustainability Award 2001.

Aug 92 -July 95 Before Nottingham, Bill developed the environmental strategy and detailed façade design for Portcullis House. This work followed 4 years of research in the European Union funded Joule Research Project, collaborating with the leading environmental consultants in Europe, including Arup, CSTB Nantes, Christian Bartenbach and Conphoebus.

July 90 - Aug 93 Bracken House redevelopment, City of London. Contract value £85 million. Senior architect

Bill has also taught at the Architectural Association and Kingston University. He speaks regularly within the UK, and has been a member on a number of overseas British Council delegations to China and Japan.



photo - Morley Von Sternberg



New parliamentary building, London



David mellor factory at Hathersage Derbyshire

Asif Din

Director
Ba Hons Dip arch RIBA



Asif studied energy efficient building with Robert and Brenda Vale and Sue Roaf before joining ZEDfactory. Asif has also worked with a range of research groups including Royal Melbourne Institute of Technology (RMIT), Australian Greenhouse Office (AGO) and Mobile Architecture and Building Environmental laboratory (MABEL). At ZEDfactory Asif was employed to detail BedZED and since then has been involved on a range of projects from SkyZED to Jubilee Wharf which he was site architect for in Penryn in Cornwall. He is also involved in ZEDproducts development such as the wind cowl and has undertaken academic lecturing and teaching at various academic institutions from Deakin University in Australia to University of East London. He has previously worked for T P Bennet Partnership on a wide range of commercial projects prior to his diploma course.

Matthew Hoad

Senior Architect
BA(hons) Dip Arch (Kingston),
AIWSc, RIBA



Matthew studied at Kingston University and the Royal Academy of Fine Arts in Copenhagen and has subsequently worked extensively on environmental based projects since qualifying. Matthew has lectured at Kingston University and written journal articles on sustainability and timber construction.

Prior to joining ZEDfactory in May 2004, Matthew worked for architects Michael Hopkins and Partners for 5 years from 1997 and for specialist timber framers, the Green Oak Carpentry Company from 2002 to 2004. This has brought design and contracting expertise to Bill Dunster Architects where the development of buildings is closely carried out with manufacturers and specialists to deliver innovative architecture.

Steve Harris

Technical Director
BSC Hons DipArch (UCL) RIBA

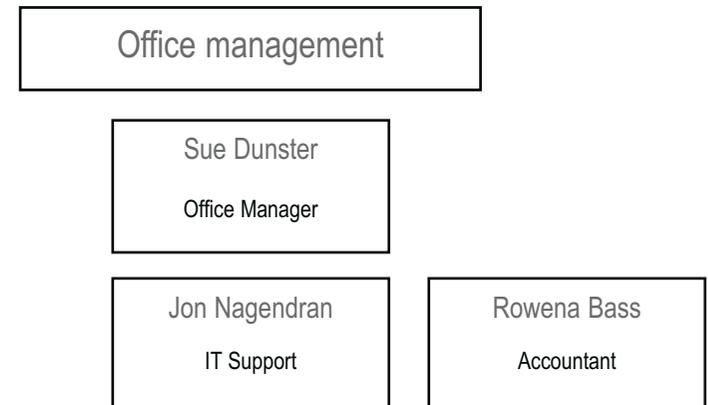
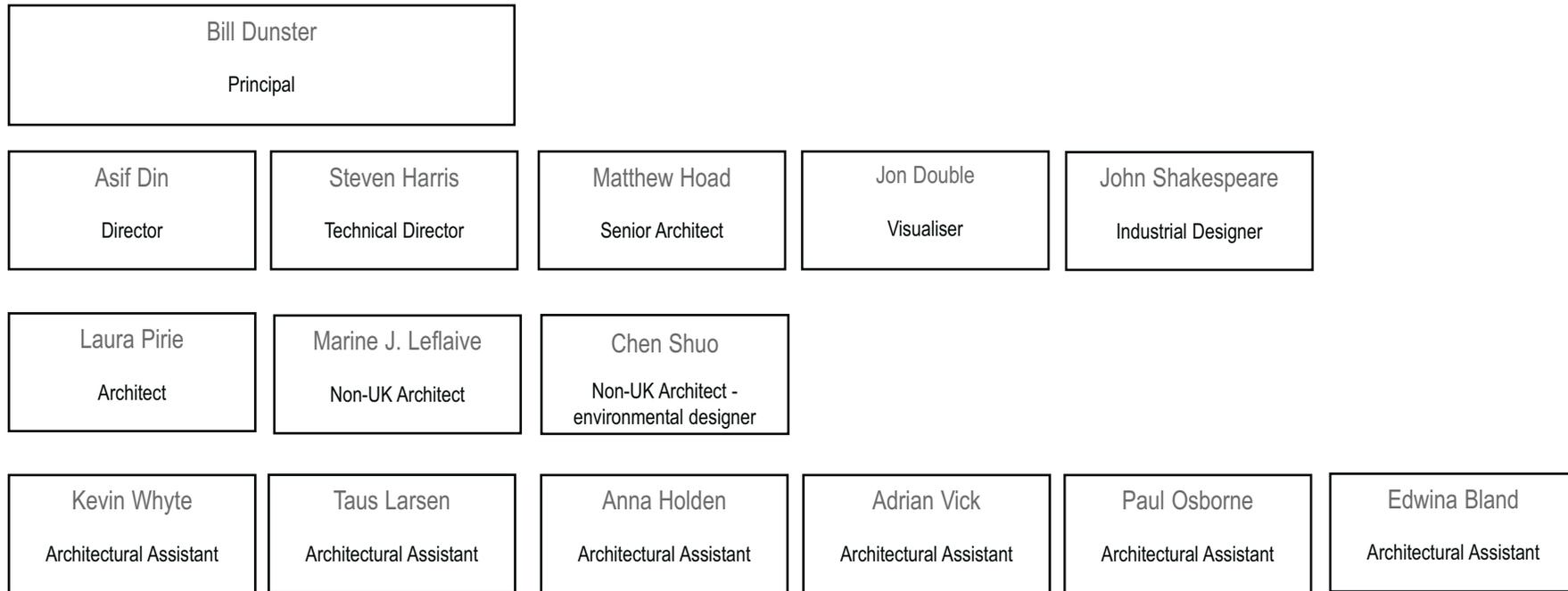


Steve Harris has been working with Bill Dunster since 1994, firstly at Michael Hopkins and Partners, and from 2000 at ZEDfactory. He has been involved with BedZED since its inception, originally working on the project privately for Bill when they were both at Hopkins. Currently he is project architect for a number of projects and has cross office input on construction detail and energy systems. He has also been involved in a number of studies looking at energy payback and building physics.

Between 2002 and 2005 Steve also took on a role as a Senior Lecturer in Environment and Energy at East London University School of Architecture and the Visual Arts. He is a member of the Hackney Sustainable Development Group for Hackney Council and has undertaken external representative roles for the GLA.

From 1988 and 1993, Steve studied at the Bartlett School London (UCL) and qualified as an architect in 1996.

Organisational Structure



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