

Interactive
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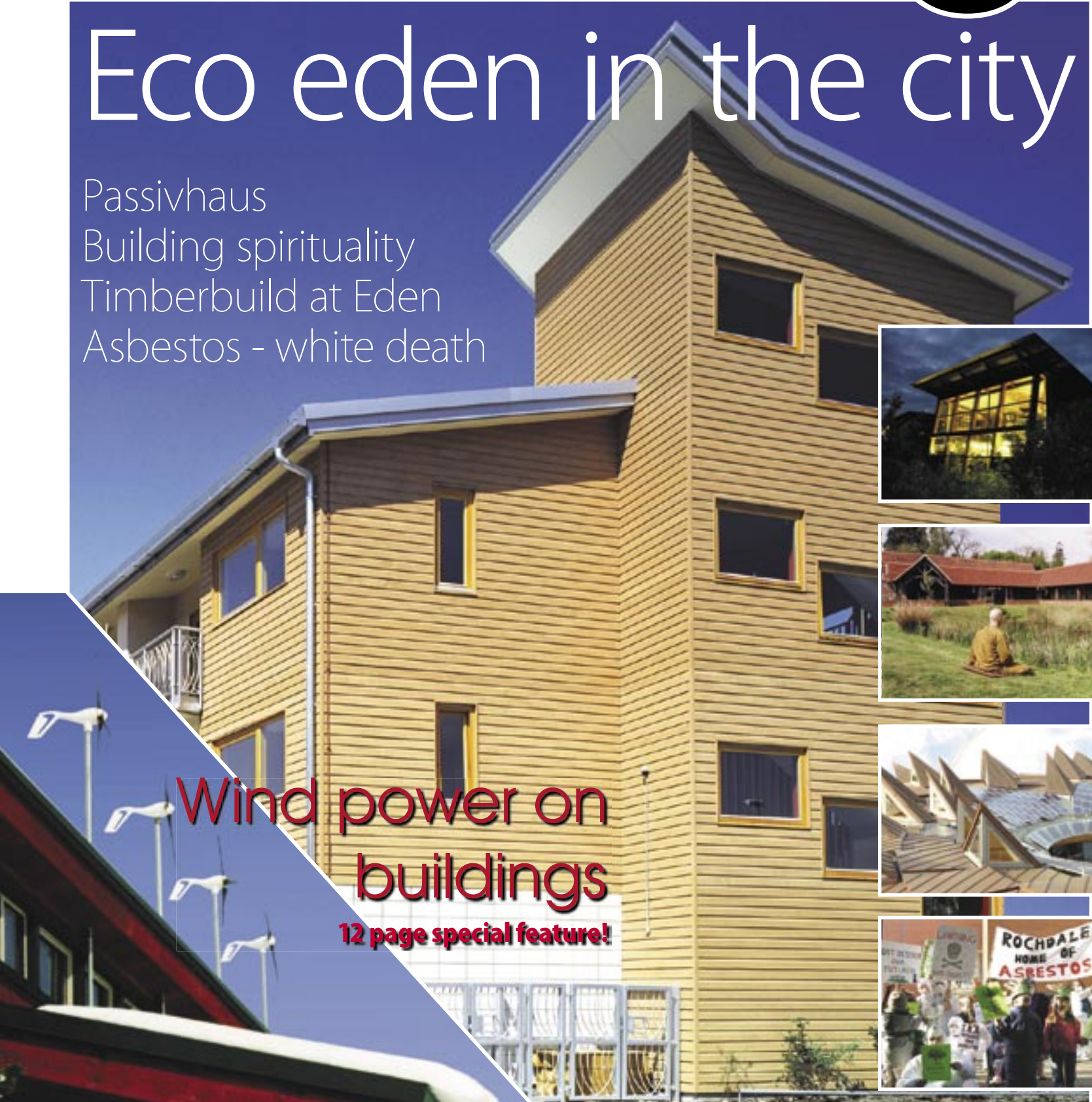
building

for a future

the independent journal for 'green building' professionals and enthusiasts

Eco eden in the city

Passivhaus
Building spirituality
Timberbuild at Eden
Asbestos - white death



Wind power on buildings

12 page special feature!

Goodbye to 2005!

FOREST LOSS SLOWING, HABITAT DESTRUCTION CONTINUES

Some 32.5 million acres of forests are destroyed around the world each year, an area the size of Greece, although the net loss of trees has finally slowed thanks mainly to new plantations, the United Nations said recently. The U.N. Food and Agriculture Organization (FAO) said its Global Forest Resources Assessment was the most exhaustive such survey undertaken, covering 229 countries and territories.

Taking into account plantations, landscape restoration and the natural expansion of some forests, the FAO said the net loss of forest area between 2000-2005 was some 18.25 million acres a year against 22.25 million acres in the 1990-2000 period. FAO officials hailed the improvement in the net loss figure, saying China in particular had embarked on a major tree-growing program to provide timber for its construction boom and to tackle the process of deforestation.

GAS GUZZLING OLD BOILERS MUST GO

The Construction Products Association has written to the Chancellor of the Exchequer in advance of his Pre-Budget Report later this year, urging him to provide grants for householders to replace domestic boilers that are over 10 years old. In his submission to the Chancellor, Association President Roy Harrison said: "There are currently over 3.5 million open flue gas boilers over 10 years old in service in British homes. At current rates of replacement, at least 2.3 million of these will still be in service in 2010. On average these boilers produce 75% more carbon emissions than condensing boilers.

The cost of replacing these boilers can be up to £3,000, but research has shown that a grant of £500 towards the cost of a replacement boiler would lead to the replacement of 600,000 boilers over and above those that would otherwise be replaced.



Keith Hall - editor

As the end of another year draws in, I'd like to reflect on the positive aspects of 2005. Just looking through this larger than normal issue of BFF will give you a good idea of how successful green building is becoming in the UK. Almost everyone in the industry is now coming up against sustainability in their everyday work. Some still have yet to engage with it but they will soon come around. People do like to have examples to follow and there are now plenty of high quality, sustainably sound and economically successful projects as standard bearers and these projects span all building types.

Boatemah Walk (cover story) in Angelstown, Lambeth is the second phase of a long term, carefully planned regeneration scheme which has evolved from listening to the tenants and following strict environmental criteria. It has delivered a high quality, visually appealing neighbourhood that residents are proud of and where people want to live. What better example can there be for housing associations everywhere.

Wind power special feature

Controversy is quite easy to find nowadays. Take future power needs for instance. Few are agreed on which strategies or technologies would be the best options; i.e. the wind lobby are pushing for wind, the solar lobby say solar, the nuclear lobby are back larger than life and so on and so on. But who is right? However, as I write this (mid November) it has just been announced that the price of wholesale gas has doubled in the course of just one week. Not unexpected, as it had been predicted for some time but it is certain to concentrate a few minds on real alternative energy sources for our businesses and homes.

Our special wind power feature offers three opinions (not necessarily opposing) on the prospects for the widespread uptake of roof mounted wind turbines as a means of generating power. As you will read, Nick Martin is voicing serious concerns about some claimed outputs that are circulating in the tabloids at present (and he is not a lone voice). So the warning is - don't believe all that you read in the press.

Wind aside, this issue is jammed solid with lots of other interesting and exciting content on a wide range of issues. We need to get the messages in this and future issues to a far wider audience so tell your friends and colleagues, or better still buy them their first year's subscription as a Christmas present!

Unique to magazine publishing

We are trying out a new feature in this issue which may revolutionise publishing or flop like bread out of the oven too soon. We have talked virtually all our authors into participating in an internet feedback forum, specifically on the articles we have published in this issue. This is a great opportunity to give the authors your feedback and we should be able to discover which subjects you enjoy or hate and from your feedback we can plan future features and reports. This feature will need reader participation to succeed.

Green Building Bible - third edition

We are beginning to focus our attention on the third edition of the Green Building Bible which we hope to publish Summer 2006. The second edition has exceeded all expectations and is one of the best selling eco building books in the UK but we want the third edition to be even better. Like the magazine, the third edition will be more interactive with a new, unique website which will be launched prior to the publication of the paper edition. We are currently looking for feedback on the second edition. What do you think of the content? What subjects did we miss? What do we need to include in the third edition? Your comments, whatever they may be, will help us to plan for the new issue. Send me an e-mail or letter by post.

As with the second edition, we are again looking for authors and section editors so send me an e-mail if you want to be involved, or wish to pull together subject matter in any area where you have the relevant expertise.

We will keep you informed of progress in the next edition of BFF and in our popular and free e-mail newsletter. If you don't already subscribe to this then go to www.newbuilder.co.uk/newsletter/ to subscribe.

All that's left is to say - enjoy your Winter edition. A big thank you to all our authors, contributors and to the BFF team. We wish you a merry little Christmas and a contented new year. Here's to a peaceful and healthy future for our planet and its inhabitants.

Keith

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CIS TOWER UP AND RUNNING

Prime Minister, Tony Blair MP has switched on the Co-operative Insurance Society (CIS) solar tower project, the largest of its kind ever undertaken in the UK. Although the work to cover the 400 ft service tower of the landmark building in the centre of Manchester is not totally complete, panels on the south side of the building went live for the first time recently after Mr Blair pressed the switch feeding electricity into the national grid.

Once all the 7,000 photo-voltaic panels are in place, it is expected that the solar panels will create 180,000 units of renewable electricity each year - enough energy to make nine million cups of tea.

NEW HOMES MUST BE GREENER SAYS WWF

Towns and cities across the South West will see a massive increase in carbon dioxide emissions, the main cause of climate change, unless thousands of new homes planned for the next 20 years are built to high environmental standards, say WWF. Exeter will see the highest rise, with a 24 per cent increase in domestic carbon emissions, if proposals to build 18,500 new homes between 2006 and 2026 are delivered to current minimum standards.

WWF's research demonstrates that if developers build their homes to the EcoHomes 'Very Good' standard then the CO₂ emissions from energy use in the home could be reduced by 32 per cent against 'business-as-usual' projections. Homes built to the 'very good' standard typically have a lower energy demand, better insulation levels, A-rated white goods (such as fridges, freezers and washing machines) and condensing boilers.

GLOBAL RENEWABLES INVESTMENT HITS RECORD HIGH

Global investment in renewable energy hit a record \$30 billion last year, accounting for 20-25 percent of all investment in the power industry, and with solar power the fastest-growing energy technology, according to a recent Worldwatch Institute report. The Worldwatch Institute, a Washington-based organization working for environmental sustainability, said the renewables sector was growing as a result of government support and increasing private sector investment.

WOOD RECYCLING

Projects are fast developing across the UK with the help of the National Community Wood Recycling Project (NCWRP) - a not-for-profit franchisor. By disposing of (or purchasing) timber via a project near you, you can save money and the environment. www.community-woodrecycling.org.uk

MORI poll for Shell Springboard offers interesting insights

Shell Springboard had a report produced by MORI entitled 'Small business attitudes to the opportunity of climate change'. The key findings included the following:

- There is a clear belief among UK SMEs (small / medium enterprises) that products and services which help to reduce greenhouse gas emissions offer a significant business opportunity. Nine in ten say there is money to be made in this market. 95% expect the demand for these products and services to increase in the next ten years. Two thirds (68%) disagree with the assertion that British consumers are not interested in climate change.
- There is also a belief that the UK is well placed. 57% reject the suggestion that most British companies do not have the technical skill to develop products and services which help to reduce greenhouse gas emissions. Half (51%) think British businesses are better placed than those in many other countries to develop these.
- But far fewer SMEs are convinced of the opportunity for their own particular business. Two thirds (69%) know little or nothing about the issue of climate change in relation to their own business. Nearly a fifth (18%) say they plan to introduce products or services which help to reduce green house gas emission in the next five years. 75% of those who are not planning to do so say this is because they are not relevant to their business. Six in ten SMEs (61%) say their company is too small to have an impact on climate change.
- As context, the clear majority of SMEs do believe that climate change is a reality. 90% of SME owners and managers think that climate change is taking place. 88% of these say it is caused by emissions from burning fossil fuels. 92% of SMEs agree that we should limit our use of fossil fuels rather than simply accepting climate change.

www.shellspringboard.org/downloads/news/10.pdf

Cobtun House wins RIBA Sustainability Award

Cobtun House, Worcestershire, built of mud, straw and corrugated iron, and designed by Associated Architects, has scooped this year's RIBA Sustainability Award.

The RIBA Sustainability Award rewards the building which demonstrates most elegantly and durably the principles of sustainable architecture. The winner was presented with a cheque for £5,000.

The RIBA Sustainability Award judges - Bill Gething, Bill Bordass, Jeremy Till and Tony Chapman - had this to say: "For sheer vision, the seamless and unobtrusive way the design was tailored to the client's needs, and the commitment and persistence of architect and client, the judges thought Cobtun House was a worthy winner of the RIBA Sustainability Award. Not only were some aspects of its construction truly innovative - particularly in the use of materials such as earth, sand and aggregate from the site itself - the architect and the contractors so entered into the spirit of the job that they made a point of arriving on site by public transport or bike."



The power of the wind blows away myths

A new report by the Environmental Change Institute at Oxford University shows that the UK has the best wind resource in Europe. The report, commissioned by the Department of Trade and Industry, analysed hourly wind speeds collected by the Met Office at 66 locations across the UK since the 1970, making it the most extensive research of the UK's wind resource to date.

BWEA Head of Grid & Technical Affairs, Richard Ford, warmly welcomed today's publication: "This report confirms what the industry has long known about the quality of the UK's wind resource. Our colleagues in Europe are perplexed that given this abundant natural resource - a strategic energy source as important as North Sea oil - this country has been slow to install turbines to harness the power of the wind."

With this evidence, there should now be no doubt at all about wind's ability to play a reliable role in the new power portfolio, and fulfil its promise to generate significant amounts of carbon free electricity for the UK. The UK is starting to catch up with our EU partners, who have been enjoying the benefits of this clean energy source for many years now, including thousands of jobs and increased energy security, despite not having this quality of wind."



Among the findings of this independent analysis, the first methodical investigation of Britain's wind resource, are that there has never been a time over the past 35 years when the entire country has been without wind, and that the wind always blows strongly enough to generate electricity somewhere in Britain. The study also showed that wind tends to blow more strongly when demand is highest, during the day and winter months.

Furthermore, the chance of low wind speeds affecting 90% of the country only occur for one hour every five years, whilst the chance of wind turbines shutting down due to very high wind speeds only occurs in around one hour every 10 years. Other findings concluded that the wind conditions in the UK are very different from those experienced in Denmark and Germany, making wind power a very real option and opportunity for the UK, as the country has 'the right kind of wind'.

The report's author, Graham Sinden, from the Environmental Change Institute research team at Oxford University, said: "The UK wind resource offers a reliable source of electricity that is not only low carbon, but reduces the UK's reliance on imported fuels. By examining such extensive wind records from throughout the UK, we can be very confident that the study identified both long term trends and the most extreme wind conditions that the UK will experience."

As Energy Minister Malcolm Wicks commented: "The only sensible debate about energy is one based on the facts. This new research is a nail in the coffin of some of the exaggerated myths peddled by opponents of wind power."

The full report of Wind Power and the UK Wind Resource can be found online at www.eci.ox.ac.uk/renewables/ukwind



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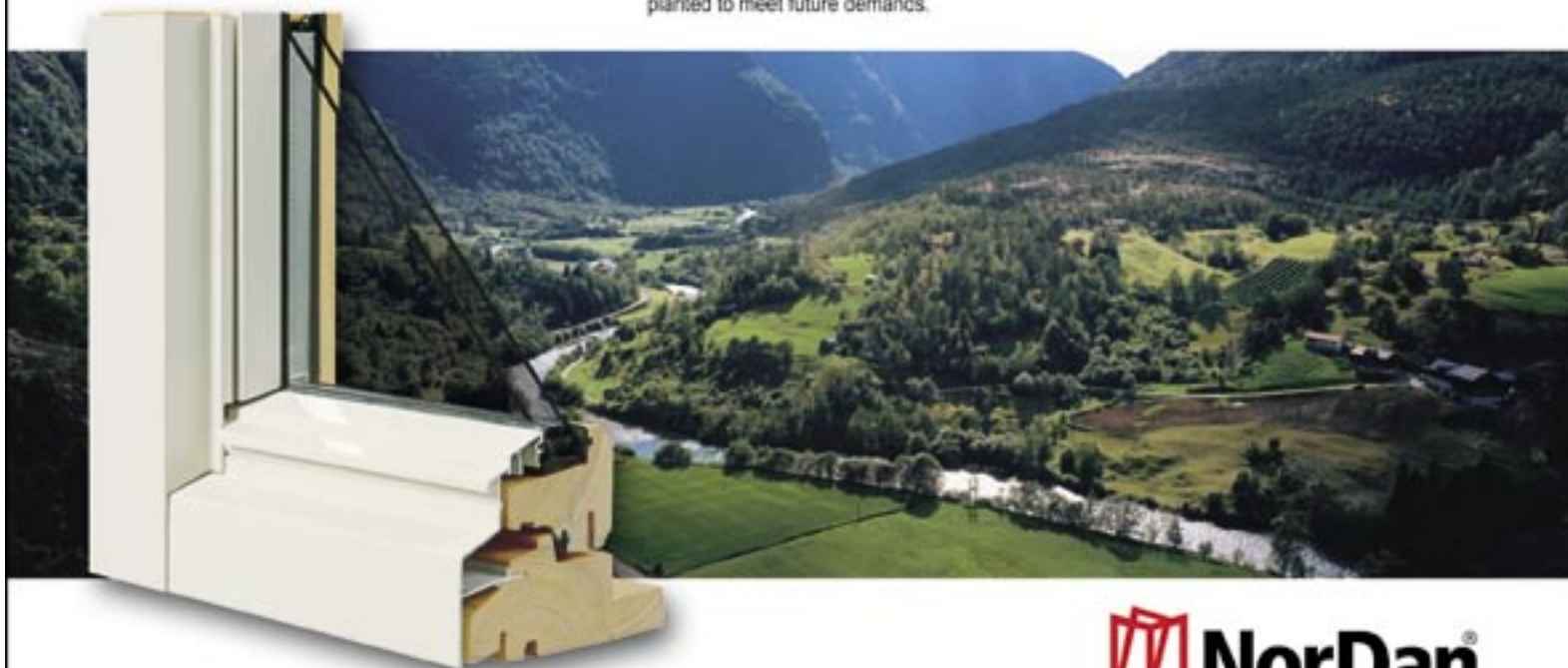
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FUNDS FOR RENEWABLES - BUT NOT ENOUGH

The DTI has unveiled a £30m funding package, entitled 'Low Carbon Buildings', intended to increase uptake of technologies such as solar cells, biomass, and small-scale wind turbines. This means that there will, after all, be no gap in funding between the Major Demonstration Programme for photovoltaics, and the Low Carbon Buildings Programme. Industry has given a mixed reaction, with disappointment that the sums are less than in previous years. Britain lags behind many European nations in the use of renewable power. The Low Carbon Buildings fund replaces two previous government schemes, the Clear Skies and Major PV Demonstration programmes, which have disbursed about £43m over the last four years.

NEW ULTRA THIN SOLAR CELLS

The Californian creators of new ultra-thin nanocrystal solar cells are heralding their invention as the leading contender in the race for future dominance of the solar market, arguing they have several advantages over the betting man's current favourite, organic cells. Researchers at the University of California have developed the first ultra-thin solar cells made entirely of inorganic materials which they claim gives the technology the cutting edge over its competitors. Such cells have been a theoretic possibility for some time but the American team's prototypes are the first to have been produced. Ilan Gur, principal author of a paper on the research published in journal Science, said the cadmium-based cells would be as cheap to produce as organic equivalents but would be more durable.

MINISTER DECLARES NUCLEAR POWER 'RENEWABLE'

Nuclear power is a renewable energy source, a government minister has declared, indicating a growing acceptance that future energy sources will have to be nuclear. In a debate on energy security in the House of Lords, Lord Sainsbury of Turville, the Science and Innovation Minister, was asked whether he would reclassify nuclear as renewable energy. He said: "it clearly is so." Lord Sainsbury's declaration recently provides more evidence that the anti-nuclear stance of the government is shifting in response to mounting concern about an emerging energy deficit. A decision to reclassify nuclear as a renewable source of energy would have dramatic consequences. Nuclear generators would be exempted, like wind turbines, from the Climate Change Levy.

Earthship Brighton gets power

October was a milestone in the Earthship Brighton project. All of the utilities were 'connected' up. The Earthship now has power, running water and waste services from the sun, wind and rain.

Earthships are 'low carbon' passive solar homes and workspaces, built using waste car tyres and many other reclaimed materials. They are in harmony with the planet's natural systems - using the sun's energy and rain to provide heat, power and water. Earthships have evolved as affordable homes, which people and communities can build for themselves. In essence, they are independent buildings that generate their own heat and power with a low global warming impact and low maintenance costs.

The Earthship Brighton is a community project building the first full scale earthship in the UK. All electricity and water heating needs in Earthship Brighton are provided by a 20kW portfolio of renewable energy sources. These are: a 1.116kW Unisolar photovoltaic array - 18 x 62W solar electric panels; 900Watt Whisper H40 Wind Turbine; 15kW wood pellet boiler and a solar thermal heating system.

As the Earthship is completely off-grid it requires its own battery bank - electricity is stored in 40 Trojan lead acid batteries. This storage is enough for 11 days capacity at around 4.2kW of electricity usage a day.

Southern Solar, a renewable energy company, accredited by Clear

Skies, the DTI's initiative to promote renewable technologies, carried out the installation. Howard Johns the Managing Director of Southern Solar commented that "It has been very exciting to be involved in the construction of the Brighton Earthship, it's a great showcase for renewable technologies. We hope that people will look at the Earthship and be inspired to make their own home more sustainable."

The entire cost of the installation was £35k, and this was covered by various grants including EDF Energy's 'Green Fund', the DTI's 'Clear Skies' Program and the Energy Saving Trust's 'Major Photovoltaic Demonstration Program'.

The next task on this community project is for a small team of volunteers to build the grey water planters. The planters have recently been lined with a TPO membrane, Flagon EP/PR, donated by Flag UK and are now waiting to be filled with rocks and sand prior to planting. All water treatment in the Earthship is with plants.

The Low Carbon Network has built Earthship Brighton as its first initiative and when completed, it will act as a community centre for Stanmer Organics, a land use co-operative. The Low Carbon Network was set up to help sow the seeds of environmentally conscious building and supports any community groups as well as self-builders. *Mischa Hewitt*



Earthship Brighton:
www.lowcarbon.co.uk
07974 122 770.

Southern Solar:
www.southernsolar.co.uk
0845 456 9474.



Sustainable Designer of the Year announced

Sheppard Robson has been named Sustainable Designer of the Year at the inaugural Sustainability Awards organised by Building magazine. The award recognises the commitment of a design practice to lead and promote sustainable design within the built environment. On presenting the award Michael Portillo said it was a 'unanimous decision' on behalf of the judges.

Alan Shingler, director of sustainability at Sheppard Robson said, 'We are absolutely delighted, this is a really important award for us. Sustainability is incorporated into the design and construction of all our projects and informs all our business processes. It is central to everything we do within the Practice and this recognition is fantastic.'

Sheppard Robson has implemented sustainability by using an environmental management system (EMS) led by a dedicated group of experts within the practice. This system enables the practice

to implement sustainable issues at the concept stages of a project encouraging consultants on the design team to influence and solve environmental issues early in a project life cycle. 'Sheppard Robson like to talk sustainability from the minute the client walks through the door', commented the judges.

Sheppard Robson is also at the forefront of environmental legislation and technological developments, leading and collaborating on research and development projects, partnering with key industry bodies.

The award also recognises in-house commitment to sustainability issues through initiatives which improve staff welfare, comfort and control of their environment. Sheppard Robson's offices in London and Manchester are located close to public transport, incorporate secure cycle storage and shower facilities, and regular fitness and team sports are supported. Energy use within the offices is monitored on a monthly basis and all consumables are bought from fair trade sources.

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RENEWABLE ENERGY? "NOT IN MY BACK YARD!"

University energy experts have showcased a three year study that investigates "NIMBY" attitudes towards renewable energy at the UK's first ever energy research summit. The research will look at factors influencing the "not in my back yard" response to renewable energy technologies such as onshore and offshore wind turbines, biomass power plant, large-scale solar panels and prototype ocean technologies.

The Economic and Social Research Council (ESRC), as part of the Research Council's energy programme, has awarded £500k to support the research project. It is entitled "Beyond NIMBYism": a multidisciplinary investigation of public engagement with renewable energy technologies", and the research will be undertaken by De Montfort University's Institute of Energy and Sustainable Development (IESD), as part of a team including researchers at Lancaster, Loughborough, Northumbria and Surrey Universities.

BIOMASS GOOD FOR HEAT, SAY TASK FORCE

Britain should use biomass to generate heat, say the Biomass Task Force. The Task Force concludes that biomass (fuel from forestry, crops and waste) could reduce the nation's carbon emissions by almost three million tonnes a year if used to provide heating. The carbon saving would be the equivalent of taking 3.25 million cars off the road.

The Chairman of the Task Force, Sir Ben Gill, presented the findings of the year-long study to Defra and the DTI, whose Secretaries of State jointly commissioned the report. Sir Ben said: "What many see as tomorrow's fuel is here today. We estimate there could be 20 million tonnes of biomass available annually. The challenge for the government now is to unlock this vast potential. We have suggested several ways to develop this industry which has a vital role in climate change, sustainable development throughout the country and economic activity in rural areas.

TO READ THE FULL STORY RELATED TO ANY OF THE NEWS SNIPPETS ABOVE GO TO:

[HTTP://NEWBUILDER.CO.UK/NEWS](http://newbuilder.co.uk/news)

York eco prefab-straw depot on cards

The Liberal Democrat administration in York, elected in 2003, has been determined to transform York into a sustainable city. It hopes to kick off with an innovative new council building called ecoDepot.

The ecoDepot will be, the largest timber framed straw clad building in Europe, incorporating many environmentally sustainable features: grey water recycling, renewable power systems, and intelligent climate control. It will be a landmark building for the entire region and, in its innovative approach to straw cladding, bring what has previously been a cottage industry into mainstream design and construction with innovative prefabricated straw bale walls.

The ecoDepot will include an interpretation suite to which local residents, developers, architects and students may come to learn about the building - how it was built, how it works, how it recycles water, how much energy it uses and where that energy comes from. During the building's construction the council will hold a series of open days to enable media and the public to explore and learn what environmentally sustainable construction is all about.

This building, claim its promoters, will be a practical busy working city depot. It has been a team effort and a steep learning curve for all involved. Plans have had to be revisited many times as everyone has learned what the issues were, what could be afforded, what could hopefully be achieved and how to make it happen. Depot staff have had to rethink office layouts and working culture to enable improvements to energy efficiency and airflow within the building. Early on in the process, Lance Saxby of the York Energy Advice Centre, proposed that they consider straw cladding as a way of dramatically improving the insulation of the building.



Other facts about ecoDepot include:

- * The office will give 76% reduction in energy use as compared to a traditionally built, air-conditioned office of the same size.
- * Cost of energy per square meter:
Normal build + air con. = £40
York Eco depot office = £5
- * The energy efficiency of the ecoDepot office will give savings of 155 tonnes of carbon dioxide per annum, if this CO₂ was emitted it would need 42 hectares of rainforest to absorb it
- * New vehicle wash to recycle grey water will reduce water consumption by 50%. Harvesting of rainwater for use in the whole depot will reduce this further
- * Electricity generated on site from renewable sources will provide 12% of energy requirement of current building (this % figure will increase as the ecoDepot will use much less energy than the current depot)
- * Environmentally friendly materials will save 1746 tonnes carbon dioxide, if this was emitted it would need 476 hectares of rainforest to absorb it
- * Construction of the prefabricated straw bale walls will create business development in Yorkshire and Humber.

Energy and waste in an age of excess

The Energy Saving Trust has been in consultation with the government of Canada's Super E® programme, to examine key issues related to energy consumption, and has revealed its findings in a new report published recently.

The report examines numerous issues relating to energy, including an examination of the current UK government's policies, international approaches and attitudes, and possible solutions to energy waste. The report coincided with Energy Savings Week and will be used to support the Energy Saving Trust campaign to help households reduce their energy consumption levels by 20%. The Energy Saving Trust approached Super E® to help it compile the report after preparing a shortlist of the UK's leading energy efficiency experts.

Super E® homes are proven to be one of the most energy efficient types of housing in the UK. A study in Kent earlier this year, compared the energy consumption of a Super E® home and compared it to a computer model of exactly the same house, but built traditionally to Part L, with air leakage equivalent to Super E ventilation rates. Taking into account the UK's gas and electric ratio, the researchers discovered that the Super E® home used 41.2% less energy.

Jeff Culp from Super E®, comments, "In 2002, Super E® was virtually unknown in the UK, so for us to be considered as a leading energy efficiency expert, by the Energy Saving Trust, is a sign of how far we've come. The growth and interest in environmentally friendly housing in the UK continues to grow. Independent research has demonstrated that 84% of consumers are willing to pay more for an eco home; consequently, more and more UK builders are joining the Super E® programme to help meet this demand."

Heavyweight is best option?

Two new reports, one on climate change and the other on energy saving, underline the fact that heavyweight construction is the best option for residential construction says The Concrete Centre.

Firstly, a report from Arup and the UK Climate Impacts Programme states that many homes in South East England could be too hot for habitation as early as the 2020s. The report, 'Beating the heat: keeping UK buildings cool in a warming climate', urges the use of heavier weight building materials combined with night ventilation to enable heat to be absorbed into building fabric. Secondly, a survey carried out by ICM for the Energy Saving Trust has found that energy saving is more important to homebuyers than a fitted kitchen or a spacious garden. Almost half (47%) of the 1,000 adults surveyed said that energy saving features influenced their decision to purchase their home. The Energy Saving Trust is using the results to urge the building of more environmentally friendly homes.

"With average summer temperatures continuing to rise, it will become difficult to maintain comfortable temperatures in homes by relying on simple ventilation", said Anna Scothern, head of residential at The Concrete Centre. "As a result, without high mass, homeowners will increasingly turn to using air conditioning. This will increase energy use and carbon emissions and have a detrimental impact on the government's goal to reduce CO₂ emissions by 20% by 2020 and by 60% by 2050".

It is those living in lightweight system homes who will be worse effected. The heavyweight mass of concrete helps to stabilise internal conditions by absorbing and releasing heat in response to changes in the internal temperature. This means that a concrete home stays warmer in the winter and cooler in the summer. Furthermore, a concrete wall is not so prone to air leaks if it is connected seamlessly to a concrete floor system. Air leakage accounts for a large percentage of energy loss in the home and is set to become an important issue with the new revisions to Part L of the Building Regulations.

"The cost of increased energy to heat and cool lightweight homes will not only be felt in increased CO₂ emissions, there will also be a financial cost to homeowners as energy suppliers continue to increase their charges", said Scothern. "These two reports underline a major environmental benefit of heavyweight construction: inherent thermal efficiency which can reduce CO₂ emissions and energy bills."



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Eco-eden in Angell Town

Closing the gap between sensible and practical sustainable construction, and what housing associations and local authorities expect to build, is a big challenge for those of us working on social housing. What a pleasure to work with clients and other professionals who join us in achieving a green approach.

Fran Bradshaw
reports ...



David Spero



David Spero

Boatemah Walk in Angell Town, London, represents a great achievement for the London Borough of Lambeth and is the result of concerted teamwork work by us at Anne Thorne Architects Partnership (ATAP), the Sustainable Construction and Regeneration teams at Lambeth Council, forward thinking residents and a willing contractor, Sandwood Construction. Following the refurbishment work by ATAP at Angell Town (see BFF, Spring 02) which resulted in halving resident's fuel bills, we expect to have significantly bettered these results with new housing facing onto Brixton Road.

Boatemah Walk also represents the other face of sustainability; Angell Town Estate was built in the 1970s with deck access blocks connected by high level bridges, with garages at ground level. It soon became the kind of estate taxi drivers

wouldn't enter. Residents wanted ATAP appointed for our consultative method of working, as well as for our green credentials, and worked closely with us throughout the design process, firstly in making decisions about demolition and rebuilding, and then in developing the design of the flats. Regeneration is also about employment and training, and the contract required contractors and subcontractors to use local labour during the construction phase. Consultants also offered training and employment to residents.

The 3 storey block of 18 flats is of prefabricated timber frame construction uses non-toxic and natural materials. It includes Warmcel recycled cellulose (newspaper) insulation, with high performance timber windows and an integrated soft film photovoltaic roof by Solar Century, from which rainwater is also collected to flush WCs.

An end to the 'estate' feel

The new building had an important function for the residents of Angell Town, as it replaced half of one of the 4 storey blocks which formed a fortress-like boundary to the old estate. The brief to architects working on the regeneration of Angell Town was that houses and flats, whether new or refurbished, should be reintegrated into the fabric of the city, and that the old idea of 'an estate' should go. Safety was also a priority, and ensuring that pavements, entrances and stairs were both open and overlooked was an essential part of the design.

Boatemah Walk lines a new pedestrian route from central Brixton, opening up views to the new houses beyond. The walk was named after community leader, Dora Boatemah, who campaigned tirelessly for the regeneration of the estate, and who died, sadly seeing the completion of

only part of the work. The design was developed with residents through a series of workshops, and they brought their own experiences of living on the estate to the evolving design. The building encloses a south facing community garden with living rooms and bedrooms facing south. The living rooms also have glazed doors to kitchens with balconies on the north side overlooking the popular green space to that side. A pleached lime hedge, with holly below and native underplanting lines the pedestrian route. This was extremely successful at Holles House as it screens flats but doesn't create hiding places, and creates green protection from Brixton Road. This 'hedge on stalks' now links the two phases of work.

The 'chain of custody' challenge

The first challenge was to get

both contractor and timber frame manufacturer registered for FSC Chain of Custody. The contractor and timber frame manufacturer Global Timber Frame Ltd, were both prepared to go through this fairly bureaucratic procedure, and achieved registration in time to ensure that the frame, cladding and internal timber and composite boards are all FSC certified, and FSC was helpful in sourcing materials. To achieve Ecohomes 'excellent' labelling, the project has to demonstrate that 70% of the timber used comes from FSC certified sources.

Richard Garland from Sandwood Construction says, "FSC timber was available for most of the components but knowledge and implementation of Chain of Custody procedures was much more limited. The windows, for example, which were imported include, according to the manufacturer, 70%

FSC content, but they have not yet seen any commercial advantage in implementing Chain of Custody procedures so they could not be included in the overall calculation of percentages. This more limited availability caused problems in terms of lead times, particularly on small orders. The conflicting certification bodies further limits supply and causes confusion, while using locally grown timber to achieve FSC and limit transportation resulted in lower quality timber being used - largely an aesthetic rather than functional issue - but clients need to be aware of this. The chain was also broken where we used intermediaries to supply our timber products to either suppliers or subcontractors."

Garland continues, "Many of these problems will be overcome if greater demand can be generated for construction products. We have



David Spero



David Spero



already added some of our supply chain to the Chain of Custody list and will be in a better position for the next project. For administration, in terms of ordering and segregation, site discipline proved problematic, despite training. A site is short term, with staff who have no experience of the procedures elsewhere and are working under time pressures throughout.

The administrative procedures for documentation were a nightmare and are still not completed, but this has been recognised by FSC and procedures have been revised with some input from this project.

Overall it will get easier, but full commitment is required from all the members of the team including the client, and some flexibility is needed to accommodate current limitations on availability”.

The structure

The frame was designed in 150mm deep timber sections, so this is the depth of Warmcel in the walls, with 300mm in the roof and 150mm Jabelite to the beam and block ground floor. It was made in panels in the timber frame workshop, and assembled on site. Rational windows with their Climaplust 1.1 argon filled glazing give whole pane U-value (that is the value for the window including frame) of 1.5w/m²K. Air

tightness testing was required by the contract, although it is only becoming obligatory when the new part L takes effect in April.

Panelvent was specified externally for sheathing strength, but NHBC required a breather membrane as well, primarily it seems, for the period the timber frame is exposed during construction. The construction was calculated for condensation, and clearly air tightness is improved, but this is not a ‘breathing’ wall any more. Following a workshop and discussion at the Association for Environment Conscious Building conference in the summer on timberwall construction, I’d be interested to hear if other readers have come up against this ruling?

Passivent ventilation was installed throughout, but this very simple and fantastically successful means of ventilation, which cost nothing to tenants, and which can hardly go wrong, seems more expensive than it ought to be. When clients are looking for savings, cutting out passive ventilation is one of the first suggested. It seems crazy that electrical equipment is cheaper than what is really just a hole in the roof!

Not a drop to lose

Our first roof design was of sedum, with a reedbed for recycling grey water to flush WC’s, on the basis

that a block of flats always has grey water to recycle, so that water would be saved when it was needed most, in the summer. This proposal was supported by a DTI innovation grant, however it was a bit too risky for Lambeth, who opted for rainwater collection to flush wcs instead. This meant the installation of a much larger collection tank, which could be located below the community garden.

Cath Hassell of Ech₂o Consultants said “As the most important part of any sustainable water strategy is to reduce demand at point of use before sourcing water from elsewhere, we specified IFO 4/2.5 litre dual flush WC’s, and flow regulators at 4 litres/minute to all basins, and at 10 litres/minute for the showers. Rainwater from the roof is filtered and stored in a 15,000 litre capacity underground tank, sized to make optimum use of rainfall on the site. The stored rainwater is pumped on demand to a header cistern which feeds the WCs in the flats. No UV disinfection has been specified as the rainwater is used for WC flushing only; thus the environmental load of using rainwater is reduced. The system is metered so that the exact amount of WC flushing demand offset by rainwater can be quantified. It is estimated that 220m³ of water will be saved a year from the WC specification and a further 176m³ from using rainwater on the site”.

Embedded solar power

At the same time an application for large scale pv installation was successful, and Solar Century designed an integrated roof of Corus aluminium panels, with soft film pv stuck to the surface. The whole building had been designed to face south, and the slope of the roof at 12 degrees which was right for the reedbed concept, was pretty good for photovoltaics. The building design embraced the change from soft living roof to sweeps of bright metal and the planners gracefully accepted the change.

Boatemah Walk's standing seam roof integrates 230m² of Aluplus Solar, a glass free photovoltaic (PV) system comprising flexible PV laminate (PVL) adhered to the surface of a specific Kalzip profiled standing seam roof. This system size will generate 1300KW, enough electricity to power the equivalent of four 3 bedroom homes every year.

Electricity generated by the PV system feeds into the power supplies of the 4 wheelchair accessible ground floor flats, helping to address issues of fuel poverty for these tenants, whilst contributing to preventing global warming by offsetting 5.5 tonnes of carbon dioxide, every year.

The high quality 'triple junction' PV laminate works well in low light

conditions common to cloudy Britain and low pitch roof angles on these buildings. With no glass, the product is vandal resistant, and its non-stick surface makes the modules graffiti resistant and self-cleaning. Unlike glass module systems which require rigid framework to hold them to the roof, the PV laminate is flexible, and can be integrated seamlessly into flexible roof systems such as the Kalzip standing seam roof used here and now a common roofing material within the construction market. They can be installed using the same methods as standard system roofing and DC electricity roof connections can be carried out by any roofing contractor.

Material considerations

With other materials, our approach is to specify 'natural and non toxic'. Tenants were concerned about health issues, especially asthma, because of living next to a main road. Externally the building is clad in douglas fir, ceramic tiles at ground floor level, and render. Internally douglas fir floor boards were used rather than chipboard. To avoid the use of pvc, marmoleum (from Forbo Nairn) was used in kitchens and bathrooms rather than vinyl, (some housing associations are not accepting linoleum in bathrooms claiming it is

too slippery. I don't think this is the case and fortunately Lambeth were happy with lino, especially given its lower embodied energy). We were also able to specify LHSF cabling throughout. Rubber was used on the external balconies.

Os Color finishes were used for timber externally and internally, and Biofa natural paints imported by the Green Building Store were used internally. Returning tenants were able to chose their own colours, and the flats were decorated in the most beautiful warm soft colours.

Tenants have now moved in and the response has been really positive, Angell Town residents have been proud to see the building on Channel 4 television news, and to take visiting groups around for London Sustainability Weeks, Architecture Week and Open House, while Lambeth have been getting phone calls from passers-by, asking if the flats are for sale!

We will monitor energy produced and used, water used, and other building in use information, so I hope we will have some hard facts to report next year.

Fran Bradshaw, for Anne Thorne Architects Partnership

Design team

Architect; Anne Thorne Architects Partnership
Landscape Architect; Studio Engleback
Quantity Surveyor; Andrew Turner and Co
Structural Engineer; Dewhurst Macfarlane and Partners
Services Engineers; Mendick Waring
Solar Roof; Solar Century
Rainwater Harvesting; Ech₂o consultants

Client; London Borough of Lambeth, Housing and Regeneration.

Photos:

Page 10: stair tower with access to pv roof and rainwater header tank'

Page 11: shared entrance to upstairs flats leads onto new pedestrian route to Brixton, with pleached lime hedge screen

Page 12: shaded south facing living rooms with balconies, the photovoltaic film shows as darker area on the metal roof

Page 13: soft film photovoltaic roof' 'view from Brixton Road with refurbished block behind

Left: living room and kitchen, Rational timber windows and FSC douglas fir floor



David Spero





Simon Fairlie

Simon Fairlie is editor of *The Land* and founder of Chapter 7, an organization which lobbies government for policies which provide for low income people seeking low impact opportunities in the countryside. 01460 249204. Email: chapter7@tlio.org.uk

The nimby explained

COUNTRY dwellers are only too aware of the sort of incomer who buys up a former agricultural property and then objects because the neighbour keeps noisy chickens or pigs. Recently, I came across a book that speaks up for such people, and explains their mentality; though interestingly, the contentious issue in Anthony Jay's book is not cocks crowing but building lime.

'A nimby' writes Jay in his preface to the book, is any citizen who tries to defend their home and their neighbourhood from plans which would destroy the view, pollute the environment, overload the transport network, upset the ecosystem and knock £50,000 off the value of their house. When it comes to our own backyard, we are all nimbies and every nimby deserves respect for standing up to corporate and government giants.

Not In Our Backyard is advertised on its cover as a campaign handbook for "anyone wanting to know how to launch an action group to halt some threat to a community from official madness or corporate greed". Certainly it will prove useful to people to fight off a traffic-generating road-scheme, an airport extension or a massive aggregate quarry. Since Jay is one of the co-writers of the TV series *Yes Minister*, it comes as no surprise to discover that he is very good at identifying the weak points of bureaucrats and dignitaries and suggesting how to get the better of them through every kind of ingenious subterfuge.

Rather too ingenious for my taste. In the preface to his book he states: "I felt that the book would be more widely useful if it included examples from the smaller type of protest. And I had a remarkable piece of luck: a cement manufacturer put in an application that had devastating implications for my own village." How fortunate! "I did not organise or run the resistance movement, but I strongly supported it and sent them a copy of the earlier edition of this book."

The protesters duly adopted Jay's handbook as their 'bible' and (according to Jay) with its help successfully fought off the cement factory, by getting the application turned down at a public inquiry. The campaign is the book's

sole case history, outlined in 17 homiletic boxes interspersed throughout the text.

So who was the greedy 'corporate giant' threatening the residents of the Somerset village of Long Sutton with such devastating implications. Lafarge? Hanson? Jay never tells us in his book.

In fact it was a partnership called HL2, consisting of Stuart Black, a local developer turned green, and Mike Farey managing director and quarry expert. Black also happens to be one of the directors of the Somerset Trust for Sustainable Development, a non-profitmaking organization which pioneered Bow Yard in Langport, a much applauded green housing project in the area. According to Black, the refusal of permission for the quarry had devastating implications for Mike Farey's business, and indeed his life, and he has now moved away from the area to work in a quarry in Lincolnshire.

As for the 'cement' they were manufacturing, it was hydraulic lime, made from blue lias stone from a local disused quarry. Many readers of BFF will know that hydraulic lime, widely used in this country up until World War II, is a sustainable alternative to Portland cement in a number of applications. It uses less energy to manufacture, reabsorbs carbon as it cures, allows buildings to breathe and enables stone or brick to be recycled more easily than when Portland is used. Most readers of Jay's book, however, will not be aware of this and Jay does absolutely nothing to inform them that the 'blue lias cement' to which he habitually refers (he never uses the word "lime") is anything different from Blue Circle Portland cement.

Builders who use hydraulic lime will also know that it is hard to get hold of: it is not manufactured in the UK and all existing supplies come from France. The transport savings to be gained from producing it in Britain, together with the other sustainable advantages, were the main reason why Stuart and Farey thought that their project to reopen the quarry would be approved.

But Jay, despite his professed opposition to projects that 'overload the transport network',

couldn't care less about any transport impacts that occur any further than a few miles from his door. He trumpets that 'The Action Committee's proof that blue lias cement was readily available from France as a viable alternative supply was one of their killer arguments.' In other words everybody between Somerset and some quarry in France where people aren't so fussy about land-based activities happening in their back yard has to put up with extra juggernauts trundling the stuff past their door, the UK building industry is deprived of a local source of a green building material, and we all have to put up with increased carbon emissions, in order to protect Mr Jay and his colleagues in Long Sutton, from the 'devastating implications' for their village.

So what are these devastating implications? One can sympathize with the locals' concern that the developers were planning to operate the kiln 24 hours a day, in order to save energy; but this is something the appeal Inspector could have regulated through conditions. The quarry lies a mile away from Long Sutton, and the application did not propose extending it beyond its original size. The closest neighbour is an isolated pub on an A road, 300 metres from the proposed kiln, whose newly installed landlord was the instigator of the campaign against the quarry. The name of the pub, believe it or not, is *The Lime Kiln!*

Well, if you buy a pub of that name close to a quarry with a valid extraction licence then what do you expect? And if you move in and buy a house in a village constructed largely of blue lias and lime, isn't it a bit rich to object to the reopening of the quarry which in all probability supplied the materials for your house? And rich in more senses than one. £50,000 knocked off the value of houses in Long Sutton is actually just what is needed to allow local people to buy or to build theirs. Jay's nimbies come out of the book looking, not like local heroes standing up to a corporate Goliath, but more like the small-minded, selfish sort of people who move to the country and complain about chickens.

Simon

Not in Our Backyard,
by Anthony Jay, White Ladder Press, 2005

building
magazine

Winter 2005/6 15



Above: passive house in Hohenstein
Building contractor and architect: Schwörer Haus GmbH

MOST of my experience of the 'passive house' style of building was gained at ProKlima, a public-private climate-protection fund operating in Hanover. I worked on the preparation of bids and budgets for EU-funded projects, and wrote technical translations for both ProKlima and the Passiv Haus (Passive House) Institute. I also represented ProKlima at trade fairs, informing people about the advantages of passive houses.

I encountered lots scepticism about the ability of passive house to use little or no energy when we displayed the system at shows such as last year during the "Week of the Environment" fair in Bonn, Germany (June 2004). This showcased innovative renewable energy and energy efficiency technology, and accompanied the international renewables 2004 conference. We explained the passive house concept to a varied, audience including engineers, conference delegates

the general public and even schoolchildren. We talked with people from around the world (Germany, France, Slovenia, South Africa, China, etc.). With a bit of patience and good humour, we convincingly demonstrated the benefits of passive house technologies, such as ventilation systems with high efficiency heat exchangers, triple-

"How can a comfortable house possibly be built without a conventional heating system?"

glazed windows and mega insulation.

I first encountered the passive house concept through a long series of coincidences. I've always had an interest in green technologies, but no idea of how to get involved or where to find work. Indeed, I really questioned my chances of entering the field. Despite trying my hand at mechanical engineering for a year and a half, I

Initially, people are sceptical about the passive house concept. However, once the basic tenets of the concept are explained, doubt is usually replaced by hesitant interest and further questions. People are often amazed by what is actually possible today in terms of highly energy efficient homes.

Peter Cox reports



ended up reading political science and history at the undergrad level at home in Vancouver, Canada. Still, out of interest, I went to the EXPO 2000 World Exposition in Hanover. With most of the pavilions having very long queues, I came across a bamboo structure without walls, open to all visitors. Built by ZERI, the Zero Emissions Research Initiative (formed by Gunter Pauli, founder of the Ecover soap company), it reawakened my interest in possible ways of reducing our impact on the planet. I would find out two years later that ProKlima and



the Passive House Institute were also present at EXPO 2000, presenting a row of terraced houses built to the

Passivhaus



passive house standard.

Spurred on by the ideas I had encountered at the ZERI stand, I searched for an appropriate postgraduate course to further my studies and gain entry to the wide field of green technology. Before starting the master's course in Environmental and Energy Management at the University of Twente (Enschede, the Netherlands), I spent the summer of 2002 as a trainee at a small wind-farm development firm in Hanover, Windwärts.

It was whilst at Windwärts that I first heard of ProKlima and the work they were doing in the city of Hanover. Formed in 1998 by the city of Hanover and Hanover's energy supply company, the Stadtwerke Hannover, ProKlima has a yearly budget of 5 million Euros. Largely funded by the Stadtwerke Hanover, a widespread support program for old

buildings was brought into existence.

At present, over 2000 applications for insulation measures, efficient house technology, quality testing, etc. are dealt with each year within the framework of this program. Over half the budget is spent in support of homeowners renovating their homes to efficiency standards beyond those required by German regulations. In some cases, buildings have even been renovated to the passive house standard. Smaller portions are spent on renovating schools and sporting facilities, as well as installing solar energy systems (both PV and solar thermal plants). With this in mind, I decided to return to Hanover, Germany in April 2003 to write my thesis at ProKlima.

I initially had plans to research the Hanover region's building stock in order to calculate the potential for energy savings. However, I was soon

asked to investigate the possibility of installing a new kind of biogas plant (production, upgrading and direct feed-in to the natural gas grid) in the region. After an extended research phase, I reached the conclusion that the project could possibly break even under ideal conditions. Asked to stay on at ProKlima as a consultant, I spent several months looking at further biogas plant options. However, once the project was dropped due to a lack of interest at the Stadtwerke Hannover, I was asked to work full-time on ProKlima's passive house activities. As I mentioned before, it really was a long series of coincidences that finally led to my involvement with passive houses.

When I first arrived at ProKlima, I had absolutely no idea what a passive house entailed. I'd heard of them, but that was about it. As I was writing my thesis, I found out more about

Passive houses in Freiburg.
Architect: Meinhard Hansen.

the concept and the possibilities for change that it presented. The idea was first formed in the late eighties by Dr. Wolfgang Feist (founder of the Passive House Institute, in Darmstadt, Germany) and Professor Bo Adamson of Lund University (Sweden).

ProKlima had first got involved with passive houses in a big way when it built 32 terraced houses for the EXPO 2000. As part of the EU-sponsored Thermie Programme's CEPHEUS (Cost Efficient Passive Houses as European Standards) research project, Hanover aimed to prove the viability of the concept on a larger scale, along with cities in Austria, Sweden, Switzerland and France. Long-term measurement campaigns over a full year clearly showed the complete success of the concept (reports, some in English, are available from both the Passive House Institute and ProKlima). The realisation of several thousand buildings (at last count, over 6,000) to the passive house standard, are a clear indication that the passive house standard belongs to the state of the art for new energy efficient buildings.

So, what is a passive house? To quote the Passive House Institute's material, passive houses "are buildings in which the space heat requirement is reduced by means of passive measures to the point at which there is no longer any need for a conventional heating system; the air supply system essentially suffices to distribute the remaining heat requirement." The standard measuring stick for a passive house's space heat requirement is 15kWh/m²a. Essentially, this is a factor ten improvement on the typical German house, and an 80% improvement on the 1995 German Thermal Insulation Ordinance for new homes. Numbers aside, a passive house also represents a marked improvement in the level of comfort experienced by homeowners and a dramatic reduction in their energy bills.



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Above: Velox Factor 10+ houses
 Builder: Dieter Tscharf tscharfd@aon.at

Wohnen & Arbeiten – Living & Working Case Study

Having said this, you may be wondering how a passive house differs from a normal house. What are the changes involved, what are the technologies required? Building to the passive house standard means optimizing the following key components of a house: the building envelope, the windows and the automatic ventilation system seem to be required for hygienic reasons. These key components are refined to a point where their combined efficiencies cancel the need for a conventional heating system. The extra costs of these more efficient components are compensated by the fact that an oil, gas or electrical heating system is no longer necessary.

The building envelope must be exceptionally good, eliminating all thermal bridges and air leakages. In addition, insulation must reach certain minimum requirements. The automatic ventilation system provides all passive houses with a continuous, but precisely regulated, supply of fresh air. To warm the incoming fresh air, a high efficiency heat exchanger transfers the heat from the extracted indoor air (usually coming from the kitchen and bathrooms). These airflows are not mixed, and a small heating element is used for those rare cold days when additional heat is necessary.

As their name implies, passive houses are solar houses. With the windows being carefully dimensioned to provide the necessary daylight, the incoming solar energy covers roughly a third of the passive house's heat demand. Triple-glazed and super-insulated windows are therefore necessary, as they allow in more solar heat than they lose. The main glazing should be south facing in order to maximise the passive solar benefits.

As I mentioned above, the passive house standard is being achieved by a growing number of new-build homes around the world. It is necessary to

Next year sees the completion of a 12-year project to turn Freiburg's Vauban quarter (formerly French military barracks) into one of the most ecologically innovative housing developments in Germany. In addition to a dramatic reduction in the use of cars within the high-density quarter and a requirement that all housing be built to a low energy standard, private building groups and co-operatives built most of the new housing. It could be argued that the most innovative development in the Vauban quarter is the "Wohnen & Arbeiten" (Living & Working) passive house.

consideration').

Although building to the Passive House standard increased the construction costs by 7% when compared with a typical residential building of the same type, the group have been able to achieve a scientifically documented 79% reduction in primary energy use (all heating plus electricity). The extra construction costs should be amortised in 10-20 years. Most importantly for the residents, no sacrifices were made in terms of living comfort.

In addition to the usual measures inherent to a passive house (air-tightness,



As one of the first private building groups, it formed in 1995, and was led by the architect Michael Gies and the biologist Joerg Lange. With the additional help of the engineer Martin Ufheil (Fraunhofer Institute for Solar Energy systems), they aimed to build the first-ever multiple-family passive house. The initial plans also foresaw the implementation of vacuum toilets, a central biogas reactor to treat the so-called black water (urine and excrement) and provide the building with cooking gas, and an ecological sewage treatment system. After three years of planning, 1999 saw the group go ahead with the construction of a four-storey, 20 unit, multiple-family passive house with vacuum toilets and the treatment system (the biogas plant is still 'under

very high insulation, triple-glazing, no thermal bridges, fresh air ventilation system with heat recovery), the group decided to add a small (14.5kW) natural gas-fired combined heat and power plant, solar thermal collectors (50m²) and solar PV panels (3.1kW peak) to cover the remaining heating and electricity requirements.

Architecturally, the building uses a concrete skeleton in combination with wood-framed outer walls. The south-facing wall is 70% glazing, whilst the remaining three walls only have 20% glazing.

The end result is a residential building with space heating requirements of 15 kWh/m²a and a total primary energy requirement of less than 100 kWh/m²a.

Passivhaus

rethink the way we build and bring in these new standards for buildings in order to deal with the constantly increasing energy costs and the increasing demands for comfort from tenants, as well as to secure the long-term value of the buildings.

Peter Cox

Birth of the passivhaus

Dr. Wolfgang Feist founded the Passive House Institute in 1996 in order to further the propagation of highly efficient passive house buildings. It also functions as a certification Institute, testing the various technologies inherent to passive houses.

The passive house was developed in cooperation with Professor Bo Adamson of Lund University (Sweden). Their motivation was to find a solution that was at the same time comfortable, energy efficient and cost effective. The low energy prices at the time (late eighties, early nineties) meant that the saved energy costs could never cover the additional investments required. Therefore, the key idea was to reduce the energy demand so much that the necessary HVAC technology would be dramatically simplified. This results in a reduction of the investment costs.

Comfort was a main motivator, for the simple fact that people do not wish to live in uncomfortable houses. Cost effectiveness was also an important factor; no one wants to pay more. Finally, energy efficiency was obviously important to the concept, even if the majority of the people haven't accepted or understood this yet. However, now that the energy prices have so clearly increased, and threaten to go even higher, it is gradually becoming clear why we must use energy more efficiently. The fact that energy resource scarcity can be a source of conflicts is also clear. In addition, as Tony Blair himself has made very clear lately, a reduction in our use of fossil fuels as a source of energy is important if we want to limit "global warming".

The development of the passive house standard was based upon a variety of experiences and theories. There was already the experience of the successful construction of low energy houses (publications from Adamson in Sweden, Feist in Germany). These houses were used to validate the calculation and simulation methods. They simulated the first houses completely on the computer before building them. There was also an extensive pre-construction research project, financed by the Hessian Ministry of the Economy.

Although no one claims to have yet built a true passive house in England, the "BedZED" houses by the architect Bill Dunster are in principle passive houses – even if he doesn't name them as such (...that's probably due to trademark reasons; the passive house is not protected, everybody can build passive houses, it's a group designation people can use freely).

The construction of passive houses expanded very gradually after the first pilot buildings: Darmstadt in 1991, Stuttgart in 1993, Naumburg, Wiesbaden, and Cologne in 1997, the first houses in Austria in 2000, Sweden in 2001. First projects in Italy (southern Tyrol) in 2002, the first house in the US in 2003, Ireland in 2005, and soon the first house in South Korea!

The knowledge and experience gathered so far must be passed on, and the know-how must be learned. The expansion therefore requires a certain period of time – largely because almost everyone is convinced that such a building, a) simply cannot function, b) probably leads to "frozen" inhabitants, and c) when a + b don't occur, it's all certainly far too expensive. This was also the general opinion in Germany, until we proved the opposite. Interestingly, it's the same experience we've made everywhere: One requires a lot of stamina in order to render such an innovation reality.

Further reading and internet links:

CEPHEUS: Living Comfort without Heating. Ed. Helmut Krapmeier, Eckart Droessler. Vienna: Springer, 2001

CEPHEUS-Project Information No. 36: Final Technical Report. Dr. Wolfgang Feist et al. Hannover: enercity, 2001

Passive House Institute (a selection of pages in English): www.passiv.de

"Wohnen & Arbeiten" (a few pages in English): www.passivhaus-vauban.de



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"The Building Centre believes that our children and our children's children deserve better. We must use industry and technology to solve problems: not create them. That is why we have set up this special exhibition area which will continually highlight manufacturers and products that offer that better, safer, future" Paul Hyett, Chairman RyderHKS, Past President RIBA.

The Eco Zone gallery is designed to encourage specifiers to select products and materials from manufacturers who have adopted environmentally responsible facility management policies.

"We are the first generation to knowingly hand the planet to our children in a worse condition than we inherited it... we cannot go on like this. Time is running out" says Paul Hyett.

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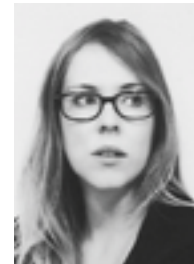
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Sustaining our tower blocks



There's a new enthusiasm for 'homes in the sky', and a growing imperative to reclaim our existing tower blocks. In our current climate of urgent and growing housing needs, where else can you find this level of housing density treading such a small ecological footprint on inner city sites? **Prashant Kapoor** and **Alison Hand** report...



A wind-swept block with boarded up shops? Provision of appropriate social amenities in or around the block can be critical to its success:

- A place for residents to 'drop in for a chat' – particularly desirable for elderly residents.
- A venue for some of the 'sheltered' services in the block, such as health related consultations.

Public areas in tower blocks typically have a bad reputation and an unwelcoming atmosphere. Improving the lobby area can drastically reinvent the overall image of the block:

- Specify materials and fittings that are easy to clean, maintain, and replace.
- Identify and remove barriers to access for people with disabilities, parents with children and the elderly.
- Consider re-planning or extending to create a more welcoming and accessible building.

The performance of tower block lifts has such an impact on the quality and accessibility of the high-rise environment:

- Refurbish the existing lift cars with improved controls and lighting and a regular cleaning programme.
- Look at radical solutions where the lift cars are prohibitively small: installing larger lifts; enlarging or creating new lift shafts; even installing new lifts externally.

Even basic modifications can greatly improve access for people with disabilities. Lower floors are often unpopular for living spaces; potentially these could be converted into communal or commercial areas,

There are more than 3000 existing tall buildings across the UK waiting to be refurbished, rejuvenated, and live up to the aspirations which informed their creation: just imagine the impact of a regenerated Park Hill, rising above the city, brought back to life through the combined effort of Urban Splash, Sheffield City Council, and the residents themselves.

It may be common knowledge that it's practically impossible to get hold of a slice of Erno Goldfinger's Trellick Tower, but it's not only the big-hitter architects who are pulling in the admirers. Salford's Pendleton Estate of 30 tower blocks, thanks to heavy investment in maintenance, has an eager list of prospective tenants waiting to be interviewed for a vacant flat.

Why not just knock it down?

That's not a 'sustainable solution'! Despite the bad press, there are thriving communities living in towers; these are people's homes, and the concept of urban renewal surely relies on a sense of continuity, which means regeneration not demolition.

Do we really want to increase the amount of landfill in the UK, and waste valuable energy demolishing

the homes of over 800,000 people? We need sustainable and economically efficient solutions that meet and go beyond the Government's Sustainable Communities Plan and Decent Homes Standards.

www.sustainingtowers.org is a newly launched interactive website that addresses these very issues. The Design Guide found on the website can be used to obtain sustainable refurbishment solutions, tailored to the particular issues of a specific block. The guide also offers the all-important costs for each sustainable strategy, enabling comparisons between varying solutions.

Creating a sustainable tower block

Safety is a top priority for any community. Improved security measures can deter crime and vandalism, and therefore reduce maintenance costs. The residents' perception of security is all-important too; you can't create communities if everyone feels unsafe:

- Effective solutions include a concierge-style system, CCTV, access control, and vandal resistant doors.
- Considered external landscaping can also help create a less favourable environment for crime.

enhancing the sense of community

- Look at new ways of combining or dividing flats across the floor plan, or even between floors.
- Think environmentally – improve solar orientation, provide pleasurable spaces such as balconies and gardens.
- Select finishes with care and attention to durability, acoustics, thermal mass, and environmental impact.

One of the best ways to enrich the image of the block is of course to improve the external façade. This also enhances the thermal performance of the building, reducing running costs:

- Provide solar shading to reduce overheating, whilst increasing the size of openings to maximise solar gain.
- Enclose balconies to reduce heat loss and antisocial noise and improve the pedestrian environment with wind ‘skirting’.

Renewables

Tower blocks present a great opportunity to generate renewable energy:

- Integrate photovoltaic panels on the roof and south façade to generate electricity.
- Install wind turbines on the roof exploiting the higher winds, and creating a fantastic visual impact.
- Use solar collectors to generate hot water for pre-heating the water in centralised boilers.

Communal areas use a large proportion of the energy bill in tower blocks, as the lights remain on through the night. Heating, too, especially in the homes of the elderly residents, as they require higher temperatures to keep warm:

- Consider a range of efficient systems: Biomass (wood chip) heating; combined heating and power; solar water heating.
- Install energy efficient electrical

fittings and white goods – save 20-30% on the electricity bill!

Each person generates around half a tonne (550kg) of household waste a year, and only 20% actually gets recycled. We also consume approximately 50m³ of water each per year:

- Install low flush WCs and spray taps alongside rain and grey water recycling systems – save over 50% on the water bill!
- Initiate a sustainable waste management strategy which incorporates sorting, recycling, and composting.

Consultation

Consultation should run through the project, and not simply be an add-on. The initial contact with residents must be part of a long-term strategy:

- Aim to organise a strong and effective residents’ association that is representative of the whole community.

The association can then act as the mouthpiece for residents’ concerns, and a useful follow-up contact afterwards.



Happy residents

Creating a successful tower block very much depends on a careful allocation strategy. There is a balance to be achieved between the high-rise being a representative microcosm of the general population, and the need to protect the more vulnerable residents:

- It may be desirable to allocate families with children only to the lower floors, which lessens the time spent in the lift, and ensures proximity to the outdoor facilities
- Some blocks are now only for older residents – with the current predictions of an ageing population, this will become increasingly relevant.

Prashant Kapour and Alison Hands

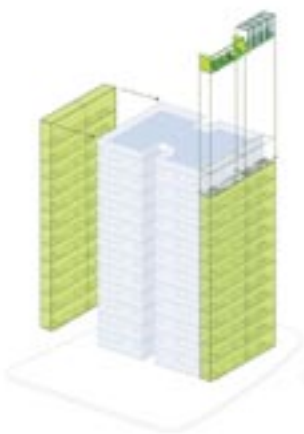
[Case study follows >>>](#)



Our tower blocks can be transformed, re-evaluated and appreciated for their fantastic space standards, their all-important environmental benefits, and, of course, for the views; ‘the once-stigmatised estates could be re-integrated into the urban fabric’

Graham Towers, The Guardian, April 2000

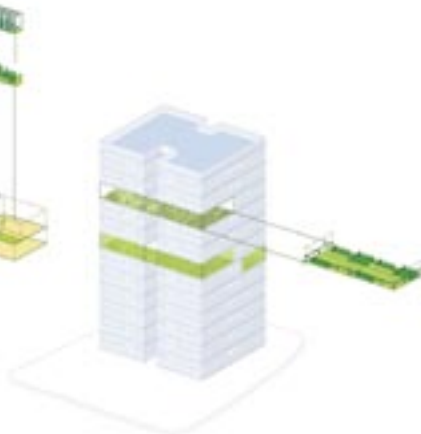
Photo: Leach Rhodes WalkerLLP Architects / LPC Ltd.



Adding garden spaces on the front of the flats in the form of enlarged balconies or conservatories



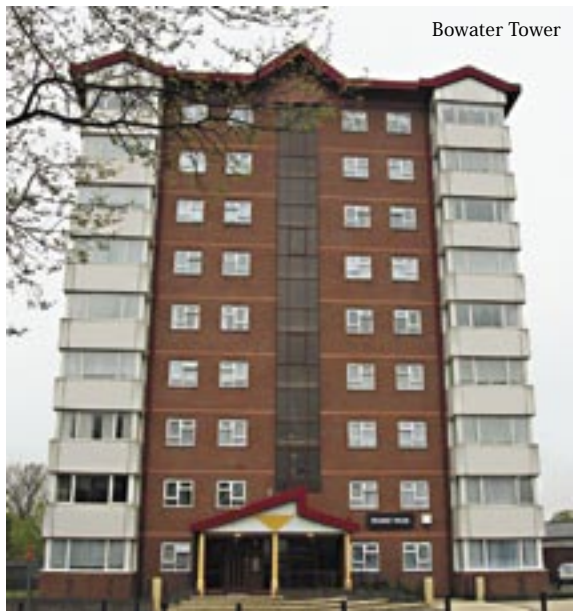
Convert areas of more generous flats, for example re-panned or duplex units, into large set-back gardens



Opening up entire floors, or sections of floors, as a series of elevated private allotments available for use by residents

Sustaining towers - case study

Bowater and Braybrook Blocks, Lyng Estate, Sandwell, West Midlands



Bowater Tower

Redevelopment plans for the 1960's Lyng Estate included the retention of three tower blocks, due to their popularity with residents, despite not having been renovated for almost 40 years. Two of the tower blocks, Bowater and Braybrook, were intended to be the council's flagship refurbishment projects, and improvements surpassed initial expectations.

Costs and funding

The positioning of the estate within a designated 'Regeneration Area' entitled it to SBR funding. Additional funding sources included MBC Capital, Advantage West Midlands, CEC (European funding), Department of Trade and Industry, and the Energy Savings Trust.

Issues and needs

Bowater and Braybrook presented few problems in terms of housing management, already having a cohesive community network. The location of the blocks means that they act as 'gateway' buildings into the town centre, and raising the standards of the existing

stock encourages private sector building.

However, the wider problems of social decline on the estate meant that a lack of security was an issue for the residents, with a maze-like layout and poor lighting contributing to this. Further issues raised included:

- Shabby paintwork and windows
- Dissatisfaction with the underfloor heating system
- Condensation and draft
- Need for wider doorways to allow wheelchair access
- * Need for a community room
- Poor acoustics

Consultation

A public meeting was held at the outset, with regular residents meetings thereafter. It was decided to move the residents out for the duration of the refurbishment of 12 - 18 months, and that they would move back to the same flat. It was important for the residents to maintain the community that had built up as many tenants had remained in the block since the 1960's.

Residents were consulted throughout on their preferences for interior finishes, and landscape design. Unfortunately, the Braybrook refurbishment was delayed due to weather conditions, which was difficult for the tenants. However, bar some minor complaints, the tenants are happy with the refurbishment works and that they have maintained the community.

Sustainability issues

The renovation of the blocks was a pilot project that aimed to demonstrate high standards of environmental improvements. These included;

- Use of renewable energy (photovoltaic panels for Bowater House and solar hot water panels for Braybrook)
- Improved daylighting by increasing window sizes
- Overcladding of buildings combined with low-energy glazed windows

Careful understanding of the social issues was crucial to ensure that the strong community was preserved. The standard of the building and flats has improved whilst the rents have not increased.

Overview of refurbishment

The external façade of the towers has been overclad with aluminium panels or re-clad with brickwork. Mineral wool insulation has been provided within a ventilated cavity over the existing tower façade. New, larger windows have been installed with low-e glass. Common areas were completed with a new lighting scheme, and a generous community room was added to the ground floor of one of the blocks.

Remodelling of kitchens and bathrooms, and the rewiring of electrics brought the flats up to 'Decent Homes Standards'. 'Secure by Design' strategies were incorporated to improve security: video door entry, enclosure of the flats' balconies, and improving the landscaping of the building approach.

Fabric and structure

The refurbishment required that repairs be made to damaged brickwork, new roof coverings be provided, and rotting timbers be repaired or replaced. After refurbishment the external walls exceed the u-value of 0.45W/m², and provide air-tightness with a target performance of 3 air changes per hour at 50 pascals.

Finishes

Floors: under floor acoustic insulation was added. PVC tiles have been used in common areas and the flats have been carpeted.

Walls: two coats of vinyl matt emulsion / wall paper /fire retardant paint.

Ceiling: two coats of vinyl matt emulsion / two coats of masonry paint / suspended ceiling.

Ventilation: Windows have trickle vents to bring in fresh air. Mechanical ventilation with heat exchangers has been installed in all flats.

Disability: All doors have been widened for wheelchair access and access ramps.

Services

Heating systems: The electric under floor heating system was replaced by gas boilers. In Braybrook, solar collectors supplement the heating and hot water requirements, resulting in energy bill savings of approximately 60% on each resident.

Security systems: CCTV has been installed at the main entrance, as have Intercom and door access.

Fire protection systems: Smoke detectors and one-hour fire doors have been installed.

Renewable energy: Photovoltaic panels on Bowater House to generate electricity and solar collector panels on Braybrook House to provide hot water have been installed.

Parking allocation: Each tenant has a parking space allocated close to the rear entrance.

Prashant Kapoor and Alison Hand

Thanks to Toby Gale and Chris Church from STBI and Pixie Tan from Franklin Andrews.

Prashant Kapoor from Price & Myers Sustainability and Catherine Harrington and Alison Hand from Architype highlight some of the best practice ideas to be found at:

www.sustainingtowers.org

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Sue's current projects include the Oxford Solar City Initiative. She is a fellow of the Schumacher Society, a Freeman of the City of London, a fellow of the Royal Society of Arts and a Liberal Democrat Councillor for the Oxford ward of Wolvercote.
s.roaf@btinternet.com

Vestigial buildings?

I LOVE the internet. I am a 'googleholic'. So I looked up the word vestigial on google and it gave 14 different definitions from different sites including:

VESTIGIAL - a structure that no longer serves a useful purpose and - a degenerate part or organ more highly developed in previous generations.

I also looked up the word FOSSIL which had 29 definitions including: the remains of a living thing that has been preserved over time.

I am looking for the right word to describe tower blocks. I think vestigial is probably best for the moment, but once they are really dead they will become fossils. This relates to a regular discussion I have with Fergus Nicol which hinges on the question: "are buildings machines or living organisms?" They obviously are not inanimate! If you took a time lapse photograph of almost any building over a year it would open and close (blinds, shutters, windows), change colour (lights) and hibernate with the seasons. We can't think of the right word to describe a structure that is half inanimate and half animal; machinimal? Nah! Any good ideas gratefully received.

These reflections were brought on by a recent visit to Manchester with around 30 architects I started university with there 35 years ago. Great trip and the highlight was a tour by Ian Simpson around his recent buildings (thank you Ian), and yes - you may have guessed - a look at his 48 storey glass tower. 45 floors of tower sit on a 3 storey podium and base. It will have 200 sky apartments and a 285 room Hilton hotel beneath. The big debate about this building, according to the 'Architectural Review', is apparently 'where to put tall towers in historic cities'. My answer would be, from now on, nowhere.

We simply cannot afford tall buildings any more. Many of the reasons why (eg. sky high energy consumption for running and maintenance and chronic impact on street level climates) are clearly stated in my (*et. al*) recent book - 'Adapting Buildings and Cities for Climate Change'² but I think of more good reasons on a regular basis. How about:

Solar rights

What was the use of spending £4.2 million to clad the Grade II listed, 25 storey CIS tower in Manchester with solar panels to generate green electricity when a tower block is then built to the south of it blocking out its sun for part of the year?³

Fire safety

In the good old days you could build tower blocks from floor slab to floor slab with the cold bridging floor slab protruding. Now for thermal performance you cannot do that so the external cladding has to be fixed about 20cms out from the slab and the gap filled with fire proof material. This detailing destroys the traditional fire compartmentalisation of the building and in the case of a strong hot fire it may well cause the filling material to slump and fall, causing the fire to spread rapidly up the inside of the outer wall (like a chimney).

This potential to breach Fire Safety Regulations does not seem to have been picked up by some building regulations inspectors let alone building occupants. 9/11 also ended our belief that you could have phased evacuation from tall buildings. The efficacy of pressurised staircases as a smoke spread prevention measure is increasingly questioned as people find that the pressure in the stair wells is destroyed when more than two or three doors are open. So we need to ask ourselves, "are

tall buildings with such a performance safe from fire?"

Water leakage

One reason that Thames Water has the highest water leakage rate in the UK is because it serves more tall buildings than any other water utility. Many of London's tall buildings are council tower blocks and Thames Water pumps water to their top floors under a much higher pressure than it would need for three and four story buildings. The higher the pressure in a pipe the more water is forced out of any leak-holes in it. Technically any building over five floors should have secondary pumps to take water at street level pressure to their top floors, but this is not true of most council owned towers. Will the buyers of flats in the Simpson (Beetham) tower be told about how much their water (and energy and insurance) might cost before they sign up? Is it right that all the people of Manchester or London should have to pay 10-20% more for their water bills due to increased leakage rates, so that people in towers can have a nice view? Has anyone looked into this? No wonder councils such as Birmingham, Glasgow and Sheffield are demolishing all their towers, because, perhaps they have actually done the sums.

Lifts

For buildings that are largely served by lifts you can add a rough figure of 10kWh/m²/a to their electricity running costs. If we have to reduce building running costs down to around 20/30 kWh/m²/a in total then an early decision we are going to have to make is to walk to our offices or flats. That means that buildings served by lifts will be in line for high levels of carbon tax penalties in the future.

The Beetham tower in Manchester advertised as 'a glass act'. The lack of concrete floor slabs penetrating the envelope emphasises the loss of the traditional 'compartmentalised building' so useful when complying with the fire regulations.

We are at the threshold of a new age for cities. We probably have around ten years to change the way we live before rising carbon dioxide emissions trigger irreversible climate change. We need to be building buildings that use 60-90% less energy than current standards, not buildings that use up to 10 times more. This is not only an environmental imperative but a pragmatic one. Many say that we have passed the 'peak' of our oil output and from now on we are running out of oil and gas, and this is certainly true in the UK where all our indigenous oil and gas will be gone by around 2020⁴. Some predict that by 2007 we will have the \$100 barrel of oil and by 2015 this will be \$300. Do the residents of these towers know that as prices of energy rise, the market value of their flats may be significantly reduced and they may have problems selling their properties? Have they ever considered how will they get to their flats when the power fails during extreme weather events, as it inevitably will?

Would people buy them if they had thought these things through? No one wants to end up owning a 'dog' apartment or building.

Tall buildings are already becoming vestigial, and if they are not pulled down they will become fossils over time. I think people are not engaging with the reality of the 21st century design challenge. We have already been proven right with the prediction in the 'Adapting' book that US hurricanes would become catastrophic and many people would not get out when they hit major cities, it happened in New Orleans. In the same way, in time, the lights will go out in UK major cities, and every new tall building will hasten that time by using more than their fair share of scarce and valuable energy. You can't make a tall

building 'green' by hanging a few window boxes on the balcony on the fifteenth floor. How could this compensate for the huge energy penalty of the building's lifts alone? There is no such thing as a 'green tower'. Planners should be spending their time writing 'Solar Rights Ordinances' for their towns⁵, keeping all new buildings down in the urban canopy, ensuring that the buildings they give permission for can comply with building regulations and making sure that all new buildings have a good proportion of their energy needs met by renewable energy. How else are we going to survive?

I hope some of you will go along and ask some of these questions at the 'Talking Tall' buildings conference in Manchester on 7th December 2005⁶ where the 'mines bigger than yours' boys will congregate.

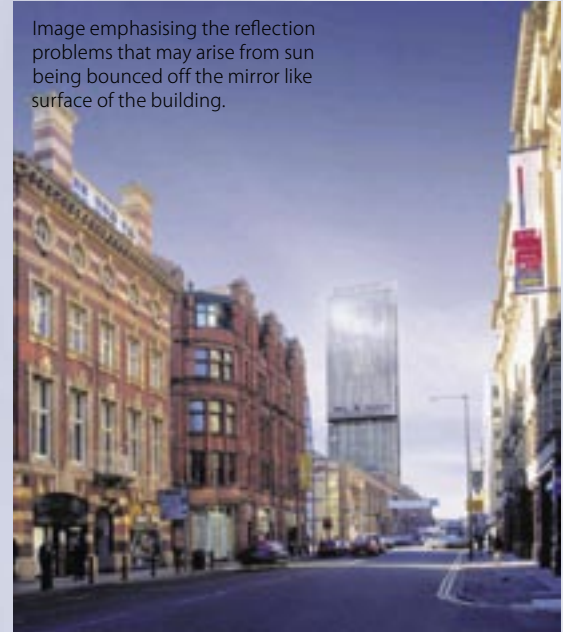
Building owners and occupiers need to know the truth about these buildings, about their costs and impacts, and what about their designers? Would they still design them so tall if they knew the true costs of such buildings to the city? If the answer is yes, then is it some sort of a denial process at work? Or will people do absolutely anything for money and fame?

Sue Roaf

Refs:

- 1) www.findarticles.com/p/articles/mi_m3575/is_1287_215/ai_n6073430
- 2) Roaf, S., D. Crichton and F. Nicol (2005). Adapting buildings and cities for climate change, Architectural Press, Oxford.
- 3) www.manchesteronline.co.uk/business/general/s/158/158798_cis_towers_warm_coat.html
- 4) for all you want to know about our fossil fuel futures google: peak oil
- 5) For help with designing solar ordinances please join us at the Solar Cities Congress in April 2006. see: www.solarcities.org.uk
- 6) www.event-solutions.info/pages/event.asp?ecode=HD1036

Image emphasising the reflection problems that may arise from sun being bounced off the mirror like surface of the building.



The cladding being hung off the floor slabs, in September 2005, set against the charming redevelopment of canal side sites.



The nature



of ultimate truth



The site of a ruined coach house set within 150 acres of Sussex forestry has become the chosen place for Chithurst Buddhist Monastery's long needed new Dhamma Hall (meditation hall). The Hall is now a place where natural balance can be realised through silent meditation. Project architect, **Andrew Yeats**, outlines the development of this unique building ...

