

A walk through the Nottingham EcoHome presented by Penney Poyzer and Gil Schalom

Copy of the scripts as presented at the AECB Summit 2003 (4 & 5 July) held at the Earth Centre, Connisbrough, Near Doncaster

This presentation is our first together so we hope you don't mind being guinea pigs! We welcome questions but would be grateful if you could make a note and ask us at the end - if not, the timing might be thrown out and so will we!

Gil is an architect at Mark Stewart Architects, a practice specialising in heritage, conservation and sustainable design. Penney works as EcoTeam co-ordinator for Global Action Plan, an environmental charity.

History

We bought the house in West Bridgford Nottingham 5 years ago when we decided to move from our cottage in a village near the city to be closer to work. The house was in a run down state, having been a student house for 20 years. The landlord had not maintained it and we found quantities of damp, mould and general decay but in our naive state, we decided to buy it. It cost us £84,500.

The house has an interesting history and has been an investment property for much of its 105 years. It has been owned by the Pimms Drinks company, a couple of baronets including Sir Jesse Boot (Boots the Chemist) and local educational pioneer Dame Agnes Mellors.

The era this house reflects is one of extreme prosperity and abject poverty in Nottingham. The Victorians brought us cities, mass migration from village to industrial towns and the diseases of densely populated slums.

This house marks part of the turning point toward the rise of the middle classes and suburban living. West Bridgford was always a draw for wannabees, it was known as 'bread and lard island' because the new aspirational bourgeoisie would knuckle down on the food budget just in order to live here.

Location, location, location

The house is a 2 minute walk from a pretty section of the River Trent, 5 mins from Gil's workplace, Notts County Cricket Ground and Nottingham Forest Ground. It is a short bike ride from the train station and city centre and generally great for amenities and public transport. We were aware we were buying in an increasingly desirable area, where previous flat conversions were being bought up and restored as spacious family homes. We knew it would be a good investment even with the extra cost that an extensive and ambitious eco retrofit would bring. We saw there was added value to be gained from a large house, with room to create lodgings that would provide some return and free up cash for further work.

Our previous home though very cute was not really suitable for further development by us and commuting to the city was becoming increasingly tedious. When we saw number 9, we knew

we had found somewhere that we could develop along the ecological path we had been influenced by from at our time at Hockerton Housing Project and from Gil's former tutors, the pioneering architects, Drs Robert and Brenda Vale.

The hideous truth behind ideals and naivety

Even our first glances revealed that we had bought into a thermal slum, with the added bonus of a poor quality interior and an exterior with its damaged spalling bricks. But we bought our ideals and naivety and saw beyond all that. Had we been experienced developers we might have carried out a more cosmetic job - taken the money and run. In retrospect, in our quest for perfection, we could have made wiser investment decisions e.g. not spent so much on triple glazed doors, but it was all part of the learning curve.

Gil finished his Architectural Diploma at the University of Nottingham just 10 months before the move and was working at Mark Stewart's practice as an Architectural Assistant. Architects leave college with as much knowledge of real architecture as a newly qualified driver has of road sense.

What we both knew we wanted was our new home to be a good example of eco retrofit, with every element as good as we could make it. We wanted to experiment with low impact materials and to apply the lessons we had learned from the Vales and HHP rural new builds - to an urban retrofit project. Our aim was to turn one of the worst performing buildings into one of the best.

Our priorities

Upgrade thermal performance: Insulate as highly as poss/pract
 Try to retain thermal mass
 Recover heat from ventilation
 Improve air tightness

Be as autonomous as possible in: Energy
 Water
 Sewage treatment
 Food

Reduce CO2 emissions to a minimum, demonstrating that our older houses can be made energy efficient and to highlight why this is important. No matter how many new eco-houses are built if the existing housing stock isn't addressed, then overall emissions can't significantly come down.

Experiment with different low-impact materials and finishes and promote and stimulate the market in these products

Show how green design can appeal to a wider audience and be an aspirational lifestyle choice

To freely disseminate what we've learned to as wide an audience as possible - not just the converted

Not overambitious then!

Insulation

Roof

We decided that although there was still life left in it, we would re-roof for 2 reasons; install breathing waterproof membrane to give new insulation added protection, second to extend the eaves and verge so that future external insulation would meet the roof with a neat junction. It was possible to re-roof independent of the works inside. We took down the old plaster and lath walls and ceilings to expose the existing roof construction, which consisted of 2 x 3" timber rafters, which had verticals connecting to the floor forming a hybrid structure, which stabilised it. We took these verticals out which also originally formed the eaves walls to the room thereby opening up the roof void all the way down to the true eaves. We supported the rafters with new steel channels – this gave us greater floor area because we were building into the void. We formed a new substructure by adding new plywood and timber to the existing rafters. Original rafters formed the top end of a timber I beam 300mm plywood strips formed the webs and new timber battens at the base which formed lower flange, creating a 300mm deep cavity. The membrane was allowed to sag by only an inch, the strips of wood fibre board called Bitvent were cut and fixed into place an inch below the tiles creating a 300mm deep cavity into which we would blow in Warmcell insulation. Pay back for losing a bit of head height was gaining greater floor area creating wedge shaped rooms. We moved all the floorboards into one room and re-boarded remaining room with reclaimed timber. We also installed 3 skylights, one in each of the two top rooms and one at the top of the landing. These were needed to bring light into the somewhat dark attic rooms and to provide enough headroom to the lowered ceiling on the landing. We kept them small particularly on the north side so as not to compromise the insulation value of the roof too much, as we used Velux's best insulated glass ($U = 1.5$). Velux have since improved the design of their skylights to reduce cold bridging.

Velux have since improved the design of their skylights to reduce the cold bridging around the edges but at the time in 1998, we had to use what was available to us.

Acoustic Insulation

Since the intermediate supports that joined the rafters and the floor joists had been taken out, the floors needed strengthening as well, which we did by bolting plates to every second joist to stiffen it. We took the opportunity of having the floor boards up to acoustically insulate between the floor and joists. We used loose fill Rockwool which is dense so has good sound absorbing properties packed between the joists. Sandwiched between the joists and the floorboards we tried out a new product called Regupol which is a sound absorbing mat 3mm thick, made of recycled cork and rubber. This mat is particularly good for absorbing impact noise. In retrospect we should have substituted the Rockwool for sheepswool but at the time this was quite hard to come by and much more expensive - we did finally use it in the cellar - more of that later.

Flat sections of roof space and upstands

Acoustic insulation was important to us, because in a shared occupancy house, noise can be a tremendous intrusion into one's privacy.

The house is on a L shaped plan, the roof on the rear wing is a separate structure and here we

applied the same strategy as we did for the big roof. On the flat sections of each roof, we applied 400mm of Warmcell, bringing us an average U value (excluding skylights) of 0.1, which is pretty close to the values achieved at Hockerton and the Vales house. At the Vales house there is 500mm between timber I beams and at HHP they have got 300mm polystyrene plus 400mm of soil and that is all over concrete beam and block construction.

We put some upstand insulation along the gable walls to minimise the cold bridging of the walls themselves this has got limited effect on the party wall side whose overall heat loss is dependent on the level of insulation in the roof next door.

We did consider paying the neighbours next door to let us go up into their roof space and put upstand insulation against the party wall in the loft space - and who knows one day that might still happen!

Walls

This is a surprisingly vertical property despite being semi detached. It is very tall and an L shape so the external wall area is pretty substantial being around 200sqm. Added to this we had to deal with the great Victorian standard of 9" brickwork with a U value of about 2. So no cavities equals you either insulate on the inside or the outside - how do you go out about weighing up which to do? If you insulate on the inside there is a lot of disruption and it reduces the size of the rooms, (with high levels of insulation this would be significant). It would ruin the character of the rooms and we would have to redo skirtings. Technically we would be decoupling the thermal mass of the property and would still have cold bridging where the internal walls join the external wall - so it had to be external insulation.

External Insulation

The thermal mass remains intact and cold bridging is kept to a minimum and particularly for our property the damaged bricks would be protected from further weathering damage. So what is the downside? COST! It will cost us £15 - 20k to insulate with 140mm of polystyrene and proprietary render system compared to around a 10th of the cost to fill a 2" cavity - but we 'int got one.

Internal Wall Insulation

Saying all that, we decided to insulate internally on the front elevation, causing disruption, tearing down original cornicing, having plaster, paint, tile internal cills and restore cornice. Why? We have a victorian house on a Victorian street and we are semi detached, so we believed it was important to retain the brick appearance externally so the house did not stand out like a sore thumb on the street - and piss off our neighbours. We also did not want to promote an eco freako image, we wanted it to look like it was from the same planet, making eco ordinaire not extraordinaire.

We decided to go for zero ozone depleting phenolic foam backed plasterboard by Knauf. It is nasty and synthetic and not very recyclable but is twice as insulating as the equivalent air based insulation e.g. polystyrene, Rockwool, sheep's wool etc. We used two 50mm layers of this board fixed with bolts to the inside face of the wall and took special care around the reveals to eliminate cold bridging and the resulting U value is thought to be comparable to the exterior insulated wall. Because the board is quite rigid it can be sawn to angles so we were able to retain a

kind of cant corner reminiscent of the original Victorian detail. We also returned the insulation around the side-wall to minimise the cold bridging where the internal insulation ends and the external begins.

Windows

We were blessed with a legacy of really lovely UPVC windows, which were installed a short time before we bought it – presumably to aid the sale. Despite being horrible visually and environmentally they are a mixed blessing because at least they were double-glazed and reasonably well giraffe-proofed. It has been cold enough in the interim period through the winters - had we still had the original single glazed sashes it would have been unbearable – for visitors it was anyway but it is amazing what your body can adapt to – specially for Mediterranean boy here! We took out 3 UPVC windows – one of which we were able to sell on, the others were chopped down to reduce volume and were sent to landfill because we had no choice. The glass units were taken out for later use. In their place we installed timber Eco Plus windows by the Green Building Store. Because we have a north facing rear garden we felt connection to the outside was very important and so paradoxically for an eco house we installed 2 sets of north facing French windows. Because of this dilemma we felt it was important to go for the maximum insulation values for the glass and we opted for triple glazed, krypton filled i plus coated panes with a stated U value of 0.6 (3 times better than the solid brick walls they currently sit in!) We actually get condensation on the outside of the glass....At the time there was no option of thermally broken glazing spacers so the edge factor is very significant and raises the overall U value considerably.

Nowadays we would have opted for the I plus double glazing with thermally broken spacers with a U value of 1.1. The frames were stained with OS colour, which is a vegetable based semi-transparent stain. We have had mixed success with it in certain places it has displayed mould growth but the plus side is it is easy to re-coat as it needs no sanding.

The two new bathroom windows are from the same supplier but because of their small size and location we opted for oak frames. In retrospect this was probably an extravagance as they are well sheltered under the extended eaves. They have the standard I plus double glazing units. We replaced the windows as part of major works, when we removed the old student first floor kitchen, divided the room in two and put in 2 bathrooms. The hole in the wall was like that for a week while the new openings were formed – in the middle of a freezing cold November – so let that be a lesson to you kids – don't renovate it in winter and live in it at the same time!

The rest of the windows will need replacing with insulating panes but it's still a real dilemma as to whether to put up with their horrible appearance and anti-eco image and just change the glass, or to rip them out and send them to landfill, replacing them with nice high performance timber. Whatever we do – the front door has to go! We'd like to install an outer door to form a small passive solar draught lobby – one of the great features of the house is the excellent south facing aspect but it does vary in temperature quite considerably front to back because of its cellular layout. The theory is that once the super-insulation is complete, this temperature differential will be evened out.

Ground floor insulation

The original construction was divided into timber ground floor above cellars in the main part of the house and solid floor in the rear wing.

The rear wing consisted of a lobby and bathroom, a former bedroom (originally the kitchen) and a step down into a kind of scullery/ utility. Because of this level change and the damp uninsulated limecrete and quarry tile floor we decided to excavate down sufficiently to insulate with 150mm polystyrene with 50mm upstands and lay a concrete slab matching the lower of the two original levels. Onto this we laid random Cornish slate which is about a third of the price of Welsh but much trickier to lay.

The suspended floors were originally underdrawn with timber lath and plaster which was hacked back and then left for 3 years so that we could really experience the meaning of draft.

We currently have in our possession all the insulation we need for this floor. The trouble is, we haven't got round to installing it yet and it's sitting in storage in what is now a warehouse but was until recently our beautiful lounge.

We'll be installing 100mm Thermafleece sheepswool insulation between the joists and 60mm Gutex wood fibre boards. Additionally, to reduce the cold bridge edge factor we'll fix a 3-400mm downstand of Gutex and left-over polystyrene along all walls.

Air tightness

When insulating above a certain level, it is essential to consider air tightness to minimise the amount of infiltration, or unwanted leakage through gaps, cracks and construction joints.

Before we install the floor insulation itself we need to deal with air tightness we'll use a Tyvek breathing membrane which we'll staple to the underside of the floorboards and joists and sealed using butyl tape.

We did a similar thing in the roof and ensured all the windows were properly masticked in. The loft hatches have been fitted with double draught strips. It's little things like this that can make a considerable difference to the heat loss – in any house but particularly in a low energy one.

Controlled ventilation

In a new build it is easy enough to provide controlled fresh air with a whole house heat recovery mechanical ventilation system which normally extracts from the wet areas and supplies warmed fresh air to the habitable rooms.

We had to compromise because the layout of the house would have made it very difficult to install all the necessary ductwork. So we chose to install separate through-the-wall heat recovery fans in each of the four wet rooms. These have worked well enough although the humidistats, which control them have all failed at least once, so we're going to link them to a different kind of sensor. The heat recovery mode works best for well heated well insulated houses so it remains to be seen how effective they'll be but they are certain to offer savings over conventional fans or pure natural ventilation.

Renewable energy

So insulation, air tightness and heat recovery has been about reducing the energy demand of the house. The flip side is how do we supply that reduced demand in the most environmentally

benign way.

To start with, we installed a solar thermal hot water panel, mounted on the south-facing roof. It's by AES - a Findhorn company - and it's a 4 m² flat plate type. For £500 more we could have had evacuated tubes but we decided that arguably the amount of extra efficiency gained would take an age to pay for itself. Robustness was also a factor in the final choice. It has worked extremely well and has already saved us hundreds of pounds. The house is currently all electric and so the top-up water heating is supplied by economy 7. This means our pay-back period for the panel is drastically reduced over other fuels.

We would also quite like to install a couple of 1m diameter Aerodyn wind turbines mounted on specially damped poles attached to the chimneys, which we will most likely feed back to the grid. We are going to argue that they do not require planning permission as they are technically temporary structures with no foundation or bearing in the ground but this remains to be seen.

Space Heating

There was never any central heating, just direct electric plug-in radiators, which we have continued to use in the interim period. This has been so costly (with yearly electricity bills of £12-1300) that in winter we have to actually heat one room at a time and wrap up in blankets and jumpers a lot. While we are on a green tariff with Unit E, and did intend, even on completion to carry on using electric heating as top up, we have come to realise that electricity for heating doesn't really make environmental sense because it's so inefficient to produce - even on a green tariff. Also, if you spend that much on insulation you don't really want to be paying continuously for the high costs of electricity to heat the place, albeit at much reduced demand.

We had also hoped that we could get away without central heating because of all the insulation and while this is still marginal we have now opted to install some. The heat load without the window upgrade but with all the other insulation in place has recently been calculated at 10 kW which for a large house with high ceilings is excellent (approx. 55 W/m² of floor area) and probably four or five times better than before. Still, it's at that awkward size where it's too much for a single wood-burning stove and back boiler to cope with. It really forced us to consider what our actual priorities were. We didn't want to use electricity, which would be by far the cheapest system to install, and we decided that CO₂ minimisation was our main objective, so we ruled out gas. We eventually opted for an efficient wood-burning boiler, which will live in the cellar. It's a Topolino and will be accompanied by a 1400 litre heat store, which we will need to cope with part loadings. Both will be supplied and installed by BioEnergy who are biomass plant specialists. Although this is the most expensive option to have chosen, what swayed us in favour was two government grants totalling £3500 towards the final bill. The new Clearskies grant and the now expired New Energy Foundation grants were an excellent incentive and reduce the overall installation costs by 20%. The other great thing for us about a wood-burning boiler, which incidentally complies with the Clean Air Act as we are in a smokeless zone, is that we become directly responsible for sourcing, storing and loading the fuel which provides us with heat so we become more self sufficient and more aware of the true cost of comfort.

Saving Water

We wanted to install a rainwater recovery system but the question was where. We needed 2000 litres of storage capacity and it is usual to bury a recycled orange juice vat in the ground and strap it down to a concrete raft to stop the water table pushing it back up. Our garden

isn't very big and we also wanted the system to be seen as an educational tool and to inspire others. We were also keen on the idea of a composting toilet but needed somewhere to site it. The rear cellar chamber beneath the kitchen was the perfect place to site both but was only accessible via a small hole in the brickwork. So we formed a new opening, dug out 400mm of soil and laid what was effectively a concrete trough to provide a base and restrain the foundations. Despite this unforeseen cost, we have ended up with a chamber which is one of the main talking points of the numerous house tours we regularly conduct. The water is stored in two oblong tanks normally used for storing oil, which had to be that shape because we had to manoeuvre them into the cellar via the main access door and narrow corridor. The rainwater harvesting kit is by WISY and was from the Green Shop near Stroud. The downpipes which collect water from the roof were fitted with filter/ diverters which filter out leaves and grit and divert the rainwater to the storage in the cellar. From here, the water is pumped directly upto the appliances requiring it, which in our case are the washing machine, WCs and the outside tap. This process is automatic and only requires us to flush the loo or turn the tap on in the usual way. We don't drink it or bathe in it as we can't collect sufficient to cover us for those uses - it's all down to the size of your roof, which in our case is small relative to the volume of the house - a bungalow could collect more. The tanks are fitted with a level sensor which tells the controller when we're running low. The controller then activates an automatic rainwater top-up device which means we never actually run dry. We have a total of three water meters at different points in the system, which allow us to calculate the proportion of rainwater used and this has averaged out at around 30% of the total - we were hoping for 50% but the limited roof area and the fact that we still have a thirsty washing machine may be factors affecting the final figure - it's difficult to know for sure. The system doesn't save us much money but with water shortage predicted to be an increasing problem in years to come we may experience a rise in the cost of water which will make systems like these appeal to a wider market. We thought we'd get there early to avoid the rush.

Our WCs are the Swedish low flush type by Ifo, supplied by Elemental Solutions and flush at 4 litres full flush and 2 litres for half. Compared to the old imperial 9 litre cisterns in place originally we save thousands of litres a year.

Composting Toilet system

The idea of a composting toilet appealed to us not just because we'd be reducing the amount of effluent discharged to the mains sewer but also because it meant we could control what happened to it and process it on site. Once it leaves the house, you can't be sure what happens to it and while it's one thing to campaign for more ecological central processing we felt it was important to do more than just accept a wholesale throughput of nutrients which could quite realistically be fed back into the soil at a local level. We originally wanted to be off the mains sewer entirely but because of the small size of the garden there wasn't enough room for a reedbed, soakaway and willow plantation. We also weren't too keen on the dry toilets we had seen as they represent too much of a leap away from 'normality' - while we could have got used to them, we figured that as we were in the business of trying to sell sustainability to a wider audience, dry toilets wouldn't do much for our cause. So we opted for a hybrid system designed by the boys at Elemental Solutions. It consists of the relatively normal-to-use low flush loos which discharge into an ingenious device called an Aquatron separator. This is basically a plastic centrifuge with a highly engineered shape which allows the liquids to cling to the edges and then discharge to the mains drain while the solids pass right through the centre into the composting chamber below. The chamber is made of engineering brick and concrete and has a raised gridded and netted floor internally which keeps the compost dry and allows any small

amounts of liquid to collect beneath. This liquid is pumped out - a quick operation which takes about 5 minutes every month. Other maintenance consists of the occasional raking of the compost, adding lime mixture and sawdust, and cleaning out of the Aquatron. After a few teething problems mainly regarding the maintenance aspect - for the first few months we tried to pump out the excess liquid using a manual bilge pump (too labour intensive) - it now works really well and we still haven't had to empty it after 4 years.

Plumbing & rainwater goods

We were keen to avoid PVC throughout the construction and so for the waste pipework we chose Geberit polypropylene which is highly recyclable (even in England). It is used a lot in laboratory fitouts and is joined together using a unique solvent-free electroweld system making it far more sturdy than pvc. Unfortunately, it's three times the price. We opted for copper for the rainwater goods, mainly for the appearance but also because it has a mild disinfecting effect on the water before it enters the tanks. Inevitably, most alternatives to pvc are more expensive but they also have additional benefits above the purely environmental.

Electrics

For the electrics, we chose low smoke fume cabling which performs better in fire but the electrician didn't like it because it wasn't as flexible. If it's not one thing it's another.

Finishes

We wanted to experiment with different finishes and materials from the eco market. In the bathrooms we used Claytec boards from Construction Resources instead of plasterboard. These are inch thick boards made of clay, reed and hessian and are finished with a clay skim. They are highly breathable, hygroscopic and have a good thermal mass. On the downside, they are expensive, and delicate compared to conventional plasterboard and skim, with extra care needed when attaching fixings. On the whole though, we are very pleased with them - they are particularly suited to bathrooms because they moderate moisture and smells and make for a very soft and clean atmosphere.

In other areas we used Claytec backing plaster and various mixes and applications of Tierrafino - a self-coloured finishing plaster based on coloured sands and clay. It comes in a few different colours which can be mixed together to form new shades. It can be trowelled smooth or sponged for a more textured grainy finish. Both finishes are very beautiful but the latter is a little fragile. In the large room, recently completed, we used a mixture of grey and white with an additive of mother of pearl powder (a waste product of the fishing industry) which gives it a rather enchanting sparkle. This is our most successful use of the material so far. The fact that you don't have to paint it also saves a bit of time and money.

There were extensive areas which did need painting and again, we tried paints from about half a dozen different manufacturers all with their advantages and disadvantages. Auro was our favourite gloss paint, with fully declared plant and mineral ingredients and one of the strictest environmental policies in Europe, but the colours are somewhat limited.

To prep the walls, we stripped back all the old layers of wallpaper and painted directly onto the plaster. This was to maximise the effectiveness of the thermal mass and to maximise breathability. For the walls, Green Paints, based on modified soya oil in a water-based carrier,

offered the best range of colour because they do a paint matching service, albeit the pigments are petrochemical based. Probably the greenest wall paints are caesein, from Nutshell or Construction Resources. These come in powder form (so you're not transporting the water) which you mix up like cake mixture. The pigments are sold separately, also in sachets of powder - the more you add, the more intense the colour. Using it is disconcerting at first because it's transparent when wet so you think this isn't covering, but as it dries it pulls together and becomes opaque. It is so non-toxic that the packet actually claims you can sleep in a painted room on the same night. The downside is that it is labour intensive and for a bare plaster wall needs about four or five coats to cover properly. It's also a little soft with not much scratch or wipe resistance but you can improve its robustness with a coat of glaze, particularly useful in bathrooms and kitchens. The other drawback is that once mixed, the activated milk protein goes off like food, so setting aside spare mixture for touching up is a problem. We tried freezing some but it turned into a curdled mess. Our current favourite paint is a natural emulsion from Natural Building Technologies which has a pleasant citrus smell and is very similar to conventional paint to use. Powder pigments can also be added to the white base and there is also a low-titanium version which doesn't cover well by itself but actually produces more vivid colours when pigment is added.

Floor coverings

One of the first things we did was get rid of the mangy carpets which covered the entire house. To our delight, we discovered a stunning Minton tile floor in the hallway which only needed minor repairs and patching. We used a linseed oil sealer to protect it. We've already mentioned the Cornish slate used on the solid ground floor at the back, and the rest of the floors were timber. Whatever you do, don't do what we did and sand the floors as one of the first jobs - the kitchen particularly took a hammering and is ready for another sanding. To coat the sanded floorboards we obviously had to avoid polyurethane or other synthetic seals. We tried two coatings - Livos liquid wax which gave us a lovely warm honey colour, and OS Colour Hard Wax Oil which we tried in clear and semi-transparent white. The latter needs to be applied in very thin layers with a cloth. If it goes on too thickly some areas end up more transparent than others, but generally the results were good.

In the bathrooms we laid Marmoleum lino, a traditional hard wearing sheet covering based on linseed oil and other natural ingredients. It's widely used for contract flooring so we were confident of its credentials from the start - and what a great, easily available alternative to vinyl, and available in a decent range of colours.

The two main flights of stairs and first floor landing get a lot of foot traffic and were quite noisy so we covered them in sisal - the most hard wearing of the woven grass carpets, which also has a natural latex backing. We had to specify sustainably sourced plywood underboarding and water-based adhesive as special items - so take care when ordering it. Penney finds it quite harsh walking

Furnishings

When it comes to furniture, we are funky chicks, liking a bit of the old designer mojo and we do enjoy checking out nice bits of furniture and lusting after them. However not all good design is eco friendly and reusing furniture, getting it second hand is much more sustainable. However, there are times when a new item such as a bed or sofa (to meet fire regs etc) is the most sensible option.

In the past we have taken the IKEA drug and bought a chest of drawers or groovy kitchenalia, but we came to realise how important it was to try and buy second-hand, good quality mind!

Kitchen

Our lodgers kitchen is by far the most modern fitted out and we went for an IKEA model for that, choosing a beech block top made from offcuts. There is a breakfast bar made from recycled ply, covered in small ceramic tiles (English). Our kitchen is a make do affair, with the sink unit recycled from the pre-refurb, utility room. This is a hideous falling apart chipboard and Formica affair, but it does the job for the time being. This is the only bit of fitted kitchen furniture. The rest of the storage is reused or second hand. When we were going through the ripping out frenzy stage, we found an old cabinet in the back lobby. The front was covered in thin ply which we removed and found nicely detailed door frames with openings for glazing. We stripped off the gloss paint and put in sand blasted glass et voila stylish wall cabinet. Our main storage is a large Victorian bookcase in two halves which we got for around £800 we have been offered £3,000 by a dealer, so not a bad investment. The only work surface is a Victorian pitch pine 6ft table which I have had for many years – this also is where the hob lives so I have about 0.75 sq. metre to work on. The chairs are early Victorian, which my mum gave us.

Bedroom

At our local cattle market, we found a great old bit of church furniture - a wardrobe used for surplices. We had this stripped which revealed beautiful carved gothic arches on the 5 doors. Again a lovely antique. We have 3 chest of drawers, 1 from a junk shop, one restored by my step-dad as a gift many years ago and a nasty IKEA job. The bed is new from Habitat and the timber is glue laminated oak from managed European forests.

Sitting room

We opted to go for a sofa bed and a chaise. They are on beech frames, filled with feathers and covered in unbleached linen. Other furniture includes a massive table and cabinet made from driftwood purchased at Glastonbury. Other bits and bobs round the house include another Victorian pine table, a couple of armchairs donated by a friend and a futon dragged from a skip by our mate Nigel.

Interior design

We wanted our house to scream style darlings. We wanted the first impression to be 'ooh, nice house' rather than it being overtly eco freako. We are getting there. By using the paints and finishes Gil describes, we have serene white walls balanced with in your face hot colour in some areas and subtle shades elsewhere. Natural pigments are so flexible because you mix the intensity you want, so they actually allow for greater creativity. We have been careful about lighting, using low energy bulbs wherever possible, including accent lighting. On the first landing, we have used 3 x 60mm circular mirrors on an angled wall to bounce light into a dark space. In our shower room we designed a Gaudi –esque curved structure which really made the most of the space. In this room we used a gorgeous pigment called ultra violet which is very like a pigment used in Provence, it has come out a sort of lavender shade. We used green glass tiles in the shower enclosure and a deep violet shade for the Marmoleum. Elsewhere we have gone for an earthier palette, using Terrafino in shades of mushroom, yellow and terracotta. We have used

white for the lightest rooms to get maximum benefit. The master bedroom feels very colonial emphasised by stripped boards and timber furniture and blinds and natural coloured ceramics for sills and hearth. The ceiling is very dramatic and glamorous being grey sprinkled with slightly sparkly mother of pearl dust mixed in with Tierrafino. We really are going for a stylish looking house to show that eco design and materials can give just a good result as petro-chemical based malarkey.

Flexible space

In the tradition of the Georgian townhouse, our home is an inherently flexible space. Each room has had and will continue to have a variety of uses. In the UK, we generally stick to the convention, living spaces downstairs, bedrooms – possibly a study upstairs. We think it unusual if people choose to have their sitting room on a first floor, or bedroom on the ground floor, because it is not conventional. It makes sense to use the biggest room as the central living space, it makes sense for a small darker and cooler room to be a bedroom, no matter what floor it is on.

If we flout convention, we are able to treat the house as a building – not just a home, where personal space and privacy is the main objective – house as castle etc. As soon as you start to look at its potential as a building then other factors can come into play. Our house is our living space, work space, income generator, demonstration model and training space – and it still feels like home. We treat our living space as an apartment within the whole – like living above the shop.

Zonal living

The size of the house is at the same time, the greatest drawback and the greatest benefit. The drawback is one of cost and the time it takes to create the infrastructure for services and décor for each room. The benefit is that because of its size and large number of rooms, we have been able to live in the house, whilst work has been carried out in other rooms which were completely uninhabitable. It has also meant that we could use rooms for storage – such as our sitting room, which we recently finished decorating, but which had to become a warehouse to store insulation for the cellar. The size of the house means that we have been able to zone areas and to use rooms for different purposes according to need. For example, the master bedroom has been our bedroom, our sitting room, an office, and a training space, is now a bedsit for a short-term lodger and may well become our bedsit in the next few months.

This large, south facing room is probably our favourite because of the amount of light and the quality of the décor -which we will see later. If we move in, it will mean that we have less living space than the lodgers do – but that is fine with us. We are planning to let our two downstairs rooms – our bedroom, which we will convert to a kitchen/lounge by installing a mini kitchen. The front room, which is currently our sitting room – well warehouse –, will become a very spacious and contemporary bedroom. We will still have our private kitchen, which is important because I don't want no other woman in MY kitchen! It also provides us with vital access to the garden, where we grow as much of our food as we can.

It has also meant that we could use it to make money not just through being able to accommodate lodgers, but also because it is a working space.

Penney has worked from home for nearly 2 years, for environmental charity, Global Action Plan as EcoTeam co-ordinator. She has also run courses here for Nottingham City Council as part of

their training for sustaining programme. She uses the house as a showcase for EcoTeam members to show the top end of the green living spectrum.

EcoTeams

The EcoTeams programme is an environmental project new to the UK that is being piloted in our borough of Rushcliffe. It is supported by Global Action Plan - an international environmental charity and funded by Biffaward, Rushcliffe Borough Council, Notts County Council and the Energy Savings Trust.

Over 200 households in Rushcliffe have already successfully completed the EcoTeams experience and it is now being extended to other areas. We have worked with a wide variety of people including retired people, youth groups, parents, in workplaces in both urban and rural areas – and everyone who has taken part has seen it as a really positive experience.

An EcoTeam is a group of 6-8 households that meet over a period of 4 months. They look at key topics such as waste, energy and water. The aim is that through measuring improvements, the household will be able to change its behaviour - thereby playing its part toward a cleaner, more sustainable future.

An EcoTeam is not simply a discussion group it is a practical programme where words and thoughts are translated into action.

The EcoTeam Programme is built upon a few simple principles:

The idea that no-one can do everything, but we can all can do something

The work is shared by a group so that members can support and encourage one another and share experiences and ideas

It is a step-by-step process that helps you to change your lifestyle by small adjustments that become good habits, benefiting you and the planet

By measuring what resources your household uses, you can see the improvements you have achieved during the course of the programme, as an individual and as a team

It takes surprisingly little time to really get results - around a couple of hours per month for group meetings and a few minutes for measuring each week. Each team is supported by a trained coach.

Anyone can form an EcoTeam - with neighbours, friends and acquaintances, in the workplace or a community group such as pensioners, mother and toddlers, gardening clubs, church groups, WI, Scouts and Guides etc.

Break for EcoTeams workshop

To give everyone a rest, we are going to break into topic groups for 20 minutes. Each group will try and come up with 5 action points that they think are most important under their allocated theme. Topics are waste, energy, transport and water.

Action points

Review of the action points from each group

Education in sustainable living

As we said earlier, the house is used for a variety of purposes including training. We ran 4 courses on sustainable living for Nottingham City Council covering greening finance, green DIY and intro solar hot water heating and rainwater collection and healthy living.

We regularly hold tours of the house for both private and professional individuals and Penney hosts meetings for local groups, which includes a tour of the house and explanation of EcoTeams. It is a great place to network and educate – and we recently had a visit from the Parliamentary sub-committee on Education in Sustainable Development, when a party of 5 MPs came for a tour of the house and to take evidence from a party of 5 EcoTeamers. The MPs took a great deal of interest in the house and even asked where they could buy some of the products we have used! A nice touch was the fact that it was the first time a committee had had a formal sitting in a house – let alone an eco one, so it was a minor historic event as well.

The house and website have been publicised through all kinds of media, including books, many articles in the national press, national and local radio, government reports etc. You can see some of them on the display boards. We have grown used to the invasion of privacy and besides that – it is a great incentive to tidy and clean the place up! Once the insulation and wood burning central heating are installed we will begin to write an illustrated story about the journey our house has taken us on – any pre-sale orders? Why would anyone bother with this palaver? Apart from the obvious eco/egomaniac angle, we want to save other people interested in eco build valuable time, money and effort. They won't necessarily go down the same route – but it has certainly already helped many people to source materials, think over our ideas and try out greener solutions for themselves.

House and garden

We mentioned earlier that we chose French windows on the north side of the house, so we could feel a sense of connectivity with the garden. The concept of the garden as another room is not a new one; the garden as living space, for leisure, for growing, for entertainment, as safe play space for kids, a haven for wildlife. I think the gardening and interiors programmes like Homefront have done a lot to help the public to see their outdoor and indoor living spaces as having greater potential than before – and I want Dermot to do our garden!

The Garden

The one drawback for me (Penney) is the size and orientation of the garden. I've been a keen organic gardener for many years and it is a place of retreat, calm and pleasure. Gil thinks it is about the right size for him – small! The back garden measures 85 sqm and the front garden 27.5 sqm including paving. We grow spuds, tomatoes, strawberries, loganberries, figs, rocket, carrots, herbs, passion fruit, dwarf and climbing beans, brassicas, shallots and edible flowers. Our ambition is that the garden will provide us with some produce every day of the year and that every plant will have a food or medicinal value. The south facing front garden is an ideal place to grow grapes and other fruit such as dwarf fruit trees and veg. We will at some point have a pergola for the grapevine to clamber up. Growing your own food has many benefits – apart from the taste and pleasure of harvesting your hard work. It cuts down on the transport, packaging, waste and social injustice that comes with so much of the food that we buy. This is a whole area we could go into but as an aware audience we won't preach to you!

Our next door neighbour recently re-built a wall down our shared long boundary and topped it with trellising. Whilst this does cut out some precious light, it does give a degree of privacy and something to grow food up – they paid for it, so we can't really argue!

From garden to table

I love cooking and I love making food with stuff that has come from my garden. I know what has gone onto it, I love the sense of digging or picking something so fresh, cleaning it and eating it within a space of time. So many people just don't know how to cook. They watch cookery programmes as entertainment, the programmes don't necessarily make them want to cook. We are very sociable types and we do love entertaining. There is something wonderful about sharing food you have grown and cooked for dear friends and family – they are sharing in an investment that has taken months to come to fruition. This is of course true for the food that we buy – but that is such an arms length process, it feels so disconnected and that is the problem. We buy into convenience – we don't care that the organic mango has travelled thousands of miles – it is organic, we are buying into the lifestyle. I'm not advocating the total opt out but I am saying that we should take as many steps as we can to grow as much as we can on our doorstep or allotment. As individuals this is probably the third biggest positive impact that we can have on the environment after home energy reduction and transportation – and it doesn't matter if you are rich or poor. You can even pay someone to do it or swap your time for theirs - as long as it is grown close to home and avoids transport and packaging.

The nearly finished - product

Conclusion

We hope you have enjoyed our presentation – which was a slice of our lives. Do check out the website and if you are interested, you will find a pdf of this presentation. We are in the process of updating the website, so please check it again in a couple of months for an update.

When we first started our work on the house, friends, family and visitors thought we were mad. Their opinion is changing. The house is the expression of our personal philosophy; getting the most out of the space and using the smallest amount of natural resources possible to live, work and inspire. We have invested our time, money and energy in the house and the old girl looks after us in return.

We are living our ideal and work hard to practice what we preach. We apply our experiences to our working lives to promote a green lifestyle in an urban setting to as many people who will listen. Thanks for listening

ENDS