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The official magazine of the Scottish Ecological Design Association, PO Box 14167, Tranent, East Lothian, EH33 2YG

Solar Systems are a Girl's Best Friend

by Prof. Sue Roaf

I have just come back from Kuwait. Kuwaitis inhabit a fossil fuel utopia built on water-less sand wastes. They live in air-conditioned palaces and diamonds are 'The Thing' this year.

Like the majority of the desert dwellers in the region, aping western energy profligacy, they are, however, living on borrowed time. Kuwait has for decades subsidised the price of electricity which is sold for around 0.05p a unit (kWh) there. As a result their huge houses are inexpensively cooled by massive machines.

Ten years ago, oil was around \$10 dollars a barrel. While I was there in early April we saw an amazing price spike for oil that went through the \$60 a barrel mark and the world began to wake up to the reality of Peak Oil (1). This is the term used for

the point at which demand for energy exceeds the global capacity to produce and refine oil or gas (2). Federal Reserve Chairman Alan Greenspan said in March: "Markets for oil and natural gas have been subject to a degree of strain over the past year not experienced for a generation."

Goldman equity analyst Arjun N. Murti went further in a report saying there was the distinct possibility of \$105-a-barrel for oil by 2007 and that the "Super Spike Period May Be Upon

Us." Murti cites the problem as being that Opec's "space capacity [is] essentially gone" and global refinery capacity

"now running full out". Meanwhile energy demand continues to soar.

The International Energy Agency (IEA) has traditionally been quite conservative on predicting future demand. This year it believed that demand growth would be 1.52 million barrels per day (mbpd) annualised over 2005. The Bank Societe Generale in Paris, however, worked on demand increases of around 2.5 mbpd over the same period. Already this year, up to the 1st of March, global oil demand rose

Societe Generale. The words doo-doo / fan / hit spring to mind.

The Kuwaitis who look so secure in their new found wealth are some of the most vulnerable people in the world to the End of Oil. People there lower their voices when talking about the possibility of removing the subsidies for electricity, claiming it would lead to revolution. Rumour has it that brownouts and even blackouts will be rife there as soon as this summer. Yet they are building more and more glass towers and appear to be relatively unaware that their gift from God will run out within decades.

What will places like Kuwait do in then, because the buildings they are constructing now are impossible to occupy without air-conditioning? (continued on back page...)

"Against the Flow" SEDA / SEPA Myth-busting Water Event Review

This event was a collaboration between SEPA and SEDA, sponsored by Lindab with speakers from a range of backgrounds and specialities involved in the utilisation, protection, risk assessment and design of water systems and the built environment.

The event was held at the Falkirk Wheel, an impressive backdrop for the day's proceedings, providing dramatic views and a healthy rush of fresh air during breaks!

The event was introduced by Mark Wells on behalf of SEPA.

Professor David Crichton is an advisor to the government and the Insurance

Industry on climate change, risks and liability. David was the first speaker and provided a detailed and up-front overview to the days proceedings; outlining the effects of climate change and human activity on water systems in a global context.

He painted a fairly bleak picture; natural disaster payments from insurers tripled in the 90s in



UK coastline after a 70m sea level rise (maximum likely predicted)

by around 245,699 bpd according to the IEA figures or by 404,109 bpd, if you prefer those of

comparison to the 1980s with the annual cost of disasters exceeding the entire world's anticipated GDP by the year 2065. Within 20

years according to a Pentagon report in Jan 2004 the US will be consuming more than the world's entire capacity of fossil fuel. What price then for oil?

He outlined some of the global strategies unfolding to avert disasters but made clear these remained wholly inadequate to the

... continued on page 4

Detailing for Deconstruction Guide Launched

The Lighthouse in Glasgow hosted the official launch of the SEDA Design for Deconstruction Guide on Friday 15 April, along with lunch and a stimulating afternoon of talks. Around 60 people were in attendance.

The Guide has been developed by Chris Morgan and Fionn Stevenson, who have both been working on the project for the past year. Chris and Fionn were joined by speakers Paola Sassi, Lecturer in Architecture, University of Cardiff and John Addison, Regional Director of...

... continued on page 3

This issue of the SEDA Magazine has been sponsored by 

Editorial

by Chris Morgan



Watered Down?

The theme of this edition was meant to be water, to complement the event we held a couple of weeks ago at the Falkirk Wheel, in collaboration with SEPA. I hope there is enough information within to give those of you who missed it some sense of it, but as articles have come in, another theme has emerged.

And that is... it's getting serious. But it's still not being taken seriously. Water issues, poverty, oil, almost every aspect of our collective human enterprise seems characterised by non-joined up thinking and the primacy of profit over care. We are being led closer to the edge and it just isn't sinking in!

I defy anyone to read Sue's piece, and Jim's and the extracts from David Crichton's talk, and not be concerned. Like compassion fatigue, I

suspect we get 'commitment fatigue' so it is good, if hard, to take on board just how bad the situation really looks.

I think we do have a right to be angry with those who are charged with looking after our collective interests. Expect little or nothing of interest from the forthcoming election frenzy which comes to resemble only so much noisy distraction from the real issues, themselves watered down to the point of banality.

It seems to me a genuine mix of 'conspiracy theory' and 'cock-up theory'. It is clear that there are widespread interests who do not wish to see the environmental and social justice agendas develop too far in any meaningful and joined up way. But there are also those who are in a position to influence things positively, who would like to do so and are casting about for advice and support. We need to be alert to both, able to tell the difference, and ready to help when it looks as if things could be genuinely improved. We need to lobby, but we also need to accept that there is a limit to what we can realistically achieve.

Its true though, younger generations really will ask, just as other nations are asking us now: what the hell do we think we are doing?

News from Tombreck

Communities Scotland have recently awarded the Tombreck Action Group a grant from their Futurebuilders, 'Seedcorn' Fund. This is to fund the Development Officer, who will promote and continue the work of developing the affordable housing, land regeneration and small scale renewable energy schemes at Tombreck.

Now that the 'spring weather' is here, there are opportunities for weekend volunteer building work at Tombreck. This will include lime pointing and rendering, clay plastering, and installation of sheep's wool insulation. Later in the summer we will be building a reedbed waste treatment system, so plenty of scope for getting wet and muddy!

For more information on Tombreck, visit the website www.tombreck.co.uk or email Sue Manning suemanning@lineone.net

Thanks to our sponsors **Lindab** and to everyone who has contributed to this issue. If you have any views or letters you would like published please send them marked for the attention of the Editor to; SEDA, PO Box 14167, Tranent, East Lothian, EH33 2YG

New Members

We warmly welcome:

- Carol Ann Aitken, interior and environmental design student, Kirkcaldy
- Gillian Hayes, architect, Glasgow
- Raymond Young, Architecture and Design Scotland, Dunning
- Diane Adams, student planner, Dunfermline
- Jill Egglestone, Senior Lecturer interior Architecture & design, University of Teesside
- Matthew Merrick, architect, Glasgow
- Wendy Hebard, Edinburgh
- Lisa Mead, student in environmental and energy studies, Edinburgh
- Bennetts Associates, architects, Edinburgh
- Jane Kelly, artist, Argyll
- Alastair Fuad-Luke, sustainable design facilitator, Bamff
- Mary Roslin, architect, Wemyss Bay
- Ivor Davies, timber specialist, Inverness
- Kirsty McBeath, (student Strathclyde Uni), Wormit, Fife

The **SEDA Magazine** is put together by Steve Malone, Chris Morgan and Jim Johnson. While we hope you find the articles and features of interest we would point out that they do not always represent the opinions of SEDA or our sponsors.

Lindab Rainline is the most comprehensive and thoroughly tested rainwater system on the market. It is manufactured in Sweden to ISO 9001 and 9002 and ISO 14001 environmental management standards.

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SEDA Events

SEDA GOES TO THE HEART OF SCOTLAND: PERTSHIRE TOUR AND AGM

Wednesday, 11th May
1 pm - 9 pm

This year SEDA's AGM will be held in the Civic Trust award winning Birnam Institute and preceded by a tour of this beautiful building and garden, together with various other highlights in the local area. There will also be a talk from local architect Robin Baker, a long standing member of SEDA, about the Douglas Plant Pavilion in Pitlochry, which was designed by Robin and constructed by Carpenter Oak and Woodland.

We have put together an afternoon itinerary with various options which should suit all tastes, culminating with the AGM in the early evening, where you can hear all about SEDA's exciting new ideas for the coming year as well as casting your votes for this year's nominees to the Steering Group.

Programme:

1p.m. Meet at Birnam Institute for lunch in excellent Cafe
2p.m. Guided tour of building
Travel by convoy to:
3 pm Pitlochry, visit Douglas Plant

Waterman Structures and Waterman HDC, with SUST's Lori McElroy chairing the afternoon's events.

Fionn began with a background into the project and a general overview of some of the criteria for the research. Of key importance to the project is the issue of minimising resource in relation to sustainable design, and specific detailing for the deconstruction of buildings to reduce construction waste, increase construction efficiency and maximise benefits to Clients.

Chris followed with the 'technical bit' of the afternoon; a series of 'conventional' construction details set against alternative designs and specifications. Chris highlighted some of the details that could be altered without a significant visual or functional change to the original and described how with some creativity, cost differences could be kept to minimum.

Paola Sassi has studied DfD from her base in Cardiff University for some years and focused on a variety of products and techniques currently being used within the construction

Pavilion and Gardens (subject of evening talk) behind Pitlochry Theatre
4 pm drive to Dalguise
4.15 visit new earth brick house by Tom Morton in Dalguise house, and Gaia Aberfeldy's timber house next door.
5.30 SEDA Steering Group pre-meeting (all members welcome)
6.00 AGM
6.45 Talk by Robin Baker (Gaia Aberfeldy) on Douglas Pavilion in Pitlochry: a unique building utilising wood technology
7.10 any questions
7.30 Food and drink in Birnam Institute
9p.m. close of play

Alternative Activities

For anyone who does not want to come on the tour, or attend the Steering Group meeting (between 3 and 6 pm): Visit the Beatrix Potter Garden in the Birnam Institute; drive to the Hermitage, which is nearby, for an afternoon walk in The Hermitage, with its stunning tall douglas fir trees, set in a forest walk that follows a spectacular waterfall and follies up the hill; have tea in the Birnam Institute's Foyer Cafe (closes 4.30).

Charge

There will be a nominal charge on the door of £5/£3 for the event, food and drink

industry, categorising them into those which can already be used to good effect for deconstruction purposes, those that could, with some alterations, and those techniques (such as sacrificial polystyrene shuttering with poured concrete within) which were impossible to deconstruct in any useful manner.

John Addison finished off the afternoon with an insightful talk on deconstruction from the Structural Engineer's viewpoint. He described a large source of waste in the construction industry as being generated by ignorance and put the case for a more appropriate response to buildings and structures generally. John showed a number of largely conservation based examples, and suggested that many of the older methods of building,



Please could you confirm with the SEDA administrator if you are intended to come, in advance for catering purposes: seda@freezezone.co.uk or Tel. 01361 840 230

SEDA Get-together Lochgilpead weekend of 18th & 19th June

For the past two years we have been taking time to review what SEDA has been doing, and where we are going. This year an informal gathering and discussions will be held in Lochgilpead, to which all members are invited.

Wednesday, 13th July Announcement of the winner of the Krystyna Johnson Students' Travel Award 2005. Edinburgh

The evening will include a talk by Jonathan Williams, joint winner of the 2004 award, on his project; "Developing Sustainable Tourism in Rural Ecuador".

Saturday, 3rd September Ecological Building Day Glen Coe Visitor Centre, Argyll

Jointly run with the National Trust for Scotland

such as vaulted ceilings, lime or clay mortared masonry and demountable timber structures, were more practical and effective in allowing for deconstruction than many of the methods of construction used today.

Judging by the discussions generated afterwards (both in the Lighthouse and in the pub next door) it was a thought provoking and relevant topic and we look forward to the next one!

The web-based guide is now live and can be reached via SEDA's website at www.seda2.org.

A second guide on Design for Airtightness will be available in Spring 2006 with the third: Chemical Free Design the following year.

Steve Malone

View from the Chair

by Fionn Stevenson



Monday 11th April saw the official launch of Architecture and Design, Scotland (A+DS) in Glasgow. Just a month previously, there was another fanfare, this time South of the Border, for John Prescott's Sustainable Communities Plan which will see hundreds of thousands of new houses built, many on green belt or on known flood-plains such as the Thames Gateway. Will these houses be sustainable? Will they decrease resource use by the factor of 20 which most researchers now believe is necessary in developed countries to stabilise carbon emissions? Will they heck!

The UK government has now set up a steering group to drive the proposed "Code for Sustainable Building" (note, code not compulsory...) which will supposedly deliver these wonderfully sustainable new houses. Except that the bulk of the Steering group is made up of the very people who have most to loose. Micheal Ankers, for example, CEO for the Construction Products Association, will no doubt be making the case for plastics, concrete, pvc and rockwool. Meanwhile David Pretty, CEO for Barratt Homes, will be fighting any on costs that might actually make his housing more sustainable.

And before we get complacent, what is the Scottish Executive proposing for sustainable building? Will it follow England, or will Ministers and the Executive adopt - not a Code, but compulsory Standards which address the problem through legislation? Because it's far too late for voluntary measures. Here's hoping that A+DS leans heavily on the Executive, to help them avoid the bad joke that's happening down South.

Water Water...

(continued from front page)



task. While risks from natural disasters increase,

the population is both increasing and ageing with an ever increasing poverty gap and decreasingly resilient buildings.

This was then placed into a Scottish context. The six main threats in Scotland are windstorm, drought and subsidence, flooding, freezing, the EU Construction Products Directive and the new Planning Guide SPP20 which he described as showing monstrous indifference to the growing issues of climate change related risk.

Prof Crichton outlined the eight

potential solutions he saw as being required here in Scotland. These were SUDS (Sustainable Urban Drainage Systems) (though he pointed out that there were some as yet unanswered questions about adjacent house insurance implications), warning schemes, insurance, the management of development in hazard areas, water resource management generally, education, the alteration of agricultural practices and the restoration of rivers and removal of culverts.

Neil McLean, SUDS Co-ordinator for SEPA, delivered a general picture of SUDS development in Scotland. The various adaptations and technical aspects involved were discussed using a number of both successful and problematic case studies, with suggestions as to the advised approach to take when utilising such a system in a new development.

Howard Liddell from the Gaia Group focused on the relationship between water and master planning, drawing on a variety of references from around the world. The Dutch, for example, were told, start every development with a consideration of water management, and Howard went on to show examples ranging from traditional cultivated terraced hillsides in rural Asia, to modern urban spaces enlivened by inspired hard landscaping and water features. "Slow water down, hold it up, make it artful and make it work for you" was

the message.

Howard also discussed people's relationship with water and the need to change current British preoccupations with health and safety and dislike of water to one in which the beauty and usefulness of water can be realised. Having recently returned from tsunami-hit areas of Indonesia, working for the British Council, he was also able to give an overview of the power and damage which can be caused.

Nick Grant from Elemental-Solutions gave two presentations during the day. The first discussed the conservation of water in the first instance and also the various effluent treatment options available.

Like Cath after him, Nick emphasised the need to concentrate first on conservation of water before consideration of any other measures. Water conservation is worth doing in Scotland because of

occasional droughts, but also because of the high energy costs associated with treatment of supplied water. In addition best practice in design of water systems generally not only saved water, but led to other improvements such as quicker hot water without the need to run the tap.

Nick gave an overview of the many water saving devices on offer (such as the low and dual flush w.c shown, below left) and warned against too simplistic a judgement as to which was best. He confirmed that simple, robust, tried and tested solutions are often better than misunderstood, mis-applied but 'eco' solutions and in some cases, after a point, saving water can lead to higher environmental costs elsewhere, usually in energy and chemicals.

Cath Hassell from ech2o is involved in water re-use and recycling systems. Cath emphasised from the beginning that while greywater

Rainwater Harvesting as part of a Sustainable Water Strategy

by Cath Hassell

It is often argued that rainwater harvesting might be necessary in the south east of England due to its low rainfall and large population but that this is not the case in the Scotland where over abstraction from rivers or ground water is not a concern and water is 'plentiful'. However, it is important to realise that energy is required to clean water so that it is fit for drinking, and that much of the water we use in our buildings does not need to be of potable water



Picture by Construction Resources

quality. It is generally recognized that 1 kWh of energy is needed to provide 1 m³ (1000 litres) of potable water. Therefore saving water will also help to reduce CO₂ emissions.

The first thing that is important to remember in any sustainable water strategy is to reduce water use within the building first before looking at alternative sources of water. For

example, specify ultra low flush dual flush WCs and flow regulators on basins in both domestic and commercial situations.

Once demand has been reduced at point of use then take rainwater out of the storm water stream using the simplest design solution for any particular situation. This may not mean using the water back in the building if there are water features on site that need top up supplies or large areas that need regular watering.

Rainwater harvesting systems have the potential to both reduce storm water run off as well as reducing the demand for potable water. Indeed, PPG 25 recognizes that rainwater harvesting can be the first line of a SUDS (Sustainable Drainage System)

reuse can be effective in certain industrial situations, it very rarely makes sense in domestic situations. Instead she focused on rainwater harvesting, the systems used for this, design considerations when installing these, filtration, bacterial contamination, payback and the use of rainwater for schools and industrial purposes. Some aspects of Cath's talk are reproduced below.

Chris Morgan from Locate Architects discussed moisture in buildings and the potential to work with, rather than against the natural movements of moisture vapour within a building. Using the two examples of 'breathing walls' and 'moisture mass' Chris discussed ways in which designers can work with this flow of natural moisture movement and flux to save energy and money, whilst creating a healthier living environment and a more durable and protected built environment..

He gave examples of alternative building materials which can be used in two Scottish case studies, in particular clay which as well as being a 'green' material is, we were told, the best material for absorbing moisture. He then spoke about the potential to reduce ventilation rates and so save energy which whilst at this stage quite a marginal subject will become more important as insulation levels and airtightness requirements become more onerous.

Nick Grant's second presentation looked at water pollution and nutrient recycling.

Citing the old phrase that pollution is just a resource in the wrong place, Nick pointed out that water is not just a resource in itself, but 'dirty' water carries nutrients which are themselves valuable if targeted and extracted in the right way at the right time and in the right place.

Nick was at pains to emphasise the need for an investigation of the problem before jumping to conclusions as to the solution. In particular, he noted the need to get away from a simplistic assumption of a 'green' or 'non-green' solution whereas he showed a more helpful graph of potential solutions pitting 'space used' against 'energy needed' and showing that different solutions are best in different situations. The package plant shown above left, for example uses energy but is efficient with space, whereas the pond, below left, uses little energy but takes up a great deal of space not always available.

Old standards like septic tanks can be quite acceptable parts of a low energy and ecologically benign treatment system whereas there were serious question marks hanging over some of the energy needs of some of the well known and 'high tec' and 'eco-' solutions.

All in all the day was undeniably stimulating, lunch was excellent and the thanks are due to Mark and to SEPA for sponsoring the event.

Anna Poston

Photos by Nick Grant and Elemental Solutions

ASHS - The Association of Scottish Hardwood Sawmillers

ASHS was set up in 1999 to help coordinate and publicise the work of the small hardwood sawmills in Scotland, in order to help develop the market for home-grown hardwood timber.

It currently has 19 members across Scotland, who mill hardwoods, with logs coming mainly from local and sustainably-managed forests. ASHS members can supply all sorts of sawn timber, from fresh-sawn to kiln-dried and machined, including, flooring, shingles, structural beams, and glulamated worktops.

Some also saw high-quality Douglas fir and Larch for specific uses such as cladding and flooring. Many work closely with joiners, furniture makers or other woodusers, and so they can supply a range of indoor or outdoor furniture as well as provide building construction, interior fitting and

other services.

Although each ASHS sawmill is small, collaborative selling allows them to fulfil larger contracts, such as the Scottish Parliament.

Timber enquiries can be submitted to all ASHS members through the online enquiry form on the website: ASHS.CO.UK. The website also has contact details for all ASHS members, who are happy to discuss timber uses and requirements on individually.

ASHS has recently benefited from funding provided by the Forestry Commission, Scottish Enterprise and the EU, which has enabled the employment of a co-ordinator and the production of publicity material and a new website as well as a series of training courses to help improve the quality, variety and consistency of products.

ASHS will have displays at Woodfair in Perth (13/14 May); Homebuilding and Renovating Show in Glasgow (21/22 May) and the Royal Highland Show (23-26 June)



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strategy as part of source control. Once a rainwater harvesting system is installed rainwater from the site will be diverted before it adds to the load on the stormwater drainage. The rainwater is stored, used in the building when required and eventually enters the foul water stream.

When designing rainwater harvesting systems for a site it is important to know how much rainfall you can expect on average over a year. Although average UK rainfall is 1000 mm/year, many areas of the UK receive between just 600 - 800 mm including most of the east of Scotland. Depending on the roof area at your disposal you may not have enough rainwater to meet your required demand. If demand has been reduced as much as possible

then consider feeding just some of the WCs, or maybe just the urinals. Alternatively pump to a rainwater header cistern to prevent mains water being unnecessarily pumped around the building.

The following design recommendations should be followed to ensure an efficient system.

- o Collect from roofs only to reduce chances of contamination.
- o Fine-filter the rainwater to reduce organic matter in the storage tank. Filters that conform to DIN 1989 (a German standard) are recommended.
- o Fit an automatic mains back up to ensure a supply of water during times

of no rain. To prevent possible cross contamination of the mains supply this component must have a type AA air gap (or conform to EN 1717) to comply with the current Water Regulations.

- o Identify supply pipework as non potable
- o Do not use copper pipe. It may corrode as collected rainwater is usually more acidic than water supplied from the mains.
- o Ensure calculations use correct rainfall figures and that storage is sized to provide optimum use of the rainwater that can be collected
- o Protect the integrity of the stored rainwater using an anti-surge valve in the storm water drainage

downstream of the tank and filter.

- o Ensure an expert overview of drainage design and that the design is followed correctly during installation.
- o Do not specify UV disinfection if the rainwater is going to be used for flushing WCs only, and the system is well designed and well maintained, as UV treatment has a high ongoing environmental cost.

Cath Hassell

ech2o designs and specifies rainwater harvesting systems. We also run training courses on rainwater harvesting and other aspects of sustainable water use. For more details contact 020 8800 4157 or email ech2o@aeceb.net

As joint winner of the Krystyna Johnson Student Travel Award, Jonathan Williams took the opportunity to volunteer for 3 months in rural Ecuador.

Letter from Ecuador

by Jonathan Williams



On arrival the banana producing town of San Luis de Pambil, population 2000, seemed a long way off the gringo trail I had glimpsed while studying Spanish in Quito. This middle of nowhere status was confirmed by my guidebook with the nearest "anywheres" being described as "best avoided", "transport hub" or even "full of muggers".

For my time in San Luis I was living and working with a locally based NGO called Corporacion Arborizadora Campo y Progresivo, translating to Network for the Progressive Development of Rural Life, run by brothers Raul and Carlos Cabrera. They are involved with various projects: community banking; exportation of bananas, chillies and cardamom; production of medicinal alcohol from sugar cane; initiation of recycling and reforestation projects. My work placement was organized through the Edinburgh based Challenges Worldwide who send people with specific skills to projects in 3 countries.

Located at the base of the Andes on the Pacific side, one aim of my project was to design and build solar heated showers and composting toilets as part of the Piedra Blanca community based ecotourism project. The premise of the project is to conserve the remaining primary

subtropical forest by providing the local families a financial incentive not to cut down the trees, i.e. profits are distributed amongst those families not involved in logging activities. Previous volunteers had built a lodge and website for Piedra Blanca, a valley in which 20 families make a slim living from crops and animals, travelling down to the Sunday market in San Luis for trade.

As one of the few remaining areas of original forest on the Western Slopes of Ecuador (i.e. non Amazonian rainforest) this enclosed valley has potential for genuine ecotourism. The first time I walked in the upper areas we passed numerous waterfalls, saw toucans, heard howler monkeys, passed under the eponymous white cliffs and were molested by various plants and insects. Ecuadorian ecologists I met described the area as incredibly special and well worth preserving.

However the activity in Piedra Blanca is not without its problems.



Although we successfully built solar hot water heaters from old radiators, the cash required dried up before completion. I learnt that mixing concrete by hand is not good fun and also reinforced what I already knew; a construction project in Ecuador would never go smoothly. Having spoken with various similar ventures, I realized that the process of setting up ecotourism projects, especially one in which all the community is supposed to be given an equal say in the decision making, is notoriously slow and fraught with difficulties.

I'm happy though with my contribution, what was achieved and potential future designs (e.g. how to reclaim heat from the bread oven to supplement the solar hot water panels and how to separate urine from the composting toilets).

Most of my initial project aims were realized in one form or another. The most successful aspect of my time in San Luis was building and demonstrating an economy solar hot

water collector made out of plastic cola bottles (above), cheap hosepipe and bamboo. The aim being to produce hot water sufficient for washing bodies, clothes or dishes - thus improving conditions for the women who carryout these tasks.

A prototype system of 20litre capacity was made and then taken on tour of various towns of market day with information on how to make your own system on sale for a nominal cost. We drew large crowds of people, amazed some old ladies and a few people said "Yes, I'll definitely make my own system". On returning two months later it was a pleasure to see two separate systems built by local people - this technology is only successful if accepted by the people for whom it is intended.

Many thanks to SEDA for helping me to realize this opportunity. The work made a small but significant contribution to life here and in turn I've learnt skills I plan to develop and put to good use in the future.

11 May - Jonathan will be presenting at the SEDA AGM. See also www.jw-ecuador.co.uk

"One Future - Different Ideas"

by Jim Johnson

Some thoughts prompted by the launch of the Scottish sustainable development strategy on 7 March 2005.

A cluster of official policies were launched in Edinburgh on 9 March - the UK shared framework for Sustainable Development, entitled "One Future - different policies" (summarised at www.sd-commission.org.uk) and the SD strategy for Scotland, which commits Scotland to pursuing SD through:

- o a sustainable, innovative and productive economy.
- o a just society.
- o protecting and enhancing the environment, and using resources and energy as efficiently as possible,
- o promoting a clear understanding

of sustainable development, so that people can contribute through their individual decisions.

A few days later Edinburgh City Council launched its Sustainable Design Guide, intended primarily to apply to the Council's own building stock, but possibly extending, by influence and example, to all building in the city. (for a copy call 0131 469 3804)

These initiatives take place against an ever more gloomy environmental background. The UN's Millennium Eco-system Assessment published on 30 March identifies (amongst many other problems) the intense vulnerability of the 2 billion people living in dry regions to the loss of ecosystem services such as water supply, and the growing threat to ecosystems from climate change and nutrient pollution. Human activities have taken the planet to the edge of a massive wave of species extinctions,

further threatening our own well-being. (details at: www.maweb.org)

On 1st. April - unfortunately not as a joke - the "Scotsman" reported that the US government's climate monitoring laboratory has recorded that levels of carbon dioxide in the atmosphere have reached a new high (378 ppm). Even if carbon dioxide emissions were stopped tomorrow, inevitable changes in the global climate will still take place over the next 50 years.

So will the UK/Scotland/Edinburgh SD frameworks and guides help us to deal with and mitigate these changes? Reaction from the Sustainable Development Commission (supposedly the government's "friendly critic") was generally favourable whilst emphasising that action not words were needed. Especially praised was Tony Blair's emphasis on local community action on sustainable

development - a resurrection of the Local 21 agenda. (www.communitywebnet.org.uk)

My own fear is that while we are all doing our bit for Tony - not over-filling the kettle and walking to work - we may be too pre-occupied to notice that the government is still making the big decisions on the assumption of "business as usual." "Building Design" magazine reports that the government is stalling on crucial climate legislation - the EU Directive on the energy performance of buildings. The Scottish Executive gets praise for committing funding to re-open the Borders railway, but a couple of days later overturns the planning reporter's decision and gives approval to the M74 extension. One step forward and two back! As the Greens said, it was: "bad news for Glasgow, bad news for the environment, bad news for Scotland and a bad day for environmental justice."

An Autonomous Rural Water System

latter was adopted (and it's a much better size for swimming). Figures all had to be adjusted for various system losses but as we had a theoretical 25% margin this was not material.

The energy requirement to run the system is minimised by using gravity flow wherever possible and arranging the components so that the lift pumps only run when energy is available rather than on water demand.

We were concerned about metal contamination by the roof/gutters and could find no authoritative information that either zinc or copper would not cause problems. Fortunately stainless steel rainwater goods and tinsmith ware are readily available with a matting surface treatment. SS has some reasonable credentials for sustainable such as it is made almost entirely from recycled metals and is one of the materials most likely to be itself recycled, also because of its inherent strength and durability very little of it is needed (0.4mm sheet) and its design life far exceeds that of the dwelling so it is

also, by virtue of its ecosystem, begins the process of oligotrophication (nutrient reduction), maintains aeration and permits a regulated gravity flow to the filters and clear well below the dwelling.

The main filtration function is served by slow sand filters, essentially reed beds without the reeds. The sand serves two functions. Firstly it is a mechanical filter for particulates. Secondly and more importantly, it is the substrate for micro-organisms which feed on the nutrients in the water. The principle is that water devoid of nutrients will not support the growth of pathogens. A sand filter is very simple, cheap and effective. It is failsafe in that if it needs cleaning it clogs at the top and overflows rather than the failure leading to water contamination and because it must not be allowed to run dry it can discharge by gravity into the clearwell (bulk storage tank).

A small negative is that it is essential for there to be a continuous flow of water so when there is no rain water to process treated water must be

cistern on the hill behind the dwelling. Because of the tanks size the pump only has to run to top it up during the daytime (when electricity is available) and water can flow continuously by gravity to the dwelling. The system would be simpler if water was pumped directly from the clearwell into the dwelling but less robust in case of pump or electricity failure.

The water passes through commodity cartridge filters and a UV steriliser at the point of delivery within the dwelling where the plumbing and appliances are entirely conventional with the exception of the provision of a recycled water option for the WC and washing machine.

Effluent discharges to a conventional septic tank which discharges to a dosing device (tipping trough or auto-siphon) to feed (by gravity) a vertical flow reed bed of 8 m sq. This is divided in half so that whilst one half is in use the other half is 'resting' as recommended. The outflow from this goes via a humus settling tank to a horizontal flow reed bed, also 8 m sq and also by gravity.

The design of a rural water system is usually straightforward using either treated surface water or a borehole but with the former not available and with the added restrictions of using an autonomous energy supply and being at worst carbon neutral the project becomes more interesting!

The bore hole option is effectively ruled out as the water table is at a minimum of 60m below the dwelling so the energy cost of the lift would be high as would the financial cost.

The basic parameter in calculation is the adequacy of supply. Scottish Water determines the PCC (per capita consumption) as 150l per day, in this case an occupancy of 4 gives us 600l per day to find. "Using Water in the Home in Scotland" for 1999 gives a slightly lower figure of 139.1l and also a breakdown into the various components of water consumption so that we can arrive at abroad division into potable uses (45%) and non-potable (55%).

The system proposed that the potable water is derived directly from treated roof collected rainwater whilst the non-potable component may be satisfied by recycling treated effluent for toilet flushing, etc.

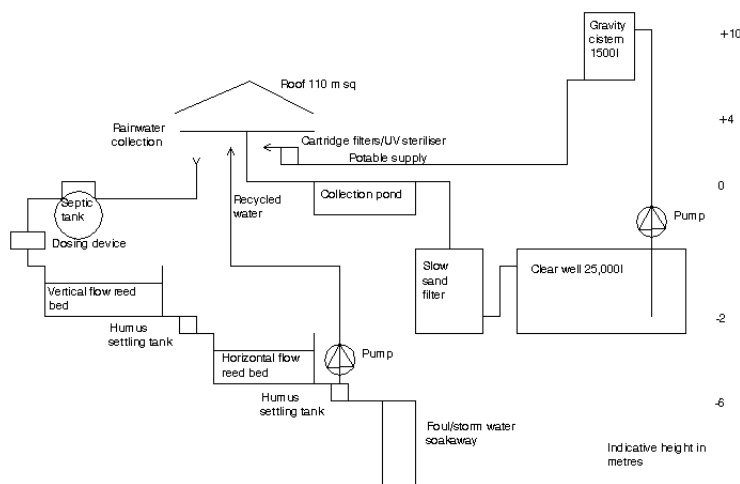
The roof area of the dwelling in question actually enables the collection of about 70% of the annual water requirement so although the use of recycled water will be minimal there still has to be a provision.

Average rainfall in the west Borders is about 900mm p.a. but in a drought year this can be as low as 640mm so the robustness of the supply has to be determined using a statistical analysis of historical data over a suitable period. Monthly precipitation figures over 30 yrs gave us the necessary granulation and aggregation period for modelling using Tabony Tables, Gumbel Reduced Variates and raw data estimates of the return periods of drought events.

We determined that had the proposed system been installed 30yrs ago with a 15,000l clear well it would have run out twice (assuming no water conservation measures during droughts) whereas a 25,000l tank would never have run out so the

zero maintenance as are the other finishes to be used. So the rain falls on the roof and washes it. Leaves and larger debris are screened out by self-cleaning gutter grids and the rains discharge into a pond which acts as a settling and holding tank for storm water. It

recycled through the system but the required flow rate is so low that the energy cost is acceptable especially as the energy is from PV which one hopes will be more productive when it isn't raining. From the clearwell water is pumped vertically 10m to a 1500l gravity



After a further humus settling tank the effluent is of low particulate and low biological oxygen demand quality and is available for re-use or discharge to a soakaway. (see BRE GBG 42 pts 1 & 2) The precaution is taken to design the soakaway both for discharge of effluent from a septic tank (Bldg. Regs. Sect M3 and BS6297) and for storm water (BRE Digest 365) as it serves both functions.

Hot water is provided by a solar thermal panel heating a thermal store with immersion heater back-up. The panel is mounted within a sun space in a lightweight thermal enclosure. This is more cost effective than a fully weather proof box mounted externally, is less liable to freeze and avoids the 'grey box on the roof' effect at a small cost in efficiency.

A re-circulation device ensures that the panel only produces hot water (60°C) which is fed to a thermal store (Albion type). Cold supply water is heated 'instantly' as it passes through a coil in the top of the heat store. This approach provides a better quality of supply at delivery as the hot and cold supplies are at the same pressure, it allows a take-off from the store for wall heating, facilitates the integration of other heat sources (e.g. micro-CHP) and exemplifies the 'solar combi' approach to domestic water and space heating.

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Andy Swales

Letters

Dear Ed.

Thanks for latest newsletter. Looks real good. Nice mix of policy, practice and polemic ("wake up Communities Scotland top brass"!). When I suggested incorporating a construction detail some time ago, I didn't for one minute think it might end up taking 2 pages worth! (keep it up). The only thing I think which is now lacking is several letters from members. You sometimes have these, and they do add to the 'dynamic' of the magazine. Can you stir them up? The Limetec sponsorship is excellent; well done (just pity no Scottish base).

Nick Brown

Dear Sir

As one of the judges for the RIAS Award I was disappointed that your review of the Award ["Eco buildings win Awards in 2004", last issue], and the accompanying BBC "Artworks" programme, was not more positive.

The performance of architect Gokay Devici's Lotte Glob House in Sutherland, in coming second to a strong winner (Elder and Canon's St Aloysius School in Glasgow) was magnificent.

Our appreciation of it was not, as you suggest, on "visual aesthetic grounds alone".

Instead, as the programme made clear, we believed that this building represented exactly the sort of rural dwelling that we would be building all over Scotland if we approached the task like our forebears - used materials and technology to hand (local timber; prefabrication) and built to suit our contemporary lives and concerns (light and view - an architecture made, at all levels, out of

our relationship to the land that sustains us).

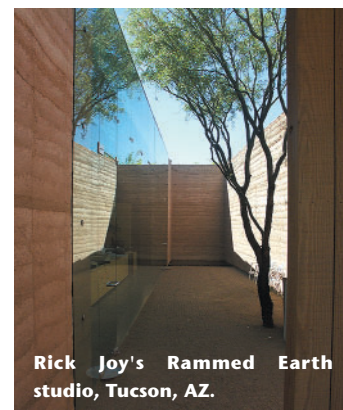
That all this is realised so beautifully - and all for £65,000 - is a wee miracle, and of enormous credit to Gokay.

We always saw this as a "house" and not an "eco-house", and I think that there is a challenge for architects concerned with such matters to avoid the narrow ghettoisation that can occur.

The architecture of the house embraced a continuum of concerns - from its setting in, and relationship to, the landscape, through its means of production down to its insulation - that, to me, represents an expanded view of sustainability.

I'd love to see our rural housing industry driven by such concerns (and I would love to see Gokay plc rolling-out buildings of this quality, all over the Highlands)!

Yours faithfully
Malcolm Fraser



Rick Joy's Rammed Earth studio, Tucson, AZ.

Postcard from America by Tom Morton

Becky Little and I spent last September looking at earth, straw and lime buildings in the US in the run-up to the presidential election and were surprised that many of the people we met were sanguine about a Bush victory.

The green building agenda has taken a severe knock since 9/11 and nobody thought that the States would make significant changes, whoever won. With a Bush victory 'the shit would hit the fan sooner rather than later'. In this political context, green designers in the U.S. are realistic about what they can achieve from their marginalised position- they are developing the materials, methods and design ability for green construction that could be taken up on significant scale after an agenda-changing event.

While the bleakness of this outlook was depressing, the clarity of purpose of the green design community was heartening. In Europe, we flatter ourselves that we have a more progressive incremental approach, but sometimes this can obscure the reality of the rate of change we are achieving.



California Winery, largest straw bale building in U.S., Earth plasters used for humidity control

Solar Systems are a Girl's Best Friend ... continued

They must adapt as soon as possible and re-learn from the wisdom of their traditional builders about how to create buildings that stay cool even in the extreme heat of the Gulf. Then they must learn to use clean renewable energy to supply as much of their needs as possible, mixing the best of the old technologies with the best of the new, in robust new buildings in which they can survive, comfortably, through the extreme weather events and the power-less decades ahead (3).

Which brings me on to my myth-busting point. I sometimes see proponents of 'sustainable' architecture saying that solar systems are too costly, or unnecessary, for low energy buildings.

They are patently wrong. We can achieve significant reductions in energy consumption in buildings by energy efficiency measures alone but these go only so far. They may reduce space heating to zero but there is still a need to heat water, cook, and use electricity for machines and light.

We should all reduce the energy we need to a minimum and then

produce as much of the energy we do need from clean renewable energy. In buildings this means installing as much solar capacity as possible because it is erroneous to just claim it is enough to buy green electricity from the Utility companies because you can never know that it is green, and there is simply not enough capacity from embedded renewable energy generation to cope with significant rises in demand for it.

It is our generation's duty to do as much as we can to head off the rapidly approaching twin catastrophes of climate change and fossil fuel depletion, by reducing our energy use and going for clean energy.

The time for saying that solar systems are too expensive here is past, because we have shifted from the comfortable, charming image of soft green 'sustainable' buildings of the 20th century and are beginning to realise that what we actually need is to design resilient, low impact, 21st century buildings in which we can, quite simply, survive.

It is no longer a matter of degree, it's

a matter of attitude, and if we do not have a rapid step change in attitudes towards carbon dioxide emissions from buildings in every country on the planet, our chances of survival are looking increasingly slim.

[1] There are a number of excellent sites on the subject and classic books on this vital subject that will strongly influence the direction of global economies over the next decade. See: <http://www.peakoil.net/> <http://www.energycrisis.com/> www.odac-info.org and the key text: Campbell, C.J., (1998). The Essence of Oil and Gas Depletion, Multi-Science Publishing Company & PetroConsultants S.A.

[2] There are a couple of chapters on this problem in our latest book: Roaf, S., D. Crichton and F. Nicol (2004). Adapting Buildings and Cities for Climate Change, Architectural Press, Oxford. Publication date: October 2004.

[3] This is very much the message we try to get across in: Roaf, S., M. Fuentes and S. Thomas (2003). Ecohouse 2: A Design Guide, Architectural Press.

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