Scientists for Global Responsibility
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SGR Newsletter
Spring 2009
Issue 37 • £3.50

Time for global responsibility in the global economy

Stuart Parkinson looks at the potential for a sustainable, low-carbon economy to be created through efforts to tackle the current global economic problems.

The major problems that the global economy is currently facing have many of their roots in the irresponsible practices of the financial sector. High levels of credit have been granted to those unable to repay, and bad debts have been hidden in complex financial packages sold and re-sold in the financial markets. It has brought the global financial system to the brink of collapse, and is driving the global economy into recession.

There is widespread acceptance that major reform of the financial sector is necessary to help tackle the problems. But there is also growing recognition among governments across the world that action to rapidly expand the development and deployment of greener technologies will provide a major boost to the economy and create many jobs. The question is: will the scale and the breadth of the action be enough to shift our societies onto a truly sustainable and peaceful path?

Green New Deal

A number of national programmes have been proposed, or are already being implemented, by governments of the major economies that in some way contribute to the development of a low-carbon economy. For example, the UK government has announced[1] a new programme on domestic energy efficiency worth nearly £1 billion and a financial assistance package[2] to the ailing motor industry including over £2 billion of loan guarantees for low-carbon initiatives. Meanwhile, incoming US President Barack Obama has promised to spend $150 billion (£105 billion) over 10 years to "build a clean energy future",[3] and China has announced a similarly sized programme of low-carbon initiatives.[4]

However, programmes such as these, while very welcome, could be much bolder. Evidence for this perspective can be found in some groundbreaking reports published in the last six months that outline radical programmes to tackle both the economic crisis and global environmental and energy problems.

Some of these have adopted the term 'Green New Deal' – inspired by the 'New Deal' programme undertaken by US government of Franklin D Roosevelt following the Wall Street Crash of 1929.

One key set of proposals that focus on the UK situation are given in a report by the Green New Deal Group[5] (see review on p.24) – a group of nine leading green thinkers. The report outlines proposals for major reform of the economic and financial systems, which could allow an investment of up to £50 billion a year in UK skills, infrastructure and new technologies and hence bring about a rapid shift to a low-carbon economy.

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If you are not a science/design/technology professional, but want to support our work, you can help us by becoming an associate.

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Editorial Issues

The editorial team for this issue of the SGR Newsletter was:

- Stuart Parkinson
- Vanessa Spedding
- Kate Maloney
- Jane Wilson

The opinions expressed within, including any advertisements or inserts, do not necessarily represent the views of SGR.

Please send articles, reviews and letters for the newsletter to **newsletter@sgr.org.uk** or the SGR postal address (above).

Copy deadline for next issue: 1 May 2009

Join the SGR Forum e-mail list!

SGR Forum is our internal e-mail list. It is used mainly for news and announcements (of SGR and other events). Forum members also engage in the occasional brief discussion via this channel, for example when a member requests information, advice or help. All SGR members who have internet access are encouraged to join.

To join visit **http://mailman-new.greennet.org.uk/cgi-bin/mailman/listinfo/sgrforum** and following the (very straightforward!) instructions from there.

naturallyresponsible

THE QUEEN'S AWARDS FOR ENTERPRISE: SUSTAINABLE DEVELOPMENT 2007

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A few words from the Director

It would be easy to get caught up in the euphoria surrounding the election of US President Barack Obama and believe that we are on the cusp of massive positive change in world affairs. Equally, we could look back to the hope generated by the election of our own Tony Blair in 1997, reflect on how cruelly that hope was dashed in the years since, and think that little will change this time either. Based on the first few weeks of Obama's administration, I think we are justified in feeling a cautious sense of optimism – and at least the years of George W Bush are over!

There are certainly some good signs. As David Krieger points out (p.11), Obama has made a number of important promises on nuclear weapons – such as reducing their alert status, and taking key steps towards the overall goal of global nuclear disarmament. He has also pledged serious action on climate change, including a $150 billion programme to support low carbon technologies (see p.1). It is also very heartening to see that Obama's scientific advisor will be John Holdren, former General Secretary of the Pugwash Conferences on Science and World Affairs.

But there are some areas in which Obama's promises are less than reassuring. For example, there is little sign that the US's ridiculously high military spending will fall any time soon. Equally, there has been little discussion about the lifestyle changes that will need to accompany the green technologies, if the US is really to make a fair contribution to tackling climate change.

The potential for the thoughtful use of technology to go hand-in-hand with lifestyle change as a way of producing both environmental and social benefits was demonstrated amply at SGR's conference in October. The theme was sustainable buildings and communities and this Newsletter features several articles based on material presented at the conference (see pp. 6-9 and pp. 19-22). For example, on p.22, Gavin Killip highlights the potential of changes in the UK housing sector which would allow it to make a major contribution to reducing greenhouse gas emissions.

Indeed, there have been some positive political developments on the environmental front in the UK in recent months. In December, for example, the Climate Change Bill became law with a strong target (see p.4), and some of the attempts to tackle the economic recession are aimed at stimulating the development of the low carbon economy (see p.1).

However, other recent government activities are undermining these positive steps – for example, the very poor decision to go ahead with the third runway at Heathrow.

Perhaps most disheartening for scientists and engineers of an ethical persuasion was the appointment of Lord Drayson as the UK's new Science Minister. From 2005 to 2007, he was Minister for Defence Procurement, overseeing the launch of the Defence Industrial Strategy. He later left government to pursue his motor-racing hobby. His political career has also been mired in controversy related to his business interests.[1] What kind of a message does his appointment send about the responsible role of science and technology in today's society?

Stuart Parkinson
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Reference

1. Wikipedia (2009). Paul Drayson. http://en.wikipedia.org/wiki/Paul_Drayson

Security and disarmament activities

SGR has maintained its momentum on issues such as the militarisation of science, nuclear weapons, the link between peace and environmental concerns, and broader disarmament issues.

Thanks to new funding from the Network for Social Change, we have been able to continue to disseminate our reports and other material that challenges the militarisation of science and technology. Since September, over 600 copies of our reports have been downloaded from our website, and dozens of printed copies distributed. Chris Langley authored an article in *Science and Public Affairs*. Stuart Parkinson published an article on military science in the EU in a special issue of the *INES Newsletter*. Other coverage appeared in *Peace Matters, Abolish War* and *Defence Management*. Chris also assisted a mature student at the University of Strathclyde with his Masters dissertation on military involvement at Scottish universities. The release of the dissertation received good media coverage in Scotland. In January, Chris gave a seminar at the Praxis Centre at Leeds Metropolitan University. Our networking with others similarly concerned about both the commercialisation and militarisation of universities continues.

Our activities in support of nuclear weapons disarmament included signing two internet appeals to incoming President Obama calling for US leadership for a nuclear weapons-free world. Philip Webber supplied information to *Channel 4 News* related to a story about flooding at the Atomic Weapons Establishment (AWE). Kate Macintosh put together an SGR objection to a new planning application made by the AWE. We also continued to highlight the links between nuclear weapons and nuclear power (see p.4).

Our activities have also included highlighting the links between climate change and conflict. In particular, Stuart Parkinson gave a presentation on this topic at the AGM of the Movement for the Abolition of War in November.

Finally, we endorsed a statement by the International Peace Bureau arguing for global military spending to be reduced in favour of spending in areas such as poverty alleviation and environmental protection. The statement was presented at a major UN conference on financing for development in November.

Copies of many of the documents and presentations mentioned above are available from SGR's website at http://www.sgr.org.uk/arms.html SGR speakers are taking part in a number of events on these issues over the coming months. For the latest details, please see http://www.sgr.org.uk/forthcoming.html

Climate change and energy activities

The last few months have seen many developments on climate and energy issues both in the UK and overseas – and SGR has kept up its activities across these areas.

In December, the Climate Change bill became UK law. It was especially gratifying that the bill included stronger targets – which SGR had argued for (along with others) – i.e. a cut in greenhouse gas emissions of 80% by 2050 (from 1990 levels).

We have also continued to argue for greater effort in curbing energy demand and expanding renewable energy. In September, Martin Quick co-ordinated the SGR submission to the government's consultation on its renewable energy strategy. One of our key arguments was that much greater effort is needed to build a strong renewable energy industry in the UK, and so provide benefits in terms of large reductions in carbon emissions, increased energy security and more employment. We also joined the Renewable Energy Tariff coalition, which lobbied during the autumn for a financial support system for renewable energy similar to the feed-in tariff used successfully in countries such as Germany. The coalition was successful in convincing the government to commit to bringing in such a system within 18 months.

The annual SGR conference in October also focused on issues related to energy use. The theme was sustainable buildings and communities, with speakers pointing out the importance of careful design in order to reap large environmental and social benefits (see p.19).

We have also continued to raise awareness of the threat of climate change. To this end, Stuart Parkinson gave a presentation entitled 'Climate change: how serious is it?' to a West Yorkshire branch of the University of the Third Age. The event attracted a large audience (over 180 people), as well as some media coverage. Stuart also spoke on a similar topic to a public meeting in Arnside, Cumbria, in January.

TalkWorks

Keith Barnham makes the case against nuclear power at a meeting in Abingdon, Oxfordshire

Our work challenging the renaissance of nuclear power has also continued. Keith Barnham gave two presentations in November on this issue, one in Oxfordshire and one at the Royal Society of Arts in London, in particular highlighting the links between military and civilian nuclear activities.

Also, the 'Nuclear Dilemma' exhibition, which SGR assisted with its factual content, opened at a venue in Spain in September, following its successful showing in Switzerland. The exhibition is coming to the UK in 2010-11 and the organisers are seeking help with finding venues especially at universities. If you can help with this, please email Stuart Parkinson at <stuartp@sgr.org.uk>

Copies of many of the documents and presentations mentioned above are available from SGR's website at http://www.sgr.org.uk/Climate.htm

The incoming National Co-ordinating Committee

The election for SGR's National Co-ordinating Committee (NCC) for this year was held during the Annual General Meeting on 25 October (see report on p.19). The incoming NCC is as follows:

Chair:	Philip Webber
Vice-chair:	Kate Macintosh
Treasurer:	Patrick Nicholson
Secretary:	Harry Tsoumpas
Committee members:	Alasdair Beal
	Roy Butterfield
	Tim Foxon
	Hilary Chivall
	David Hookes
	Patricia Hughes
	Martin Quick

At the first meeting of the new NCC in January, it was agreed to co-opt Rachel Marshall and Sean Rose to be SGR's student representatives.

Some of the new NCC and staff (from left to right): Hilary Chivall, Kate Macintosh, David Hookes, Stuart Parkinson, Alasdair Beal, Tim Foxon, Patrick Nicholson, Roy Butterfield, Philip Webber, Chris Langley

Wendy MacLeod-Gilford 1939-2008

Wendy MacLeod-Gilford, long-standing peace activist and member of SGR, has died aged 69.

Wendy was born in Bristol in 1939. She worked for the Atomic Energy Authority, Rutherford Laboratory and Plessey Radar from 1960 to 1980. In the early 1960s, she saw classified photographs of the victims of the Hiroshima and Nagasaki atomic bombs. The destruction and human devastation wrought by nuclear weapons shocked and appalled her.

Having realised the immorality of nuclear weapons, in 1984 she became a peace campaigner and joined CND. Together with other women from Oxfordshire, she did a regular soup run to the women's peace camp at Greenham Common. In 1985, she married Mick Gilford and together they founded Blewbury Environmental Research Group. Her environmental and anti-nuclear activities continued, taking part in protests at nuclear and other sites around the UK, including Harwell where she had worked. She tracked nuclear convoys and raised awareness of the dangers. She tracked nuclear waste too and campaigned to close down faulty reactors and radioactive incinerators on the Harwell site.

She was a tireless campaigner who read and absorbed vast amounts of scientific information. She found flaws in technical documents with alacrity and could present her arguments simply and convincingly.

She leaves a widowed husband, many friends who thought of her as a second mother, and a memorable legacy. To quote one of her SGR colleagues, "she was an amazing person and an inspiration to many of us."

Thanks to Mick Gilford

Science ethics and policy activities

SGR has undertaken several activities over the last few months on issues such as science and society, and ethical careers.

In October, Stuart Parkinson co-ordinated the SGR response to the government consultation on science and society. In it we argued that the government often glosses over the ways in which the misuse of science and technology contributes to global social and environmental problems. We argued there needs to be a more open dialogue about this, including the problems caused by powerful vested interests, such as big business and the military. In December, Chris Langley was interviewed about the misuse of science for Teachers TV.

Our ethical careers programme has also continued. In October, Dave Webb gave a seminar on the programme at an academic conference at Hamburg University. In November, SGR material was made available to students at a science and technology careers fair at York University. As we go to press, we are preparing to run stalls at several university careers fairs up and down the country during the spring term.

More information about SGR's activities on ethical careers and science policy can be found on our website at **http://www.sgr.org.uk/ethics.html** and **http://www.sgr.org.uk/SciencePol.html**

Santa Goes Running (SGR) and other fundraising activities

Office staff Kate Maloney and Jane Wilson, along with Jane's son Jack, took part in a Santa Charity Fun Run in Folkestone in November. Over 600 men, women and children dressed as Santa assembled in the town centre and then ran or walked the 6km course.

SGR office staff, Kate Maloney and Jane Wilson, and Jane's son Jack take part in a Santa Charity Fun Run.

Together the SGR team raised over £250 for the Martin Ryle Trust (of which SGR is one of the main beneficiaries), Pilgrims Hospices in East Kent, and the Cystic Fibrosis Trust Kent. Although the weather at the end was somewhat damp, a fun day was had by all!

Another innovative fundraising activity was carried out by an SGR member who asked for donations to the Martin Ryle Trust in lieu of presents on the occasion of a special birthday. This resulted in kind friends raising £630 for the Trust.

If you are taking part in any local fundraising for SGR (through the Martin Ryle Trust) and would like to be featured in the next issue of the Newsletter, please email details and any pictures to **<janew@sgr.org.uk>**

1,000 members and counting!

SGR has now reached a milestone in its membership expansion. We now have 1,000 members, 362 of whom have been recruited in the last 3 years!

This is a fantastic achievement in the development and influence of the organisation but we still need to expand further to give us the financial security that we need.

If you have any colleagues, friends or relatives that would be interested in joining, then do please give them a membership leaflet or direct them to the 'join' section of our website at http://www.sgr.org.uk/joinsgr.html

Key principles in making sustainable buildings and places

Sandy Halliday traces the evolution of the principles behind sustainable design, and argues for their much wider use.

'Sustainable development' has suffered from an image problem. It requires us to act in a sensitive manner towards natural systems, and has for many years been seen as a restraint on development per se.

A clue to the image problem lies partly in our use of language. Currently the 'S' word is rarely out of the press, lecture theatre or office. For something this ubiquitous it is remarkably poorly understood, and the source of much debate and disagreement. Engineers who justifiably splutter at their students' failure to distinguish between 'power' and 'energy', and politicians who can fit a bus between 'government' and 'parliament', seem content to use 'sustainability', 'environment', 'global warming' and 'climate change' interchangeably. It highlights a real confusion. It appears that increasingly people talk about sustainability like ten-year olds talk about sex – a lot, but without any great insight. We need to talk about the 'D' word. Sustainability is about how humanity *develops.*

Only recently, 37 years after the first intergovernmental conference on environmental issues, and a similar period after I first read about the impact of climate change in my school text book, is it emerging that sustainability is a totally justified restraint on *inappropriate development* and a major driver of reversing unsustainable trends and hence improving quality of life for all.

Human skills and ingenuity have transformed the environment. The quality and quantity of life in recent decades has vastly extended for many. However, for some, inappropriate development means that high quality of life has become a distant collective memory, and for many others there have been unintended consequences that can take the edge off any celebration. Whether the unintended consequence is escalating knife and gun crime, disaffection, inequality, racial and religious tension, water pollution, the rise in asthma, an obsession with consumerism, or erosion of the rights of the elderly – the list is long – the extent to which our activities lead to 'unsustainability' has become clearer.

There is much to do. This is equally true of Africa, Brazil and of deprived areas of the UK. Across the globe there is a realisation that pursuit of 'progress' has unintended consequences that need to be recognised and avoided. Resolving the dilemmas that result from this progress, and taking frequent reality checks to ensure that what we are doing is taking us in the right direction, is *the* most progressive, positive agenda, and perhaps the most awesome challenge we face. Yet for years it has not been seen as such.

In my work, I find clients, designers and students most responsive to the concept of sustainability when they are presented with the emergence of the fundamental principles, rather than a definition. A multi-dimensional perspective on the issues and challenges provides a good grounding and a basis for creativity and problem solving to emerge.

The history of international action

Much visual art, religion and poetry would suggest that concerns for the natural environment are deeply rooted in the human psyche. Yet it was very recently that environmental protection became a respectable concern. In the 1950s such concerns were perceived as a preserve of the elite and the politically subversive – strange bedfellows in other times! A change in attitudes began in the 1960s mainly in industrialised countries, with concerns about pollution, disaffection, wealth imbalances and urban sprawl. Rachel Carson's work on toxicity played a seminal role.

The first Club of Rome meeting in 1968 opened up the international debate on 'How we develop?' The resulting 'Limits to Growth' report pointed out that it is not the number of babies, cars or refrigerators that put stress on an environment, but the efficiency with which we use resources and minimise pollution and net waste. It delivered, to my mind, the optimistic conclusion "that there are limits to growth but no limits to development" – development being largely in our power of design, invention and creativity.

The UN Conference on the Human Environment in 1972, at which 113 countries were represented, transformed the environment into an international political issue and signalled the birth of agencies and legislation to start to resolve the conflicting dilemmas of growth, development and environment. It was recognised as pragmatic and in every country's interest to do so.

In 1987, the Brundtland Commission published a report which coined the term 'sustainable development'. This established the agenda for the international policy debates and agreements that followed, covering concepts such as inter- and intra-generational equity, the precautionary principle, the protection of biodiversity, and the internalisation of external costs. That was over 20 years ago, so where are we now?

Sustainable design is that which delivers real benefits

Most countries have ignored the agreements and are adopting styles of development that are inappropriate and unsustainable. The quality of most built development, for example, is a disgrace. Global improvements are the exception, not the rule. There is ever-increasing demand on the earth's limited resources, escalating pollution and growing inequality. In industrialised nations, there is a growing tendency to nihilism. With evidence of massive environmental damage in developing nations it can seem pointless to try to do anything.

So it is now more important than ever to appreciate that *sustainable design is that which delivers real benefits.* We need look no further than pedestrianisation to see that rules and guidelines reap instant rewards. And there is much to be done!

The legislative context is unhelpful, and typically two decades behind best practice. Instead of seeking best value, healthy, efficient buildings, our government and policy initiatives are looking for one-dimensional margin-chasing technical fixes which, like the private financing initiative (PFI), will leave a sorry legacy. Howard Liddell's book[1] on eco-minimalism covers the territory in depth, based on more than 30 years of practice and applied research.

To meet the challenge in the UK and beyond we have to enhance quality of life for all by designing healthy buildings and environments fit for individuals and communities both now and in the future. We need to minimise resource throughputs, waste and pollution, and to fulfil our responsibility to protect other species and ecosystems. Buildings and the built environment will therefore increasingly be required to satisfy a number of criteria, including that they should:

- enhance biodiversity – not use materials from threatened species or ecosystems and improve natural habitats where possible through appropriate planting and water use; support communities – identify and meet the real needs, requirements and aspirations of communities and stakeholders and involve them in key decisions;

- use resources effectively – not consume a disproportionate amount of resources, including money and land during material sourcing, construction, use or disposal; not cause unnecessary waste of energy, water or materials due to short life, poor design, inefficiency, or less than ideal construction and manufacturing procedures. Buildings have to be affordable, manageable and maintainable in use;

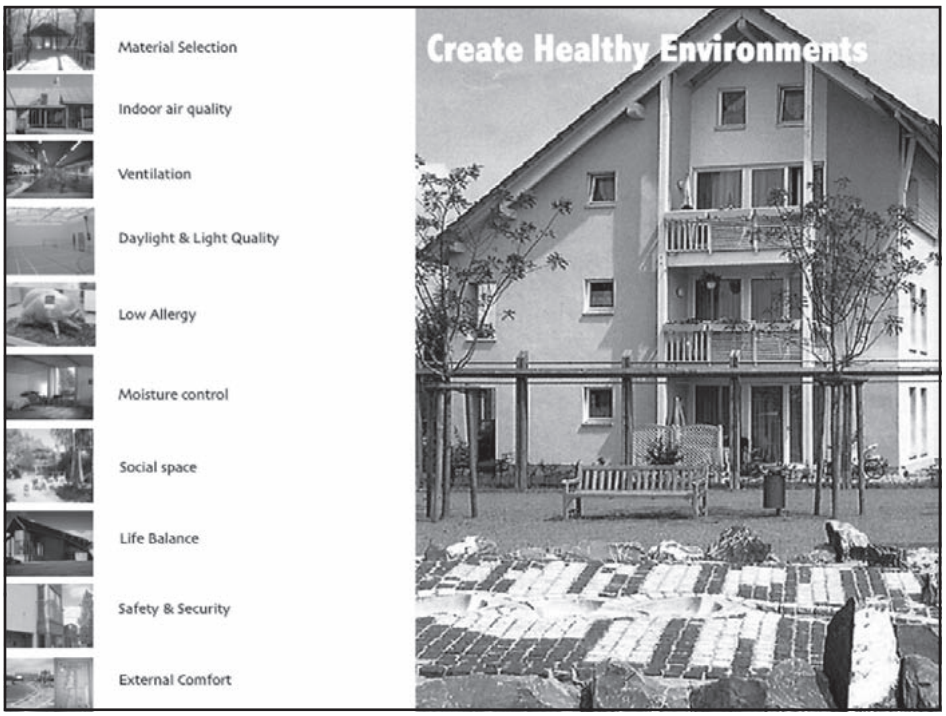
- minimise pollution – create minimum dependence on polluting products, materials, management practices, energy and forms of transport;

- create healthy environments – enhance living, leisure and work environments; and not endanger the health of the builders or occupants, or any other parties, through exposure to pollutants, the use of toxic materials or providing host environments to harmful organisms;

- and manage the process – stewardship of projects is a vital and overarching aspect in delivering sustainable projects, both in the first instance and also in ensuring their performance over time. Too many aspirations are undermined by failure to manage the design process, particularly at crucial handover points where responsibilities change. This requires us to identify appropriate targets, tools and benchmarks, and manage their delivery.

Sustainable design is a process not a product

Constant innovation and vigilance are vital to delivering best practice. At Gaia Research[2], we try to engage clients, designers, developers, politicians, users, teachers, parents and children fully in what we are seeking to achieve and how to achieve it[3]. We use tours, workshops and community consultation. We have found that there is often a willingness to make a difference but many designers and developers simply do not know what they do not know. Much of our work involves an education process to encourage clients and teams to set their own targets – we then become facilitators in the delivery process.



Gaia Research

As an example, the passive-solar[4] school at Acharacle, Scotland came about through taking interested politicians, designers, educators and estate managers on working tours of schools in Norway and Germany. The experience generated an invitation to write a brief for a best practice sustainable school and Gaia won the tender competition to build it.

Our regeneration projects start from where residents are rather than wholesale clearance. They result in successful, affordable, healthy new-build and refurbishment initiatives, driven by and for communities.

The future

Alongside the environmental destruction in developing countries there are very many exemplar projects evolving in Continental Europe, and ecological towns developing in South America, Taiwan, India and the USA, which surpass the UK's puny initiatives. These will challenge people to think about what is *appropriate* development. Their design ambitions and success or failure may determine life quality for the majority in this millennium.

How good would it be if future development of land, buildings and the economy were non-toxic, equitable, supportive of community and bio-diversity and resource-efficient? *This is sustainable development.* It's about design. We have the knowledge. We just need to commit to making development appropriate. It's up to us.

Professor Sandy Halliday is a chartered engineer working in research and design of sustainable buildings and places. She is Principal of Gaia Research and also the Royal Academy of Engineering Visiting Professor in Engineering Design for Sustainable Development at the University of Strathclyde, Glasgow.

This article is based on a presentation given at SGR's 2008 conference (see p.19). Her latest book is reviewed on p.25

Notes and references

1. Liddell H (2008). Eco-minimalism - the antidote to eco-bling. RIBA Publications.
2. Gaia Research is part of a 'boutique' practice which combines architecture, engineering, landscape and masterplanning – see: http://www.gaiagroup.org/
3. For more examples, see: Halliday S (2007). The Green Guide to the Architect's Job Book. RIBA Publications; Halliday S (2008). Sustainable Construction. Butterworth-Heinemann. Gaia Research also has an extensive range of publications available, many on-line – see http://www.gaiagroup.org/Research/publications.html
4. The school has been designed to the 'passivhaus' standard – see http://www.passiv.de/.

Social housing projects could learn from past successes

Past collaborative efforts of architects and policy-makers have produced elegant social housing solutions. Kate Macintosh reflects on two examples and how their lessons could help the housing crisis.

Social housing is in short supply. 1.7 million homes, built at the public's expense, have been sold off for a fraction of their market value since 1980. East London boroughs have already lost half their stock (of course the more attractive half) and the 'right to buy' policy has had the unintended consequence of stoking the housing market and at the same time shrinking the social rented sector to the least desirable properties.

The Byker development in Newcastle, adjacent to remaining old terraces.

Furthermore, for the last 15 years the government has encouraged local councils to hive off their stock, either to housing associations or arms-length management organisations. Cash to maintain existing stock has been withheld under a bizarre redistribution formula through which the Treasury receives £800 million in council house rents from local authorities but returns only £600 million to councils, with no guarantee that the £200 million difference will be ploughed back into housing.

Since the credit crunch has hit, even housing associations are having difficulty funding new developments because they are unable to sell off the allocated proportion of their stock to raise finance.

There were officially 149,900 homeless families in UK in 2007 and there are considered to be 400,000 additional 'hidden' homeless: single people shacking up with friends. How can this situation be improved? One solution is to restore the right to councils to buy sites and build homes to let. If a change in government policy allowed this, it is to be hoped that such developments would be informed by the two success stories described below.

The Byker development in Newcastle[1]

In 1970 Newcastle City decided to carry out a massive redevelopment of the area to the north of the centre known as Byker. The existing housing in this 200-acre site was all 19th century, two-storey terraced cottages. They appointed a UK-born architect who had worked all his professional life in Sweden, Ralph Erskine[2]. What Erskine brought to the development process, apart from a well-honed sensitivity to environmental issues, was a commitment to respect for the user-client and a belief in *real* consultation. The process of development was openly discussed with the locals at all stages.

The team responsible for the implementation had a site office in a former undertaker's parlour, where locals could drop by at any time in the working day. Life for the 15 office staff would have been impossible without support from the residents for what was being planned. The policy was adopted that all residents who wished would be re-accommodated in one of the 2,400 homes of the completed scheme. The site clearance and rebuilding were therefore carried out piecemeal, taking great care to protect as far as possible the adjacent houses from the nuisance of building work. No doubt the sharing of that on-site life by the architects led to a mutual tolerance.

Public Lecture
Climate change and military conflict

Dr Stuart Parkinson
Scientists for Global Responsibility

Wednesday 25th March, 7.30pm
C-SCAIPE, Kingston University
Penrhyn Road, Kingston KT1 2EE

Part of 'Think in Kingston' event -
for more details, see:
http://www.kingston.gov.uk/think-in-kingston

The first show flat was furnished with furniture loaned by a local resident and the whole process lasted until 1984 when the site office closed.

The Byker approach sets a benchmark for achieving urban renewal in a way that brings socially sustainable improvements. It required full commitment from the architects, who gave uncounted unpaid hours to the participation process.

The site is known for its landmark barrier-block for single people and childless couples, featuring its largely imperforate, undulating northern wall, which protects the low-rise terraces of housing on the southern slope from the noise and disturbance of a rapid-transit route, linking Byker with the city centre. The unity of the design has since been compromised by right-to-buy, but the management proposal put forward by Erskine's team has now been adopted and the Scheme was listed grade 2* in 2007.

Kate Macintosh

A three-storey terrace in the Byker development

Kate Macintosh

The Lifschutz Davidson building and OXO tower – part of the Coin Street development, London

Coin Street Community Building on London's South Bank

The achievements of the Coin Street Community Builders (CStCB) provide a very interesting example of community building. Their achievements are the result of tenacious campaigning and endeavour, which was sparked off in 1974 when the (then Conservative-controlled) Greater London Council (GLC) proposed selling off a site on the south bank of the Thames. This site stretched from Waterloo to Blackfriars Bridge and was earmarked for large-scale office development.

After many years of campaigning, the policy of GLC changed in 1981 in favour of the community builders. The site was sold to them in 1984.

Since that time the CStCB has created four housing co-operatives and 220 homes, which provide housing for 1000 people. There is also a public park, a river-side walk, an office building with ateliers for artist/craftspeople and a roof-top restaurant within the OXO tower and factory. The retention of these two buildings from the site's industrial past was the key to achieving a balance sheet that stacked up.[3]

Kate Macintosh

The interior of the Haworth Thompkins Nursery

The group has more recently completed a community centre with a 64 place crèche and a conferencing suite for hiring out. They have further development plans (all funded from lettings profits) for a swimming pool and fitness centre.

The whole enterprise is run as two not-for-profit companies, CStCB and Coin Street Secondary Housing Co-operative. The CStCB team also initiated the setting up of South Bank Employers, a partnership of organisations in the area with a social focus, through which they liaise with other enterprises in the area on employment, festivals and cultural events.

Public housing: the future

Faced with a stalemate in the housing market, the former housing minister Caroline Flint announced at the start of the credit crunch that she would be "willing to take a totally pragmatic" view of whether councils could be allowed to establish joint ventures with developers to build both private and social homes while retaining management control over the latter. If council home building is re-activated, the lessons of Byker and Coin Street would prove useful guides to the way it is handled.

Kate Macintosh MBE Dip Arch is Vice-Chair of SGR. She was awarded the MBE in 1987 for services to architecture.

This article is based on a presentation given at SGR's 2008 conference (see p.19).

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The MOD Grand Challenge: war games for young engineers?

Phil Chamberlain discovers some disturbing activities on Salisbury Plain.

The 'Grand Challenge' was a Ministry of Defence competition where entrants were encouraged to design a new robot to be used in urban warfare. While the military imperative behind this competition was clear, it also had several other objectives – some commercial, some promotional. For example, it brought small military/defence companies to the attention of the MOD, and it fostered links between established defence giants and potential suppliers. But most disturbingly, it helped promote military industry inside universities and schools.

Hundreds of organisations originally got in touch and eventually they coalesced into 23 teams, of which 11 reached the final. The competition was deliberately designed to attract entries from small defence firms and educational establishments. Indeed the MOD funded six teams to "ensure a diverse representation of solutions". This ensured that two schools and seven universities made it to the final. Whether it was more important to bring in potential partners than the quality of their entry was not clear.

One of the competition's key aims was: "To provide an opening into the UK defence market for new suppliers and investors". This echoed the objective of the Defence Technology Strategy (DTS) under which the competition was launched. The DTS sets out the MOD's research and development priorities for providing future UK military capability.

Lord Drayson, the then Defence Procurement Minister (and now Science Minister), said at the time of the competition's launch: "I am well aware how difficult it is for smaller companies and research laboratories to get large organisations interested in their ideas. Through the Grand Challenge I believe we will make it much easier for them to approach the MOD."

The stage for this beauty contest was Copehill Down, a huge mock village on Salisbury Plain. It has trained troops in urban warfare for 20 years. The teams had spent a year preparing for the three days they would get to test their systems. It was also the culmination of an intensive MOD public relations effort. Dozens of journalists from across the world attended and were treated to a fly-past by the Red Arrows, a Eurofighter and an Apache helicopter. The cost in fuel alone for those three aircraft could have been used to fund a whole new team.

A movie production company was employed to run the show. Television presenters Vicki Butler-Henderson and Phillipa Forrester, who also do not come cheap, interviewed contestants for the sake of the cameras and presented the awards. The MOD's public-relations team made sure that footage and words were repackaged and issued in as many different outlets as possible – including those targeting schools.

The autonomous systems themselves were eye-catching. There were mini-helicopters, flying saucers, radio-controlled cars and even hi-tech wheelbarrows. Each was packed with detection systems not only to register thermal signatures but to identify suspect cars or sniff for chemical traces. This was not a glorified 'Robot Wars' though. The UK and overseas military were taking it very seriously.

There were lots of men in trench coats peering excitedly inside the machines. These were the scientists from departments such as the Defence Science and Technology Laboratory. Meanwhile Tom Killion, the US Army's chief scientist, had also come along together with colleagues from the US Soldier Battle Lab and defence attachés from several foreign embassies.

As well as the universities of Warwick, Surrey, Manchester, Reading, Bristol and Portsmouth, sixth-formers from two schools also took part. On 'Team Mira' pupils from the Royal Grammar School Guildford, who helped design its entry, had their work assessed as part of their final A-level course. Meanwhile pupils from Bruton School for Girls in Somerset, part of the 'Silicon Valley' Team, did the research and building in their own time.

Steve Christopher, Head of Technology at Bruton, admitted that the thought of taking part in a military event had given him pause for the thought – but the opportunity was too good to pass up. He identified a lack of role models for young people interested in engineering.

While the MOD was making the most from the 'Grand Challenge' military companies saw opportunities too. Thales ran its own competition alongside the MOD one, asking schools to submit designs for their own autonomous vehicles. Dawn Ohlson, Director of Educational Affairs at Thales, works to encourage links between schools and the defence firm. "I've never had a school say no because we are a defence company," she said. "But then it depends how you present it. We don't go in and say would you like to see our guns."

Many of those taking part argued that, while their machines were designed for military purposes, there could be significant civilian spin-offs. Suggestions included television companies using the flying spy planes for filming and developing countries adapting one of the vehicles to clear mines. When asked why not just build a mine clearance vehicle, one of the scientists replied: "Well, no-one's going to fund that. I mean, where's the return for the company?"

Phil Chamberlain is a lecturer in journalism at University of the West of England, and writes for a number of publications including Engineering and Technology.

Phil Chamberlain

A mini-helicopter: one of the entrants in the MOD's Grand Challenge

President Obama and a world free of nuclear weapons

US campaigner, David Krieger is hopeful about future progress on global nuclear disarmament.

The election of Barack Obama as President of the United States is a great moment for America and the world – a time of celebration and tears. The American people have chosen hope over fear, unity over division. In doing so, we have repudiated policies of violence, lawlessness and closed-door rule. We have restored hope and made possible the restoration of America's credibility in the world.

President Obama has already made many statements about US nuclear policy during his long campaign for the presidency. The one I like best is: "A world without nuclear weapons is profoundly in America's interest and the world's interest. It is our responsibility to make the commitment, and to do the hard work to make this vision a reality. That's what I've done as a Senator and a candidate, and that's what I'll do as President." [1]

He has also said, "I will make the goal of eliminating nuclear weapons worldwide a central element of US nuclear policy".[2] He has also wisely stated that "if we want the world to de-emphasize the role of nuclear weapons, the United States and Russia must lead by example".[3] He has made clear that he does not seek unilateral disarmament, but that America must lead in achieving the global elimination of nuclear weapons.

Among the specific steps for US leadership that the newly elected President emphasised in his campaign are the following:[4,5]

- lead an international effort to de-emphasise the role of nuclear weapons around the world;
- strengthen the Nuclear Non-Proliferation Treaty;
- lock down the loose nuclear weapons that are out there right now;
- secure all loose nuclear materials within four years;
- immediately stand down all nuclear forces to be reduced under the Moscow Treaty and urge Russia to do the same;
- seek Russia's agreement to extend essential monitoring and verification provisions of the START I (Strategic Arms Reduction Treaty) before it expires in December 2009;
- work with Russia to take US and Russian ballistic missiles off hair-trigger alert;
- work with other nuclear powers to reduce global nuclear weapons stockpiles dramatically by the end of his presidency;
- stop the development of new nuclear weapons;
- seek dramatic reductions in US and Russian stockpiles of nuclear weapons and material;
- set a goal to expand the US-Russian ban on intermediate-range missiles so that the agreement is global;
- build a bipartisan consensus for ratification of the Comprehensive Test Ban Treaty;
- cut investments in unproven 'Missile Defense' systems; and
- not weaponise space.

President Obama has proven himself a man of vision and integrity. For the first time since Presidents Reagan and Gorbachev met at the Reykjavik Summit in 1986 and came close to reaching an agreement on abolishing nuclear weapons, the vision of a world free of nuclear weapons appears to be within the realm of possibility. This will require presidential leadership, and the President will need support and encouragement from the American people and from people throughout the world.

Dr David Krieger is Chair of the International Network for Engineers and Scientists for Global Responsibility (INES) and President of the Nuclear Age Peace Foundation, USA.

This is an updated version of an article which first appeared in *What's New in INES*, November 2008. Reprinted with permission.

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Deterrence irrelevance: Trident, Britain and nuclear weapons

Nick Ritchie outlines the serious flaws in the logic of nuclear deterrence upon which the proposed replacement of Trident is based

In December 2006, the British government released a White Paper announcing its intention to begin the process of replacing the current Trident nuclear weapons system, thereby enabling it to retain nuclear weapons well into the 2050s.[1] The government's case rested on the continuing relevance of the logic of nuclear deterrence for long-term British security. Particularly prominent was the assertion that nuclear weapons provide an insurance, or guarantee of protection, against future strategic threats to the country and its 'vital interests'.

The logic of nuclear deterrence elaborated by US strategists as the Cold War unfolded asserted that an adversary could be successfully persuaded to refrain from or to halt its aggressive actions through the threat to inflict unacceptable and inescapable damage with a retaliatory nuclear strike. The threat of nuclear devastation would decisively alter the aggressor's calculation of the costs and benefits of its actions causing it to change its behaviour.[2] Proponents of nuclear deterrence argue that it is the possibility of nuclear retaliation that has kept the peace between the major powers since the Second World War by making the costs of aggression prohibitively high.[3]

Despite the apparent simplicity of this logic, theorists and policy-makers have struggled to devise credible policies to deter adversaries with the threat of a retaliatory nuclear attack. Interpretations of nuclear deterrence and its translation into strategy, force structure and command and control processes have varied considerably.

Problems with deterrence

The problem with the government's undimmed faith in the logic of nuclear deterrence is that it is not an exact science. The seemingly straightforward cause-and-effect equation at its heart is unreliable and success is far from assured for a number of reasons.[4] First, simply deploying a 'deterrent' does not automatically ensure that others will be 'deterred' because nuclear deterrence is a process rather than a quality intrinsic to nuclear weapons. The government is misleading when it refers to its nuclear weapons as 'the deterrent'.[5]

Second, the effectiveness of deterrent threats is based on the perceived credibility of the threat in the eyes of the deterrer and the deteree. Nuclear deterrent threats need not be 100 per cent credible to be effective, but the less credible the threat the less effective it will be.[6] The credibility of nuclear deterrent threats was questioned repeatedly throughout the Cold War leading to regular revisions of nuclear strategy.[7]

Third, nuclear deterrence in practice does not automatically stabilise relations between nuclear-armed opponents as is often claimed. Different governments and leaders may interpret the dynamics of nuclear deterrence, its cost-benefit calculus and the credibility of nuclear threats quite differently.[8] This can lead to dangerous misunderstandings, miscalculation or determined resistance to deterrent threats.[9]

Finally, it cannot be unequivocally asserted that nuclear deterrent threats were the primary reason the Cold War did not turn hot. Powerful arguments can be made that the sheer scale of destruction with conventional weaponry that accompanied the Second World War was sufficient to deter future global war between the major industrialised powers.[10] The advent of nuclear weapons intensified the reluctance of major powers to engage in mass war but it did not establish it.[11]

Trident replacement: flaws in the use of the deterrence argument

The government claims in its 2006 White Paper that nuclear deterrence still pertains in four broad areas:
1) deterrence against aggression towards British/NATO vital interests or nuclear coercion by major powers with large nuclear arsenals;
2) deterrence against nuclear coercion or blackmail by regional 'rogue' states armed with weapons of mass destruction (WMD);
3) deterrence against state-sponsored acts of nuclear terrorism; and
4) a general residual deterrent to preserve peace and stability in an uncertain world.[12]
All four claims have serious problems.

1) The only major powers likely to have the capability, and possibly the intention, in the future, to threaten Britain and Europe with nuclear attack are Russia and China. Yet the long-term, post-Cold War trend in relations with both major powers has been positive, current tensions with Russia not withstanding. Both countries are becoming ever more integrated into the global economy and the prevailing international order. Their nuclear arsenals, which Russia is keen to reduce and China has kept deliberately small, have little relationship with Britain's. Confrontations and crises will undoubtedly occur, some of which may have military dimensions, but it is barely conceivable that British nuclear deterrent threats and consideration of using nuclear weapons against Russia or China will ever be part of the solution to future confrontations, particularly in the absence of Cold War ideological enmity.

2) Threats to use nuclear weapons against WMD-armed 'rogue' states are highly problematic. Limited military objectives may be achievable if Britain gets involved in future military interventionist activities against a 'rogue' state in possession of advanced WMD. Nevertheless, it will be dangerous to assume that British nuclear deterrent threats will keep a conflict at the level of conventional weaponry, particularly if the survival of the 'rogue' regime is threatened and whose intentions, values and understandings are less than clear. Containment, isolation or engagement will likely represent a more productive strategic choice. Furthermore, the credibility and legality of threatening major, indiscriminate civilian casualties through the use of British nuclear weapons in retaliation for a WMD attack by a 'rogue' leadership is highly questionable and would have deleterious long-term consequences for British security. Does this leave Britain open to the much-feared nuclear coercion? No. Nuclear coercion, or 'blackmail', has rarely worked in practice. As Michael MccGwire argues, "Despite theorists' best efforts, there is still no example of nuclear compellance. This inherent constraint applies to the rogue state that acquires a minimal capability".[13]

3) Similar reasons undermine the role British nuclear weapons can play in deterring state-sponsored acts of nuclear terrorism. Effective nuclear deterrent threats or retaliation with British nuclear weapons will require incontrovertible evidence of state sponsorship of nuclear terrorism that will be hard to ascertain. Terrorist groups may also actively seek nuclear retaliation for their attacks, and killing many thousands, or tens of thousands, of civilians in the sponsoring state would be massively disproportionate and counter-productive.

4) The government's insistence that British nuclear weapons provide a general deterrent to threats against its 'vital interests' in a complex, uncertain future international security environment is also highly problematic. First, the government's emphasis on nuclear weapons as a form of insurance is dubious. Nuclear weapons provide no insurance in the generally accepted understanding of the term, i.e. as a guarantee of reimbursement for loss under the terms of an agreement. They can only provide some assurance of revenge rather than an insurance, or guarantee of protection, against attack and the two should not be conflated. Furthermore, possession of

nuclear weapons has failed to provide an 'insurance' against threats to the 'vital interests' of nuclear weapon states in the past. Argentina's invasion of the Falklands/Malvinas is an important example.[14]

Second, threats to Britain's 'vital interests' from 'future uncertainty' are increasingly likely to arise from a complex and interdependent mix of environmental, economic, military and political sources of insecurity, including the effects of climate change, mass poverty, global pandemic diseases, weak and failing states, international terrorism, the spread of WMD and advanced conventional military technologies, ethnic and sectarian nationalism, and competition over access to key resources such as oil and water.[15] Such threats will not be susceptible to purely military solutions and the use of military force in regional crises will be messy, indeterminate and of limited value.[16] British nuclear deterrent threats and the use of a devastatingly blunt instrument like a nuclear weapon cannot hope to offer any useful solution to such complex threats and conflicts. The government's argument that we must keep nuclear weapons 'just in case' because the future security environment appears so uncertain makes no sense if British nuclear threats offer no solution to the causes or symptoms of that uncertainty.

In summary: it is very difficult to make a compelling case for British possession of nuclear weapons based on the continuing relevance of the logic of nuclear deterrence, and the necessity of being able to threaten to kill tens, if not hundreds, of thousands of people for long-term British security. In fact, nuclear weapons offer very little to British security and the current or future government should seriously rethink the decision to replace the current Trident system.

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Trident replacement timeline

The government has stated that the first new submarine should enter service in 2024. The Ministry of Defence (MOD) procures new weapon systems according to its CADMID cycle of Concept, Assessment, Demonstration, Manufacture, In-service and Disposal. These factors lead to the timetable below.[17]

Year	Activity
2007	**'Concept' phase start.** The decision endorsed by parliament in March 2007 to begin the process of commissioning new submarines to carry the Trident missile into the 2050s authorised the first phase of CADMID only.
2009	**'Assessment' phase start.** The decision to move to the next phase – often referred to as the 'initial gate' decision – is due to be taken in September 2009. At this point the MOD would place a full design contract for a new submarine.
2010-15	**'Demonstration' phase start.** Two crucial decisions would be taken in the next parliament (2010-2015). The first would be the 'main gate' decision – which would begin the 'Demonstration' and 'Manufacture' phases. It is at this point that the submarine design is finalised, contracts to build the new boats are tendered, billions are committed and the process becomes politically difficult to reverse. The decision must be made no later than 2014, with approval for the procurement of long-lead items for the new submarine by 2011. The second decision would be on whether to refurbish or replace the current UK Trident warhead. The government says the current warhead was designed to last into the mid-2020s and it is currently exploring life-extension options but has made no decision on whether a new warhead will be required.
2016	**'Manufacture' phase start.** A contract to build the new submarines would be expected. A decision would be required on whether to build a fourth new submarine or whether current British nuclear doctrine could be operationalised with three.
2022	First submarine would be delivered to the MOD and begin two years of sea trials.
2024	**'In-service' phase start.** First submarine would enter service.
2020s/ early 2030s	Britain's new submarines would carry the current US Trident missile. The US plans to phase this missile out of service by 2042, long before Britain's planned new submarines will retire. A decision can therefore be expected in the 2020s or early 2030s on whether to purchase a successor missile. The US Navy recently initiated studies for a new missile to replace Trident. The government has sought assurances from the USA that any new missile will be compatible with the new British submarines, but this is not guaranteed.
2050s	**'Disposal' phase start.** Submarines would begin to be decommissioned.

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The low-carbon energy debate

Nick Reeves, Alasdair Beal and Stuart Parkinson outline contrasting positions on the issue of low-carbon energy in the UK. In the first article (below), Reeves questions whether ministers can be trusted on the environment if they say that nuclear power and coal are a major part of the answer to Britain's energy needs. In the second (p.15), Beal questions whether it will be straightforward to avoid building new coal-fired power stations. In the third article (p.16), Parkinson discusses the implications of some recent UK energy modelling studies.

Responsible energy solutions can power Britain – when its leaders switch on

Every product we make, every building we construct, and every road we travel definitively and permanently alters the environment. The human economy wastes and discards, while the natural economy is cyclical and replenishes. The human economy has turned the world upside down and is a root cause of climate change, which is the greatest threat to humankind.

We are failing to reduce global greenhouse gas emissions. This means that we are now staring at something very sinister, as the DEFRA Chief Scientist, Professor Bob Watson, has warned[1]: a 4°C rise in global warming. In reality this will mean an end to living and the beginning of survival or, arguably, the start of extinction. The drive for cleaner and sustainable sources of energy has never been more important or more urgent. Cue political leadership.

Prime Minister, Gordon Brown, has just created a new Department for Energy and Climate Change (DECC). This looks like a tactical move to persuade the public that his discredited energy policies are green and synonymous with action on climate change, and risks leaving DEFRA (Department for Environment, Food and Rural Affairs) diminished. The test will be the resulting action.

It is heartening that the government has accepted the advice of the Committee on Climate Change and strengthened the targets in the new Climate Change Act[2] – greenhouse gas emissions must now be reduced by more than 80% from 1990 levels by 2050. However, DECC's new minister, Ed Miliband, continues to reaffirm the government's backing for new nuclear power and energy from new coal plants. Consequently we have every right to ask: can this government really be trusted on the environment or with action on climate change?

Ministers are swallowing the line from disingenuous energy companies that one solution is to use carbon capture and storage (CCS) technology, which will make energy from coal green and clean. This is baffling: even the House of Commons Environmental Audit Committee argues that CCS is unproven and very costly[3].

We are used to the idea that the government is wedded to nuclear, despite the advice of its own Sustainable Development Commission whose independent research warned against the nuclear option[4]. I'm reminded of the French, who launched their nuclear programme back in the 1950s on the back of the slogan "We may not have any oil, but we have ideas". Had they also had foresight, they may have been tempted to rethink their ideas. Enriched uranium, necessary for nuclear-generated electricity, is a finite resource and therefore unsustainable. Furthermore we can meet our carbon emissions targets without resorting to nuclear power.

Renewables can power Britain, given the political will. Between 80% and 100% of our electricity could be produced from renewable sources[5]. Wind, wave, tidal, solar, hydro and geothermal could between them deliver more than twice as much electricity as the proposed new nuclear reactors. Together with technologies such as combined heat and power, decentralised energy, energy efficiency and sustainable transport strategies we could meet or even exceed emissions targets. Investment in energy conservation alone instead of nuclear would result in seven times the reduction in emissions[6]. These are proven technologies on which (along with action on consumer consumption) we should focus our efforts. Around 40% per cent of Europe's wind blows across the British Isles, yet we obtain a pitiful 1.5% of our electricity from wind; compare this with Denmark, which ratcheted up a credible 19% from wind last year[7].

Feedstock and finance aside, the real problems with nuclear are reactor safety, waste disposal and the proliferation of nuclear weapons (which can follow on from nuclear power generation capacity).

The most serious of these is nuclear waste. Britain is sitting on 3,000 tons of high-level nuclear waste[8] with no viable plan for getting rid of it, making the nuclear option as irresponsible as coal. We can have genuine energy security only when we produce electricity safely from within our own borders.

The bottom line is this: nuclear power delivers too little too late and is dangerous, extremely expensive and unnecessary. Clean coal remains a romantic dream. Responsible options will unlikely be favoured until we also recognise the need to shift from being a greedy, consumer-led economy fixated on gross domestic product, to one based on nature, compassion and replenishment.

It takes a long time for a new government department to bed in and make an impact. DEFRA was created five years ago and the sweat of integration has been long and slow. Ed Miliband's new department has eighteen months at most to deliver concrete strategies that will truly tackle climate change.

Nick Reeves is Executive Director of the Chartered Institution of Water and Environmental Management (CIWEM).

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Should we 'call the coal thing off'?

The current proposal for a new coal-fired power station at Kingsnorth in Kent has generated a lot of controversy. It is argued that to reduce carbon dioxide (CO2) emissions, and so tackle climate change, new plants such as that at Kingsnorth should not be built. This case has been laid out, for example, in a recent briefing by anti-coal campaigners entitled *Let's call the coal thing off* [1].

On the face of it, the argument is straightforward: burning coal emits more CO_2 emissions per unit of energy output than any other source – twice as much as natural gas and at least ten times as much as renewables, once lifecycle emissions have been taken into account[2]. However, things are not so simple. For a start, the proposed new Kingsnorth power station will generate 20% less CO_2 than the coal-fired power station it replaces so, if all else is equal, it will actually significantly reduce CO_2 emissions. Similarly, closing the UK's most efficient coal-fired power station, Drax B, (as called for by many at the 2006 Climate Camp) could have led to an increase in overall CO_2 emissions.

The problem with turning complex issues of electricity supply and the environment into simple 'yes/no' questions and campaigns against individual power stations is that it can cause confusion and play into the hands of the environmental movement's opponents. Thus stopping Kingsnorth would certainly be good news for the natural gas and nuclear power lobbies – but the consequences for the environment and climate change would be less certain. It might even end up as an 'own goal', leading to an unsustainable 'dash for gas', an even more unsustainable new nuclear power programme, and possibly (at least in the short term) increased CO_2 emissions through less efficient coal use. It is also important to balance the issue of climate change with other concerns, such as the potential for conflicts over natural gas and oil supplies, or the radioactive waste and weapons proliferation issues related to nuclear power.

If we stop construction of new coal-fired power stations, what will be used instead to generate the electricity? In the short term, the answer is likely to be 'older, less efficient power stations' – but what about the longer term? The anti-coal campaigners' briefing says that "Given the new impetus to build renewables at a fast rate, the green light for nuclear and the large amount of CCGT [combined cycle gas turbines] in the pipeline, there is no clear case for building new coal plants on the basis of need"[3].

Many will disagree with the view that we should regard the green light for new nuclear power stations as 'given' – that debate is certainly not over. However, elsewhere the briefing points out that for the UK to achieve its EU target of 15% of energy from renewables by 2020, 45% of its electricity will need to come from renewables. The final paragraph of the briefing then acknowledges that, if this is to be achieved, "an additional mid-term strategic imperative is to reconfigure conventional capacity" so that it can "cycle readily to maximise the use of renewable technologies"[4]. This means that in a system where 45% of electricity is supplied by renewable sources, conventional power stations will no longer be able to run steadily all day long producing constant 'base load' power. Their role will be to fill the continually changing gap between variable demand for electricity on one side, and the fluctuating output from power sources such as wind turbines on the other. This is a problem for nuclear power stations, which need to be run at steady output and can take days to fire up or shut down. (Perhaps this is why the nuclear lobby is so happy to support anti-wind farm campaigns?)

Thus in the UK electricity supply system of 2020, if it meets its targets for renewable energy, there will be a very limited role for nuclear power. If we also take the advice of the campaign briefing and phase out our coal-fired power stations, then (apart from a limited amount of hydroelectricity) the main source of power left to meet electricity demand variations and to prevent power cuts when renewable output is low will be natural gas. It is worth bearing in mind that for most UK households, when there is no electricity, the only alternative source of energy for heating and cooking is ... natural gas.

Natural gas is a limited resource. Modern condensing boilers can use it at 95% efficiency for heating and it has many other uses, including as road vehicle fuel. Should we be burning this valuable premium fuel for electricity when even the latest CCGT power stations are only 60% efficient? Is it wise to move to a situation where we would be more heavily reliant on imported natural gas not only for heating and cooking but also for our electricity supplies?

We certainly should not be building new coal-fired power stations designed only for base load generation. However, unless we are happy to rely heavily on gas, it is hard to escape the conclusion that there will still be a role for efficient coal-fired plants which are designed to cope with variable loads and also co-firing with wood chips or other sustainably-sourced biomass[5].

In reality, 'supply side' arguments, such as whether or not to build a new coal-fired power station at Kingsnorth, miss the point. If we wish to maximise use of renewable energy sources for electricity, then the choice of fuels to provide the remainder is limited – and in this scenario we cannot simply 'call the coal thing off'. What we should be campaigning for – in addition to renewable energy – is practical measures to reduce electricity demand. Demand reduction is the most effective way of reducing CO_2 emissions from electricity generation – and it is also the key to a sustainable energy policy.

Alasdair Beal CEng is a consulting civil engineer and a member of SGR's National Co-ordinating Committee.

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3. p.5 of: Anon (2008) – see note 1.
4. p.10 of: Anon (2008) – see note 1.
5. Recent experience has shown that many coal-fired plants can accept up to 15% of their fuel (by energy content) from a wide range of solid biomass. p.277 of: IPCC (2007) – see note 2.

Low-carbon, non-nuclear electricity scenarios for the UK

Over the last few months, proposals have begun to be put forward for new nuclear power stations and a new coal-fired power station in the UK. These are argued to be consistent with strategies to tackle climate change while maintaining energy security. Indeed, in its energy white paper (EWP) of 2007, the government explicitly argued that a new generation of nuclear power stations was needed1. But several detailed studies published in the last few years have highlighted alternative paths. In this article, I briefly outline three of the most comprehensive of those studies.

One of the key concerns stated in the EWP is that a large number of power stations are planned to close in the near future, and hence potentially there could be a shortfall in electricity supply. In 2007, 76 gigawatts (GW) of electricity capacity were connected to the national grid[2]. By 2020, the government estimates that 30% of this capacity (22.5GW) will be closed[3]. This lost capacity includes older coal and oil plants – closed in order to comply with new EU emissions regulations – and ageing nuclear power stations that will reach the end of their planned operating life. So how do the alternative scenarios tackle this potential shortfall? And what do they suggest for further into the future?

Pöyry study[4]

This study was published by Pöyry Energy Consulting, one of Europe's leading energy consultancies. It assessed six scenarios for the electricity sector up to 2030, the scenarios making different assumptions about energy demand and renewable energy policies. The key constraint was that the UK should meet its proposed EU target of supplying 15% of its total energy from renewable energy sources by 2020. The study used the EURENO model, which had been previously used to provide analysis for the government in drawing up its own energy strategy. The model explicitly takes account of the variability of renewable energy sources, such as wind and solar, to assess the ability of (for example) the national grid to meet peaks in demand.

The report concluded that the UK is capable of hitting its renewable energy target – requiring 35%–45% of electricity to come from renewable sources – and successfully implement its National Energy Efficiency Action Plan to reduce total energy demand. Under these conditions, the analysis indicates that *no* major new power stations (nuclear, coal or gas) would be needed to ensure that Britain can meet its electricity requirements up to at least 2020. Moreover, the report finds that this strategy would reduce the UK's CO_2 emissions by up to 37% by this time.

The study estimated that the total installed renewable energy capacity in the electricity sector in 2020 would be between 32GW and 52GW, of which around two-thirds would be wind farms (offshore and onshore). In just one of the six scenarios was there a slight dip below the desired 20% margin of spare power capacity (for coping with winter peak demand), and this was only short-lived. The authors argued that this could best be dealt with using demand-side management or by installing small 'top-up' peaking plants.

In the period after 2020 when more of the UK's existing coal and nuclear plants are due to close, the report observes that a number of further options could be deployed including more combined heat and power plants, further roll-out of renewables, and possibly carbon capture and storage.

Tyndall Centre study[5]

This study was published by the Tyndall Centre for Climate Change Research, one of the world's most influential climate research institutes. It models the development of the whole UK energy sector up to 2050. The key constraint was that the UK should meet its share of a global target to keep the atmospheric CO_2 concentration below 450ppm (parts per million). This, the authors note, implies a cut in emissions of 90% by 2050.

The results indicate that the emissions reduction target can be met with major near-term efforts to curb energy demand and large-scale R&D and investment in new technologies. Its emissions reduction targets are more demanding than those in the Pöyry study, and hence it argues that there will be a large role for carbon capture and storage technologies, so long as adequate major investment is made to make this technology widely available.

In terms of the electricity sector, the key changes that are projected up to 2030 are:

- a major expansion of renewable energy, especially offshore and onshore wind;
- a major expansion of carbon capture and storage, especially with coal-fired power stations; and
- a significant expansion of electricity demand, as transport energy comes increasingly from electricity rather than oil (due to, e.g., plug-in electric cars).

Zero Carbon Britain[6]

This study was published by the Centre for Alternative Technology in Wales, a leading education and research centre on green lifestyles and technologies. It proposes a detailed scenario for the UK whereby direct carbon emissions across the economy are reduced to zero over a 20 year period. Hence it is more ambitious than either of the preceding studies.

The scenario proposed in this report is based on measures that lead to a 50% reduction in total energy demand over the period, coupled with a major expansion of renewable energy. The huge reduction in energy demand is achieved through a combination of economics instruments – the main one being 'tradable energy quotas' – and technological improvements to support lifestyle change, such as better insulation, more efficient public transport, plug-in electric cars and 'smart' meters. The expansion of renewable energy is rather more rapid than in the studies above, with about 50% of electricity supplied by wind, 35% supplied by marine (tidal and wave) sources, and a few percent each for biomass, solar and hydro.

Concluding comments

These studies show that the goals of tackling climate change and improving energy security can be achieved without recourse to new nuclear power or large, new, unabated coal plants such as that currently proposed at Kingsnorth in Kent. The key condition is that major investments are made quickly in energy efficiency, renewable energy technologies and carbon capture and storage, supported by other policies to curb energy demand.

Dr Stuart Parkinson is Executive Director of Scientists for Global Responsibility. His background includes academic research on energy and climate issues.

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Could we have safer medicines through non-animal testing?

The use of animals in medical research is an emotionally charged topic, but the scientific rationale behind their use is rarely questioned. Margaret Clotworthy describes an initiative doing just that.

A groundbreaking conference last November brought together eleven scientists from around the world who specialise in developing drug safety test methods that focus on human biology. The conference, 'Speed and Safety in Drug Discovery', was held at the Royal Society in London and was hosted by Safer Medicines Trust. This charity is concerned with the use of animals in medical research, but it differs from the others in that the Trust's concern is for the patients who ultimately receive the drugs, rather than the animals. We believe that using animals is actually ineffective at testing the safety of new medicines. It not only fails to stop harmful drugs from reaching people, it also prevents treatments that would be safe and effective from reaching patients who need them.

The clinical trial at Northwick Park hospital in March 2006, where six previously healthy young men were rushed to intensive care with multiple organ failure, put a spotlight on safety issues surrounding clinical trials. The drug had already been tried out on monkeys at 500 times the dose the men received, yet this was not sufficient to reveal its dangers[1]. Although it was exceptional for all the volunteers to suffer such severe reactions, the fact is that nine out of every ten new drugs fail in clinical trials after success in animal tests[2]. Even the drugs that succeed in clinical trials and reach the market are not safe for everyone: side effects are a leading killer in the western world, after cancer, heart disease and stroke[3,4,5]. Moreover, adverse reactions to prescription drugs are now estimated to cause one million hospital admissions per year at a cost to the NHS of £2 billion[6]. Safer Medicines Trust does not claim that an over-reliance on animal testing is solely responsible for these statistics; but could better pre-human testing improve the situation?

Science has come a long way since the UK Medicines Act, introduced in 1968 in the wake of the thalidomide tragedy, made animal testing of new drugs mandatory. Extensive animal testing had in fact shown thalidomide to be perfectly safe[7], and it was prescribed to pregnant women to treat their morning sickness, causing thousands of babies worldwide to be born with deformed limbs in the 1950s and early 1960s. However, the testing technologies then available were very limited compared with those at our disposal today, and what was clear from the astonishing range of presentations at the November conference is that we may no longer need to depend on the unreliable indications from animals at all.

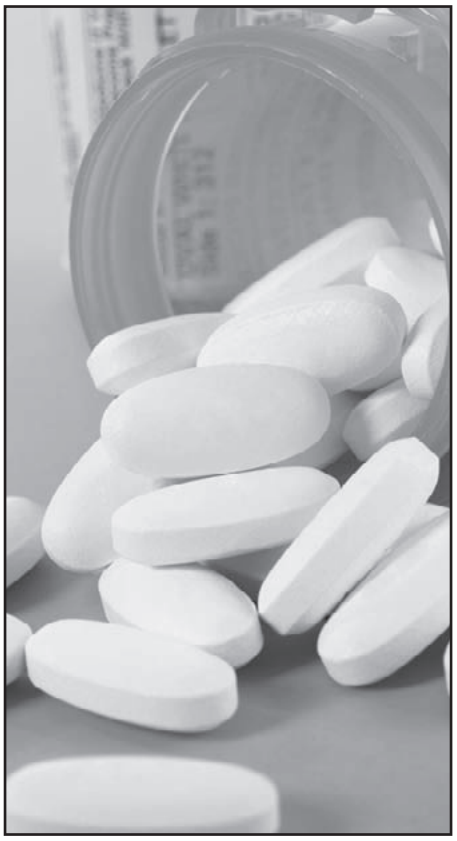
Experts in human tissue science spoke of the array of tests that can now be conducted using tissue sourced ethically from surgery, for example, or using cells grown indefinitely in the lab. American company Hurel – their name deriving from 'Human Relevant' – uses interconnected human tissue samples to represent a 'whole body on a chip'. A particularly exciting technique developed by another US company, VaxDesign, involves growing up miniature immune systems for vaccine testing from donated blood samples – something undreamed of even a few years ago.

The use of computer models to predict which drugs would be toxic, and to make dosing safer, was also discussed, before the conference moved on to how to take drugs into humans safely for the first time. One option is microdosing, which uses miniscule doses of new drugs, combined with ultrasensitive imaging and analysis equipment, to reveal how the drugs are metabolised in humans safely and with unsurpassed accuracy – enabling safer clinical trials. The motto of Xceleron, the world's first microdosing company, is that "the best model for human drug development is human beings" – a sentiment that was echoed many times throughout the event.

Finally, an expert from the University of Vienna explained microdialysis, which uses very sensitive probes to detect what is happening in a tissue or to a drug in a highly localised part of the body. This is already used extensively in Sweden to monitor the brains of patients suffering from severe brain injuries.

Safer Medicines Trust believes it is time to put animal tests to the test against these amazing new technologies, which could deliver medicines to patients not only more safely but much more quickly and cheaply as well. We will shortly be launching an initiative to put pressure on the government to do just that. Details of how you can help will be available at our website, http://www.safermedicines.org/

Dr Margaret Clotworthy is Science Consultant to Safer Medicines Trust, a registered charity whose goal is to protect human health by promoting human-specific medical research.



Safer Medicines Trust

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Time for global responsibility in the global economy

...continued from front page

The United Nations Environment Programme (UNEP) has also been arguing the social and environmental case for a major shift to a low-carbon economy. In a report[6] on 'green jobs', it estimates that at least 2.3 million people currently work in the renewable energy sector worldwide, with many more in related sectors. The report argues that with the right combination of policies and measures the market for environmental goods and services could grow to a massive $2,700 billion (£1,900 billion) by 2020.

Even the organisers of the World Economic Forum have made radical proposals[7] – arguing that globally, over $500 billion (£350 billion) needs to be spent each year up to 2030 on limiting carbon emissions.

The peace dividend

But even these reports are failing to discuss a key issue. As SGR and several peace organisations have repeatedly pointed out, huge resources – in terms of skills, finance and materials – are still tied up in the vast military programmes of the world's major economies, especially the USA. Government spending on the military across the industrialised world dwarfs that spent on, for example, tackling climate change.[8] Furthermore, while employment is increasing in the green economy, rationalisation has led to a less rosy situation in military industry. In the UK, for example, employment in this sector is showing a long-term downward trend, despite the high levels of funding.[9]

And the current economic problems mean that military industrial programmes are starting to come under greater scrutiny. Recently the UK government announced that the construction of its two new aircraft carriers was to be spread over a longer timeframe as a way of controlling costs.[10] This therefore seems to be an opportune moment to ask more searching questions about spending on this and other large military technology programmes such as the Astute submarines, Type 40 destroyers, Joint Strike Fighters and – especially – the planned replacement of the Trident nuclear weapons programme.

The steady-state economy

But the debate over the economy could go even deeper. One issue that mainstream economists and senior policy-makers still refuse to discuss is whether the current economic system – based on the unending growth of economic activity, itself based on the continual growth of consumption of materials and energy – can be sustained for much longer as we start to reach resource and environmental limits.

To its credit the *New Scientist* magazine devoted a recent issue[11] to this question, entitled 'The folly of growth'. Prominent among the recommendations was the need to move to some sort of a 'steady-state' economy – something first argued by former World Bank economist, Herman Daly, as far back as 1973.[12]

Conclusion

The last time the world saw a financial crisis of the current magnitude was in 1929. It led to a global depression, the rise of extremist governments in major countries, and ultimately the biggest war in history. Arguably the action being taken now by leading governments will be enough to avert a global depression this time, but it is much less certain that we will avoid one further down the line if we do not take action to deal adequately with climate change, peak oil and other natural resource problems. And if we reach a crisis point without having achieved elimination of the 25,000 nuclear weapons currently in global arsenals, we are going to be very serious trouble.

The current global economic problems have catalysed scrutiny of the financial sector. But policy-makers need to go further, and grasp the opportunity for deep and lasting change across the whole economy, starting with the energy, environmental and security sectors. Professionals across science, design and technology will need to push for this change as much as we can.

Dr Stuart Parkinson is Executive Director of Scientists for Global Responsibility.

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Sustainable buildings and communities: their role in meeting environmental and social goals

SGR Conference and Annual General Meeting 25 October 2008, The Gallery, Alan Baxter and Associates, London EC1

Over 70 delegates attended this stimulating event. Stuart Parkinson (Executive Director of SGR) welcomed delegates, and thanked Alan Baxter and Associates for providing the venue.

There were two main speakers – Kate Macintosh and Sandy Halliday – and ten posters presented by researchers and others (see list). SGR's AGM took place at the end of the day.

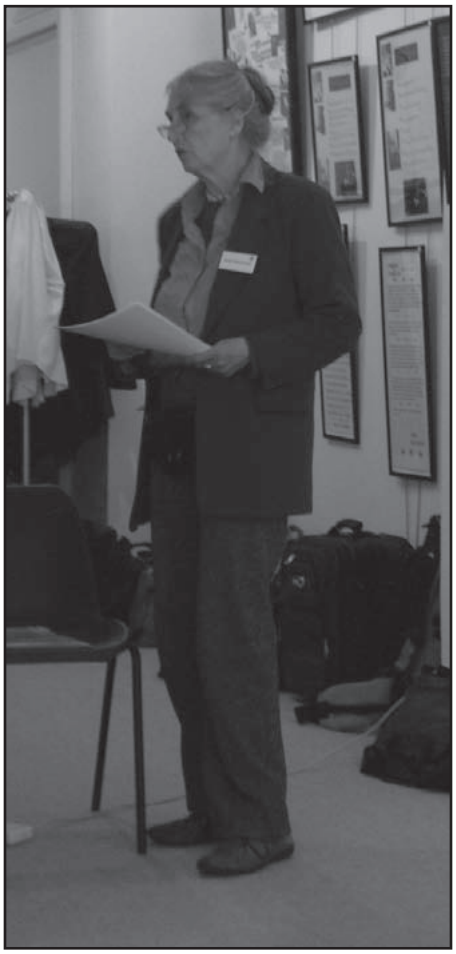
Social Housing

Kate Macintosh (Vice Chair of SGR) spoke on 'Social Housing: From Paternalism to Co-operatives'. Kate traced developments in social housing from 1920s initiatives such as those from the St Pancras Home Improvement Society and the Liverpool City Architects' Department. Karl-Marx-Hof in Vienna was a very influential development at the time. Liverpool planned to build 5,000 units per year up to 1936. After World War II, a flagship scheme was Churchill Gardens, Pimlico – 1,700 homes, with shops, pubs and community centre, all heated by waste heat from Battersea Power Station. London City Council Architects' Department was established in 1949 and other cities followed suit, leading to a series of ambitious schemes.

However, imported ideas such as large-panel high-rise blocks of flats led to crude and insensitive schemes. This trend was only ended following the partial collapse of Ronan Point in Newham in 1968. More modest-scale and individually designed developments from the same era have survived much better. In the 1970s, design consultation with tenants led to schemes like Byker in Newcastle. In the 1980s and 1990s, housing co-operatives like Coin Street in London produced excellent developments.

Unfortunately, council houses have been sold off cheaply – many to the private sector – with local authorities receiving only a fraction of the money raised. If there is a revitalisation of council housing, it is important that lessons from the past successes and failures are learned.

Kate's talk stimulated a lively discussion, covering space standards, design and energy conservation. More detailed discussion of this issue can be found on pp.8-9.



Kate Macintosh discusses social housing

Sustainable Building and Places

Sandy Halliday (Gaia Research, Edinburgh) spoke about 'Making Sustainable Building and Places'. She began her presentation by outlining the history of the concept of sustainable development, touching on key events such as the publication of the 'Limits to Growth' report and the 1972 UN Conference on the Human Environment.

Sandy outlined the importance of 'appropriate development'. The key to energy saving in buildings is not gadgets like rooftop wind-turbines and solar photo-voltaic panels – it is good design and construction, she said. She advocated 'eco-minimalism' as an antidote to 'eco-bling'. More should be spent on the roof and cladding, less on mechanical services, and toxic and polluting materials should be designed out. 'Green' buildings need not cost more, she argued.

Sandy gave examples of interesting projects in Germany where sustainability is treated as part of the design and function rather than a separate subject. Another example was the Fairfield Community, which had been regenerated as a housing co-operative. The design of Acharacle School in Scotland – which involved consultation with the children there – was based on lessons learned on visits to Norwegian and German projects. Sandy also pointed out that schools in Europe constructed under public-private partnerships score badly on eco-efficiency, just as they do in the UK. More detailed discussion of these issues can be found on pp.6-7 and p.25

SGR AGM

SGR Chair Philip Webber welcomed delegates to the Annual General Meeting (AGM). Director Stuart Parkinson reported on the organisation's recent activities (see photo on p.20). SGR had undertaken some effective campaign and education work, he said, including working in coalition with other larger organisations. Unfortunately, some key government decisions went against us – on Trident nuclear weapons replacement and new nuclear power. SGR's other activities included new publications on the militarisation of science and technology, submissions to government consultations on peace and environmental issues, numerous lectures, and stalls at ethical careers events. Membership continued to grow significantly. However, Treasurer Patrick Nicholson reported that it had been a difficult year financially and thanked staff for voluntarily accepting a temporary reduction in paid hours. The incoming National Co-ordinating Committee was elected – further details can be found on p.4. A constitutional amendment to allow organisations to affiliate to SGR was accepted. Alan Cottey, who stepped down from the NCC this year, was thanked for his past work and also for organising this year's successful poster exhibition (see pp.20-22).

In further discussion, SGR's increasing public profile was welcomed. We also discussed a variety of suggestions for reaching larger audiences, especially young people.

Summary by Alasdair Beal

Events Reviews

Stuart Parkinson reviews SGR's activities during the AGM

Posters

Communicating Science – Rich Blundell

Economics of the Finite Earth – Wiebina and Aart Heesterman

Housing, Design and Community – James Scott

Insulation, Efficiency and Funding – Ian Greenwood

Modelling Energy Distribution Networks – Salvador Acha

The Localworks Project – Michael Weller

The Low Carbon Futures Project – Sue Pollard

TREC-UK's Desertec Project – Hywel Roberts

Schools for the Future* – Alice Moncaster

UK Housing Stock Strategy* – Gavin Killip

The two posters marked * are included on the following pages.

Schools for the Future? Visions and Realities of Sustainability in UK School Buildings

Alice Moncaster University of East Anglia

The Vision

'Sustainable development will not just be a subject in the classroom: it will be in its bricks and mortar and the way the school uses and even generates its own power. Our students won't just be told about sustainable development, they will see and work within it: a living, learning place in which to explore what a sustainable lifestyle means.'

Tony Blair, Climate Change speech,2004

Introduction

The first decade of the 21st century marks a major shift in our understanding of the effect of human activity on the environment. The Building Schools for the Future programme, as Tony Blair recognised, must respond to this. Consciously or unconsciously, entwined within our aspirations and designs for school buildings are our aspirations for individuals and for society.

But how closely do the schools being built today really achieve their stated aspirations for sustainability? The influences of both Government **policy,** and design and construction **practice,** on the process of procuring, designing and constructing a sustainable school are examined.

The research is intended to show both the potential for, and the barriers to, building sustainable schools in the UK.

Alice Moncaster is in her second year of a PhD funded by the EPSRC through the University of East Anglia. She is supervised by Professor Jacquie Burgess in the School of Environmental Sciences at UEA and by Dr Minna Sunikka at the Department of Architecture, University of Cambridge.

She is also a Research Assistant at the Centre for Sustainable Development at the University of Cambridge, working on the EPSRC ISSUES project, looking at improving knowledge and take up of sustainable construction research by industry.

Alice has previously spent ten years in the construction industry as a civil and structural engineer.

Understanding the Background

Four **background** aspects which have gone into the development of both **policy** and **practice** are investigated. These are:

- the **historical, social and political** position of schools in the UK, and how these have influenced the BSF programme,
- emergent dialogues of **sustainable development** and **climate change** and their role in recent policies,
- **research into sustainable design and construction,** and
- current procurement, design and construction **practice** in the UK.

Collecting data: UK School building post 2004

The second part of the research will explore how visions of 'sustainability' have been incorporated in school buildings since 2004, developing a set of data showing what is happening in practice.

An **overview** of school building post 2004 is developed from:
- a review of current school building policies and
- a brief study of the Government exemplar schools, to understand the Government vision for sustainability, and
- a review of the published reports, and
- interviews with individuals from CABE, PfS, SDC and elsewhere,

to gather real data and expert views of what is actually being built across England.

A more detailed focus is provided by **case studies** of
- four individual school building projects,
- Review of the project files ,and
- interviews with key individuals

to track individual visions of sustainability through each project

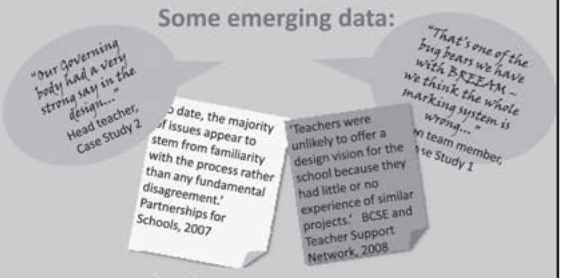
Overview:

- **Policy documents**
- **Published reports**
- **Exemplar schools**
- **Expert interviews**

Detailed focus:

4 case studies identified:
current building projects at existing state secondary school sites in England, valued between £5m and £20m, due to complete by September 2010
- Interviews with: Head teacher, Client, Design team members, Contractor
- Project documents

Some emerging data:



Analysis and recommendations

Gathered data from the different sources will be studied to consider:
- **What are the visions** for sustainable school buildings**?**
- **Where**, or who, **do they come from?**
- **What happens to them** during procurement, design and construction**?**

The data will be related back to the first section to attempt to understand the reasons for vision creep, and to suggest what might be done differently to ensure that schools are built as sustainably as possible. It is hope that this will lead to recommendations for the current school building programmes and policies, and for sustainable construction research and practice.

School building programmes:

recommendations to ensure that policies and regulations encourage rather than discourage sustainability in the built environment, by highlighting factors which improve innovation and ownership

Sustainable Construction:

recommendations to encourage take up of research and innovation, and to improve education, in order to increase understanding and capacity in the construction sector

A low-carbon future for the UK's housing stock

Gavin Killip, Environmental Change Institute, University of Oxford

CONTEXT

- The UK's climate change target is a 60%*cut in CO_2 emissions by 2050 (1990 baseline)
- More recent climate science suggests it needs to be more like an 80 - 90% reduction
- While climate change is global, the solutions need to be tackled by nations and regions, and by economic sector
- Housing = 27% of the UK's CO_2 emissions

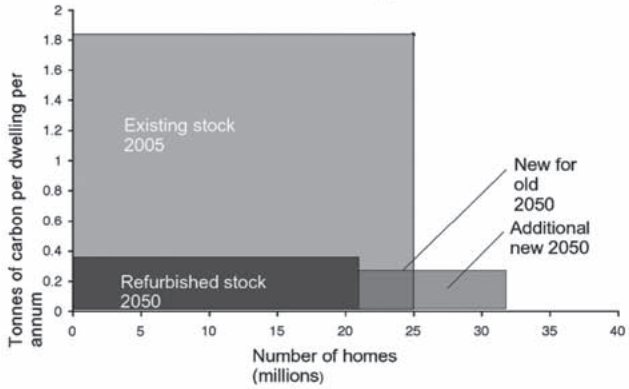


Fig 1. Impacts of refurbishment and new-build on CO_2 emissions (RCEP 2007)

CREATING A MARKET

- Existing policies promote 'cost-effective' measures but this is inadequate: a whole-home refurbishment approach is needed
- The UK spends £24bn per year on repair, maintenance & improvement to housing, mostly ignoring energy issues
- Investing in low-carbon renovation would cost about £5bn extra per year
- A market can be created with information, financial incentives and regulation

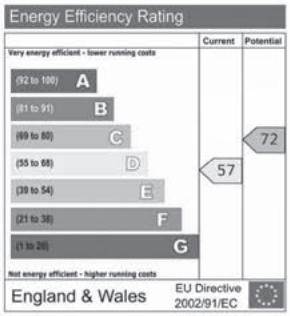


Fig 2. Energy Performance Certificate (EPC)

Energy Performance Certificates are required when any property is sold or rented, and could form the basis of a future mandatory standard for existing homes.

STRATEGY

- Continue with existing programmes for the next 5 – 10 years
- At the same time, start a process of innovation, demonstration, learning, mass communication and standards development
- Send a strong policy signal to give industry the confidence to invest and develop skills

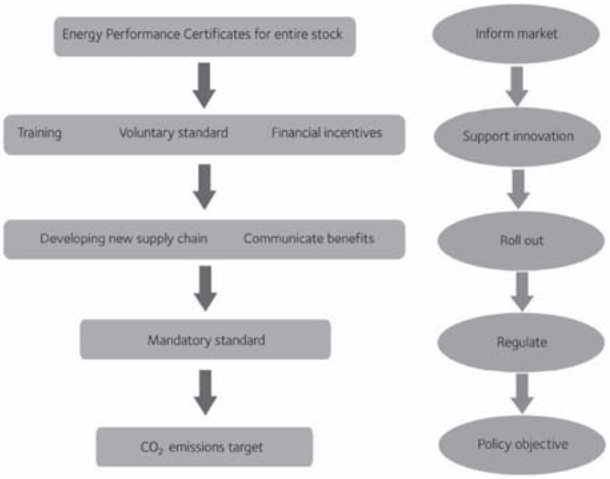


Fig 3. Elements of a possible strategy for low-carbon housing (Killip 2008)

Dwelling type	3-bed terraced house
Date built	1929
Location	Birmingham
Tenure	Social rented

Energy-saving features	▪Insulated ground floor ▪External wall insulation ▪Insulated loft ▪Efficient A-rated appliances ▪Sun pipe ▪Low-energy lighting ▪Insulated hot water tank & pipes ▪Timber-framed double glazing ▪Passive ventilation system
Low- and zero-carbon technologies	▪Solar water heater ▪Ground-source heat pump
Water-saving features	▪Water-efficient bathroom suite ▪Rainwater butt
Other 'green' features	▪Re-used and reclaimed materials ▪Non-toxic paints and finishes ▪Porous paving ▪'Green' sedum roof
CO_2 emissions reduction	Being monitored in 2008, compared with an un-refurbished house
Builder's comments	*This is the seventh project we've done like this and it is fast becoming our speciality. Each time we complete a project we put that experience to good use on the next one, we are learning very quickly what works and what doesn't and how to build in new technology.*

*Since the presentation of this poster in October, the government has revised the UK target from a 60% cut to an 80% cut.

Study War No More: military involvement in UK universities

Tim Street, Martha Beale - Review by Patrick Nicholson

Fellowship of Reconciliation and Campaign Against Arms Trade, 2007, 50 pp., £3

Available to download free of charge from http://www.studywarnomore.org.uk

Study War No More is a fact-filled, investigative report looking at funding provided by military organisations – government and industrial – to 26 universities in the UK between 2001 and 2006. It presents and analyses detailed information down to the level of individual projects. The report neatly complements SGR's ongoing programme and publications on military influence on science and technology. Indeed, the foreword is written by SGR's principal researcher, Chris Langley.

The report reveals the investigative methods and sources used to obtain funding data (e.g. Freedom of Information Act requests, university websites and the Engineering and Physical Sciences Research Council website). We also learn about the lack of transparency organisations often display, and how important data can be obscured.

The high level of detail gives a unique and valuable sense of what is actually going on in our universities. In the section looking at Bristol University (which apparently made a particularly full response to the requests for information), we learn of a fascinating range of military-funded projects from the predictable (e.g. unsteady aerodynamics, materials science) to the less so (e.g. dog tracking, sleep analysis, quantum computing).

I also liked the part dealing with academics' personal perspectives, solicited via a questionnaire. This brings to light the strong pressures to attract (any) funding in order to strengthen departmental Research Assessment Exercise (RAE) performance. One professor of engineering stated that "the RAE definitely undermines research ethics in this respect". Many respondents noted that almost any research could have a military application and the report highlighted the implications of not considering the underlying nature of funding bodies for apparently benign projects. Most military industrial funders engage in at least some civilian production, and this provides a moral "get-out clause" that researchers may adopt, consciously or unconsciously.

While its fine detail is the obvious strength of thisreport, the extent of the work involved is only fully visible through the website (see above). Here, users can select universities via a map and obtain information for each, such as the amount of military funding, the number of projects, the top three funders and which departments are most active in military-funded work. A full information sheet can be downloaded for each university, which provides detail down to project level.

This is a fantastic resource, placing a huge amount of information at your fingertips in seconds and perfect for those wanting to get up to speed with military involvement on their own campus. The 'get involved' section provides useful advice on how to research and campaign for people ready to take action.

Dr Patrick Nicholson is a medical physicist and peace campaigner. He is also Treasurer of Scientists for Global Responsibility.

Trident and British Identity: letting go of nuclear weapons

Nick Ritchie - Review by Jim McCluskey

Bradford Disarmament Research Centre, September 2008, 20 pp.

This is the third in a series of Briefing Papers which are being published as part of the Bradford Disarmament Research Centre's programme, "Nuclear-Armed Britain: A Critical Examination of Trident Modernisation, Implications and Accountability." All papers in this series can be downloaded from: http://www.brad.ac.uk/acad/bdrc/nuclear/trident/trident.html

There are no weapons that could destroy Britain and the USA in a matter of hours except nuclear weapons. It would seem reasonable, therefore, that in the interests of security, we would do everything in our power to rid the world of such apocalyptic instruments of destruction.
We do not. On the contrary we are renewing our arsenals. This paper presents a compelling case that a major driving force for this is the belief amongst the ruling elite that nuclear weapons are an essential part of Britain's self-identity. This elite sees Britain as a 'pivotal' and 'interventionist' world power. It believes that nuclear weapons are a necessary back-up for this interventionist role.

This perceived self-identity is discussed under four headings: "Identity and national security", "Britain as a responsible, interventionist, 'pivotal' major power", "British identity and the 'special relationship'", and "New Labour and France". Also discussed is the gender-influence on nuclear weapons whereby they are seen as expressions of masculinity, based on the crude analogy that real men wield 'hard' power while nuclear disarmament is akin to emasculation.

This elite view of Britain as a 'pivotal', major power leads to the argument that its values of liberty, democracy and justice bestow on it a responsibility for international security, which justifies the wielding of a nuclear arsenal. One vital part of our identity, as seen by the establishment, is our 'special relationship' with the United States. This was illustrated clearly by then Prime Minister Tony Blair when he declared that it was the USA's destiny to lead the 'war on terrorism' and that it was "…. our job to be there with you". Supporting the exercise of American power means being able to act with US armed forces at all levels, including having a nuclear weapons capability, which is seen to support Britain's credibility in Washington.

France comes into the argument, explains the paper, because the elite's view of Britain's self-identity is threatened if we do not have nuclear weapons while France does.

This publication is a powerful presentation of an essential dimension in the nuclear weapons debate. It shows how vital it is that we understand the self-image that underlies the ability of the establishment to discount, or to be ignorant of, the terrible dangers posed by our nuclear weapons arsenals. It also points out that descriptions of current national identity are not permanent, quoting Michael Ignatieff: "National identity is not fixed or stable: it is a continuing exercise in the fabrication of illusion and the elaboration of convenient fables about who 'we' are."

Further beneficial studies, it concludes, would include examination of aspects of certain leaders' pronouncements, belief systems and behaviour that relate to such psychopathological symptoms as paranoia, projection, splitting and repression.

Jim McCluskey has a background in civil engineering, writing and peace activism.

A Green New Deal: joined-up policies to solve the triple crunch of the credit crisis, climate change and high oil prices

Review by David Hookes

Green New Deal Group and New Economics Foundation, July 2008, 44 pp., ISBN 978 1904882350

Available to download free of charge from: http://www.neweconomics.org/gen/z_sys_publicationdetail.aspx?pid=258

This important document was published just before the full effect of the 'credit crunch' crisis had been revealed. Its authors are luminaries of the green politics, alternative economics, green technology and sustainable development movements, including Larry Elliott, Economics Correspondent of The Guardian and co-author of The Gods that failed: how blind faith in markets has cost us our future; Colin Hines, Co-Director of 'Finance for the Future' and former head of Greenpeace's International Economics Unit; Caroline Lucas, Green Party MEP, and Andrew Simms, Policy Director of The New Economics Foundation – to name but a few. Clearly the document is written by serious people for serious times.

At its heart is the acknowledgement that the world is in a 'triple crunch' situation: a 'credit crunch', a 'climate crunch' and an 'energy crunch'. They propose an economic programme for de-carbonising the economy that will create new jobs to replace those destroyed in the old fossil fuel economy by the credit crunch. So their proposals deal simultaneously with all components of the triple crunch.

Although the authors are UK-based, their ideas overlap with similar concepts that gained support in the US during the recent presidential election campaigns; Green New Deal proposals have been raised by UN bodies as well (see p.1).

As suggested by the title the proposals in this document borrow heavily from Roosevelt's New Deal in the US of the 1930s but with some differences, such as the greater use of private capital resources. Some of the suggestions are:

- A low-carbon energy system, with 'every building a power station', maximised energy efficiency and renewables to generate electricity.
- A 'carbon army' of workers for a vast environmental reconstruction programme.
- A tax on fossil fuel.
- A wide-ranging package of financial innovations and incentives to raise the many billions needed.
- Many other adjustments to the financial system, geared to returning finance to its former role as servant, not master, of the global economy.

In addition, they include a list of desirable government objectives that relate directly to the environment and climate change:

- Setting a formal international target for greenhouse gas concentrations that keeps future temperature rises "as far below 2ºC as possible".
- Delivering a fair and equitable international climate agreement to succeed the Kyoto Protocol in 2012.
- Giving poorer countries the opportunity to escape poverty without fuelling global warming, by helping to finance massive investment in climate change adaptation and renewable energy.
- Supporting the free and unconstrained transfer of new energy technologies to developing countries.

The last two proposals are probably the most important in terms of combating climate change. They may also be the most controversial politically, since they imply a massive transfer of wealth to poorer parts of the world.

There is a fascinating section on the experience of Cuba after the collapse of the Soviet Union. This country effectively experienced its own 'peak oil' shock and climate change effects. Its response was so contrary to orthodox approaches that it was dubbed 'the anti-model' in Washington DC. There was a rapid shift to bio-fertilisers and bio-pesticides, and to urban food production. Today half the food consumed in Havana is grown in the city's own organic gardens, and Cuba produces 60% of its vegetables in urban gardens. The population is fed by an organic system that has resulted in considerable improvements in the health of the people. The document says: "It should have become a classic failed state but it did not. Serious long term investment in science, engineering and health meant that Cuba had developed the human resources, strong social fabric and thus the capacity to act."

There are aspects of the report that might be criticised. For instance, it tiptoes around the issue of the relationship of the UK to Europe, even implying in places that we would be better able to manage on our own, by setting our own interest rates and so on. The recent decline of the pound against the euro and the dollar shows the weakness of this approach. The scale of the problems associated with climate change requires vast resources that can only be brought to bear by economies the size of the EU, USA, or China but there is a noticeable 'little UK' tone in some parts of the report, perhaps suggesting caution by the authors in the light of a possible future Conservative government.

Other missing issues, also perhaps on the grounds of political sensitivities as above, are those of nuclear power and Trident renewal, both of which will absorb scientific and engineering expertise as well as funds, and which could therefore undermine the possibility of a Green New Deal.

There is no mention of 'zero overall growth' economics of the type proposed by Herman Daly in the US[1], or ideas such as 'Wikinomics' put forward by Don Tapscott and Anthony Williams[2]. Similarly, no mention is made of the possibility of a 'Wikitech' or 'Opentech' movement that harnesses, through the internet, vast reserves of technical and scientific expertise for sustainable technologies[3]. The proposal also overlooks the need for an overhaul of the education system so that it produces active, green citizens who understand the ecological concepts and technical solutions relating to renewable, distributed power sources and systems, sustainable agriculture, and so on.

Overall, however, the proposal is important, far-reaching and valuable. In my view, by championing programmes such as this, SGR can combine its present functions with support for plans to create a humane, sustainable socio-economic world system. I thus strongly recommend this document to SGR members and hope that it will lead to vigorous discussion on SGR's email-list, sgrforum.

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2. Tapscott D, Williams A (2008). Wikinomics: How Mass Collaboration Changes Everything. Atlantic Books. July 2008.
3. See: http://www.ukuug.org/events/opentech2008 and http://design4dev.wetpaint.com/?t=anon

David Hookes is a member of SGR's National Coordinating Committee and Honorary Senior Research Fellow in the Department of Computer Science, Liverpool University.

Sustainable Construction

Sandy Halliday - Review by Philip Webber

Butterworth-Heinemann, 2007, 408 pp., £29.99, ISBN 978 0750663946

Sandy Halliday, who gave an inspiring talk at SGR's annual conference in 2008 (see p.19), has managed in this book to bring together the latest knowledge across the enormous field of sustainable construction in a way that is meaningful for architects, clients, engineers, and finance professionals.

This is a crucially important topic: the highly inefficient structures in which we live and work are a major reason why climate change emissions are so high. The current norm is poor, unsustainable buildings that are bad for people's health, well-being and wealth, and which, in their construction and use, damage the environment in the short and long term.

In this book Professor Halliday highlights a comprehensive range of holistic solutions using an enormous number of practical and inspiring case studies. Each is presented with detailed costs, design information and humour. The 14 chapters contain a huge amount of really useful information covering policies and measures to drive sustainability, appraisal tools, costs, materials, heating, electrical installations, ventilation and cooling strategies, construction processes and urban ecology.

The scope also extends to several emerging or cutting-edge approaches to building design – for example, the use of permeable materials and sacrificial design elements, and the ability to replace and dismantle across the whole life cycle. The ethic implicit in the text is that a building must respect its users, its various uses and the environment in which it sits in order to function practically, ecologically and financially. This approach is most unusual, in my experience. It comes from a perspective of deep ecology and sustainability, yet Halliday makes this seem obvious, sometimes simple, necessary and aesthetic.

With the growth in awareness and use of BREEAM (the Building Research Establishment Environmental Assessment Method) and the Code for Sustainable Homes there is much more awareness these days of the need to reduce the negative impacts of buildings. The professional approach to this vital topic is, however, very limited and in my view fractured, and there is a great need for guidance that is accessible, inspiring and understandable for all the key players involved in getting buildings built, rebuilt and commissioned. I think this book achieves this. The style is neither worthy nor clunky, and combines with the excellent case studies and photographs to offer a refreshing change from the approach taken by many in the profession.

Overall, I think Sandy Halliday has produced an indispensable guide covering this huge field and I recommend this book to anyone seriously thinking of building almost anything. It should pay for itself several times over. I very much hope that it can be part of a sea change in building design and approaches to the built environment and ecology.

Dr Philip Webber is Head of the Environment Unit, Kirklees Metropolitan Council, West Yorkshire. He is also Chair of Scientists for Global Responsibility

Sustainable Biofuels: prospects and challenges

Review by Amyan Macfadyen

Royal Society Policy Document 01/08, 2008, ISBN 978 085403 662.2

Available for download at: http://www.royalsociety.org

If you had been inclined to think of the biofuel question as already settled, this report will disabuse you of that inclination. This remarkably thorough, balanced and clearly written policy document from the Royal Society's Science Policy Series allows no doubt that the precipitate actions of government bodies on both sides of the Atlantic, the rush to grow biofuel crops and the facile reactions by some journalists and members of the 'green' lobby have all been far in advance of necessary scientific knowledge.

The report rehearses the need for alternative energy sources as supplies of oil run out, and the disastrous climatic consequences of our growing dependence on fossil fuel combustion. Transport currently generates 60% of the demand for oil and this is increasing at 3% per annum in both China and India.

The report goes on to review the consequences of early and current attempts to substitute plant-derived fuels for fossil fuels. These consequences are associated with cultivation and include additional fertilizer manufacture, transport of inputs and products to and from the actual crop, the effects on water consumption, eutrophication of water supplies, reduction of biodiversity and, of course, diversion of land from food growing. Some are less predictable than others; for instance the mere disturbance of soil, in order to grow biomass crops releases substantial and variable amounts of greenhouse gases. The report urges the use of 'Life Cycle Assessments' or LCAs in the assessment of all such practices.

A major strength of the report is its clear emphasis on the deficiencies in our knowledge of the consequences of biofuel production and the immediate need for more scientific research. Not only are the quantitative estimates of known parameters uncertain; there are also other factors that have simply been ignored by promoters of these crops. The report provides figures setting out the overall net savings of greenhouse gases associated with a range of biofuel crops as compared with the equivalent use of fossil fuels. Wheat is shown to offer a net saving of 22%, while sugar beet offers 40% when natural gas is used in processing. In all cases the benefits of using by-products as animal feed are included in the equations.

There are also sections on feedstocks, conversion, bio-refineries (for 'co-production' of at least as wide a range of organic chemicals as are currently available from the oil industry) and end use (including necessary modifications to engines).

The final sections consider the need for wider publication and public discussion (to which the report makes a notable contribution) and the responsibilities of different ministries for research and development. Note that this report came ahead of the creation of Ed Miliband's new ministry. Perhaps we can hope that some effort is now made to reverse the disastrous effects of the decline in research in these fields over the last decade.

Amyan Macfadyen was formerly Professor of Biology, Dean of the School of Biological and Environmental Sciences, and Pro Vice Chancellor at the University of Ulster.

The Enemies of Progress: the dangers of sustainability

Austin Williams - Review by Roger Levett

Societas, 2008, 156 pp., £8.95, ISBN 9781845400989

The blurb says "Sustainability is a malign philosophy of misanthropy, low aspirations and restraint. This book argues for a destruction of the 'sustainable' prefix, removing its unthinking status as a contemporary orthodoxy, and for the reinstatement of the notions of real development, progress, experimentation and ambition …"

I was afraid it would upset me. It didn't. It's worse. It made my eyes glaze over. Because it's *dull*: Williams doesn't actually engage with the substance of what he attacks.

He does, to be fair, warn readers that "[colleagues] assumed that it would deal primarily with the issue of climate change. As it happens, this book has nothing to do with it." He airily explains: "This is because it [climate change] is considerably low down on my list of things-to-worry-about." That's about as much analysis or argument as we get, and is typical of the tone. His main method throughout is to quote short, context-free, pro-sustainability sound-bites and sneer at them. For example:

"Even when it comes to scientists – people who should know better like meteorologists, climatologists, geologists etc – all are prone to the sustainability zeitgeist. Physicist Stephen Hawking, who has been out of the headlines since receiving severe heatstroke and sunburn outside his house in 2004 and therefore thinks he knows a thing or two about global warming, says that 'the worst-case scenario is that the Earth would become like its sister planet, Venus, with a temperature of 250 [degrees] centigrade, and raining sulphuric acid'. Thanks, Stephen, that's very useful."

Williams evidently thinks that bracketing the quote with an irrelevant and belittling anecdote and a flippant bit of teenage backchat is all that is required to dismiss it. A swipe at Sir David King goes the same way: "The Government's ex-chief scientific adviser notes that 'we've been having cheap energy for so long and people have just seen it as a resource that they can burn.' I'm no scientist, but isn't that what fuel is for?"

Williams must think this sarcastic rhetorical question is enough to confound King. But the question has an answer: bits of the planet aren't intrinsically "for" anything; we use them in various ways. Using fossil hydrocarbons profligately as fuels has grave consequences for our future security, so it's a good idea to do so less. Williams is indeed "no scientist", in the self-limiting and unattractive sense of showing no interest in, or respect for, the quest to understand how the world works and inform human action for the better. As a non-scientist, in this know-nothing sense, he has no standing to say all the real scientists he sticks his tongue out at "should know better".

This makes the interminable passages of quotations interspersed with sneers a weary, dreary read. It is a terrible waste of opportunity. Denunciatory polemic lends itself to wit: if you set out to be this unrelentingly rude about a set of beliefs and the people who hold them, you should at least manage to raise some laughs. Alas, Williams never rises above snippy petulance.

He doesn't explain what he's in favour of either, although from the things he objects to, you can deduce that he believes that the apotheosis of human freedom and happiness is the ability to leave lights and heaters on in empty rooms, wallow in deep baths, discard more rubbish each year, drive thirstier cars farther to things that used to be nearby, get fat and unfit, and fly ever farther to places that are ever more like the place you've come from and everywhere else. You can also deduce that he thinks the noblest enterprises humanity can engage in are things like building ever higher flood defences around unwisely located cities, air conditioning buildings to keep the seasons out, and helicoptering food aid into starving or drought ridden regions, and that organising ourselves to reduce the *need* to do such things is a weak and shameful abdication of the human calling and destiny to defy, trample down and triumph over mere nature.

Perhaps wisely, Williams never presents these propositions clearly enough to be examined and tested. The whole lively debate about life satisfaction and the real sources of wellbeing passes him by entirely. The nearest he gets to a serious discussion is to point out that the world is full of poor people who need and deserve to consume far more. But he uses this to denounce people who call for less consumption in the *developed* world as hypocrites, missing one of the main themes of the sustainable development movement these two decades: the need for development paths in the global north to create the economic and political opportunity, and the resource headroom, for more, and fairer, development in the global south.

This is not the only point where Williams' superficial swipe-and-rush-past approach leads him to mistake friend for foe. On the strength of one short and typically un-contextualised sentence ("cities have become parasites on the landscape"), he lumps Richard Rogers in with the reactionary anti-urbanists, bemoaning, "Gone are the days of visionary urbanists like New York's Robert Moses." Weirdly, for a man who describes himself as an architect, Williams appears unaware that Rogers chaired the Urban Task Force, whose report was an impassioned plea for 'visionary urbanism' that could easily have included the Moses passage that Williams quotes approvingly. Maybe he just doesn't like to admit that this doyen of humanist urbanists also champions environmental sustainability, because that would introduce an unwelcome note of qualification and subtlety into his project.

Sadly, the uncomfortable sense that Williams is writing about an imaginary parallel universe, concocted from gappy and partially digested reading, robs us environmentalists of any pleasure we might take from his claims that we are ruling the world. This aspect reaches an unlikely climax in a bizarre chapter portraying America as paralysed by guilt over its energy wastefulness, and in thrall to sustainability.

If only.

Roger Levett is a Partner of Levett-Therivel Sustainability Consultants.

Letters

Letters to the Editor should be sent to <newsletter@sgr.org.uk>. It is recommended that they should not be longer than 250 words. They may be edited for brevity or clarity.

Dealing with the UK's Plutonium: Strategy Options for the UK's Separated Plutonium - Review by Martin Quick

Royal Society, September 2007, 36pp., ISBN 978-0854036493

Available to download at: http://www.royalsoc.ac.uk

This report discusses the options for improving the security of the UK's very large plutonium stockpile. This includes plutonium from both the civil nuclear programme and from military activities. The Royal Society issued a report in 1998 urging the government to review the options for managing separated plutonium but, ten years later and despite much greater security threats, the government had not undertaken such a review.

The report clearly emphasises the need for safeguarding the plutonium from theft or terrorist attack by physical protection and security measures. It makes a series of recommendations for safeguarding measures. But perhaps the most important recommendation is that the government should set a cap on reprocessing to prevent the stockpile continuing to grow indefinitely. This is encouraging as SGR and AESR have argued for the cessation of reprocessing for many years now!

Another recommendation is that weapons grade plutonium should continue to be blended with civil plutonium to make it less suitable for making an effective nuclear weapon. However, the report also acknowledges that it is still possible to make a crude nuclear weapon using civil plutonium.

The plutonium is currently in the form of oxide powder. The report argues that, as a minimum, this should be converted to mixed oxide (plutonium and uranium) pellets to minimise the risk of dispersal in case of an accident or deliberate attack. However, the capability for doing this is very limited, as the existing mixed oxide (MOX) fabrication plant is fully utilised. The wording in the report seems to be a rather guarded description of the situation as recently stated by government, namely that the average throughput during the plant's six years of operation has been 2.6 tonnes per year, compared with the design value of 120 tonnes per year. The report recommends expanding MOX fabrication capacity.

A more secure management option, the report argues, is for the plutonium to be converted as far as possible to the 'spent fuel standard'. This is where it is made more difficult to access by incorporating it into MOX fuel, and then this is used in a reactor, thus ending up in spent fuel mixed with highly active fission products. (This is the route agreed by Russia and the USA for taking out of use their surplus military plutonium). However, this would be only possible for the whole of the plutonium stockpile if a further programme of reactors were to be built in the UK – unless the surplus were traded internationally, which would raise serious non-proliferation issues. There are also significant safety issues with the use of MOX fuel that the report does not mention.

In the long term, the report accepts that deep geological disposal would be used whether as plutonium oxide in some form of matrix (glass, concrete or other) or in spent fuel. There is no discussion of the radiological risks from such disposal from very long-lived nuclides including the plutonium.

One option to minimise the amount of separated plutonium, which the report does not discuss, would be for the government to negotiate an immediate end to current overseas contracts for reprocessing at the THORP plant.

Overall, the report is valuable in its proposals for improving the security of our plutonium stockpile, but does not go far in examining the issues in the broader context. However, it is important as a wake up call to the government to treat the security risks of plutonium as an urgent matter.

Martin Quick is a member of SGR's National Co-ordinating Committee and a retired chartered mechanical engineer.

Psychopathology of Leaders: a subject for investigation

The Bradford Disarmament Research Centre's publication *Trident and British Identity* considers that the Trident renewal policy derives from British self-identity as experienced by our ruling elite. There is a key relationship between the belief systems of this elite and our government's postures towards others. As Harry Davis says in his thoughtful book The Palace of Crystal on the urgent need to put an end to war, "It is leaders who decide on wars". Consequently, to give us more insight into the causes of war, he examines the type of people who want to become leaders and their reasons for seeking such a role.

This seems to me to be a crucial issue. The more fully we understand the personalities, psychology, drives and ambitions of those who seek to lead us the more chance we have, in a democracy at least, of electing leaders who will find better ways than violence of solving conflicts.

One aspect of this that I find particularly interesting is the psychopathology of some of the leaders we have recently elected to power; a psychopathology which has come to light through their actions – but which we were unable to detect beforehand.

It seems to me that it might be worth considering (as an adjunct to the ways that we assess the suitability of the individuals) the application of similar criteria to the statements, attitudes and belief systems of those who seek to become our leaders, as are applied in the normal course of psychotherapeutic work.

Dysfunctional individuals are found through identifying those who exhibit, to a dangerous degree, symptoms such as paranoia, splitting, projection and repression. It can be argued that such symptoms can been discerned in the mentality of some of our past leaders.

Jim McCluskey, Twickenham, Middlesex

Rethinking Energy

Your contributors Dave Andrew and Martin Quick (SGR Newsletter, autumn 2008, p.14) say "…other renewable energy generation (such as tidal, wave, biomass and solar photo-voltaic)…" But they are mistaken. Tidal power is not at all renewable. On the contrary, it is tapping the kinetic energy of the Earth's rotation and that is quite certainly a finite resource. I estimate that the total kinetic energy of the Earth to be 2.5 x 1029 joules or 7.14 x 1016 gigawatt-hours – a lot of energy to be sure, but one with no possibility of being renewed.

Your contributors go on to say that combined heat and power (CHP) plants are much more efficient than conventional electricity supply plants. But this is only the case if we allow the rejected heat to be regarded as waste rather than as a resource. To make use of this 'waste' heat, I suggest that our existing power stations should be surrounded by polytunnels and greenhouses for growing tropical fruits. The heating of them will lead to a considerable saving of the fossil fuels presently used to power the aircraft that bring these delights to our tables. It would CHP of a second kind, Combined Horticulture and Power.

Dr John Ponsonby, Wilmslow, Cheshire

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If you're interested in what we do and how we work you can always pop in and see us at 55 Rectory Road, Oxford OX4 1BW.

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