Breakthroughs for the twenty-first century

Sustainable Development Commission

Contents

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Foreword

'Whatever it takes, for as long as it takes'

That phrase has become the watchword of governments around the world when it comes to sorting out the implosion in capital markets. For the last eighteen months, they've been working together in unprecedented unity to try and restore economic stability.

Compare that, however, with governments' combined response to accelerating climate change, collapsing ecosystems, the Millennium Development Goals and so on – the sum of all those civilisation-threatening crises identified by governments from the early 1990s onwards. Stumbling, uninspired incrementalism would be a generous description.

That may now be changing. President Obama has seized hold of the climate change agenda, and has inspired people all over the world with his plans for getting rid of nuclear weapons. Governments of many different persuasions are completely re-thinking their strategies to help protect the rainforests. China is driving forward a number of 'disruptive innovation' programmes on renewable energy and transportation that could astonish everyone. The UK's Climate Change Act has become the first legislation in the world to set legally-binding short, medium and long-term targets for reducing greenhouse gases.

But setting targets, however ambitious they may be, is not of itself a breakthrough. The increasing levels of R&D for sustainable technologies is not of itself a breakthrough. And making sure that things are at least not getting worse is not, of itself, a breakthrough. We all know that things need to get a very great deal better very quickly indeed.

Views differ as to just how much time we've got to make those changes. On climate change, very little, say an increasingly worrying number of very eminent scientists. If that's true, and if we pick up on Lord Stern's advice to governments that up to 2% of annual GDP will need to be invested in a rapid transition to a low-carbon world, how long before 'whatever it takes, for as long as it takes' also becomes the watchword of global climate diplomacy?

And climate change, however big and daunting it may be, is only one facet of the broader sustainable development agenda. It is now more than four years since the UK Government published its second Sustainable Development Strategy, 'Securing the Future'. During that time there has undoubtedly been some progress. We have cleaner air. More of our waste is re-used and recycled. Crime rates are falling, people are living longer and, until recently, we were experiencing a period of steady economic growth and high levels of employment.

But on the whole, we have still not seen the kind of transformation that is needed. Indeed, the most recent evidence tells us that levels of inequality in the UK have **not** been reduced since 1997, which demonstrates just how far we have still to go in terms of creating a genuinely sustainable economy. We seem bogged down on so many different fronts.

That's why, in 2008, the Sustainable Development Commission launched 'Breakthroughs for the 21st Century'. We wanted to bring together a dynamic and hard-hitting portfolio of ideas that could really inspire and motivate policy-makers and others to set the UK much more decisively on the path to becoming a sustainable society.

See what you think about these potential breakthroughs. If you're excited by them, what can you do to help make them a reality? They may not be the sum total of what's required, so we encourage everyone to come up with their own – and make **them** happen!

Jonathon Porritt
Chairman, Sustainable Development Commission

Finding Breakthroughs

We knew there were good ideas out there – compelling propositions that, put into action, could really help make the UK more sustainable. So, last autumn, we invited experts, practitioners and enthusiasts to share their thinking with us, and those breakthrough ideas started pouring in. And because sustainable development has intergenerational equity at its core, we made a point of seeking the views of young people too (see page 4).

To put together a portfolio of the best and brightest, we've looked at every single one of the 285 submissions we received from organisations and individuals across the UK. As we sifted out those we felt were the strongest, we were looking for ideas that could create some kind of shift in the next three to five years – or at least make steps towards a longer term change – as well as inspire others to make that change.

Our selection meetings, involving Commissioners and policy analysts from across the SDC, led to a shortlist of 40 ideas which we then took to a wider audience, to get more feedback and see whether others shared our enthusiasm. Over 200 commentaries helped us decide on the final package of ideas we wanted to present.

The nineteen 'Breakthrough Ideas' set out on the following pages are spread across the spectrum of sustainable development, with solutions ranging from policy change to grassroots action to technological innovation. They encompass varying levels, from individuals, to communities, cities, and things that need to be done at national or international level. Indeed, many of the ideas are driven from the grassroots, but require government to act as the enabler.

The ideas are not all completely new, and they are certainly not rocket science. Some have been around for a while, but need to be mainstreamed or scaled up. The breakthrough is sometimes about simply making a good idea happen! Others build upon concepts about self-reliance, community and frugality which have served our nation well in the past – concepts which have renewed relevance in an economic downturn and given the climate change imperative.

We've presented the ideas grouped into three broad categories:

- **Sustainable lives:** ideas which are symbolic of the ways in which we as individuals can be directly enabled to change our own lifestyles and work with others at a community level
- **Sustainable places:** ideas which are iconic in terms of changing the built environment, our infrastructure and green spaces, in ways which could help reinforce and 'lock in' new and more beneficial ways of living
- **Sustainable economy:** ideas which change the marketplace, the signals about price and value, making more sustainable choices easier and more accessible.

Our selection represents just a few of the great ideas out there – the tip of a rather impressive iceberg. The process we have been through to reach this point demonstrates the sheer amount of creativity and innovation there is in the UK in response to the challenge of creating a more sustainable society. Most of the ideas we've picked are at an early stage and will need a great deal more work in the form of research and development. This report, and the events that go with it, are simply ways of throwing the spotlight on innovative thinking and encouraging you and others reading this to help convert the thinking or demonstration projects into concrete initiatives. The real breakthroughs will come in the way Government, business and other organisations nurture this talent and enable ideas like these to happen quickly and at a transformative scale.

What do we mean by a 'breakthrough'

For us, a 'breakthrough' is something that moves us decisively away from the status quo or the usual incremental change. It provides some kind of step change, if not a quantum leap, towards a significant outcome. Past breakthroughs have included the Clean Air Act of the 1950s, the signing of the Good Friday Agreement in Northern Ireland, and legislation to ban smoking in public places. We aim to find the ideas which will create equivalent breakthroughs in sustainability.

Breakthroughs can be new ways of thinking or working. They may be new technological solutions. They can also be something that has been suggested before but for some reason has not happened yet; or something that is already happening that could be scaled up or applied across the UK. Sometimes the breakthrough can be how you get an idea to happen, rather than the idea itself.

Commissioner working group

Invited ideas from sustainability experts, practitioners and enthusiasts

Free Bikes
Algal Carbon Capture and Storage
Royal Bank of Sustainability
Biomass and Soils
Cap and Share
Congress for the Future
Community wind turbines
Countryside Contracts
DesignWays
Domestic Tradeable Quotas
Eco Zones/ Communities
Enhanced Re-mediation and Carbon Sequestration in Soils
Fife Diet
Food Revolution
From 'Pre-pay' to 'Pay as you save'
Green Bonds
Green Constitution Commission
Green Corps
Independent monitoring body
Kyoto2
Local Food Competition
Low Carbon Zones
Manchester buildings retrofit
Mid-term shareholder loyalty shares
Open Feedback
Outdoor experiences
Personal Carbon Budgets
Project Dirt
Public sector food procurement
Regional Resource Balance
Rethinking Gardening Practices
Retrofitting Buildings with No Upfront Cost
Seven Generations Body
Soil Management
Steady State City
Green Inc
The Ecological Innovation Zone (EIZ)
Travel Centres
Water Neutrality
Happiness

285 ideas
submitted

40 ideas
short-listed

Testing
with wider audience

Final selection
meeting

Lives 1 2 3 4 5 6

Places 7 8 9 10 11 12

Economy 13 14 15 16 17 18 19

19
Breakthrough ideas

A better UK for future generations – engaging young people

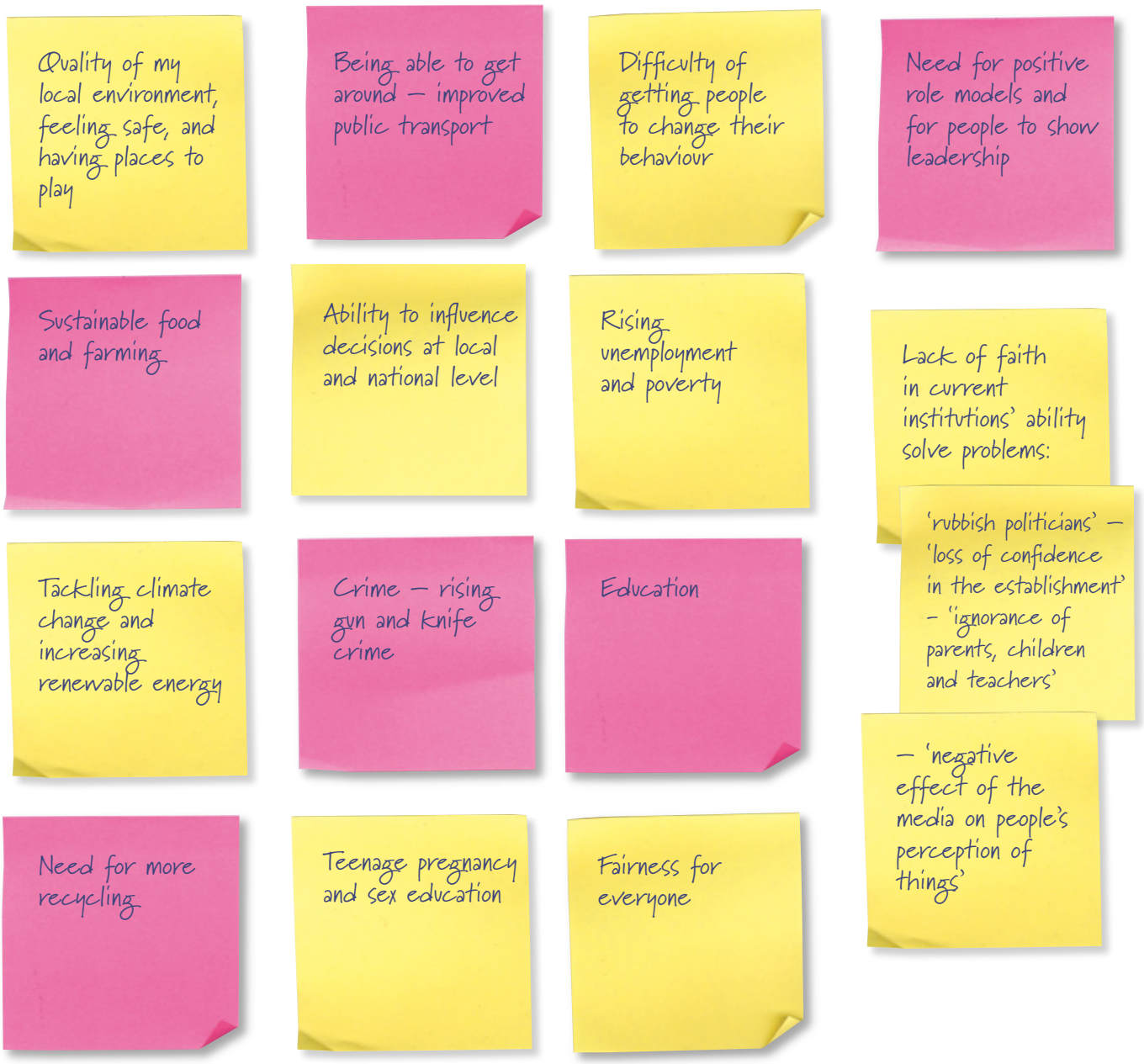
All these breakthrough ideas, wide-ranging as they are, have a common aim: a better future. So is this how today's young people see their world? What should a future UK look like to them, if it is to meet their needs and desires, and those of succeeding generations? We wanted to know. We wanted to hear their suggestions for how we get there – and whether they see the main challenges of sustainability in the same way.

What we heard, as we hoped and expected, did frequently echo what we were hearing in our other research. But when it came to creative ideas, the breakthroughs that young people suggested to us were sometimes refreshingly new, and less constrained by preconceptions about what can be achieved.

We spent a full day with the Children and Youth Board (CYB) – a group set up by the Department for Children, Schools and Families to provide a real sounding board for its policies – and invited more views through a survey to the existing networks of We Are What We Do and the Youth Parliament.

This is what they told us...

Young people's concerns



Young people's ideas

Show us how to do it! Provide interactive examples of what individuals can do, so we can see it and take it back to our own homes and schools
Thomas, 18, North East & Vicky, 13, South West

If you have the power to change something then you should use it. Use it for good not for profit.
Children and Youth Board 2009

Need to make people more passionate about Sustainable Development
Remziye, 15, London

Political Leaders need to prioritise sustainability beyond their political terms of office
Children and Youth Board 2009

Reward communities who've done well
Daniella, 12, East Midlands

The world needs to be less focused on money
Chloe, 15, West Midlands

There should be a plan to reduce every person's carbon footprint in an easy and simple way that means people will do it. So this could be individual targets for the typical family in a leaflet that everyone gets with ways on how exactly to reduce their energy consumption.
Alice, 15, South East

Control car congestion in the Central Business Districts in big towns and cities. Public transport schemes such as park and ride could be a substitute. This would both ease the carbon emissions and make traffic flow in inner city areas much faster and safer.
Thomas, 17, Northern Ireland

Leaders should provide examples of how to live to encourage others to follow in their footsteps
Alys, 16, Yorks & Humber

Encourage people to use bikes – introduce school cycling programmes, providing subsidised or free bikes, make safer routes, and encourage people to use a bike e.g through a 'cycle to school' week. It's good for health as well and saves you money.
Eathan, 16, London & Avril, 17, South East

Buy responsibly – 'name and shame' companies when irresponsible methods are used
Alice, 17, East

Spend the money for reducing emissions on better flood defences as big enough emission reductions won't happen.
Chris, 16, East Midlands

Education! Education! Education! Have more projects inside and outside of school, so children find out what they are good at, and have a passion for, therefore not resulting in gun crime. As school isn't for everyone so it is important that they have a goal.
Devika, 18, London

The need for Breakthroughs

We know we need to do much more to make the UK a truly sustainable society – one that is prosperous, healthy, fair and operates within environmental limits. The imperative to avoid really dangerous levels of climate change represents just one of these limits, and responding to them in a way which is fair, equitable and economically sound is what sustainable development is all about. Compelling evidence on the state of the environment, the economy and social trends (see below) underpins the increasing awareness amongst organisations and individuals of the challenges that we face, and the need for us to face these challenges head on.

'We are today faced with a crisis of sustainability.'
Hilary Benn, Secretary of State for the Environment, 2009[1]

Many of these challenges aren't new – but we do now find ourselves in extraordinary times. Paradoxically, the economic crisis has opened up new political space. There's a growing recognition that in response to global changes we need not just more resilient economies, but more resilience at the individual and community level to meet external shocks. The mood of the day is that things need to change – and more and more people are eager to be a part of making that happen.

On climate change alone, there are between 2000 and 4000 active community groups.[2]

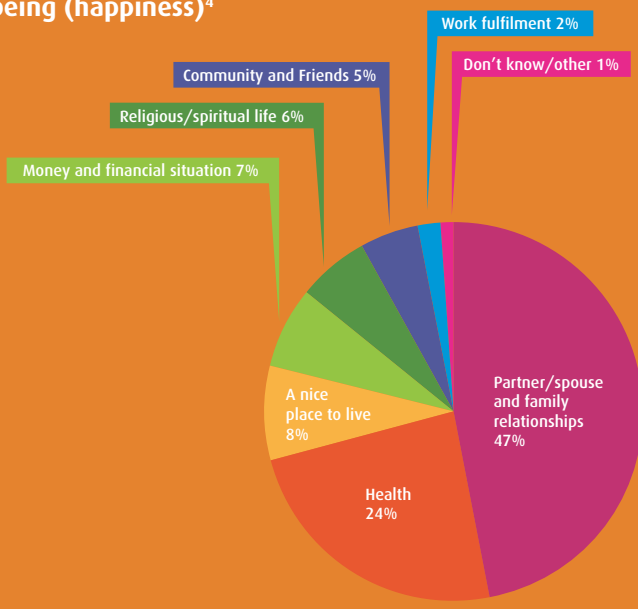
The rapidly growing Transition Towns movement, working on communities' resilience to peak oil and climate change, is one powerful example, and in this report we highlight South London's 'Project Dirt', one of a growing number of active web-based communities linking environmental projects at local level to create more critical mass (see page 15).

The interest and opportunity is there. So is the pressing need – to find Breakthroughs, and make them happen!

'If I had to choose one word that best describes the impetus for our journey to a low carbon economy, it would be 'resilience'. The creation of an economy, ecology and society with greater resilience has many aspects, but the three which stand out are the role of technology; the importance of individual and collective behaviour change; and changes in culture, values and expectations.'
Jan Bebbington, SDC Commissioner[3]

sustainable lives

Factors influencing subjective wellbeing (happiness)[4]



1 Limited progress has been made on reducing income inequalities, and the gap between the richest and poorest tenths is increasing.[5]

2 Although the number of children in low-income households decreased from 27% to 22% between 1997 and 2007, one in five children still live in poverty, and the UK is not on track to meet its 2011 target for child poverty.[6]

3 Life expectancy has increased in all areas of the UK[7], but the pace of improvement has been slower in poorer areas[8]. Mental health[9] and obesity[10] have become particular challenges.

4 The UK ranks 24th in a league table of 29 European countries on child wellbeing, well below countries of similar affluence. Only Romania, Bulgaria, Latvia, Lithuania and Malta do worse. The ranking looked at seven different areas, including health, education, children's views of about how they feel about themselves and their relationships[11]

5 The UK has the highest rate of childhood obesity in the EU.[12]

6 Road traffic volume has risen by 20% since 1990, while walking and cycling have decreased.[13] Many car journeys are avoidable; 25% of all car journeys in the UK are under a mile, while two thirds are under five miles.[14]

7 Despite the fall in crime since 1995, two in three people believe crime has increased in the last two years.[15]

sustainable places

1 Expected increases in population will create new and competing demands for land to be used for housing, infrastructure and food production.

2 Despite improvements following government initiatives, existing housing stock in the UK still requires massive energy efficiency improvements to meet climate change targets and to combat rising fuel poverty. Existing homes are responsible for 27% of the total CO_2 emissions of the UK, and around 80% of the homes we will inhabit in 2050 already exist today.[16]

3 In 2006, approximately 3.5m households (14%) in the UK were in fuel poverty[17]. Almost a quarter of households in Wales, and a third of households in Northern Ireland and Scotland[18] were fuel poor in 2006. Latest estimates predict that the problem had worsened by 2008.[19]

4 Access to quality green spaces can substantially reduce health problems,[20] but only 50% of children in England rate their local green space as fairly good,[21] and only 29% of children today enjoy most of their adventures in the natural outdoors, compared with 70% of adults as children.[22]

5 While the overall condition of Sites of Special Scientific Interest (SSSIs) is improving, the UK is below the percentage needed to be in 'favourable' or 'unfavourable recovering' condition' by 2010, and is not on target to halt biodiversity loss by 2010.[23]

sustainable economy

1 After a period of steady growth, the UK is now experiencing severe economic recession.

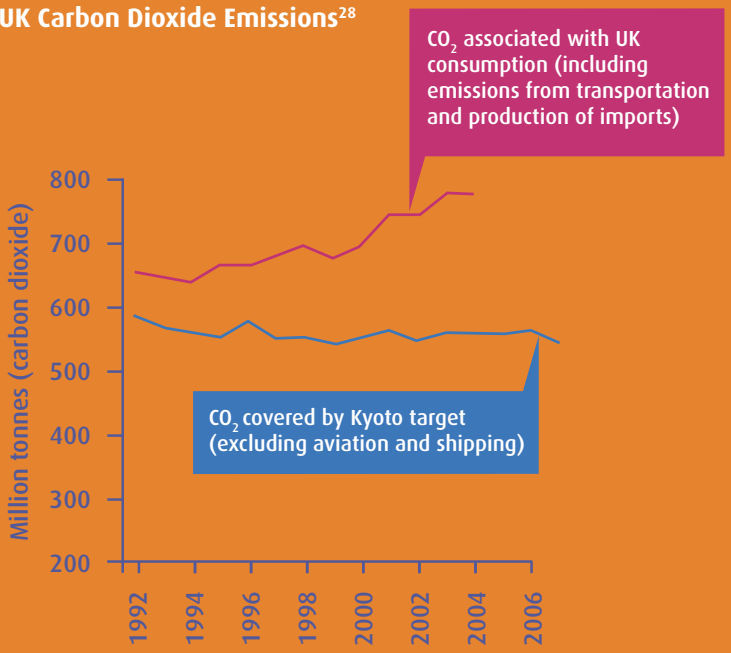
2 'From 1981 to 2005, the global economy more than doubled, but 60 percent of the world's ecosystems were either degraded or over-used.'[24]

3 If everyone in the world consumed natural resources and generated CO_2 at the rate we do in the UK, we'd need more than three planets to support us.[25]

4 Although the UK is on track to meet Kyoto targets to reduce greenhouse gas emissions, an apparent decrease in CO_2 emissions (of around 8%) becomes a significant increase (18%) once emissions embedded in trade and travel are considered.[26]

5 The UK is one of the poorest performers among EU countries in supplying energy from renewable sources, and is not on track to meet national and EU targets. Projections suggest that the share of renewables in the energy mix will merely increase to 5% in the UK by 2020, well below the EU target of 20%.[27]

UK Carbon Dioxide Emissions[28]



Breakthroughs for sustainable lives

Ideas which are symbolic of the ways in which we as individuals can be directly enabled to change our own lifestyles and work with others at a community level

Incredible Edible Todmorden canalside vegetable box

Breakthroughs in land-use for food and social benefit

'Going local' is only one aspect of the whole complex issue of sustainable food. It's significant, however, that a number of ideas submitted to the SDC for an overall 'food revolution', centred firmly on the **re-localisation of food** and support for local producers.

This localisation provides the key to improved access to fresh seasonal produce, reconnecting producers and consumers, reducing transport-related emissions and increasing resource-efficient production. It also supports social interaction by bringing people together to make more of public and private space.

We have chosen to showcase two practical initiatives. The first is based on what's happening in 'Incredible Edible Todmorden', West Yorkshire, and encouraging other communities to follow their lead. The second idea is for a new project to make use of under-used land for community gardening.

Incredible edible communities

C1

sustainable lives

Encouraging communities to grow and eat local food

Pam Warhurst, Incredible Edible Todmorden

'Incredible Edible Todmorden aims to increase the amount of local food grown in both public and private spaces and eaten within the town. Businesses, schools, farmers and the community are all involved.

A **national** programme along the same lines could inspire more towns and communities to work towards this goal. Rolling this out as a competition means you could have one scheme based on the "all entrants are winners" model, as in Britain in Bloom's Neighbourhood Awards. A second tier could be competitive, identifying the best local food towns in each region.

Local food is the door to a sustainable lifestyle. Or, to put it another way, food is the trigger for greater engagement with the big issues such as climate change and health. It cuts across age, income, race and class. In Todmorden, vegetables and fruit are springing up everywhere. Public flower beds are being transformed into community herb gardens and vegetable patches. We've set up a campaign called "Every Egg Matters", so every egg sold in the town is free-range and produced in Todmorden, and another to launch a local food market, as part of a 10-year programme to "Put the Market Back into Market Towns". We're working with tenants in social housing to show people how to grow food and cook, and rolling out a toolkit to help bring in a range of necessary skill sets, from planning and sustainable design to soil quality expertise.'

Rowena Hay, Commission for Architecture and the Built Environment (CABE), says: 'Inspired by a trip to Todmorden, CABE has been "pollinated" by the "incredible edibles" idea. The windowsills and balconies around CABE offices are sprouting herbs, flowers and veggies for staff consumption – and enlivening our environment by engaging everyone in growing.'

SDC

'Every community can be inspired to act more sustainably by growing and consuming local food. Reconnecting food and consumers and reconnecting people with the land is key. The idea of a nationwide competition is all about stimulating innovation and creating new possibilities, even in a time of recession; any neighbourhood in any city can do it. It allows for cross-fertilisation between different sectors, shows people how to share, and encourages local authorities to work with local community groups who are finding solutions to local problems.'

What happens next

These ideas aren't necessarily dependent on new funding. Incredible Edible Todmorden started with 'easy wins', financed from individuals' own pockets. Nor do they need Local Strategic Partnerships or local authority leadership – they are community-led. Launching a competitive element of a nationwide programme, however, would need two years of preparation and development, with expert growing and cooking advice for all entrants, free membership of support organisations, and support with promotional material. The main ask, to make it possible for community initiatives to be self-sustaining, is threefold:

- a food land bank, through which land transferred from public (and private) bodies can be licensed for access by the community
- a continuum of learning opportunities, including schools, diplomas in land-based industries, apprenticeships with farmers, parks departments, etc
- incentives for businesses to help develop food markets.

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Rethinking the community garden

C2

Building community and resilience by turning public spaces and under-used land into urban farms

Matthew Taylor & Steve Broome, Royal Society for the encouragement of Arts, Manufactures and Commerce (RSA)

'Gardening in Britain is usually seen as a private activity. But giving the community a stake in growing food and flowers on underused public and private land can change the way a place thinks about itself. That's what lies at the root of this network of projects being conducted within a RSA research framework. Building on existing links within various communities and expanding beyond them, citizens and organisations will re-think gardening practice by using parcels of private space (gardens), public space (parklands, schools, hospital gardens etc) and underused land (brownfield sites, gardens of disabled and elderly people) to create dispersed urban "farms" for community use and benefit. A paid "community farmer" will provide vital cohesion and continuity, help the community work the pieces of land, and reach out to include new network members.

The recession gives us both the need and the opportunity to rethink our values. This rethink of gardening poses a challenge to individualism, by proposing instead a shift to **collective** benefit. But which benefits? Should we value most highly the opportunities that gardening can offer for sharing and reducing consumption (for example through communal gardening tools), reducing isolation, and increasing social capital? How vital is green space for recreation – or, in response to concerns about food prices, food miles and the environment, is it more important to maximise access to good, healthy and affordable food?

Britain has very rigid ideas about how land is used in the private sphere. In America, community gardens mean literally that. Here we grow our own food and flowers in our own small spaces of land. This project is about changing the way that land ownership and land use is viewed, using activity around that land to develop social capital and networks.'

SDC

'The shift that really needs to happen is not just conceptual, but behavioural. Getting people actively involved will do more than anything to enable them to realise the benefits of pro-community gardening practice, to rethink the idea of gardening collectively, and to see how decisions about private space can affect the public realm.'

What happens next

A funding proposal needs to be developed to get this off the ground, and one or more communities need to be identified for a pilot project stretching over 24 months. During this time a tool-kit would be developed that could be applied elsewhere, and feed learning into other initiatives. RSA Fellows would be the most active participants at the outset, but with advances in communication capacity through online and viral media tools, it has never been easier to share information, resources and examples of best practice. A wide range of stakeholders would be involved through consultations and partnerships (such as collaboration with the Eden Project). There is already evidence of an appetite for using green spaces more effectively, as shown in recent national initiatives such as Channel 4's Landshare scheme and London's Capital Growth project. This project does not aim to influence policy makers and government directly, but it will involve a targeted media campaign to demonstrate particular achievements which will engage the wider public.

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Breakthroughs in our interaction with nature
Natural values: Outdoor experiences for all children in the UK

C3

Getting young people reconnected with the natural world

Dr Kate Rawles & Dr Chris Loynes, University of Cumbria

'Young people need outdoor experiences – but a growing number aren't getting any. This project is about reversing their "nature deficit" – by ensuring that teaching and learning in outdoor settings is built into the education system across the board. From early years to secondary level, children's well-being is nurtured by bringing them into frequent contact with the natural world, helping them to develop the values, knowledge and understanding that underpin sustainable lifestyles. We want more schools to focus on this – and to be assessed on how effectively they deliver. Environmental organisations can be their natural allies – with informal education, youth activities and multi-agency services such as Children's Centres all playing their part too.'

'If we want children to flourish, to become truly empowered, then let us allow them to love the earth before we ask them to save it.'
David Sobel, US writer and pioneer of place-based education

'Outdoor experiences during childhood are a foundation for developing a personal concern for the environment. Yet we've inadvertently created a situation where Britain's increasingly urbanised children can grow up with no connection with trees, birdsong or where their food comes from. One in five has never ever visited the countryside, and many spend more time in cars, indoors and in front of electronic screens than they do outside. This project addresses many of the contributing factors, and enlists our schools to provide a remedy. By organising regular outdoor experiences, they can encourage the celebration of nature, a sense of wonder and (for older children) an exploration of the relationship between contemporary values, negative impacts on nature, including the consequences of consumerism and lifestyle choices, and our own wellbeing and identity.'

SDC

'If we're to be suitably ambitious about this whole issue – how the environment contributes to young people's well-being, and how young people contribute to the well-being of the environment – we should aim to make it a sixth objective of the government's Every Child Matters Framework. As a minimum, structures and clear targets for outdoor experiences need to be backed up by strong and consistent incentives. Unless this is properly resourced, children's services, schools and other local partners can't and won't deliver.'

What happens next

There's a fair amount to build on, since across the UK there is significant work already underway and some policies in place to promote children's learning outside the classroom. To move forward, we now need to get agreement on what level of outdoor experience of nature becomes every child's formal 'entitlement', to be met as an integral part of early years and schools provision. Teachers also need the commitment, confidence and competence to turn this into a regular feature of what they do. Identifying, promoting and rewarding exemplary practice would all help, but as a solid base there should be a specific focus on outdoor experience in teacher training, standards for newly qualified teachers, continuous professional development programmes, and qualifications for early years and youth workers. Then there's the child safety dimension. However confident we are that the benefits of outdoor experience outweigh the attendant risks, we'll have to find ways to bring even the most cautious of teachers, parents and governors onside.

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RSPB Rainham Marshes

More than 6,000 children and young people enjoy a stimulating connection with nature outdoors every year at RSPB Rainham Marshes in Essex. The site was recently rated 'outstanding' when it was awarded its Quality Badge for Learning Outside the Classroom. Professional RSPB field teachers lead small groups on nature walks and encourage children to get stuck in to such ever-popular activities as pond-dipping and mini-beast hunting. But there's space and time for less structured exploration, play and reflection too. Activities and materials for teachers help them extend the outside experience, so it's not just a one-off but an integrated part of their class's regular programme.

Find out more:
education@rspb.org.uk
www.rspb.org.uk/teaching

Breakthroughs in happiness
Taking happiness seriously

4

Discovering what makes for a happy life

Ann Finlayson, Sustainability and Environmental Education (SEEd) and SDC Commissioner for Education & Capability Building

'Young people should be given every opportunity to discover for themselves, throughout their time in education, what makes for a happy life. For personal wellbeing. For social cohesion.

These things shouldn't just be taken for granted, with insights and understanding about them somehow picked up by osmosis. They should be **taught**. And that means they have to be formally incorporated within the school curriculum.'

Since 1974, there has been a dramatic increase in emotional and behavioural difficulties as experienced by both boys and girls. The indicators of child welfare for the UK show British children fare worse than all other Western European countries. They get into more fights with friends, get drunk more often, give birth before 19 more often. Fewer of them are in school.

Oliver James, the eminent author and psychologist, once suggested that enthusiasts for sustainable development should set aside all the different targets and indicators they love so much, at both the local and national level, and focus on just one educational outcome: 'Let us ensure that every child in the UK reaches the age of six feeling radiantly happy about their life. That's the only sure foundation on which to build a secure and sustainable world.'

We're a long way away from that! But it's not too late to do something about the curriculum in our primary and secondary schools.

The new secondary curriculum in England has aims and cross-cutting themes that lend themselves to a deeper understanding of sustainable development and wellbeing, and the new primary curriculum is expected to follow. However, we know that teachers, although personally motivated, feel unprepared to take on these new challenges.

The best way of dealing with this would be to extend the horizons of PSHE (Personal, Social, Health and Economic education) into something that makes a coherent package of the full range of factors driving happiness and wellbeing. Though the boundaries are already wide (eg identity, health, risk, relationships and diversity), the well-documented links between wellbeing and environmental factors (traffic, litter, green space, nature, noise etc.) are not included. So, we believe this area of learning should be renamed Personal, Social, Economic and Environmental education (PSEE) or, if that sounds a little heavy, then just Personal Wellbeing Education (PWE).

What would it mean in practice?

'Students are expressing dissatisfaction with their school lives in many and varied ways. Teachers and teachers' unions have raised very serious concerns about the "standards agenda" and its effectiveness in motivating young people to learn.

Focusing on this integrated area of concern will bring new vitality to this part of the curriculum. There is a substantial evidence base from all round the world regarding the positive impact of the kind of community-based action learning and teaching of life-skills on which an initiative of this kind will depend.

Wellbeing programmes have been shown to reduce rates of depression and improve levels of self-esteem in young people. Action-learning programmes have been shown to reduce rates of truancy and to improve both behaviour and learning outcomes.

Schools become more outward-looking as they connect more directly with their communities, as research has demonstrated[29].'

SDC

'The overall goal would be to get schools and teachers working with young people to help build self-esteem, to turn the fuzzy notion of "citizenship" into opportunities to engage and commit – and to do some serious work on what really makes people happy in life.'

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Breakthroughs in engagement

To secure real breakthroughs, people have to be engaged in the transformation. This means enabling citizens to take collective action both at the local level and in having a much stronger stake in the big, long-term choices faced by our country.

Mobilising popular support and collective action

C5

SDC

Whilst there are literally thousands of local groups and organisations already taking action on sustainability, a new generation of networking initiatives is emerging. Some have taken their inspiration from online movements such as Moveon.org, the progressive politics movement in the US which was one of the springboards for the Obama campaign. There is a growing mood for change, and these new networks have the potential to link activists groups and projects together, creating critical mass and hence a much more powerful catalyst for change. We've been talking to a number of these such as Green Voice[30], Ecomotion[31], 38 Degrees[32], Climate Outreach and Information Network[33], Transition Towns Network[34], Rural Community Carbon Network[35], Low Carbon Community Network[36] and Project Dirt[37]. The latter, in South London, is one very inspiring local version which has the potential to be scaled up.

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Project Dirt

Mark Shearer & Nick Gardner

With a plethora of community-led projects working towards environmental improvement, but not linking up with each other, it can feel as if the whole is less than the sum of the parts. Project Dirt aims to help this often fragmented and uncoordinated movement get better at sharing best practice. Put simply, it makes information readily accessible to everyone who wants to know. The best sources of this information are the people involved in current and real life projects, so Project Dirt's website provides a neutral platform for them to set up and manage what they're doing within the context of a wider green community. The website currently covers South London, has 900+ members and receives 150+ visits a day. It is looking to expand across the city, then nationwide.

Using Project Dirt, members can quickly discover what is going on in any given field. Connecting them with others with similar or complementary skills or experience allows them to share best practice. The project is currently talking to several local authorities and businesses about using its website to distribute grants to environmental groups. But the real value of Project Dirt is its ability to motivate people to become committed and active locally, by showing them all the activity going on all around them.

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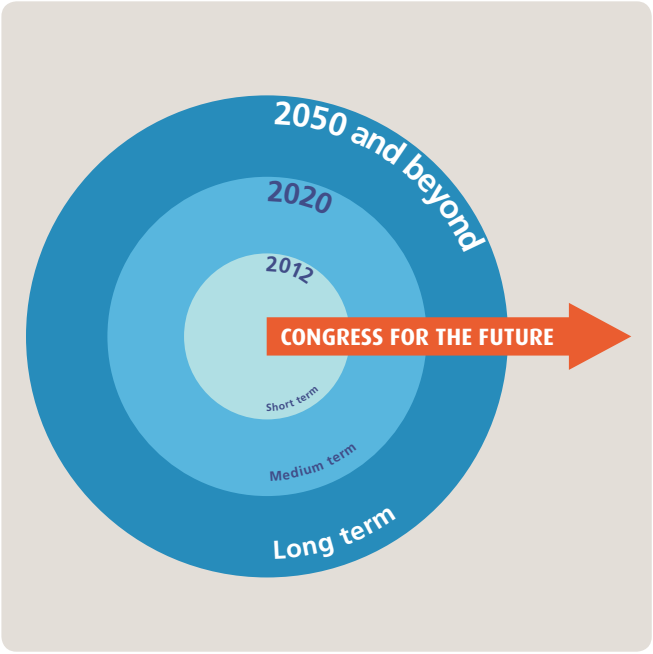
Congress for the future

6

sustainable lives



Avoiding short-termist policy making by involving citizens in national decision-making

Lindsey Colbourne, SDC Commissioner for Engagement & Communications

'This is a breakthrough idea for improving the governance of the UK. Its intention is to create a special Congress, convened by Parliament every year, to help build broad agreement and provide direction on long-term questions.

One or more issues in need of public debate will be put before each Congress, either by the Government of the day or by MPs in response to public petition. Randomly-selected citizens and stakeholders will then engage with the issues in an informed, deliberative process, supported by a secretariat to monitor progress. They'll have scope to solicit input, not least from MPs and other elected representatives, with the overall objective of reaching an informed consensus to give long-term vision and direction to the country.

Imagine... the UK with long-term thinking enshrined at the heart of our democratic processes, raising awareness, creating political space, and generating action on the biggest issues of our time. The Congress for the Future is a way of giving adequate attention to the long-term in what has become an overwhelmingly short-term political world. It will act as a counterweight to that short-termism and to the media-inspired "something must be done" quick fixes. Without such a mechanism, is there any way that we can use sustainable development to tackle issues like prosperity, peak oil or climate change?'

SDC

'This proposal does not undermine representative democracy, but rather strengthens it by generating a sense of collective responsibility on issues that can't be solved by government alone. Its status will ensure it has real clout, and its reach will go beyond the policy community, via the media and internet, to build national awareness and interest in the topics under investigation.'

What happens next

The Congress for the Future will require proper funding and excellent communications. First of all, though, it needs people to demonstrate commitment to the idea, and work to develop models for getting it off the ground. To give it authority, its key procedures should be set by statute and its independence assured. The recruitment of participants and expert stakeholders could either be done on a random basis or citizen-jury style. Either way, it must be designed to prevent control by either political parties or the civil service.

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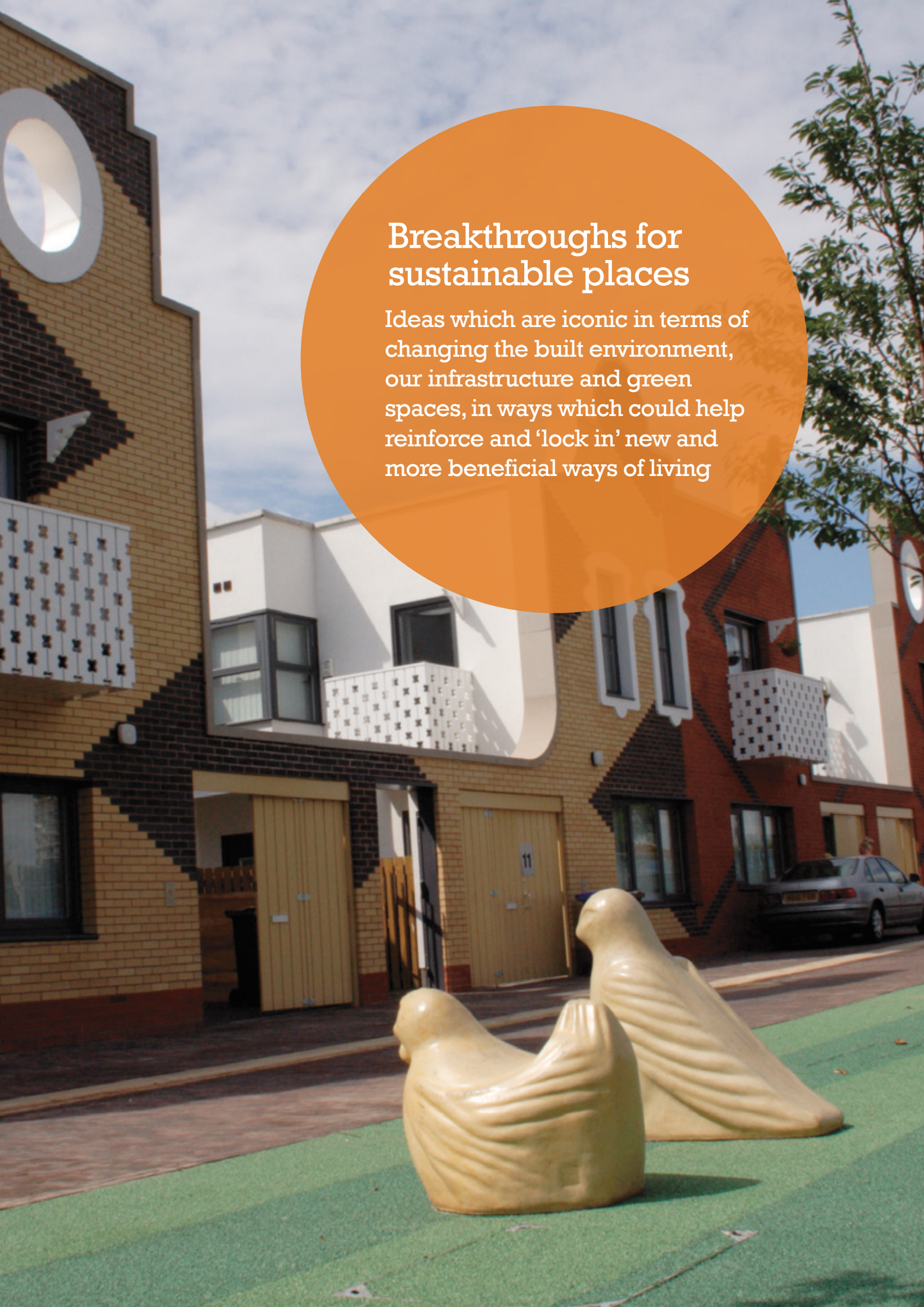


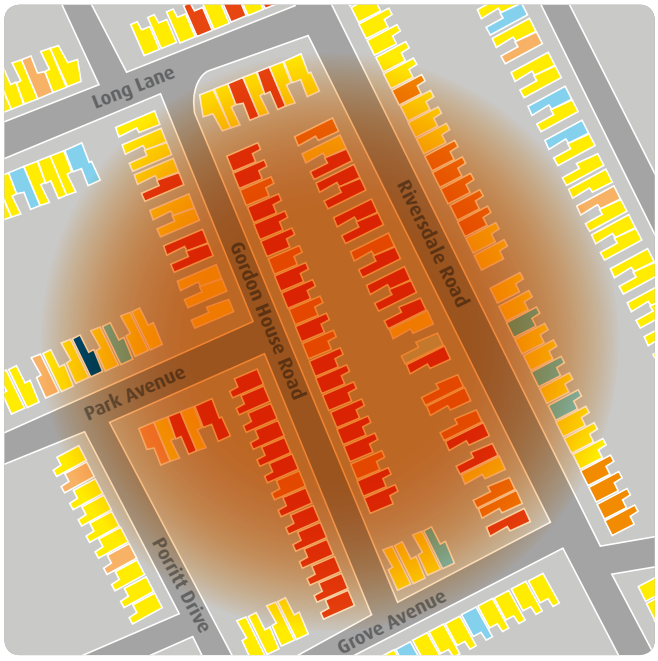
Breakthroughs for sustainable places

Ideas which are iconic in terms of changing the built environment, our infrastructure and green spaces, in ways which could help reinforce and 'lock in' new and more beneficial ways of living

Breakthroughs in the energy performance of our buildings
Low carbon zones

7

sustainable places



Combating fuel poverty, health problems and emissions by bringing poor-quality housing up to highest energy efficiency standards

Dr Brenda Boardman, Lower Carbon Futures, Oxford University Centre for the Environment

'This project proposes Low Carbon Zones – energy action programmes in specially designated areas within **every** local authority. In these zones, all homes will be brought up to the best efficiency standard by 2012 – earning at least a B rating on the Energy Performance Certificate. Improvements will go beyond the familiar territory of loft lagging and filling cavity walls to embrace techniques such as solid wall insulation and zero carbon technologies (such as solar water heating, solar photovoltaic electricity generation, and community-scale combined heat and power).

Each Local Authority can determine the size and shape of its own Zone, provided it contains at least 50% of all the fuel poor households within that Authority's jurisdiction. People in fuel poverty won't have to pay, because work on their homes will be funded out of income tax. Other households will be encouraged to join in too, subsidised through existing programmes or financed through low cost loans, so the work can proceed street-by-street as comprehensively as possible, maximising cost effectiveness and economies of scale. Low Carbon Zones shift the emphasis from targeting the poorest people to targeting the areas with the poorest quality homes. This is a highly effective way both to boost overall energy and emissions savings, and to get more help more quickly to those in need – the five million fuel poor households in the UK who in 2008 couldn't afford to heat their homes properly. It also marks a shift from central to local decision making, reinforcing Local Authorities' appetite for tackling fuel poverty and delivering carbon reductions within their community. A radical programme, it will require a dedicated local presence answerable to the local community and available to "hand hold" occupants through the transformation.'

SDC

'Bringing cold homes up to the best energy efficiency standards will bring financial, health and well-being benefits to occupants for many years, plus crucial carbon emissions reductions for the UK. Low Carbon Zones will be a cost effective way of achieving this, thanks to the way the work can be organised to ensure economies of scale. And the economy as a whole will benefit from the stimulus to the building industry through local jobs and training.'

What happens next

This idea builds on and scales up existing programmes, delivering more radical improvements, more rapidly. It will play a key role in ensuring that the Government achieves its legal obligation to end fuel poverty by 2016. Responsibility is shared between central and local government, as part of the move towards devolution and area-based programmes for energy efficiency.

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Greater Manchester retrofit plus

8

Future-proofing Manchester's building stock while providing employment, skills and long-term investment opportunities

Mike Reardon, Association of Greater Manchester Authorities

'The vast majority of Greater Manchester's homes and businesses still need converting to much higher energy efficiency standards, and low- and zero-carbon heat and power. So this breakthrough idea involves setting up a company where the local authorities partner with the private sector to bring together the necessary finance and expertise, and stimulate the development of innovative products and services.

The company offers residents and businesses a straightforward choice of off-the-shelf low carbon retrofit packages appropriate to local circumstances, delivered by approved agents and backed by financing deals to cover the up-front cost. The repayments would be made over time (perhaps via a Pay As You Save mechanism linked to the property's energy bill – see page 20). Risk would be spread by bundling large numbers of upgraded home projects together, making up-front financing an attractive proposition for long-term investors such as pension funds.

The company's activities would also extend to owning and operating low- and zero-carbon energy generation at community scale – bringing in revenue from the sale of heat and power to local residents and businesses (perhaps including new-build developments), and for excess electricity delivered into the grid. At its best, it would localise energy supply as well as reducing demand for energy and looking at the total carbon footprint of our wider lifestyles.

This idea connects benefits for the local economy with future proofing Greater Manchester's existing building stock, three quarters of which will still be in use in 2050. Not only will it cut carbon emissions, energy use, household bills and business operating costs, it will create entry level jobs and a skills ladder in the low carbon technologies and services sector, and business opportunities all along the supply chain, developing and delivering product and services innovations. The model is designed to be replicable across other cities.

The proposal for creating this company is targeted at businesses who see tackling climate change as a core concern. The partnership approach builds on initiatives such as "Manchester is My Planet" and the "triple helix" of strong public sector leadership, a vibrant, innovative and tuned in academic community, and a track record of successful supply chain intervention to deliver jobs and skills.'

SDC

'Despite significant activity in carbon reduction at a national level, the evidence is that current efforts aren't working anything like fast enough. A viable and attractive model to stimulate investment in sustainable infrastructure in existing communities is still urgently needed. Solutions tailored to specific areas are likely to be able to go further and deliver greater carbon reductions whilst bringing a host of benefits to local communities.'

What happens next

The investment model development is under way. The relevant government departments – DECC, CLG and BERR – may have to be persuaded of the advantages of developing this integrated approach. Issues around grid connection and energy price points will need to be resolved via close partnership with the utilities and the regulators. Greater Manchester also has plans for a Climate Change Agency.

For the business model to work, it needs to generate a secure revenue flow, and to be able to access long-term affordable financing and new innovative financing schemes. Rolling it out will rely on mainstreaming successful pilot projects, finding and enlisting visionary local leaders, and strengthening social business models. Developing the skills base is essential.

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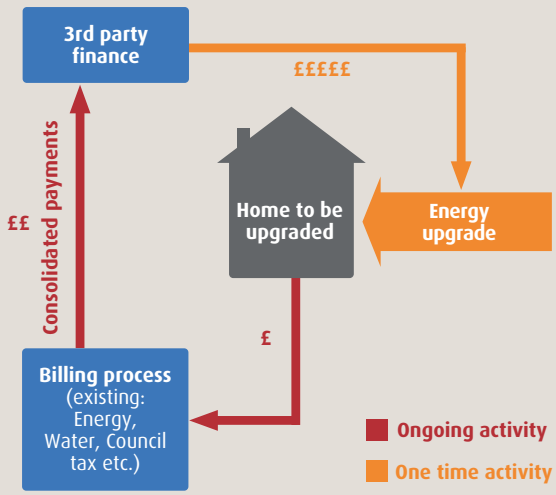
From 'pre-pay' to 'pay as you save'

9



Financing home energy efficiency measures through future savings on energy bills

David Adams, Knauf Insulation

'This is a smart way of financing energy efficiency measures in people's homes, which gets round their reluctance – or inability – to pay up front for future benefits. The project builds upon the concept of third party financing the upfront costs repaid via a charge on the property rather than the individual. This will enable the costs to be spread over a sufficient period so that repayments are less than energy cost savings, so the householder sees a net financial benefit every time the bill arrives – whether they own the place, rent it, or take it on with this arrangement already up and running.

The project has developed this basic idea into a comprehensive policy package providing further incentives by relating stamp duty and/or council tax to home energy performance and guaranteeing quality through an integrated accreditation scheme.

The level of savings will be dependent on fuel costs. Taking a conservative estimate* applying a basket of measures worth £8,600 to a 3 bed semi would deliver net average savings of £50 per year over a 25 year loan period, rising to £900 per year thereafter. If fuel prices rise at 4% per year, this rises to over £200 per year. This is on top of improving the Energy Performance Certificate rating from E to C, and saving 3 tonnes of CO_2 per year.

* With a 30% reduction on Q4 2008 prices, followed by a 5% increase per year, and taking 9 years to return to 2008 prices

Nobody need be deterred any longer by up-front costs; the same mechanism can be applied to "fuel poor" and "able to pay" households; and the Government will be able to make energy efficiency improvements mandatory at specific times (as, for instance, under the "consequential improvement" requirements in building regulations) without accusations of unfairness. Linking the charge to the bill payer also removes the "split incentive" problem in the rental sector, where it is tenants who stand to gain from lower bills and greater comfort, but landlords who pay (or won't pay) for the work. Likewise, it enables registered social landlords to finance energy efficiency improvements which cannot be recouped through rent increases.'

SDC

'Household energy use currently accounts for over a quarter of the UK's carbon emissions. To achieve a breakthrough in carbon reduction, as the Government acknowledges, emissions from buildings need to be down to almost zero by 2050. And energy inefficient homes are a contributory cause not only of climate change, but also of fuel poverty – a misery for growing numbers of people.

Sadly, many are still being left cold by the existing case for energy efficiency. The upfront costs barrier is compounded when people aren't sure of remaining in their homes long enough to recoup their investment, or (for landlords rather than owner-occupiers) when they aren't the ones who'll be getting the energy cost saving. But both these conundrums are neatly unlocked by this idea of linking loans for energy efficiency works to **the property rather than its owner**. As outlined in SDC's *Sustainable New Deal*, no climate change strategy will succeed without a comprehensive upgrading of the existing housing stock.'

What happens next

To gain customer confidence and incentivise installers, an accreditation and quality assessment scheme needs to be linked to the financial package. After all, everything relies on achieving the promised energy savings. And, although the initial financing concept is fairly easy to grasp, its details need to be accessible to potential customers and policy makers. In any event, the role of local – and central – government will be key. Encouragingly, Ed Miliband, the Secretary of State for Energy and Climate Change, has already given vocal support to the Pay as you Save concept, which also features in Conservative Party's Low Carbon Economy policy paper.

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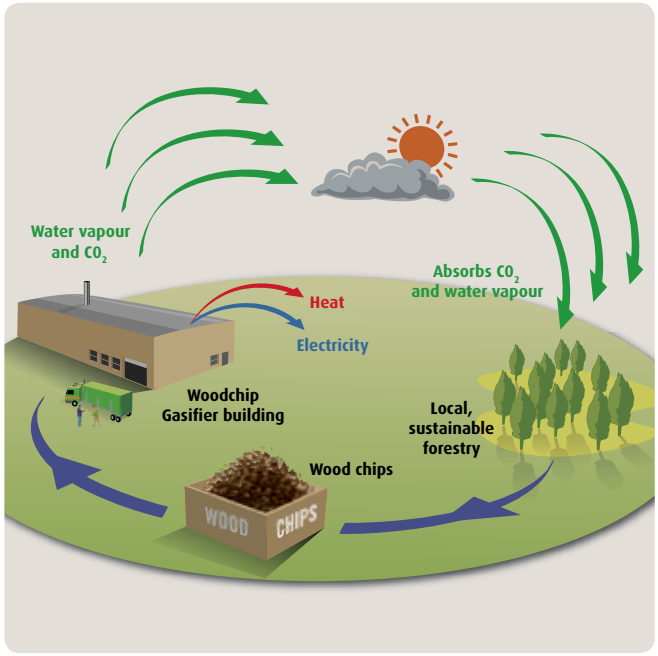
Breakthroughs in how we use our land

Biochar and soils: A win-win for climate and communities

10



Providing renewable heat, improving soil quality and creating carbon sinks with biochar

Professor Tim Lenton & Dr. Zoe Wallage, University of East Anglia

'The biochar process converts part of our waste stream into a form of carbon which can be locked back into the soil – a "negative emissions" system which has the potential to become widespread across the UK. It is based on the burning of biomass waste in a modern process akin to ancient charcoal-making. The biomass goes into a pyrolysing energy-and-charcoal generator, which drives a local heating system, producing a useful synthesis of gas and bio-oil, and converting the remaining half of the carbon into *biochar*. Once in the soil, if properly managed, this carbon is permanently removed from the atmosphere. Adding "biochar" to agricultural soil has many other benefits: it can improve the soil structure and enhance its nutrient and water retention ability, so potentially you get better crops with less fertiliser, less need for irrigation and fewer problems of eutrophication of streams and rivers.

This idea combines a form of Carbon Capture and Storage with the simultaneous recycling of waste, the production of alternative and renewable fuel sources, the enhancement of agricultural productivity, and the promotion of more energy independent communities at the local scale. At present, by contrast, huge quantities of biomass "waste" generated by farms, forestry and in rural regions (England alone currently produces over 272 million tonnes a year) is often simply burned or just allowed to biodegrade, emitting methane and nitrous oxide as well as carbon dioxide.'

SDC

'Sustainable energy generation and food production must be at the core of a sustainable society, and over the coming centuries we will need to enhance natural carbon sinks to return CO_2 concentrations to pre-industrial levels. This approach addresses both these sustainability issues – the future equilibrium, and the legacy problem. It is not a Global panacea – there will be parts of the world where it may not be an appropriate technology. But for the UK as a whole, it has been estimated that biochar could sequester as much as about 10% of current annual carbon emissions. Furthermore, once the infrastructure is in place, it will generate long-term benefits with minimal further investment.'

What happens next

Robust environmental lifecycle impact assessments will be a prerequisite before putting the biochar concept into practice at scale. UK waste legislation will need to be revised, to recognise biochar as a co-product rather than a by-product of the bio-energy process, in order to prevent restrictions on burying it. Government innovation and support will need to be combined with proper public engagement. With relatively little media attention so far, biochar is currently rather the poor relation amongst other larger-scale approaches to Carbon Capture and Storage.

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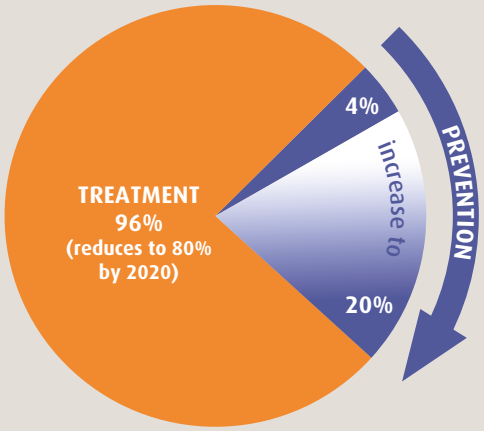
Breakthroughs in health
Fewer patients are a virtue

C11



Total health spending (£92.3 billion in 2008)

By 2020, 20% of all health spending dedicated to preventing illness and public health

Anna Coote, New Economics Foundation and SDC Commissioner for Health

'A strong, healthy and just society is a central principle of sustainable development. So when we focus on cutting CO_2 levels, for instance, mitigating the harmful effects of climate change on health is a really important driver. Some of the breakthroughs we feature have a number of positive impacts – "making cycling mainstream" (page 23) promises to improve health by increasing levels of physical activity, cutting harmful air and noise pollution, and reducing traffic accidents. "Natural values" (page 12) draws on strong evidence that time spent in outdoor environments has positive effects on physical and mental well-being. The same is true of projects promoting gardening and local food (page 10 –11), which offer additional benefits from healthy eating.

It cannot be left to the NHS alone to improve the health of the population. Indeed, if it were, the NHS couldn't cope. In his 2002 Review for the Treasury[38], Sir Derek Wanless warned that if people were not encouraged to lead healthier lives, NHS costs could spiral out of control. He outlined three scenarios: "fully engaged" (with a focus on preventing illness and making better use of health resources), "solid progress" and "slow uptake". Taken over a 20-year period, he found, the "fully engaged" scenario would not only be the least expensive, but would also deliver the best health outcomes – and the gap between this and the worst scenario would have grown to around £30 billion – half of what the NHS spent in total in the year he was writing. This makes a compelling case for all the different sectors and services, including education, employment, planning, housing, benefits, transport, sport, leisure and environment, to share responsibility – and work together – to address the underlying causes of illness and health inequalities.

However, the NHS must play its part, and that too will require a breakthrough. Currently, nearly all its budget goes – directly or indirectly – on the treatment and care of illness, while it only spends 4% of the £92.3 billion it gets from taxpayers on prevention and public health.[39] Yet more than half the illnesses treated by the NHS are preventable.[40] This is unsustainable, unethical and unjust. Unsustainable, because in a low-growth or no-growth economy, there will be less money to pay for public services; funds for meeting unavoidable needs should not be wasted on meeting those that could have been prevented. Unethical because avoidable risks – including obesity, mental illness, homelessness, incarceration and educational underachievement – undermine people's well-being. And unjust, because the burden of risk falls most heavily on the poor.

We propose a radical shift in the focus of health spending – from treating illness to preventing it. A further 16% of the NHS budget should be dedicated to preventing illness, to achieve a total figure of 20% by 2020. This represents an additional 1.6% of the budget each year, and could be achieved by an incremental approach over the next ten years – small increases at first, accompanied by investment in research to consolidate the evidence base. A partnership approach would be essential, pooling NHS funds with those of local government, schools and other relevant agencies in order that they can work together to address the underlying social and economic determinants of health.'

SDC

'The importance and urgency of preventing illness and reducing health inequalities is clearly recognised by government, but it seems we've been going backwards. In a 2007 follow-up report, Wanless found that the number of public health consultants and registrars had actually declined since 1997, while there had been an increase of almost 60% in other medical staff numbers. A cross-sectoral approach is strongly supported by the findings of the World Health Organisation's Commission on the Social Determinants of Health, and by the emerging findings of the Strategic Review of Health Inequalities in England Post 2010 (Marmot Review). It is further endorsed by recent guidance from the National Institute for Health and Clinical Excellence (NICE) on physical activity, built and natural environments, and spatial planning.'

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Breakthroughs in how we get around
Making cycling mainstream

12

Transforming our roads and giving people the confidence and incentive to cycle

Chris Peck, CTC – the national cyclists' organisation

'A big push to promote cycling could make the bike the normal choice for journeys up to five miles. The top priority is overcoming the risks that put people off. That means redesigning street layouts with cyclists in mind. It means curbing traffic speed, reducing the volume of traffic, and investing in high quality cycle lanes or paths on the busiest roads. It means providing every child – and all interested adults – with the training to ensure they can cycle both safely and well. And, going beyond safety issues, promotional campaigns, journey planning advice, cycle-to-work schemes, incentives and facilities for locking up bikes and showering on arrival should encourage everyone to seriously consider making cycling a regular part of their life.

Bikes are best in the 1-5 mile range where cars are at their worst. Yet these short trips currently account for 60% of all UK car journeys. Every trip made by bike instead will cut emissions of greenhouse gases, particulates and other pollutants. Switching half of them would save up to 5 million tonnes of CO_2 a year, which is around 4% of domestic transport emissions.

This is a quality of life issue too. People will be healthier, happier and better off if they cycle more. Many would love to, but just don't feel it's safe. Half the children in the UK would like to cycle to school, surveys say, yet only 2% actually do. By creating a more cycling-friendly environment, and helping them minimise the risks, we'll get more of these would-be cyclists on their bikes. Once kick-started, the momentum of change will create a virtuous circle. The more people do it, the greater the awareness of cycling and its benefits – and the safer it becomes. In London, where cycling has almost doubled in the last 10 years, cyclist casualties have actually fallen by one third.'

SDC

'This isn't a novel idea – but it's one whose time has come. At the very least, we should aim to double cycling levels within 10 years. The bicycle is the most efficient and environmentally benign form of transport ever invented. We know cycling is good for health – and building regular exercise into everyday routines is one of the best ways of staying healthy and avoiding obesity. Just as important are the social spin-offs, especially for the young. The young people that we spoke to really wanted to see a breakthrough on cycling. Instead of unsustainable car dependence, we look forward to a world in which it's taken for granted that our children can get around cheaply and independently – by bike.

Look at countries where cycling is more common, and you find much higher levels of child well-being. It's not only the cyclists who benefit. Less car use means less traffic congestion and better road safety for all. And cycle-friendly neighbourhoods allow more scope for play and social interaction, encouraging better personal behaviour and even cutting crime.'

What happens next

Improvements in infrastructure and street design, and the extension of 20mph speed limits to cover most urban neighbourhoods, should be backed up by better enforcement of traffic law, protecting vulnerable road users from injury or intimidation – and by one to one advice on travel planning for people at critical times such as moving house or leaving school or university. Pro-cycling initiatives and cycle training need more funding and support from local authorities, schools and employers. In much of the UK, funding for cycling averages £1 or less per person per year. Best practice might cost at least five times that, but would be money well spent, with studies[41] suggesting that each additional cyclist boosts the economy by between £300 and £600 per year in environmental, health and social benefits.

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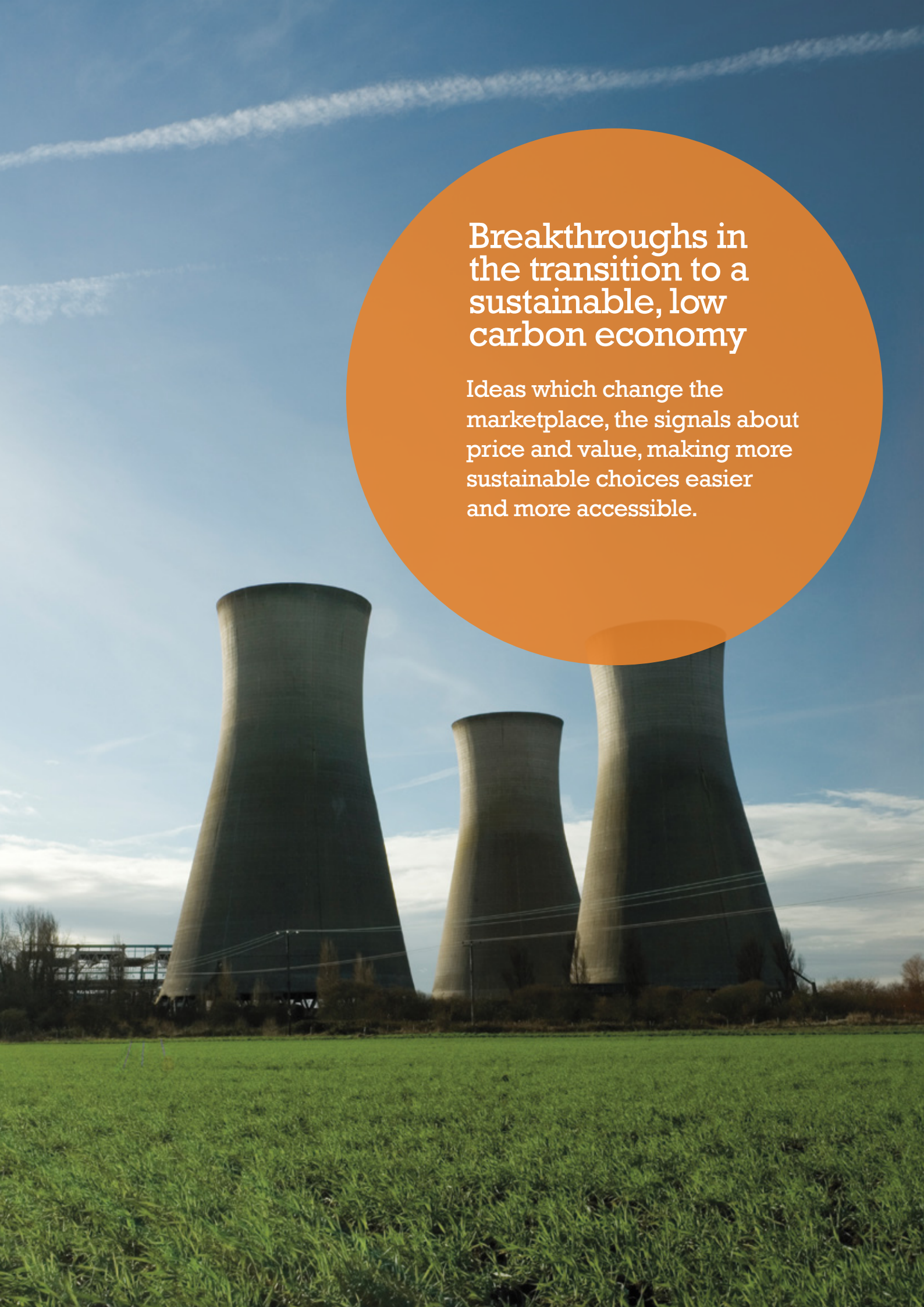


Breakthroughs in the transition to a sustainable, low carbon economy

Ideas which change the marketplace, the signals about price and value, making more sustainable choices easier and more accessible.

Transforming the way we manage carbon

We need to reduce emissions of greenhouse gases globally by at least 80% by 2050. And the developed countries need to make cuts of at least 30% by 2020. An unprecedented scientific consensus has got us this far. But the politics of tackling climate change still lags far behind the science. The frameworks at the heart of carbon management at a global level, such as Kyoto and the EU Emissions Trading Scheme (EU ETS), have struggled to make much of an impact on emissions not because they were flawed ideas, but because they were undermined by fundamental political tensions between the US, EU and developing countries. With Copenhagen approaching, and both the Obama administration and China gearing up, a new international settlement on climate change looks possible for 2010. It is therefore a good time to look again at ways of capping and allocating carbon emissions.

What's the single most important thing we can do to correct that science-into-policy deficit? Lord Stern was clear on this: 'get a realistic price on a tonne of CO_2 just as fast as possible.' That won't be enough on its own, but it's the baseline without which everything else is at risk.

So how near are we to getting a 'realistic price'? Substantial volumes of carbon are traded though the EU ETS and under the Kyoto Protocol's flexibility mechanisms. President Obama is vigorously pushing a similar Cap-and-Trade scheme in the US, and other countries are starting to get to grips with what this all means. But ETS permits to emit CO_2 are trading at around €10 a tonne these days. That's woefully inadequate. US scientist Jim Hansen reckons it will take $250 a tonne to get emissions down by 80%. At present rates of progress, the concentration of greenhouse gases in the atmosphere will be through the 450ppm barrier (the upper limit if we are to have a decent chance of staying below the all-important 2°C average temperature increase) before we get anywhere near Stern's 'realistic price'.

This kind of realism (**not** pessimism!) is persuading more and more people that we've got to come up with something much faster, smarter and fairer than the current Kyoto regime. And some of the brightest thinking on how to tackle that challenge is going on right here in the UK.

Here we present three Breakthroughs: two are new ideas for a much tougher global regime for allocating and driving down carbon emissions. Their approaches differ, but both believe that interventions have to be **upstream** (at the point where carbon-based fuels enter the economy), and **global** (unlike the Kyoto Protocol). And both, significantly, are **upbeat** – rooted in the idea of getting everyone to focus on benefits and opportunities. The third idea takes a very different and quite distinct approach – placing the responsibility for managing carbon with the individual.

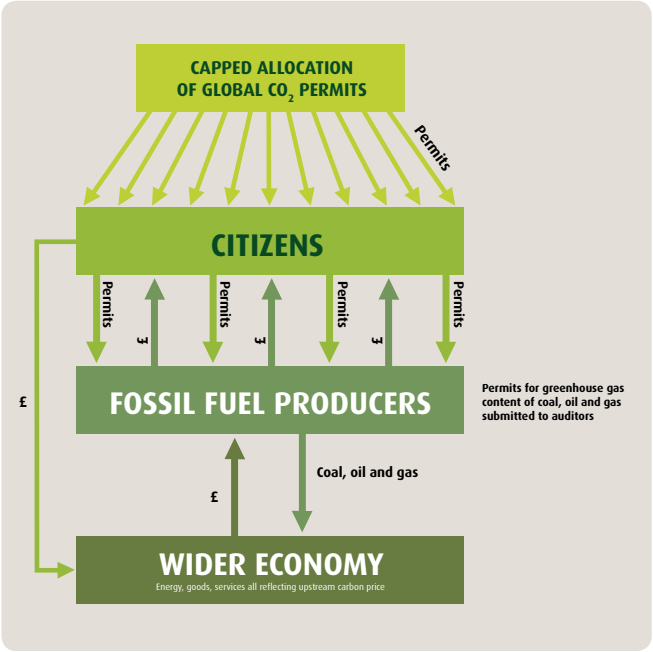
Understanding the basic principles of carbon allocations

Imagine, if you will, that the management of the Earth's atmosphere (including its use as a 'sink' for greenhouse gases) is shared equally between all the 6.7 billion people currently living on earth. Then imagine that the world's politicians, being serious about tackling climate change, work out the maximum (safe) amount of greenhouse gases that can be emitted every year and put those 'entitlements' up for sale. Energy companies the world over who wanted to go on using fossil fuels would then have to buy those entitlements. The cost would of course be passed on to their customers. But here's the upside: the revenue from those sales (running into trillions of dollars) would come straight back to all 6.7 billion of us, on a strict per capita basis. Bill Gates would get exactly the same 'carbon dividend' as the poorest citizen in the world's poorest country.

Cap and share

13

sustainable, low carbon economy



Cap the carbon and share the income with an innovative, citizen-centred permits scheme

Nick Bardsley

'This breakthrough, developed by the Foundation for the Economics of Sustainability,[42] (Feasta), is based on compelling the producers of fossil fuels to buy permits for their greenhouse gas content **before** they are allowed to sell the fuel. The permits are purchased from **citizens** (who each get an equal share of the revenue). Over time, the number of permits is reduced, ensuring that their price keeps on rising. If people choose not to sell their permits to the energy producers, then those tonnes of CO_2 are in effect just removed from the annual total.

Returning the proceeds of the permit sales to the public on a per capita basis, rather than to the companies or the state, swings political support behind the idea and also addresses the fuel poverty implications of a rising carbon price. People leading sufficiently low-carbon lifestyles will be making more money than they lose through rising prices – an obvious encouragement for investing individual's carbon revenues in energy efficiency and renewables. There's no need for a complicated and costly system of personal carbon accounts, since the only thing people do with their permits is sell them or decide not to, and the only purchasers of permits are the relatively small number of fossil fuel producers.

Reducing the number of permits ensures a permanent reduction in fossil fuel supply. This forces energy suppliers to diversify, for example into renewables, or into new business models that aim to help customers manage with less fuel and less energy.'

SDC

'Natural justice tells us that individual emissions of CO_2 must, in the long run, "converge" around the same per capita entitlement. And that means emissions in rich world countries must start "contracting" just as soon as possible.

In an alternative version, an organisation is set up, independent from the government, which auctions permits to the fuel companies and rebates the public with the revenues on a per capita basis. This arrangement prevents the state reclaiming the revenues for other purposes. This is being promoted in the United States as "Cap and Dividend", and was nominated by *Newsweek* as one of its truly "Transformative Ideas" from 2008.'

What happens next

The scheme has to cover the entire economy, except for those businesses already covered by other schemes. Administrative and commercial systems need to be devised to run the permit sales. More fundamentally, making the idea work depends on building public understanding, acceptance and support – and getting the backing of politicians – as a way of making much faster progress on the UK's new carbon budgets. Plus complementary policies across the EU and wider are needed, to sort out how it can be implemented internationally. Energy suppliers will have to accept the logic of business diversification in the face of continually reduced fossil fuel production – and make a commitment not to fund disruptive lobbying and publicity campaigns.

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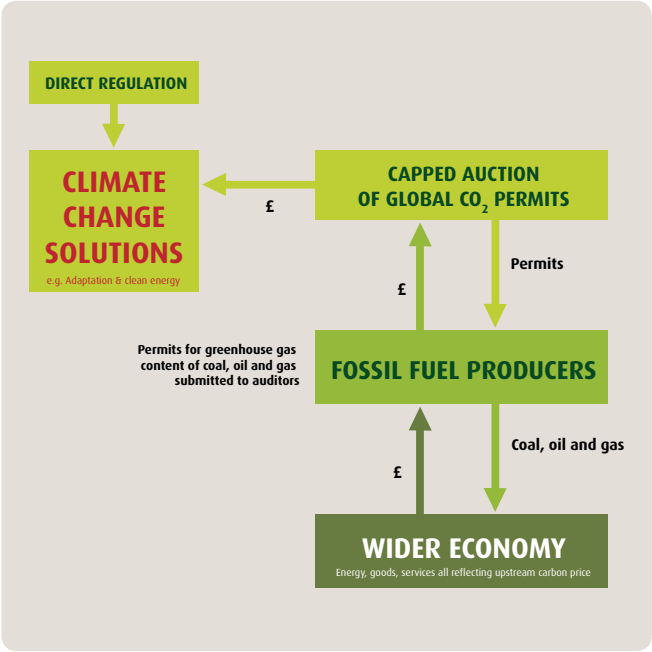
Kyoto 2

14



Tackling climate change with a global carbon price on fossil fuels

Oliver Tickell

'The existing Kyoto Protocol has failed to deliver the intended cuts in greenhouse gas emissions. One reason is that it's national emissions allocations and targets don't make sense in the context of the global economy. So, Kyoto2 proposes a new approach. It starts by defining a global cap on emissions. It would then control emissions 'upstream', at or close to where fossil fuels are produced.

Emission "permits" up to the cap are sold in an open worldwide auction, subject to a reserve price to provide a long-term signal for investment. Fossil fuel companies have to obtain and surrender permits relating to their production, before their fuel can enter the economy. The proceeds from the auction are invested in climate change solutions: to conserve and enhance natural carbon sinks, to develop and deploy renewable energy, to raise energy efficiency, and to finance adaptation. Special emphasis is placed on the needs of poor people, poor countries, and those most vulnerable to climate change impacts.

This main mechanism is supplemented by direct regulation aimed at reaching into sectors only weakly influenced by carbon price alone, such as the energy efficiency of goods. The entire process is kick-started by an infusion of funds from rich countries, reflecting their historic responsibilities.'

SDC

'At the heart of this is the recognition that markets can be inefficient. They are subject to specific failures (price volatility and speculation, for instance), and even the most powerful market signals may impact only weakly on behaviour change. And at the moment, if coal is burned in China to produce goods consumed in Europe, the associated emissions are accounted to China. It makes far more sense to account for them at the point of consumption.

This idea supplements market mechanisms with direct regulation, aimed at overcoming market failures and reducing waste. Funds raised through Kyoto2 permit auctions, amounting to at least $1 trillion per year (roughly 1.5% of the global economy), would be invested both in mitigating climate change (by supporting renewable energy, energy efficiency and so on) and adapting to its anticipated and unavoidable effects in areas ranging from biodiversity to meeting additional healthcare needs and emergency relief from climate-related disasters.'

What happens next

There is already a broad base of support for this idea, and there is now work going on to turn this into a more organised body of support. While a range of international institutions will have roles to play, individual governments will need to adopt the idea in order to argue for wider support at the forthcoming international climate talks in Copenhagen in December 2009.

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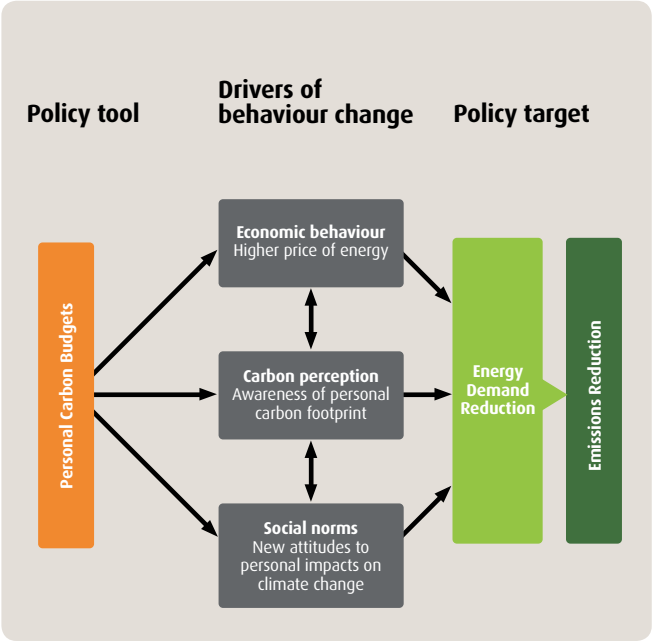
Personal carbon budgets

C15



Individuals and communities taking responsibility for reducing emission of CO_2 through personal carbon budgets

Nick Eyre, Environmental Change Institute, University of Oxford

'Reducing emissions of CO_2 is not just a matter for government and business. The idea behind personal carbon budgets is to make it relevant to the individual level. Currently, in "cap and trade" schemes such as the EU Emissions Trading Scheme, energy use by companies is the subject of carbon emission quotas. In the same way, each of us could be given direct accountability for our own household and transport energy use. The fairest way of doing it would be for everyone to be allocated an equal-sized annual allowance. As this "cap" reduces progressively year-on-year, it helps drive down the UK's overall carbon emissions – about half of which come from personal energy use.

A personal carbon budget will quite literally "bring home" the whole concept of cutting emissions. Each individual will have clear rights and responsibilities, and new motivation to live a low carbon life. Those who manage to live within their budget in a given year will have some spare quota to sell. Those who don't will have to buy from the scheme to cover their excess. People will think very differently about climate change, focusing on what they can do by their own choices. At present, they may well be concerned, but often aren't taking major action because they see it as the Government's responsibility. We also believe that personal carbon budgets should include personal transport.'

SDC

'The UK has the opportunity to lead the way on personal carbon budgeting. It's an idea with great potential to reduce carbon emissions over the long term, by stimulating individual action in a clear and direct way. It should be transparent, demonstrably fair, and socially just. Much of the early thinking has been done in this country, and there is a clear fit with our national budgeting approach, as laid out in the Climate Change Act. This particular idea is good because it starts with personal travel and energy, rather than trying to do everything all at once.'

What happens next

Personal carbon budgets are currently at the concept stage – developed in various forms over the last ten years, but with details still to be worked out. Turning this essentially simple idea into a firm policy proposal won't be easy. It will require leadership and ownership by the Government and policy community, and a commitment to research, develop and test such crucial aspects as IT systems, enforcement procedures, and wider income distribution effects. The ultimate success of a fully-fledged scheme will depend hugely on the effective management of its costs and sheer organisational complexity, covering millions of people's individual transactions. It will also depend, of course, on public reaction. Knowledge of personal carbon footprints is currently very limited, and, whatever they say in focus groups and opinion polls, it's still difficult to gauge how people will actually respond to living with personal carbon budgets.

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Fair Shares, Fair Choice

An example scheme, Fair Shares, Fair Choice (FSFC), is currently being piloted by Sustainability South West, the region's independent champion body for sustainable development.

To date, over 1300 people have signed up at www.fairsharesfairchoice.com including not only climate change experts and sustainability champions, but also organisations such as the TUC, local councils, businesses and MPs from all the main parties along with individual supporters. Each thereby endorses the principle of 'a globally fair and climate safe carbon share for everyone', calculated annually in a way that takes into account the differing needs of developing and developed nations.

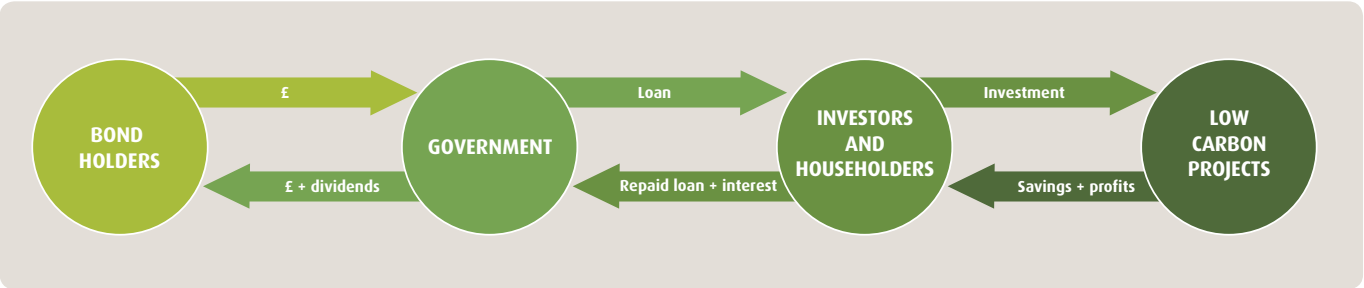
The scheme is not prescriptive but aims to help people understand that each of their lifestyle choices have a different 'carbon price' and that adopting a low carbon lifestyle would drive a low carbon economic recovery and support personal well being – particularly if the Government now chose to invest in low carbon infrastructure to enable people to take low carbon options. The emissions ceiling they must try to live within, through their energy, travel and shopping choices, is 3.92 tonnes of CO_2 in 2009 – falling to 3.2 tonnes by 2017.

The website itself features the new 2009 personal carbon budget, a short film exploring the idea of personal carbon allowances with the public and students, answers questions about personal carbon allowances, provides advice and signposting for low carbon living and working, has stories shared by FSFC supporters, and lists its supporters.

www.fairsharesfairchoice.com

Getting more from our money
Green bonds

16



Financing the transition to a low-carbon economy through individual investments

Ingrid Holmes and James Cameron, Climate Change Capital

'Green Bonds are designed to raise capital for energy efficiency projects, and low or zero carbon energy generation. They'll be issued by the Government for sale through the usual bond market routes. Funds raised through the bond could be managed by a new government-backed Green Investment Bank, in which case the Bank would co-invest alongside the private sector. Alternatively, existing banks would be allowed to bid for capital to invest in suitable projects. Green Bonds should be an attractive proposition, with returns linked to revenues from the investments, but with the Government acting as guarantor. One version, sold to institutions and likely to raise the bulk of the capital, will have a maturity of at least 15 years and (probably) a fixed interest rate. The "retail" version for individual investors will have a shorter timeframe of around five years, and pay interest in line with current market rates.

It helps finance the move to a low carbon economy – and thus reduce the chances of catastrophic climate change. The investment needed to meet the UK's carbon-cutting commitments runs into hundreds of billions of pounds. The private sector is very unlikely to be able to provide all of this, since the financial crisis has reduced the amount of debt capital available, and the current policy landscape still leaves so many uncertainties. However, government cannot afford to fill the gap out of general taxation and borrowing: it is already hitting the limits, with spending cuts predicted for future years. Green Bonds are a way of squaring this circle.

There's some good evidence that they'll attract institutional investors, even those who don't want to buy any more ordinary government bonds. This is partly because they are not there simply to fill a gap caused by the downturn: they create assets with secure and distinct future revenue streams. What's more, they will work to limit the risk of the investment they finance. Most of the uncertainty about future revenues from carbon-cutting is uncertainty about future policy – and if government is guaranteeing the bond coupon, then it is much more likely to provide policies that give business the certainty it needs. Future governments are, in effect, locked in.'

SDC

'Just as "Tell Sid" and the other public share issue campaigns of the 1980s helped convert ordinary citizens to participating in the privatisation of services, Green Bonds could engage the public in the process of tackling climate change. Since the projects they put their money into will also be helping them (and other people) save energy and money, they'll have a direct positive stake as both investors and consumers.'

What happens next

The aim is to get Green Bonds into the 2011 budget. There will be quiet lobbying over the course of the next year, and a more public campaign starting in spring 2010 involving a coalition of prominent organisations and individuals. It will need to overcome the potential reluctance of the Treasury to ring-fence the proceeds, and any fears that it might cannibalise traditional government bond (gilt) issues.

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The Royal Bank of Sustainability (RBS)

C17

Using the public stake in the Royal Bank of Scotland to create a bank to support the transition to a sustainable, low-carbon economy

Kevin Smith, Mel Evans & James Marriott, PLATFORM

'This idea amounts to making lemonade out of lemons – taking a bitter situation and making something sweet out of it. First, it capitalises on the current economic crisis, and specifically on the fact that 90% of Royal Bank of Scotland is now owned by the state. Second, it converts the British bank most closely associated with the oil and gas industry, and with the worst record in coal finance, into one that invests to halt the effects of climate change. Using the capital, physical assets and human resources of a transformed Royal Bank of Scotland (renamed the Royal Bank of Sustainability), it creates a new and innovative bank that will provide finance for:

- achieving a step-change in the scale of renewable energy projects
- establishing a comprehensive sustainable transport system
- transforming the UK housing stock with a dramatic upgrade in energy efficiency
- weaning companies and institutions off their dependence on the fossil fuel industry.

The scope of what we propose is unprecedented – and that level of ambition is also what makes it so exciting. Whereas similar initiatives, such as Friends of the Earth's *Green Investment Bank*, require building a banking institution from the ground up, the Royal Bank of Sustainability has the power to drive the transition to a low-carbon economy by leading current banking investments away from high carbon sectors, starving them of funding, and making large investments in the zero-carbon sector instead. So, rather than creating a new green bank (as has also been suggested in the United States[43] to finance government purchases of renewable energy), RBS will send a strong signal to the existing investment community. This can provide a model for other institutional investors and governments alike – fulfilling the UK's true responsibility for international leadership as one of the world's largest financial hubs.'

SDC

'This initiative addresses both our economic crisis and our urgent need to tackle climate change. The general public is aware and watching the action on both fronts, with a keen eye on the evolution of the financial industry. A dramatic change in the Royal Bank of Scotland, such as this idea proposes, might create a multiplier effect as it opens up more opportunities. It could also serve as the government backing to support Green Bonds (see page 30), and provide a pivotal opportunity for local investment to help stimulate a truly sustainable labour market (see page 32). At the micro-level, local RBS branch investments could fund the insulation of individuals' homes, or provide loans for low-carbon community initiatives, such as a community-owned wind turbine.'

What happens next

For this initiative to work, it is essential that the Government takes a 'hands on' approach to its investment in RBS, rather than preferring to remain at arm's length.

There must be a clear separation between the Royal Bank of Scotland's 'toxic assets' and the new direction taken by the bank. Risks come with any financial investment, especially in new technologies that are littered with unknowns, but the Royal Bank of Sustainability's purpose is to take these risks in the right direction.

By combining the higher state-level with local initiatives, RBS will have the advantage of tackling the economic and climate crises from multiple angles. Support already expressed in dialogue with a variety of stakeholders, parliamentary Select Committees and the Environmental Audit Committee, is just the start.

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Breakthroughs in connecting work to a sustainable economy

Green Inc. – a truly sustainable labour market

18

Shaping jobs and skills around the needs of a sustainable, low-carbon community

Graham Duxbury, Groundwork

'Green Inc. is about generating a concerted drive to put public money to work in deprived areas. By focusing on the type of functions a low-carbon, sustainable community needs, lots of "green" and socially useful paid employment can be created, of the kind that will give positive meaning to people's lives. It's a way of using government investment simultaneously to rebuild the economy and put it on a sustainable low-carbon path. There's plenty of work to be done – on everything from retrofitting energy efficiency improvements in existing homes, to ensuring we have safe, healthy and low-carbon food supplies. Rather than waiting for tomorrow's technology – for instance, the prospect of photovoltaic cells getting better – Green Inc. is about using what we've got right now.

This idea is not just about creating another scheme for those who are unemployed. It is about giving people the opportunity to be in the vanguard of a post-industrial revolution, building a strong connection between the jobs they do and the challenges posed by climate change. It is good for people, good for engagement and inclusion, good for deprived areas – and good for the economy.

It addresses problems of unemployment, poverty, low self-esteem and community cohesion, while meeting the need to develop a competent workforce for a range of purposes that require large amounts of labour. Jobs that we fund in the third sector now, for instance, can focus on creating the very demand that will turn them into tomorrow's employment opportunities, in new and expanding businesses and social enterprises.

This is future-casting. It involves creating policy on the back of predicted challenges. There is no safety in failing to respond: it is far better to invest in working towards innovative solutions. We know that the major retrofitting of domestic homes and public buildings, for example, is vital for both climate change adaptation and mitigation.'

SDC

'It is vital that the UK's ambitious goals for tackling climate change are matched by our seriousness about restructuring the economy. This breakthrough helps respond to the recession by creating jobs which can bring a sense of pride to everyone. Meaningful paid work has an enormously positive impact on health and well-being. It affects not just individual workers, but their whole families and their local communities. The legacy of improved self-esteem will be seen not just in this generation but the next one too.'

What happens next

It will take more than the Chancellor's recently-announced '£1 billion Future Jobs Fund' to measure up to the need for real and worthwhile job creation in deprived areas. Regional Development Agencies, if they're to be the main levers of change, need to measure their success in terms of meeting their sustainable development goals, not purely in GDP growth. Local authorities must be brought on board, as must trade unions, and the private contractors involved in the flexible New Deal, who need jobs to place their clients in. Strong leadership and support can also encourage traditional businesses to play their part – so long as the programmes really do stimulate demand for goods and services, and help ensure the future availability of people with the right skills in the right sectors to meet it.

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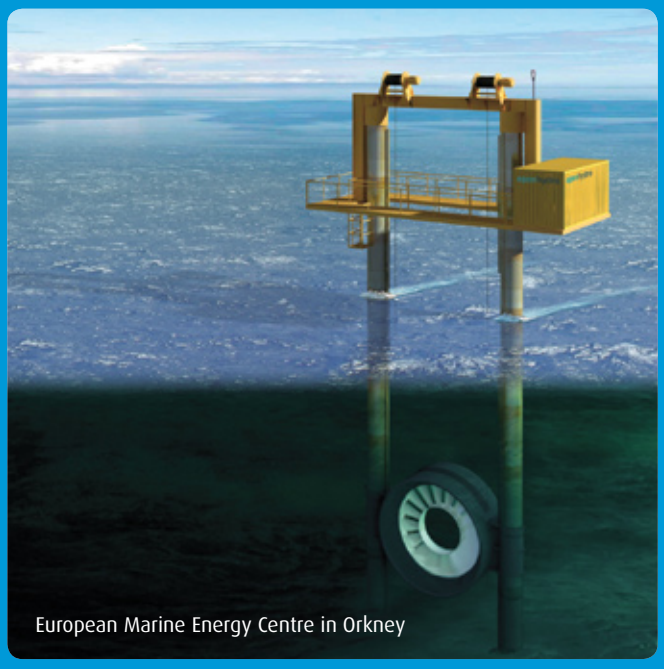
Breakthroughs in technology


European Marine Energy Centre in Orkney

We'd be daft to pin our hopes on finding some kind of technological 'silver bullet' solution for the challenges we face, but technology does have a vital role to play. Breakthroughs in technology will form an essential part of many of the ideas we've highlighted in this document.

For the SDC, Breakthroughs in the field of technology are as much about how to scale up innovations and bring them to market – so we can unlock their potential to transform the way we do things for the better – as they are about the ideas themselves. The UK will only succeed in this if we 'get it right' at every stage, from creating the climate for innovation, through to research and development, support and market development.

We haven't always done that. Alan Moore, Co-Chairman of the Renewables Advisory Board, is keenly aware how our 'excellent record of invention and early technological development', supported by government and private funding, has been let down in the past by our 'less good record for extracting full value from this early work'. On wind turbine manufacture, for example, when the commercial market opened up, the Danes overtook us and became dominant global players, thanks to their Government's stimulation of a strong home market. So when Ed Miliband's Renewable Energy Strategy comes out this summer, Moore says, look closely at how it tackles five key issues:

- strong leadership and commitment from government (current and future) which instils confidence in investors
- a stable market mechanism for both proven and developing technologies
- a steady, high volume market which encourages manufacturing and jobs
- a swift, predictable consenting process
- continuing research support for innovative technologies.

Investment is critical – and one can hardly underestimate the importance of the Government's role in this. The recently-launched strategy document *Building Britain's Future: New Industry, New Jobs*[44] does recognise that creating a thriving low-carbon economy will involve putting some serious money into technology development, infrastructure and supply chains. And there were some steps in the 2009 Budget to back this up – more funds for test facilities for wind, wave and tidal power prototypes, for instance, and a new funding mechanism for Carbon Capture and Storage projects, plus a boost for ultra-low-carbon vehicles.

We still need more stimulus action – and fast. The opportunity is there to be seized, to tackle the financial crisis and climate challenges **together**, and put the UK at the forefront of the new low-carbon industrial economy. With the environmental and low-carbon sector already worth £3 trillion globally, and rising, industry is ready to respond.

Interestingly, there were only a handful of technological Breakthrough ideas submitted to the SDC. We have chosen to showcase one that we feel could have real potential: algae carbon capture and sequestration. But we know from the work we do as the SDC, and through the work of other organisations, public and private, that there is a huge amount of activity on technology in the UK and elsewhere. We wanted to highlight three initiatives from other UK organisations geared to stimulating that kind of innovation (see box overleaf).

Stimulating Innovation

Renewable Energy Development Project, International winner 2008. Pupils from Caoduo school in Yushu with the solar module that brings affordable solar lighting to rural Tibet.

The Ashden Awards for Sustainable Energy, set up in 2001 by Sarah Butler-Sloss, have become an internationally recognised yardstick for excellence in the field of sustainable energy. The Awards celebrate and reward visionary champions who are finding solutions to climate change that also bring real social and economic benefits to their local communities. More than 100 projects have benefited from prize money, but it is the ongoing relationships and sharing of ideas, experience and technologies between winners and further afield that has the continuing impact on structuring a low-carbon future. Across the UK and the developing world, the Award winners provide inspirational examples of simple, practical ways to cut CO_2 emissions while also improving quality of life. Whether harnessing technology, energy efficiency or renewable sources such as solar, wind or biomass, they're all beacons that encourage others to take the sustainable energy path.

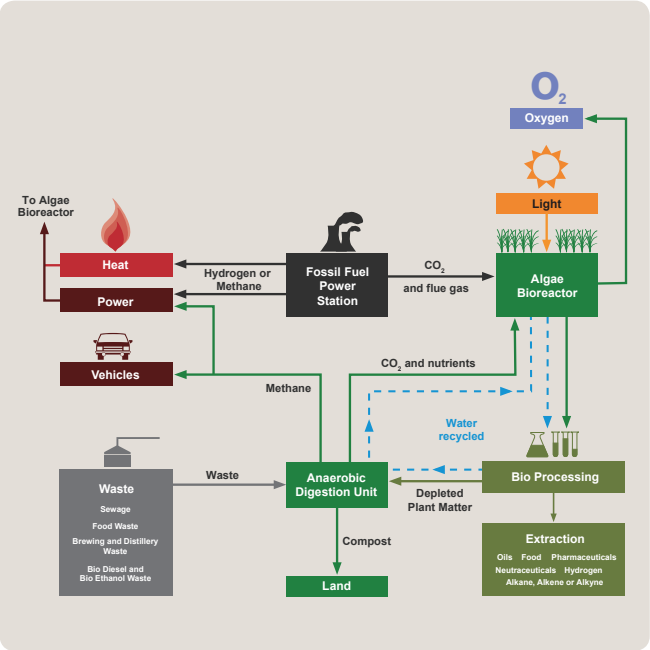
The Big Green Challenge from NESTA (the National Endowment for Science, Technology and the Arts), is a two-year project with a £1 million prize fund. Launched in October 2007, it encourages people to work together in their communities on cutting their CO_2 emissions in innovative ways which can be sustained and replicated more widely. This year is about putting ten Finalist approaches into practice, with NESTA providing advice and £20,000 in funding for each project. Winners will be announced in early 2010. The Challenge is one of several experimental, high-impact projects developed by NESTA as it builds a body of evidence on encouraging, supporting and stimulating innovation around the UK.

The Kyoto Box

The Climate Challenge, a competition run by the Financial Times, Forum for the Future and Hewlett Packard, picked the 'Kyoto Box' – a cheap, solar-powered cardboard cooker for use in rural Africa – as the winner of its 2008/9 prize of $75,000 for the most innovative solution to the effects of climate change. The Kyoto Box aims to halve firewood use, thus reducing deforestation and carbon emissions. Its simple design was a large part of the attraction. It can be made in existing cardboard factories, it comes flat-packed for easy distribution, and it has just gone into production in a Nairobi factory that can produce 2.5 million a month. 'There are too few people looking at simple research,' says its inventor, Jon Bøhmer. 'We need the basic stuff too.'[45]

Algae carbon capture and sequestration – the 'short carbon cycle'

19



Using algae to capture industrial carbon and sequester it through agricultural engineering

Peter Head, Arup

'This breakthrough proposes a positive solution to one of the world's most pressing energy problems: dealing with the CO_2 given off by coal-fired power stations (and other industrial burning of fossil fuels). The idea is to use fast-growing algae to mop it up in situ, once it has been captured within the pre- or post-combustion process. Rather than piping or transporting it to underground sites for indefinite storage, as proposed by most advocates of Carbon Capture and Storage (CCS), CO_2 is passed through a collection of bioreactors in which light, nutrients and seawater encourage different types of algae to grow quickly and absorb the carbon. The algae could be used to produce a range of products, including oils, pharmaceuticals and foodstuffs. The residual biomass after extraction can be put together with organic waste collected and brought in from local cities, to feed on-site anaerobic digesters that produce both methane and compost. Nutrients, CO_2 and water from the digesters are recycled in the process. The oxygen (and in some cases hydrogen) which this releases could have commercial uses.

This innovative approach simultaneously helps tackle both climate change and declining food production. This idea first germinated in efforts to combine Arup's work on carbon capture with its research into food technologies for the Dongtan eco-city project and has been further developed with the UK Centre for Process Innovation (CPI). The "short carbon cycle" goes from fossil fuel emissions via algal biomass to biofuel and plant-growth-promoting compost.

Crucially, this approach creates revenue streams for power station and process plant operators to offset the costs of carbon capture. So it should be more appealing to them than CCS – which will also typically incur extra costs for taking the problematic emissions away and locking them up. The energy balance in the process uses waste heat from the power station, energy from the other wastes, locally gathered solar energy, and energy recycled from the digesters.

The technology is modular and could be deployed quickly on any scale if successfully proven. It could really help developing countries to address CO_2 emission targets, while lifting food productivity. The algae types can be changed to enable products to be tailored to suit local needs. Using anaerobic digesters, which link in with systems for managing urban waste (bringing further inputs and providing energy) as well as agriculture (taking the composted output), will help create jobs in urban and rural locations. Revenue from sales of compost and other products, together with carbon credits for the CO_2 sequestration, will help support the business case for investment to meet carbon cap requirements.'

SDC

'There's some classic sustainability thinking at the core of this idea: never stop looking for opportunities within your problems. It also avoids the intergenerational equity issues which must arise with any process involving perpetual waste storage, even of CO_2. And growing algae in bioreactors does not raise the same "land take" problems as projects for vast algal lagoons to sequester carbon.'

What happens next

A fully funded and rapid research and development programme will be needed to move the concept from small-scale testing into practice at large scale. There's also work to be done on how whole city waste management systems can best be integrated – and on using power station fuel supply lines to bring compost out from the digesters too. The roll-out will be a great challenge for the process development and construction industries. Government and business, working together, must show leadership, ownership and commitment to attract investment and build technological capability. And, obviously, government must ensure that new rules and regulations on carbon capture embrace these bio-sequestration alternative approaches.

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Making it happen

There's little point in having great ideas if nothing changes as a result. That's why we went back and challenged the champions of the selected ideas to think about what it would take to turn them into reality.

As you've seen, they identified a varying range of 'needs'. There's no one set path or magic recipe: mainstreaming each breakthrough will have different determining conditions and require a particular set of barriers to be overcome. But there are common themes – and what they told us mirrored our own research on what makes breakthroughs happen[46]. Financing looms large. So does leadership, ownership and commitment. Working in partnership is frequently cited too.

For some of the showcased ideas, the ones at an early stage, we see a need for further research – and backing to get it done. Others, already more advanced, are now at the stage where they need to build critical mass, get more people on board, and be supported and reinforced by changes in policy.

The solutions aren't always proven. New technologies are always on the horizon. But there's a powerful sense that it can't be right for government to wait until such time as all the answers might be in. Too often there is a long lag period from when an idea is first mooted to it becoming a reality. Given the scale and speed of transformation needed in our society, the time traditionally taken between the genesis of an idea and its deployment at scale must be radically shortened. As a nation, we have to get better at this.

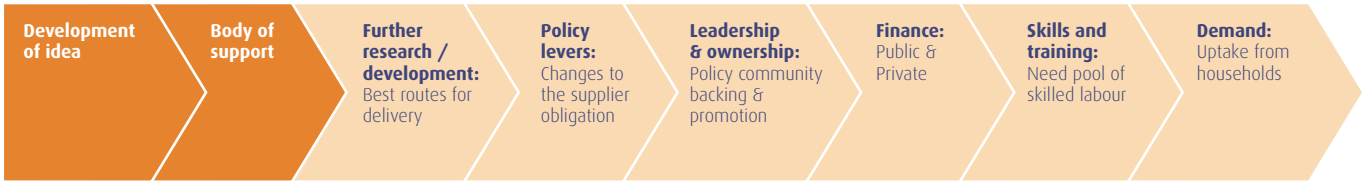
This project has identified something else, too, that gives food for thought; there is no one space, or central 'hub', where good ideas are coming together to be shared and embraced.

One thing is certain, though. It's time to get serious about implementation. We need to pin down what steps are needed to progress these ideas. We want to secure commitment for taking those crucial steps – as well as to identify where the UK can make simple (and not so simple) wins, to enable and support more innovative thinking for the future.

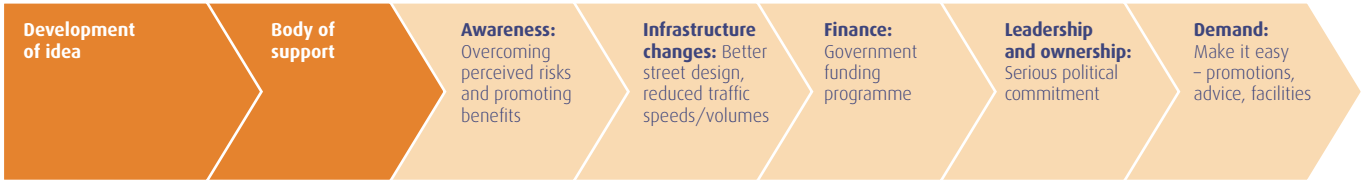
As for the SDC, as the Government's independent advisor, we will be seeking out opportunities for progressing these ideas through our own work, and through the advice we give to government departments across the UK, and will continue to promote the urgent need for breakthrough thinking in the UK.

3 Natural values: Outdoor experiences

9 From 'pre-pay' to 'pay as you save'



12 Making cycling mainstream



WHERE WE ARE NEEDS

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We are grateful to the following organisations for supporting the Breakthroughs event on 1st July 2009.

The Carbon Trust's mission is to accelerate the move to a low carbon economy, by working with organisations to reduce carbon emissions now and develop commercial low carbon technologies for the future.

Wessex Water congratulates The Sustainable Development Commission for its leadership in developing the understanding and application of sustainability principles in business and regulation, a role of real and future value to the UK.

Left unchecked, climate change is the greatest threat we face, and has the potential to wreck livelihood's and ecosystems. The Co-operative is recognised as a leader in the fight against climate change; we're working hard to reduce our emissions, help communities to reduce theirs, and campaigning to get the right laws in place to speed up the transition to a low carbon economy.

NESTA (National Endowment for Science, Technology and the Arts) is an independent body with a mission to make the UK more innovative. We are a leading authority on how to grow new ideas and stimulate imaginative solutions to pressing social challenges.

WRAP (Waste & Resources Action Programme) encourages the efficient use of resources by helping individuals, businesses and local authorities to reduce waste and recycle more. We work to create the case for change, support change and deliver change.

To meet the challenges presented by climate change we need local solutions to global problems. Ashden Award winners are breaking through barriers for a more sustainable world and a better quality of life for all.

Ecotricity, the worlds first green electricity company. Turning electricity bills into windmills.

Willmott Dixon was recently ranked in the Sunday Times Best Green Companies List as best performing contractor. The company aims to be carbon neutral and send zero waste to landfill by 2012.

Over the next 20 years business will have to change radically in order to become more sustainable and the Breakthroughs event offers exciting and challenging examples of the lengths we will have to go to deliver change on this scale.

Natural England wants to transform how people connect with nature, ensuring we all understand how the economic and health benefits of a well-balanced environment contribute to healthier, happier communities, better able to adapt to the impacts of climate change.

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