Can we learn lessons from the US experience of producing gas by hydraulic fracturing?

Martin Ince looks at long pipes and wild waters to assess the future of the fracking industry.
Can we learn lessons from the US experience of producing gas by hydraulic fracturing? Martin Ince looks at long pipes and wild waters to assess the future of the fracking industry.
As a result, shale-gas producing areas have access to cheap energy that can transform their economic outlook. Energy-intensive manufacturing booms, as does the manufacturing of goods such as fertiliser that can be synthesised from natural gas. Companies make good profits because the higher wages they pay are more than compensated for by lower energy bills. In a sense, says Fetzer, “It is impossible to export the gas, but you get a manufacturing boom, which means that the gas is exported in processed form.”

A gas boom like this also generates new, well-paid jobs. Studio apartments in some areas of North Dakota, for most of its history a less than affluent region of the US, are now being let at nearly New York rental prices. But the work that fracking leads to is not for everyone. It mainly creates tough, manual jobs carried out by young men with modest educational achievements. As Fetzer sees it, these jobs are especially valuable. This demographic group has suffered severely in the aftermath of the global financial crisis and from long-term shifts away from low-skilled labour. Their higher incomes benefit the people who receive them, and the region in which they live and where they do most of their spending.

Fetzer says that because “the laws of physics” make it tricky to move gas around, the economic benefits of fracking are likely to be permanent for the regions in which shale gas is extracted for long periods. Many of the jobs it generates may well be long-lasting. In particular, he says, “A job in manufacturing requires investment, and creating such a job makes a statement about the employer’s long-term plans.” On the other hand, he warns, a hotel receptionist or shop cashier whose job is created because of new demand caused by temporary drilling activity may not have long-term prospects.

Indeed, Fetzer warns that “not everyone is having a party” in the new gas-rich regions of the US. “A pensioner whose income does not go up is going to suffer as prices rise,” he says. And there are other winners and losers. Less energy-intensive manufacturing does not benefit as much from low gas prices as high-energy businesses, but does suffer the wage and cost inflation that accompanies the local economic boom.

His research shows that some areas of economic life are severely damaged by the arrival of fracking and the wealth it brings. An example is agriculture. Fetzer says: “Fracking makes the land less productive because of the roads and pipelines that are built. It also competes for similar types of labour. And because the fracking process is very water-intensive, farmers sometimes choose to sell their water rights to gas producers, damaging their own productivity.”

In addition, fracking areas tend to see reductions in the number of people employed in health and education. This is probably because salaries in schools, colleges and hospitals tend to be determined by some central, bureaucratic process, and do not rise in line with local inflation. This inevitably means that jobs in sectors linked with fracking activity gain...
in attractiveness. In addition, young people seeing well-paid jobs in fracking may be tempted to skip college altogether and start earning money as soon as they can.

FRACKING IN BRITAIN
The big question is whether fracking in the UK will have similar economic effects. Fetzer says that there could certainly be consequences at the national level. UK oil and gas production are on the way down, as they were in the US before fracking came along. The arrival of a major new source will alter the picture fundamentally.

But at a more local level, he adds that fracking in the UK will take place in a more tightly regulated setting than in the US. Infrastructure bottlenecks are less likely to be tolerated, so the kind of transport problems that lead to natural gas varying radically in price across the US may well not arise here. In any case, the transport issues are reduced by the smaller size of the UK. Instead, Fetzer anticipates that the UK as a whole could end up having natural gas prices substantially lower than in continental Europe. This would create a competitive advantage for the UK’s energy-intensive industries.

If large amounts of shale methane are produced in the UK, Britain could even become a significant exporter of gas to continental Europe, with its gas substituting for gas from Russia. The political advantages of this switch for the nations of western Europe hardly need spelling out. But Fetzer points out that there would also be a green dividend. He says: “The cost of bringing Russian gas to western Europe is high and there are significant carbon emissions associated with it, because it is travelling a long distance.” Gas from the UK could be shipped to western Europe with a smaller carbon footprint. He adds that fracking may be paradoxical good news for renewable energy in the UK, especially for wind power. Fetzer says: “An electricity system that relies on wind power can become volatile and unstable. Natural gas is a natural complement to wind power, because gas-fired power stations can be used to fill the gap rapidly when the wind drops. This type of flexibility does not exist for conventional coal or nuclear power generation.”

Andy Gouldson, Deputy Director of the ESRC Centre for Climate Change Economics and Policy, agrees with Fetzer that the impact of fracking on UK energy prices is highly uncertain and is likely to depend to a large extent on world energy prices. The biggest economic effect of fracking in the UK, he thinks, may be the uncertainty it generates. The prospect of falling energy prices could deter investors who are thinking of building a wind farm or some other major renewable energy project.

Gouldson adds that it is hard to work out whether shale gas actually reduces carbon emissions by replacing coal and other carbon-intensive fuels. It may displace coal use to other countries, so we are no better off on a global scale. This has happened in the US, where coal exports have risen as shale gas and oil have come on stream.

One message of this research, says Fetzer, is that we should look sceptically at the idea of global markets, in this case for energy. “In the globalised world,” he says, “people tend to think that energy costs are unimportant and that energy is universally available. In fact, energy is a fundamental economic input and needs to come from a reliable supplier.” In recent years, energy markets have become more fractured because of fracking and this affects investment decisions. Cheap gas can help tip the decision on whether to site a factory in China or in the US in favour of the latter.

Martin Ince is principal of Martin Ince Communications. He is a freelance science writer, media adviser and media trainer.
WHAT RISKS OF CLIMATE CHANGE DO WE PERCEIVE AND HOW CAN WE BE PERSUaded TO PREPARE BETTER FOR THE FUTURE?

CLIMATE EXPERTS WARN that climate change will bring hot weather. This message has reached many. Surveys show that people expect climate change to bring higher temperatures - and that climate change concerns are highest when the weather is hot. But most surveys have focused on the US, where summers can get oppressively hot.

Summer temperatures in the UK are not as high as in the US. I experienced the difference in July 2012, when I moved from the US to the UK for a professorship at Leeds University Business School. When I left Pittsburgh, July temperatures soared at an average daily high of 30°C, reaching a maximum of 37°C. By comparison, the maximum temperature for Leeds that month was 18°C.

During that first summer, I enjoyed the cool summer drizzle in Leeds. My colleagues seemed less pleased with the wet summer weather. Perhaps this dislike explains why some people in the UK hope that climate change will bring warmer summers.

After my move to Leeds, I started studying weather perceptions in the UK with Professor Suraje Dessai, Dr Carmen LeFevre and Dr Andrea Taylor at the University of Leeds, Dr Sari Kovats at the London School of Public Health and Tropical Medicine, as well as Professor Baruch Fischhoff, Dr Kelly Klima, and Dr Gabrielle Wong-Parodi at Carnegie Mellon University. Since 2012, we have surveyed UK residents about their climate change beliefs and their perceptions of how weather has changed over the course of their lifetimes. Participants perceived hot weather to have become less common and wet weather to have become more common. Their concerns about climate change were more strongly associated with perceived changes in wet weather than with perceived changes in hot weather.

FAIR WEATHER FINDINGS
These lay concerns about wet weather are in line with climate experts’ projections. Climate experts expect that climate change will bring more heavy rainfall and flooding, as well as rising temperatures; the specific weather changes that people will experience as a result of climate change will naturally depend on their location.

Climate experts require complex statistical analysis to estimate how much climate change contributes to an extreme weather event. Even if the role of climate change is often unclear, better preparation for extreme weather can reduce deaths, hospitalisations and economic loss. Based on our survey findings, public support in the UK will likely be larger for flood preparedness than for heatwave preparedness. Yet the UK may need to prepare for heatwaves: July 2013 brought the first heatwave in seven years and the summer of 2014 has also been relatively hot. Even though some UK residents may welcome hot weather, heatwaves do pose health risks.

When hot weather is expected, people are warned to protect themselves by avoiding the midday sun and drinking plenty of liquids. Our research suggests that people who hear these warnings are more likely to implement heat protection recommendations, but these warnings also evoke good feelings about the impending heat, which reduces people’s willingness to implement the recommendations.

Psychological theories suggest that people judge the riskiness of events by the emotions they evoke. If thoughts about hot summers evoke positive emotions, heat protection may seem less necessary. We are therefore testing warnings that remind people of negative experiences of extreme heat. Our initial findings suggest that such warnings may be more effective at promoting heat protection behaviours. Ultimately, we aim to develop messages that promote safe enjoyment of hot weather.

OPINION
WHEN THE HEAT IS ON
By Professor Wândi Bruine de Bruin

People in the UK hope that climate change will bring warmer summers

PROFESSOR WÂNDI BRUINE DE BRUIN
Professor Bruine de Bruin leads the ESRC project Understanding Public Perceptions of and Responses to Heatwaves: A Behavioural Decision Research Approach

Get this content online at lubswww.leeds.ac.uk/cdr/responses-to-heatwaves
ENERGY EFFICIENCY

KEEPING WARM IN A COLD CLIMATE

More efficient heating systems mitigate climate change and also bring social benefits.

RIISING ENERGY BILLS make it harder for low-income households to keep warm, a problem exacerbated by poorly insulated buildings with old heating systems, where energy and money are often wasted. Research by Jan Webb, Dave Hawkey, David McCrone and Maggs Tingey, as part of the Research Councils UK Heat and the City research at the University of Edinburgh, has found that new efficient community heating has social benefits, as well as contributing to mitigation of climate change.

Cube Housing Association recently replaced the outdated electric night-storage heating on a 1960s Glasgow housing estate with a local combined heat and power system, supplying heating and hot water to tenants and owner-occupiers. In most cases, building insulation was also improved.

The estate has 1,900 houses in multi-storey and low-rise flats and maisonettes and is in one of the ten per cent most deprived areas of Scotland.

A sample (ten per cent) of tenants and owner-occupiers were interviewed twice: first when the new heating was being installed and again one year later. All were very satisfied with their house to begin with, but very dissatisfied with the old electric heating. Most complained of being cold all or most of the time, and many had related health problems. Despite spending over 25 per cent of their very low incomes on energy, tenants in particular were still unable to keep warm.

The new system has resulted in a major increase in satisfaction with heating: for tenants this has leapt from 24 per cent to 70 per cent, and 80 per cent now say they were never cold during winter (compared with only eight per cent the previous year). Heating is now more affordable, although average energy bills have not changed as households take the improvement in warmth rather than in financial savings. The incidence of reported health problems has stabilised, or in the case of owners shows signs of improvement.

More efficient heating systems improve people’s quality of life and reduce greenhouse gas emissions, but more work is needed to address affordability for all.

www.heatandthecity.org.uk

HEATING SYSTEMS THAT ARE MORE AFFORDABLE AND EFFICIENT HAVE SOCIAL BENEFITS

CRIME

INVESTIGATING GREEN CRIME

Increasing collaboration and influencing policy to investigate and prevent crimes against the environment

MUCH ENVIRONMENTAL HARM has only received scrutiny from ecological or conservation disciplines ignoring the criminological aspects of such harm, even though its global impact is more damaging than conventional street crime. Green Criminology is an interdisciplinary field that focuses on this neglected area of crimes against the environment. This means the examination of harms against humanity, the environment and other species inflicted by powerful entities and everyday people.

These harms and crimes range from the abuse and exploitation of ecological systems and other species to long-term damage by corporations, states and militaries to the land, air and water; from illicit trades in nuclear material and endangered species to the monopolisation of natural resources. Equally important are the emerging issues that Green Criminology analyses such as bio-ethics around genetically modified food and bio-piracy (theft of indigenous knowledge), and the new forms of conflicts and harms that arise with the degradation of the environment.

WORLDWIDE INFLUENCE

The ESRC-funded Green Criminology Research Seminar series brought together academics at all career stages from a range of disciplines such as law, sociology, criminology, and justice studies to focus on the analysis and examination of such green crimes. Crucially, though, the series also included ecological and conservation practitioners, environmental and wildlife law enforcement, and other experts with the goal of increasing collaboration and influencing policy.

The six-seminar series was a collaboration among principal investigator Dr Tanya Wyatt of Northumbria University, and co-investigators Professor Nigel South of the University of Essex, Dr Angus Nurse of Middlesex University, Dr Matthew Hall formerly of the University of Sheffield now with the University of Lincoln and Dr Gary Potter of London Southbank University. The seminars took place around England and also Wales (where it was hosted by Dr Jenny Maher, the University of South Wales) and presented research around theories and concepts of green crime, wildlife and timber trafficking, animal welfare, hazardous waste and pollution, environmental law and a final conference with attendees from around the world.

www.crimejusticejournal.com

To find out more type ESRCGreenCrime into YouTube. Three edited collection books will be published in 2015.
COSTING THE EARTH

How is the way we use energy changing, and how do we want energy to be produced in future?

We all use it and, whether it’s turbines on hills or mounting bills, we all have an opinion on it. Some struggle to pay for it: currently between 2.3 million and 6.6 million people in Britain live in fuel poverty – figures vary depending on who you ask. Others work in it: more than 600,000 Brits are employed in the energy industry, which brings more than £80 billion to the economy each year. Ultimately, we are each dependent on it. But the way we use energy is changing in response to climate change.

Supplying energy to homes and businesses accounts for more than 38 per cent of the total greenhouse gases emitted every year in the UK and that doesn’t even include transport. The problem is we have an enduring love affair with fossil fuels and around 86 per cent of the energy we use comes from coal, oil and gas. Breaking this long-term habit comes with a price tag. In the long-term, investment in green energy and energy efficiency measures will save us money because it will reduce the costly effects of climate change. But in the short-term it will increase energy bills. In March 2014, £110 – or around eight per cent – of every energy bill in Britain was spent on ‘environmental and social’ costs, which included subsidies for green energy.

How much is too much?

There is no getting away from the fact that green energy is currently more expensive than burning fossil fuels, but the gap is closing. The cost of technologies like onshore wind and solar photovoltaics has fallen rapidly over recent years.

A study by the UK Energy Research Centre (UKERC) – which is funded by the Research Councils’ Energy Programme – found that onshore wind is predicted to be cheaper than gas by the end of the decade, even without subsidies. But deployment of these technologies needs to be sustained for these trends to continue and for it to spread to other technologies such as offshore wind.

The cost to energy consumers or taxpayers associated with maintaining support for green energy and energy efficiency measures is estimated to reach £135 per household per year in 2020, about the same as the average house insurance. Viewed as insurance against the risks of climate change, the price we pay to support green energy should be considered to be very good value. But for some this remains unpalatable. For poorer households and energy-intensive businesses the extra costs of green energy represent a significant challenge. Rising bills brought energy costs under the microscope and consequently, in March 2014, the government decided to cut green subsidies by nearly a quarter. Despite this, green subsidies continue to cause political tension.

A study by UKERC has warned that political uncertainties over green energy and energy efficiency measures could prevent the UK from meeting its greenhouse gas emissions target. Recent rises in energy prices, the impact of the 2008 financial crisis and heightened concerns about energy security have dampened public and political appetite with the public will be essential. Rather than seeking to persuade people to accept less desirable aspects of system, UKERC research recommends technologies should be prioritised. This could persuade the public to accept more desirable aspects of system change.

A political battleground

The UK has among the lowest cost of energy per unit anywhere in Europe but bills remain
Households are now using around 20% less energy than they were in 2004 - saving the average consumer around £200 a year.

Source: Delivering UK Energy Investment July 2014; www.gov.uk

High because our housing stock is poorly insulated. In a typical British home, £1 out of every £4 spent on heating is being wasted. Consequently, UKERC research recommends that the government should expand its energy efficiency programmes, especially those that can reduce the use of energy for space heating in buildings. But this is not happening; in fact quite the opposite. The government has scaled back its energy efficiency support and put pressure on Europe not to set a binding energy efficiency target for member states.

In addition, much broader engagement with the public will be essential. Rather than seeking to persuade people to accept particular pre-determined technologies, the public should be involved in making decisions about what combinations of technologies should be prioritised.

More attention should be paid to public concerns about the structure of the energy market, energy company profits and who should pay for the new investments that are needed. This could persuade the public to accept less desirable aspects of system change, like some continued use of fossil fuels as a bridge to a greener future, but this will only be possible if there is confidence that the full range of concerns is being considered, and there is a clear long-term vision for change.

Dr Matthew Aylott is Policy Engagement Manager at the UK Energy Research Centre

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**GETTING INSULATED**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Suitable homes</th>
<th>Homes with measure</th>
<th>Remaining potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loft insulation (at least 125mm)</td>
<td>24 million</td>
<td>16 million</td>
<td>7 million</td>
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<tr>
<td>Cavity wall insulation</td>
<td>19 million</td>
<td>14 million</td>
<td>5 million</td>
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<tr>
<td>Solid wall insulation</td>
<td>8 million</td>
<td>0.3 million</td>
<td>8 million</td>
</tr>
<tr>
<td>Hot water tank insulation</td>
<td>14 million</td>
<td>14 million (99%)</td>
<td>0.1 million</td>
</tr>
<tr>
<td>Double glazing throughout</td>
<td>27 million</td>
<td>20 million</td>
<td>7 million</td>
</tr>
<tr>
<td>High efficiency boilers</td>
<td>27 million</td>
<td>12 million</td>
<td>15 million</td>
</tr>
</tbody>
</table>

Source: Delivering UK Energy Investment July 2014; www.gov.uk
ENERGY TALKS

Discussion can be a low-cost way to help people make better choices about how they use and conserve energy

ENERGY BILLS ARE RISING, fuel poverty is increasing, and government energy policy is dominated by top-down information campaigns and by incentivising households to improve the energy efficiency of their homes through schemes such as the Green Deal. But the success of these approaches has been patchy.

Research funded by the ESRC and the EPSRC, carried out by Keele University and the Marches Energy Agency in the project ‘Reducing Energy Consumption Through Community Knowledge Networks’ (RECKKN), shows that making energy ‘discussable’ is an effective, low-tech and low-cost way to help people make better choices about how they use and conserve energy, and to increase their confidence and capacity as active citizens. Although energy consumption is a widely-shared worry, most people see it as a private issue. Of course it’s important to address concerns about energy at an individual level, but we don’t know much about the potential for community-level initiatives to drive positive change. What if energy became a public issue that people talked about with friends and neighbours?

The researchers’ collected data by working with 55 households in Newcastle-under-Lyme and Shrewsbury from 2011-13, and compared and contrasted how ‘community knowledge networks’ – connections that allow information to circulate and learning to take place – operate in these two communities. They looked at how people get knowledge about energy from each other, as well as from the media, local groups and organisations, businesses, events and other sources they encounter in daily life. They found that peer networks in local areas help people to share information and expertise by making energy ‘discussable’, and this leads to the spread of useful knowledge about using energy more efficiently.

COMMUNITY ENERGY ACTIVITY

Previous academic research has focused on what individuals know; the RECKKN project examines how knowledge travels in communities. Also, most community energy research has studied communities where an initiative to produce or conserve energy already exists. These ‘success stories’ are inspirational, but they overlook ordinary people in ordinary situations. In contrast, the RECKKN work has included participants who haven’t previously been involved in a community energy project. It has concentrated on local areas where, like most places across the UK, there was little or no existing community energy activity. The RECKKN discussion groups showed that the ‘knowledge deficit’ model – where we are empty vessels who only need to be filled with the right information in order to change behaviour and practices – is off the mark. Researchers found that participants gained new and built on existing knowledge by comparing habits and routines, and by monitoring personal energy use.

They reported that involvement in the discussions gave them inspiration to make changes, and/or to work out solutions to problems on the basis of advice from peers, online forums, local experts and independent advisers. Many said that the groups helped them gain confidence in discussing energy with others and in their own ability to change energy consumption patterns.

The researchers’ recommendation would be to channel some of the huge amounts of money being spent on schemes like the Green Deal into the creation of local energy discussion groups. Universities, local community groups, local government, non-governmental organisations and charities were widely regarded by participants as honest brokers, and these are the organisations and institutions that should be given the responsibility for making energy discussable. The findings are similar across contrasting places and socioeconomic groups, suggesting that they are widely applicable across the UK. They should be of interest to policymakers, local authorities, third sector organisations, community groups and individuals.

www.reckkn.org.uk

SUITS YOU?

Getting the government’s Green Deal can improve your home’s energy efficiency. The scheme lets you pay for some or all improvements over time on your electricity bill. Repayments will be no more than a typical household should save in energy costs. But does it work for you? Is it enough?

The government says you should make improvements in the following areas to save the most energy:

- insulation – eg. solid wall, cavity wall or loft
- heating
- draught-proofing – to gaps round doors and windows
- double glazing – stop heat leakage and make your home warmer
- renewable energy generation – eg. solar panels or heat pumps
- create your own energy – with wind turbines or solar panels
- change your boiler – old ones tend to use more energy than new ones

A ‘Green Deal Assessor’ will look at your home and suggest where you can make improvements and write you a ‘Green Deal Plan’.

Source: gov.uk
Climate control

The way climate change is discussed in Brazil ensures people are much less sceptical about its impact

The News Media are playing a significant role in making Brazil a world leader in responding to public concern about the causes and consequences of climate change.

Research by John Urry, Carmen Dayrell and Tony McEnery from the ESRC-funded Centre for Corpus Approaches to Social Science (CASS) at Lancaster University shows that in Brazil much media and popular debate accepts the existence of climate change.

In a study of 1.1 million words of Brazilian newspaper articles about climate change they found almost no opposition to the notion that human activity is causing the climate to change. This mirrors the view outlined in the periodic reports appearing since 1990 produced by the Intergovernmental Panel on Climate Change (IPCC).

Brazilian newspapers consistently mention and endorse the views of the IPCC, the Kyoto Protocol, the United Nations Framework Convention on Climate Change and organisations such as Greenpeace and WWF. These all advocate the view that global warming is an immediate problem that requires major global action. Credibility is also given to the argument by mentioning public figures such as Al Gore, Marina Silva (a renowned environmental activist and Brazilian politician) and various Brazilian scientists who either contributed to the IPCC reports or hold key posts within the Brazilian government.

By contrast the researchers found very few articles in the data that expressed climate change scepticism. Hardly any articles contest the general consensus of IPCC science and policy, and only a tiny number of articles refer to public figures, reports and organisations linked to climate change scepticism.

It seems that this striking level of concern about climate change has put pressure on the Brazilian government to take action – Brazilians are overwhelmingly supportive of what are believed to be effective climate change policies. The contrast with the UK, in which climate change scepticism is often voiced in the press, is evident.

cass.lancs.ac.uk

BETTER FLOOD FORECASTS
Researchers at King's College London have been exploring whether flood predictions could be improved to provide more time to prepare and reduce impact. The research has helped improve the design, communication and use of state-of-the-art flooding forecasts, supporting flood planning and responses at local, national and international levels. The team, led by Professor David Demeritt, worked closely with forecasting agencies such as the Met Office and Environment Agency and focused on improving the communication and use of so-called 'ensemble' flood predictions to provide earlier warning. Information can be shared with emergency management services to help evaluate risks and aid preparedness planning and emergency responses.

GREENER AIR TRAVEL
The risk-averse nature of the aviation industry is the main factor behind its slow progress towards radically more fuel-efficient technologies, according to a University of Edinburgh study.

Improvements in passenger aircraft are urgently required to reduce aviation’s environmental impacts. Potential fuel-efficient technologies – such as lighter structural materials - have been introduced very slowly. Researchers highlight the risk-averse nature of an industry where not only can high-profile disasters kill hundreds of people, but also designing new aircraft is a lengthy and expensive process. The commercial risks are thus very high.

“The risk-averse innovation system exacerbates the phenomenon of ‘path dependence’ where a technology is adapted and becomes ‘locked in’ as it gains further investment at the expense of alternative approaches,” says researcher Dr Graham Spinardi.

Overcoming such a lock-in requires R&D in innovative greener aircraft technologies to be supplemented by support for more realistic testing, says Dr Spinardi.
WHY PEOPLE AND GOVERNMENTS NEED TO ACT TO PROTECT FUTURE GENERATIONS AND THE PLANET

TODAY’S LIFESTYLES ARE destroying the planetary conditions on which the health of future generations depends. This is the starting point for an ESRC project on the Health of Populations and Ecosystems (HOPE), led by us at the University of York.

Our everyday lives are powered by fossil fuels. Nearly everything we consume – at home, in the workplace and when travelling between them – relies on fossil fuels. The carbon dioxide emitted is heating the planet and making the oceans more acidic, effects that accumulate and persist across centuries. At the same time, we are placing intense pressure on what environmentalists call ecosystems: the plants, animals and smaller organisms that sustain the natural environment. Tropical forests are being cut down, water systems polluted and the plant and animal kingdom placed under threat to support our lifestyles: to provide materials for buildings, roads, cars, food, clothes and electronic devices.

The ‘double whammy’ of climate and environmental change is moving the planet beyond the narrow range of variability that, over many thousands of years, has enabled societies to flourish and health to improve. While it is our lifestyles that are driving these changes, the costs will be borne by our children and their children. This sobering fact has yet to register with the public or be addressed by health policy. Why is there so little acknowledgement that, individually and collectively, we are creating a world hostile to health?

TIME TO ACT

One reason is that we are largely insulated from the effects. The environmental footprints fall outside the UK. What we buy and consume – and waste and discard – comes via complex global supply chains. It is hard to appreciate that natural habitats are being lost, soils degraded and rivers polluted when all we see is well-stocked shops and supermarkets. Health policy, too, does not help the public appreciate that our lifestyles are damaging the environment. It is the health consequences that are stressed. Many lifestyle factors are linked to the chronic diseases – heart disease, stroke, cancer, type 2 diabetes – that are pushing up healthcare costs. We are urged to change our diet, stop smoking, drink in moderation, drive less and walk and cycle more to reduce our disease risk and the burden we place on the NHS. Protecting the planet gets little attention.

Meanwhile, climate and environmental policies are being forged elsewhere. In England, separate government departments deal with climate change policy (Department of Energy and Climate Change – DECC) and the environment (Department for Environment, Food and Rural Affairs - Defra). Both have small budgets and little political muscle. Like policies for people’s health, policies for the planet’s health take second place to economic policy.

Many economies, including the UK’s, rely on increasing – not reducing – what we consume. Economic success and national prosperity are measured by selling and spending more: more cars, more air miles, more food, more electrical goods. Environmental impacts are not factored in. Economic policy can therefore work against the health of both people and planet. But is this in line with public sentiment? Young people are aware that their planet is under threat. Most adults have children and put them first. Societies are sustained by a web of family relationships, among which the child-parent-grandparent bond is the strongest and most enduring. There is plentiful evidence of lifestyle changes and sacrifices being made every day in Britain for the sake of the children: by pregnant women, parents, grandparents and other family members.

So, protecting future generations is deeply woven into the social fabric, but it is time to weave it through all government policies too. It would mean an integrated approach to lifestyle change, to improve health today and protect the planet for our children and grandchildren.
**THE BALANCE OF POWER**

*Which form of renewable energy might be suitable for you?*

### 20-20-20 VISION

Ambitious legislation is setting the EU on course to improve the Union’s future with The Climate and Energy Package 2020. It includes the 20-20-20 targets, a set of three key objectives for 2020:

- **20%**
  - A 20% reduction in EU greenhouse gas emissions from 1990 levels
- **20%**
  - Raising the share of EU energy consumption produced from renewable resources to 20%
- **20%**
  - 20% improvement in the EU’s energy efficiency

### WHY RENEWABLE ENERGY?

1. It reduces greenhouse gas emissions
2. It diversifies availability of energy supplies
3. It reduces dependency on fossil fuels
4. It offers employment opportunities
5. It will save money on energy bills
6. You’ll be less affected by increases in the price of electricity, gas and oil
7. You’ll be more self-sufficient
8. You will have a greener home or office

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### THE MAIN SOURCES OF RENEWABLE ENERGY AND HOW THEY SUIT YOU

#### GENERATING ELECTRICITY

**WIND TURBINES**

*What are they?*
- Wind turbines harness the power of the wind to generate electricity.

*Suits you?*
- A site-specific form of power. You need a nearby source of water and head, such as flowing over a weir.
- Summer water flow is vital.

*Costs*
- Dependent on the site, a typical scheme will cost from £25,000 including installation.

*Key benefits*
- Domestic systems tend to be 60-90% efficient – where efficiency measures how well the water’s power is converted into electrical power.

*Disadvantages*
- Expensive to install.

**European Figures**

- Hydropower contributed 16% to the Euro energy mix, and remained the single largest source for renewable electricity generation in the EU in 2012 at 54% of the total.

**Superfact**
- Once installed, systems will last 40-50 years.

#### Solar Electricity

*What is it?*
- Solar panels use sunlight to generate electricity.

*Suits you?*
- Ideally a solar PV system should face between southeast and southwest, and be free of shade.
- For best performance they should be angled at 30 to 40°.

*Costs*
- Depending on how much electricity you want to generate: £4,000-£8,000.

*Key benefits*
- Easy to install, needs little maintenance and estimated to last 40 years.

*Disadvantages*
- Solar panels are heavy, so your roof must be sturdy.
- Shade falling on roof will reduce the performance.

**European Figures**

- In 2012, the growth in electricity from solar power was 252 times higher than ten years earlier.

**Superfact**
- Snow transmits diffused light so unless a covering is heavy output from solar PV system shouldn’t be affected much.

#### Biomass

*What is it?*
- The main fuel is wood as logs, pellets or wood chips, but also animal, food and industrial waste, and high-energy crops such as rape and maize. Systems burn the fuel to provide warmth in a single room or power central heating and hot water boilers.

*Suits you?*
- Stoves are suitable for any room with a chimney or flue.
- Needs space to store fuel, or for a large biomass boiler.

*Costs*
- Automated wood pellet stove £2,000-£4,000 including installation.
- Boilers £5,000-£11,000 including installation.
- Plus ongoing fuel costs.

*Key benefits*
- Solar panels are compatible with most existing hot water systems.

*Disadvantages*
- Shade on the panels at any time of day will reduce the performance.

**European Figures**

- Solar energy accounted for 5% of the EU energy mix in 2012.

**Superfact**
- China accounts for over 80% of the world’s new solar hot water installations.

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**Sources:**
- www.environenergytrust.org.uk
- www.gugus.co.uk