JULY 2012

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THE GUIDE

to Limitless Clean Energy

“I’D PUT MY MONEY ON THE SUN AND SOLAR ENERGY. WHAT A SOURCE OF POWER! I HOPE WE DON'T HAVE TO WAIT TILL OIL AND COAL RUN OUT BEFORE WE TACKLE THAT.”

THOMAS EDISON

blue&green tomorrow

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BLUE & GREEN TOMORROW

Essential intelligence on sustainable investing and living
Blue & Green Tomorrow wants to support innovative businesses that balance the needs of the planet, its people and our prosperity.

We aim to provide our readers with the knowledge they need to make informed choices without prejudice, scaremongering or greenwash.

We want the world to be as blue and green tomorrow as it was yesterday.

We believe that everyone can play a part and anyone can make a difference. Not by going back through misplaced nostalgia to some bygone age, but by striding out to a bright new future in which we take advantage of the new approaches that can improve our quality of life, the food we eat, the air we breathe, the water we drink and the land we live on.

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LIFE IS FOR LIVING WITHOUT COSTING THE EARTH. THERE IS NO PLAN (ET) B.

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FOREWORD

I'm delighted to introduce you to *Blue & Green Tomorrow's Guide to Limitless Clean Energy*. Here, you'll find everything you need to know about one of the world's most stimulating and fastest-growing industries, directly from the mouths of some of its leading lights.

We cover the whole landscape: the minister, the supplier, the developer, the investor, the trade body, and of course, the customer. All of which ought to inspire you to make the switch to, invest in or simply support the renewable energy sector.

Since I started at *Blue & Green Tomorrow* in October 2011, my eyes have been opened to many under-reported wonders, and indeed, to many over-reported horrors. From the sustainable technological advances to the high street banks that invest in evil industries that are destroying the planet.

But above all, renewable energy is the thing that has captured my attention to such an extent that it now appears ahead of my love for Blackburn Rovers Football Club in my Twitter biography – arguably the most accurate way of measuring interests in the 21st century.

This point is proven by a recent experience I had. Whilst travelling around Liverpool on the world-famous Magical Mystery Tour – a bus ride that takes you to a number of Beatles-related locations around the city – I only took one photograph. It wasn't of Penny Lane, Mendips or Strawberry Fields, but instead, of a house directly opposite Sir Paul McCartney's childhood home, that had a roof bursting with solar panels.

This is the reaction that I hope radiates out of our *Guide to Limitless Clean Energy*, from the incredible stories of some incredible people and companies, and into you. And if my experience is anything to go by, simply immersing yourself in the renewable energy sector will almost certainly do that for you. Before long, an increased adoption of renewable energy will seem obvious, necessary and exciting.

You too will see a bunch of solar panels, a wind farm or even a gasification and pyrolysis plant and feel a buzz from the innovation that's literally seeping out of each and every clean power technology. That, to me, is wonderful.

Before *The Guide to Limitless Clean Energy* became *The Guide to Limitless Clean Energy*, we played around with a number of adjective combinations to prefix the word 'energy'. We tried 'renewable', 'unlimited', 'alternative', 'new' and 'green', amongst others, but eventually settled on a pair that we think epitomises the sector: limitless and clean.

Renewable energy is thriving, and it's here to stay. Read our guide and be inspired to make a difference.

ALEX BLACKBURNE
Editor, Blue & Green Tomorrow

BUSTING RENEWABLE ENERGY MYTHS

MARK BARRETT DEBUNKS SOME OF THE MORE POPULAR CONCERNS SURROUNDING RENEWABLE ENERGY. HE SAYS THAT WHEN COMPARED DIRECTLY TO THE ALTERNATIVES – FOSSIL FUELS AND NUCLEAR POWER FOR INSTANCE – RENEWABLES FARE VERY WELL INDEED.

Energy is needed to provide people with food and water, health, comfortable buildings, transport and all the things of modern life. In the UK, we will have an increasing population with a growing proportion of older people on fixed incomes. The past two centuries have seen an increasing reliance on fossil fuels, but this simply cannot be maintained indefinitely.

We face a future where fossil fuels will deplete, and this will cause energy prices to increase and fluctuate chaotically. And our use of fossil fuels causes global warming. We need to use energy efficiently and build energy systems that predominantly use renewables.

But there are many critics of this scenario: there isn't enough renewable energy, it's too expensive, it doesn't work, it's a blot on the landscape, it gives us no security and it's inefficient because the wind doesn't blow all the time.

But we cannot assess renewable energy in isolation, we have to compare our different options – fossil, nuclear and renewable.

UK RENEWABLE ENERGY RESOURCE – THERE ISN'T ENOUGH

The UK has abundant resources of renewable energy on land and in its surrounding water which are adequate to meet all our needs now and in the future. Unlike with fossil and nuclear fuels, these resources vary in time, and so we have to build systems to match renewables to our demands.

TECHNOLOGY – RENEWABLES DON'T WORK

Many renewable technologies have a longer history than so-called conventional fossil and nuclear technologies. Of course, many are becoming very sophisticated pieces of engineering. And of course, they work.

SECURITY

All types of energy supply can fail at some time or another for human or technical reasons, environmental events, disruption to fuel supply, or temporary loss of renewable energy resource.

If a wind turbine or solar collector breaks down, its effect is local and brief. Individually, they are small and so failure does not have the widespread and long term consequences of fossil or nuclear failure. Conventional fossil and nuclear energy technologies are usually very large and failure can cause widespread, long-term economic and environmental damage.

As UK oil and gas reserves diminish, we increasingly depend on importing these fuels which are increasingly concentrated in just a few countries. This concentration engenders political conflict and crisis as has been shown over the past four decades. As reserves are further depleted and competition for fuels increases, this instability will worsen.

In contrast, the UK has abundant renewable energy resources which it can trade with

> **"RENEWABLE ENERGY WILL HELP PREVENT MAKING THE VERY WORLD WE LIVE IN AN INHOSPITABLE PLACE"**

its neighbours. This will mean strengthening the international electricity grid to gradually displace the international pipeline and shipping now used for fossil fuels.

Europe already has a grid extending into Africa and Asia and there are negotiations for enhancing it. Renewable electricity will be exchanged over this grid – when there is a surplus of wind power in the UK, it can be exported; equally, when there is a deficit, it can be imported.

So countries will exchange energy and this two-way trade and mutual dependency requires co-operation and enhances political stability and security, rather than one-way co-dependence. Renewable energy improves the trade balance of a fossil importing country like the UK.

ECONOMY

As time passes, the costs of conventional energy increases because of depletion, while the costs of renewable energy fall with innovation and mass production. Further, the costs of fossil and nuclear are increased by constraints and taxes incurred because of their environmental risks.

In consequence, the market share of renewables is increasing. In the global economy, investment in renewable generation is overtaking conventional generation. There is a huge opportunity to develop a UK renewable industry that can export to the world.

One great advantage of renewables is that once the technologies are in place, energy prices will be quite stable, unlike for gas, oil and coal which have suffered price fluctuations of a factor of two or three in recent years. These leave people with low incomes, such as pensioners, vulnerable to fuel poverty and ill-health through under-heating. These price variations have a major impact on the UK and global economies.

Renewables constitute an industry which is stable in the indefinite future, in contrast to fossil or nuclear industries which are subject to the vagaries of international politics. Single events like Fukushima or Chernobyl have had long-term global impacts on nuclear power which cannot survive in a free market without government support.

ENVIRONMENT – WIND TURBINES ARE A BLIGHT ON OUR LANDSCAPE

All technologies have environmental impacts, but of different kinds. The most abundant renewables – solar and wind – have a visual impact, but their others are small. Power stations and refineries also blight the landscape, but they have other more serious effects through chemical and radioactive waste. Fossil fuels are changing our climate; nuclear energy poses risks through accident and weapons proliferation.

The critical difference is that certain environmental impacts of fossil and nuclear energy are essentially irreversible. If Elizabeth I had decided to have nuclear and coal power stations, we'd still be living with the consequences of her decision today. Sheep farming was restricted in Wales for over two decades because of the Chernobyl disaster – an accident that happened over 1,500 miles away.

In contrast, if a future generation finds better solutions than wind turbines or solar panels, they can remove them with virtually no trace.

Conclusion

Renewables thus enhance security in all dimensions: personal, social, international political, and economic.

Renewables can provide stable energy supplies for the indefinite future without the energy crises we ricochet between because of using finite fossil and nuclear fuels.

With no effort from us, renewable energy just keeps coming.

But most importantly, renewable energy will help prevent making the very world we live in an inhospitable place.

Mark Barrett
is a senior lecturer at University College London. As a consultant and academic, he has been researching renewable energy systems for 30 years. Some of his work may be found here: **http://societyenergyenvironment.net/Index.html**

THE HOME ENERGY HANDBOOK

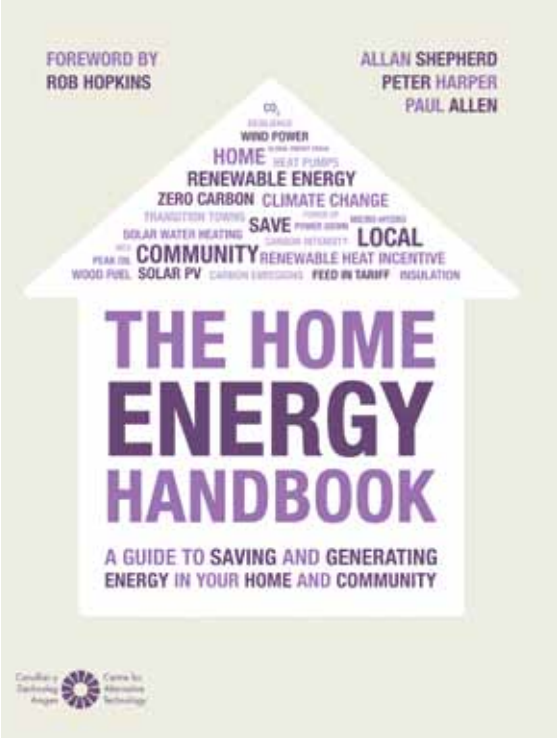
IF YOU'RE LOOKING FOR THE PRACTICAL KNOW-HOW ON SAVING ENERGY IN YOUR HOME AND COMMUNITY, LOOK NO FURTHER THAN THE CENTRE FOR ALTERNATIVE TECHNOLOGY'S (CAT) LATEST PUBLICATION. ALLAN SHEPHERD INTRODUCES THE HOME ENERGY HANDBOOK.

Funded by the Carnegie Foundation, and written by a group of five experts and supported with contributions by many others, *The Home Energy Handbook* is the first practical book to cover all the key subjects of home and community energy in one volume. It is essentially CAT inside a cover.

As well as giving the big picture of our 21st century challenges and a detailed exploration of how to calculate and cut your carbon emissions, *The Home Energy Handbook* has seven chapters tackling the nitty-gritty practicalities of how to power up and power down, for real, both at home and in your community.

Each of these seven chapters expands on one of seven key questions:

- **Have I draught-proofed and ventilated correctly?**
- **Have I insulated?**
- **Am I making the most of passive solar gain?**
- **Do I have an energy efficient heating system and energy efficient electrical appliances?**
- **Should I switch to a renewable heat source?**
- **Can I generate my own renewable electricity?**
- **Could I scale up to community level energy generation?**



LET'S LOOK AT THESE QUESTIONS IN A BIT MORE DETAIL.

THE POWER DOWN QUESTIONS

HAVE I DRAUGHT-PROOFED AND VENTILATED CORRECTLY?

The controlled release of fresh air into a building is essential for health and wellbeing but uncontrolled draughts waste energy and are bad for you. The technical term for draughts is infiltration, a word I like because it gives a visual picture of air getting in where it's not wanted. Air flow should be controlled through ventilation, not allowed to happen by chance through infiltration. Eliminate infiltration by draught-proofing and use good ventilation techniques instead.

> **"THERE IS A REVOLUTION AFOOT IN TERMS OF HOW WE IMAGINE ENERGY GENERATION. THIS IS ITS MANIFESTO."**
> Rob Hopkins, Transition Towns

AM I MAKING THE MOST OF PASSIVE SOLAR GAIN?

Passive solar gain delivers a cut in fuel consumption by trapping and storing heat from the sun. Rooms are warmed using energy from the sun rather than heat from a heating system. Passive solar gain exists to some degree in most houses (unless you live in a cave!) but can be improved using techniques described more fully in chapter five of *The Home Energy Handbook*.

THE THREE ESSENTIAL INGREDIENTS ARE:

- Large double or triple glazed windows facing somewhere between east and west, but preferably south (windows that face north should be smaller in size to minimise heat loss).
- Walls and floors with a high thermal mass – in other words, a capacity to absorb and store excess heat when it is sunny and release it back in to the room when it is not.
- A fast reaction heating system, to respond quickly to changes in the weather. It is possible to overheat a house using passive solar heating techniques, so ventilation, heat storage control and shading are all important aspects of any passive solar design process.

HAVE I INSULATED?

Insulation slows down the speed at which heat is lost through the fabric of a building; the materials that make up the external walls, floors, windows and roof. Heat will always be lost through these materials, but slowing down the rate of heat loss cuts fuel consumption. Draught-proofing also prevents heat loss so it makes sense to do this when (or before) you insulate. There is no point insulating well but not draught-proofing. Double glazing is another form of insulation; the air gaps between the layers of glazing slow down heat loss.

DO I HAVE AN ENERGY EFFICIENT HEATING SYSTEM AND ENERGY EFFICIENT ELECTRICAL APPLIANCES?

Energy efficiency is different from energy conservation. Energy conservation is about keeping heat in using insulation and draught-proofing techniques. Energy efficiency is about using less energy to do the same amount of work. We can increase energy efficiency by changing habits, switching appliances and establishing better control systems. Improvements in the energy efficiency of some products mean they now represent some of the easiest and, often, most cost- and environmentally effective changes you can make in a home.

THE POWER UP QUESTIONS

SHOULD I SWITCH TO A RENEWABLE HEAT SOURCE?

The three primary renewable heat choices – solar thermal, heat pump and biomass – are all site specific, meaning that not all households will be able to install them. In CAT's *Zero Carbon Britain 2030* report, renewable heat was identified as a key way for households to reduce their household carbon emissions, but those already connected to mains gas may be advised that installing a more efficient gas boiler (perhaps along with solar thermal panels where appropriate) could be a better bet than switching over to a biomass boiler or ground source heat pump.

CAN I GENERATE MY OWN RENEWABLE ELECTRICITY?

The three main renewable electricity generation technologies – solar PV, wind and micro-hydro power – all work on a household and community level. However, most people opt for solar PV, as it is the least 'picky' of the three technologies when it comes to location. Wind and hydro power require very specific conditions which are typically only available in rural areas. Solar PV only requires an unshaded position (usually but not always a roof) that faces somewhere between east and west, preferably between south east and south west. This makes it the option of choice for urban areas.

COULD I SCALE UP TO COMMUNITY LEVEL ENERGY GENERATION?

Fixing your own home is great but you can achieve more with a community project. Working with others allows you to combine resources to save and generate energy on a much bigger scale, earn money for your community, strengthen bonds between neighbours, create local jobs and keep money spent on energy in the local area. It also allows you to take on or be part of projects that you could never possibly be involved with as an individual.

"The Home Energy Handbook is a hugely valuable resource for individuals, households, communities and local and national decision makers. It is the first practical book to cover all the key subjects of home and community energy in one volume. It is a powerful tool in the hands of a community that wants to regain control of how it generates energy. There is a revolution afoot in terms

“WE CAN INCREASE ENERGY EFFICIENCY BY CHANGING HABITS, SWITCHING APPLIANCES AND ESTABLISHING BETTER CONTROL SYSTEMS.”

of how we imagine energy generation. This is its manifesto.” Rob Hopkins, founder of the Transition Town movement.

The Home Energy Handbook is available from the CAT Eco Store – call 01654 705989 for details.

THE HOME ENERGY HANDBOOK CASE STUDIES

Most of the case studies in *The Home Energy Handbook* are big projects, but if you want to get started with something small yet incredibly effective, read the case studies below. All are in inner city areas but the ideas can be applied anywhere.

BRISTOL GREEN DOORS

Bristol Green Doors was set up in 2010 to give householders the chance to open up their energy efficient homes to members of the public and to share their retrofitting experiences, both of saving and generating energy. Over one weekend, thousands of visits were made to over 50 homes, with an average of 50 visits per home. Visits were pre-registered via the website to avoid overcrowding and to protect households. Case studies of many of the homes were then made available on the Bristol Green Doors website (www.bristolgreendoors.org).

The weekend was followed by a two month programme of courses, talks and workshops, and two more technology focused events: Insulation Celebration and Solar Saturday. If you haven’t got the resources to put this kind of event on yourself it could be possible to link up with existing providers instead. Contacting your local Energy Saving Trust office might be a good place to start. If you don’t want to organise an event yourself but would either like to open your doors to others or visit an open doors house, visit www.superhomes.org.uk. Superhomes are older homes that have been refurbished to the highest standards of energy efficiency, leading to at least a 60% reduction in carbon emissions.

DRAUGHT BUSTERS

‘If you’ve got fresh air, leaking into your house, who you gonna call? Draught Busters.’ Watch the YouTube videos made by the Hyde Farm Climate Action Network (Hyde Farm CAN) and you’ll get a good idea of what Draught Busters is all about. But here’s a quick summary: Draught-busting is a way to get together with your friends and neighbours to work one house at a time on fixing draughts. You’ll need someone who knows what they’re doing to start things off, but once you’ve fixed one house together the knowledge should spread easily between people.

Hyde Farm CAN (www.hydefarm.org.uk) offer a draught-busting service to identify low-cost measures and work with you to install these measures. The only thing they ask is that the householder pays for the materials and invites some of their friends and neighbours to join in. This way the skills are passed quickly between households. There are local Draught Buster initiatives all over the country. Look for one near you.

ENERGY MONITORING HIRE

Energy monitoring equipment can be expensive to buy so why not share the cost with your neighbourhood? Transition Town Brixton applied for a grant to buy ten Energy Electricity Monitors to lend to the community. To borrow one, local residents have to sign up via www.transitiontownbrixton.org.

Allan Shepherd
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HULL DAILY MAIL

RENEWABLES:

THE UK'S NEW INDUSTRIAL REVOLUTION

ANDREW MORTON DESCRIBES HOW RENEWABLE ENERGY – WHICH BY DEFINITION IS DEPENDABLE, PREDICTABLE AND SUSTAINABLE – CAN BE THE DRIVING FORCE BEHIND FUTURE ECONOMIC GROWTH.

As a country, the UK can claim to have seen it before. Rising unemployment, the threat of widespread government cuts and a crippling recession – all set against the worrying backdrop of an energy crisis.

As many economists, historians and politicians have pointed out, the scenario faced by the country in the 1970s is very similar to the problems we are battling both as businesses and individuals in 2012.

But there is, thankfully, a critical difference between then and now, which could help fuel an economic recovery and also shape a cleaner, greener, future.

Forty years ago, reducing fossil fuel use and living more sustainably was only a storyline on episodes of The Good Life. Whereas, today's financial woes come at a time when corporations, communities and countries are agreed on the need to move towards a low-carbon existence. This outlook is coupled with the genuine need to slash energy costs.

Collectively, this unique situation presents the chance for a new industrial revolution. And the good news is that it is a transformation many of us can join and even benefit from.

Moreover, the UK's expanding renewable energy industry, and the wider environmental sector, is big business and we should not be afraid to talk about it in this sense.

The issue of powering our workplaces and homes in the decades to come is not going to disappear. The challenge is considerable – with equally considerable investment needed to overcome the hurdle. So, in switching to greener fuel, we can potentially improve our balance sheet at the same time.

When you think the offshore wind power sector alone could be employing nearly 100,000 people in the UK by 2020 – according to a report released in June by the Centre for Economics and Business Research – you begin to realise the scale of this economic opportunity.

This is even more impressive when you realise that this wasn't really an industry for the country until only about a decade ago.

Importantly, before understanding how this can be our new industrial revolution, it is useful to remember why there is an energy crisis.

We have as a country – for the first time in decades – become a net energy importer. The UK has become increasingly dependent on uncertain, and in some cases volatile, parts of the world for our energy requirements. This means we are vulnerable to the rise and fall of global energy prices.

As we have seen with household bills and fuel costs, this reliance on imported energy impacts on every one of us and the prices we ultimately pay for goods and services. It is also worth considering emerging economies, such as China and India, have an ever-greater appetite for diminishing fossil fuels.

So, this means we have a responsibility – and a pressing need – to carefully think about creating a more dependable, predictable and sustainable energy source.

Perhaps the best way to achieve this, and economic growth, is by fully exploiting our range of renewable energy resources in and around the UK.

This also goes some way to prove why there is such political will, from all quarters, behind green energy, notwithstanding mostly local debates on issues such as the popularity of onshore wind farms. Indeed, president of the European Commission, José Manuel Barroso, has said the opportunity could "create thousands of new businesses and millions of jobs".

But how is this emerging industry taking shape and how is it creating a new economy in the UK?

Some of the action involves big projects that are attracting, understandably, big headlines.

An example is the development of bio-renewables, including biomass and bioethanol, which will take a share of the new green energy mix. Up to 40 new production facilities are expected to be built in Europe in the next five years, with the UK taking a prominent role.

> **"PERHAPS THE BEST WAY TO ACHIEVE ECONOMIC GROWTH IS BY FULLY EXPLOITING OUR RANGE OF RENEWABLE ENERGY RESOURCES IN AND AROUND THE UK."**

In East Yorkshire, commissioning is underway at the Vivergo Fuels site – one of the largest bio-refineries in the continent.

The plant will produce 420m litres of fuel a year, using 1.1m tonnes of locally sourced wheat. The company is investing £350m in the area and creating and sustaining more than 1,000 jobs.

Given the potential for this technology, and how such developments will support local supply chains, it is a tangible demonstration of how large-scale renewables can make strong contributions to an area's economic wellbeing.

But perhaps the area of clean energy that has attracted the most focus – and where there is the most hope of a green-inspired industrial revolution – is offshore wind.

The UK is now widely-regarded as the global leader in this sector and the work developing the massive "Round Three" wind zones off our coastline is among the world's largest civil engineering projects.

Remember, some of these sites in North Sea are the size of English counties – filled with turbines that need designing, assembling, transporting, installing, operating and maintaining.

Industry-backed reports suggest this activity could return the country to being a net energy exporter by the middle of the century, generating electricity equivalent to one billion barrels of oil a year.

Based on predictions of delivering 33 gigawatts (GW) of offshore wind power by the early 2020s, it is also thought the sector could contribute 0.4% of GDP per year around the same period.

Being just a decade away from realising this – and with such impressive forecasted numbers – it is a bold example of a new industrial revolution.

Already, so-called "super clusters" of expertise, businesses and supply chains are forming in pockets of the UK that will assemble the Eiffel Tower-size turbines destined for the Round Three sites.

Hull and the Humber, Newcastle and the Tyne and Leith in Scotland are all offering homes for this industry and engineering giants such as Gamesa are developing plans.

The positive impact Siemens' proposed turbine assembly plant in Hull – employing about 700 people – could have on the entire Humber region and business

community is vividly illustrated by the parallels drawn with similar economic revolutions elsewhere in the UK.

Some have said renewables will be to Hull what oil and gas have been to Aberdeen and car manufacturing continues to mean for places like Sunderland and Derby.

In the Humber's case, up 10,000 jobs are being talked about in terms of the supply chains and wider area, with everyone from lawyers and training providers to caterers and engineers required as part of this sector.

Proving UK manufacturing and traditional industry is far from extinct; ship building will also happen, with modern vessels required to ferry equipment and crews offshore.

The recent announcement by Danish firm Vestas to drop plans for a large turbine facility in Kent may have led some to question the future of the industry. But this is surely a small bump in an overwhelmingly positive-looking journey – irrespective of on-going arguments about government subsidy levels and other political issues.

In fact, the bigger danger in making sure this new industrial story has a happy ending may be the readiness of companies in the UK to actually believe it and fully seize the opportunity.

Our supply chains must prepare now for their golden chance and be ready to compete with overseas rivals in a fast-paced and dynamic industry that has existing relationships with renewables businesses in mainland Europe – notably Germany – where offshore wind already has an established presence.

Having local advantage will not be enough on its own to win this work, generate investment and create jobs.

Carbon capture and storage and tidal and wave power also present huge economic opportunities for the UK, once research and issues surrounding commercial viability have been concluded.

But these big projects are only part of the green industrial revolution.

Micro-generation and the related field of energy-efficiency in domestic properties have the potential to be a crucial, lucrative, market.

Already, solar power is responsible for employing more than three times the number of people the wind industry does – many in small and medium-sized enterprises (SME).

There are about 55,000 companies active in the low-carbon and environmental goods and services sector in the UK, of which 18,000 are involved in manufacturing. Some 90% of the firms are in the industry are SMEs.

And these numbers will only improve as our appetite for renewable energy comes from lifestyle, comfort and cost-reduction choices, rather than subsidies and tariffs.

As a nation, we have a target of getting 15% of our energy requirements from renewables by 2020, with everyone having a role to play, whether as a homeowner or a director of a business.

Working towards this goal – and others associated with carbon emissions – will mean we have economic growth underpinned by a reliable and secure power source.

In the process, we have the chance to create green jobs, generate new business and build a home-grown industrial success story.

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www.footprintrenewables.co.uk

WHAT HAVE SUBSIDIES EVER DONE FOR US?

SIMON LEADBETTER EXPLAINS HOW THE BENEFITS OF SUBSIDISING RENEWABLE ENERGY TECHNOLOGIES FAR OUTWEIGH ANY KIND OF OPPOSITION.

There's a famous scene from *Monty Python's Life of Brian* where the People's Front of Judea (or was it the Judean People's Front) in Roman-occupied Palestine ask, "What have the Romans ever done for us?"

Essentially, the Romans subsidised things that 'civilised' the people and made their Empire richer and more secure, such as water supplies (aqueducts and irrigation), sanitation, roads, defence and public baths.

One of the criticisms of renewable energy is its apparent status as a 'subsidy-junkie'. But subsidy is just another word for government aid for a public good.

It's apt, considering this article's opening, that one of the largest on-going public subsidies is for roads, which went unsubsidised nationally and were a complete mess from Roman times to 1936 – when the government decided to take charge again.

£3.8bn goes into roads each year with hundreds and hundreds of billions spent since the government first took responsibility for the greatest subsidy junkie that is road transport. Without massive subsidies there would be no A roads or motorways.

WHAT ELSE ARE SUBSIDIES DOING FOR US?

Nuclear power decommissioning: £2.2 billion per year and £70-£100 billion clean-up costs. Without massive subsidies we would have nuclear waste stored and disposed of insecurely.

Rail: £4 billion a year for a privatised industry, up from £1-1.5 billion when nationalised – but imagine if those 1.3 billion journeys took place on the roads – along with the 500m tonnes of freight (ORR).

Without massive subsidies, our already congested and heavily subsidised road system would grind to an abrupt halt and we would need anymore subsidy to cater for the demand.

Clearly those who oppose subsidies for renewables wouldn't oppose the government defending the realm through our armed forces and police service – but even those have heavily subsidised private parties involved in provision of equipment and services.

Not to mention a better education system than in pre-Education Act times and the most cost efficient health service in the world (OECD), before the current cuts and reforms kick in.

Oh, and the internet, which grew out of the massively subsidised CERN project. The Americans saved themselves a few billion by cancelling their CERN-like project, letting all their physicists move into Wall Street to develop complex financial instruments – current subsidy running into trillions.

The cost of air particulates' damage to public health is estimated to cost anything from £5 billion to £3 5 billion. Most of these air particulates come from burning fossil fuels in our transport, industry and homes. Subsidising the impact of oil, coal and gas on our health and children's health seems a price worth paying to those who think subsidising renewable energy is a bad thing.

As the infographic opposite shows, the subsidies for fossil fuels globally far outstrip the subsidies for renewables.

Renewable energy subsidies are costing £2 billion a year, rising to £6 billion by 2020 – by which time that'll account for 61p per day for everyone in the UK.

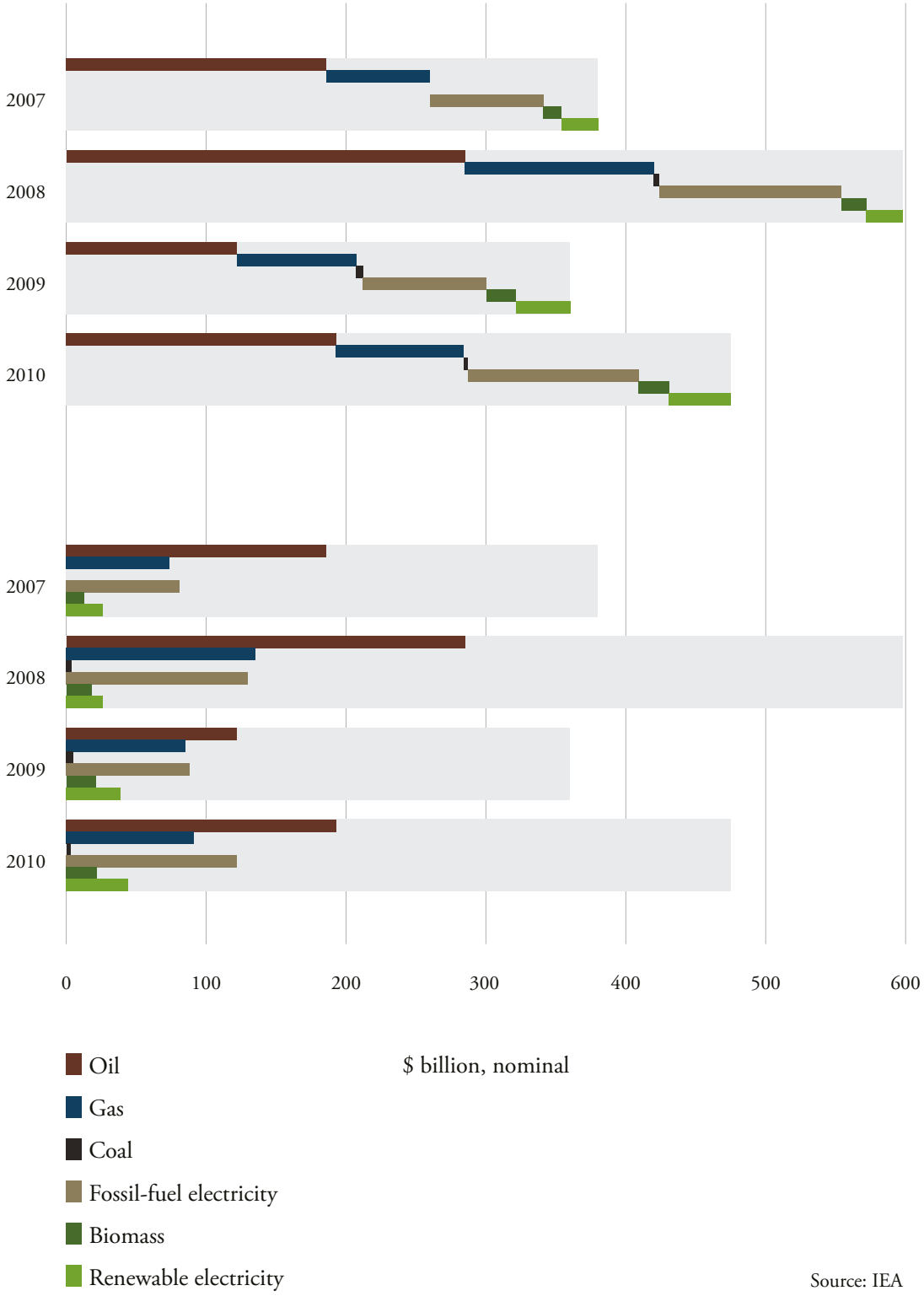
It seems a very small price to pay for clean, limitless, domestic and secure energy and a lot more sensible than, as Al Gore put it, "Borrowing money from China to buy oil from the Persian Gulf to burn it in ways that destroy the planet."

If you object to renewable energy on principle because of subsidies, you have to give up a lot of other things too.

In the words of Reg in *Life of Brian*, "*All right... all right... so apart from better air quality and medicine and education and internet and public health and roads and sanitation and rail and public order... what have subsidies done for us?*"

> **"IF YOU OBJECT TO RENEWABLE ENERGY ON PRINCIPLE BECAUSE OF SUBSIDIES YOU HAVE TO GIVE UP A LOT OF OTHER THINGS TOO"**

Global subsidies for fossil fuels and renewables



Source: IEA

RENEWABLES ARE THE ONLY LONG-TERM ENERGY SOLUTION FOR THE PLANET

THE RENEWABLE ENERGY ASSOCIATION (REA) SAYS IT IS "THE VOICE OF THE RENEWABLES INDUSTRY IN THE UK". WITH THIS IN MIND, BLUE & GREEN TOMORROW CAUGHT UP WITH ITS CHIEF EXECUTIVE, GAYNOR HARTNELL.

Who is the REA?
We're the only renewable energy trade body that covers renewable heat, transport fuel, power generation and biomethane or green gas. We have over 900 corporate members so we're the largest trade association in terms of number of member companies, and our main focus is from the perspective of the renewable energy producer – people selling renewable electricity, or installing heat projects and so on.

We also have several members who are service providers to the industry, anything from lawyers and consultants to utilities and blue chip companies, but obviously it's the renewable energy producers that we are seeking to be the voice of.

Our mission is to secure the best markets for our members, and to help meet the 15% renewable energy target by 2020 and go beyond it.

If we weren't here, there would be a number of smaller trade associations just trying to do one small part of the industry. But many companies are active in a portfolio of different renewable energy technologies and they want to be a member of one trade association with a holistic view of renewable energy. They don't want to join lots of different trade associations.

How do you think the government could be doing more with regards to renewable energy? One thing that the government is doing which isn't helping at all is serially undermining investor confidence in the sector. We were supposed to see the publication of the Renewables Obligation banding review at the end of May, but didn't. We understand it's been delayed because government is considering reducing the banding level for onshore wind below the level that it consulted upon.

It feels like that's been driven by politics rather than evidenced-based research. And it's very destabilising because normally what happens when the government consults is that it sets out its proposed tariffs or prices, and those are widely reviewed as the worst case scenario.

One wouldn't expect them to propose support levels after having gathered evidence, and then go lower. It will have a very destabilising effect.

There are numerous examples in other technologies where there have been changes of policy. In the context of introducing new electricity market arrangements under the Electricity Market Reform (EMR) process, it's very important that investor confidence is maintained. If the government doesn't start improving its performance in this respect, it's going to be very difficult indeed to meet the renewable targets.

What has the government done well with regards to renewable energy? While we have many concerns about the Electricity Market Reform, which we discussed in the Select Committee evidence session on June 19, I would say that the

KRIS GRUBER FOR RES

concept of the contracts for difference (CfD) feed-in tariff is laudable, and if it can be made to work, it will be a good thing. I can understand what the government wants to achieve with these CfDs, and the objective is a sound one for renewables, but the devil is in the detail.

Another positive from Government is that it is getting the feed-in tariff for PV onto a more stable, predictable pathway, and it is going to revise its view of the contribution PV can make in the longer term. It has recognised finally that the costs are coming down so dramatically that it expects it to play a major part from 2020 onwards. It will publish an updated Renewables Roadmap to make that clear.

What's your background in renewable energy and how has the sector changed since you entered the industry? I've been at the REA since it started. In fact, I was there helping to get it off the ground. It had been a long-term objective of mine to see the renewables industry present a strong and united voice to government.

I got into renewables in the mid-1990s, and I've worked with a number of different trade associations. When I started, there was a lot of competition between different renewables as to which one was best.

All of the technologies were such small players then, and this carping and competing wasn't constructive. The important thing was to actually work together, and so that's why I felt motivated to try and bring about a pan-technology trade association.

There have been tremendous changes over the years. One of them is just the sheer number of government officials and departments involved. Back in the 1990s, there were really only three civil servants that we needed to have a relationship with. The growth's been exponential since then.

Blue & Green Tomorrow often prefers to use words like 'clean', 'alternative' or 'green' when describing renewable energy. Do you think the word 'renewable' has picked up negative connotations? No, I don't think it has at all; in fact I think the opposite. There's an assumption that something isn't really totally environmentally wonderful unless it is renewable energy.

So you'll have people talking about the recovery of waste heat, and they describe it as renewable energy. Now, it's not renewable energy necessarily, unless it's waste heat from a renewable energy source. But that doesn't mean to say it's not a fantastically sound thing to be doing for the environment.

Renewables doesn't have the monopoly on being green, I'd certainly argue that. It can be that doing something like recovering coal mine methane that's just venting out the ground, for example, could be a more environmentally sound thing to do than to actually build a new renewable energy project.

And of course energy efficiency and conservation is one of the most environmentally sound things to do.

What's the long-term goal for the REA? Trade associations exist to serve their members. They should always take account of what is best for the industry and the members. They don't exist to promote their own agenda.

> **"IF WE WEREN'T HERE, THERE WOULD BE A NUMBER OF SMALLER TRADE ASSOCIATIONS JUST TRYING TO DO ONE SMALL PART OF THE INDUSTRY."**

In the long term, it may be best that the REA eventually ceases to even exist, because come the time when our energy is pretty much 100% renewables, different renewables will be competing against each other and there will be no role for a body that's seeking to unite them all like the REA is.

Finally, what would you say to encourage and inspire people into switching to renewable energy? Renewables are the only long-term energy solution for the planet. The fuel sources for renewables aren't going to run out, and you haven't got issues like dealing with radioactive waste or waste carbon that you've got to store because you can't let it out in the atmosphere.

They're totally the answer for the long-term, and increasingly also the answer for the short-term, because fossil fuel prices are only going upwards, and many businesses and individuals want to insulate themselves against future price rises.

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Journalism is changing rapidly through a digital and social media revolution. It is no longer the preserve of press barons and elite groups; journalism is now democratic and everyone has a voice.

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CLEAN ENERGY: A REWARDING, RENEWABLE INVESTMENT

AFTER MAKING A NAME FOR ITSELF INVESTING IN THE UK CREATIVE ECONOMY, INGENIOUS INVESTMENTS TURNED PART OF ITS ATTENTION TO CLEAN ENERGY IN 2010. TWO WHIRLWIND YEARS LATER, B&GT SPOKE WITH ONE OF THE FIRM'S DIRECTORS, SEBASTIAN SPEIGHT, ABOUT THE SECTOR'S METEORIC RISE.

In March this year, Ingenious Investments closed its Energy Efficiency EIS (Enterprise Investment Scheme) Fund, after exceeding its £10m target. This achievement, followed by the launch of a second, similar fund in May, was the latest clean energy step taken by a group that has established itself as the largest media investor in the UK.

It has developed an incredibly strong reputation within the UK creative economy, and to date, has raised and invested over £7 billion in media and entertainment. It might have come as somewhat of a surprise to the outside world then, when in 2010, it launched its first clean energy fund.

But, according to one of the firm's directors, Sebastian Speight, branching out into the sector was a natural progression for Ingenious.

"Ingenious prides itself on investing in rapidly changing industries", he says. "When we invested in media in the late '90s, it had been impacted heavily by the arrival of digital and the internet. There was not only technology change but a lot of regulatory and consumer change. A similar dynamic exists, and has existed for the last few years, in the clean energy sector.

"We see significant policy initiatives to stimulate investment in the industry. Partially as a result of those successful measures, we've seen capacity being built out in those sectors which has reduced costs and shifted the commercial dynamics of the projects."

Speight personally became interested in clean energy after a contact at one of the large German insurers came to speak to the Ingenious management about the sector in 2006. Accepting that it was probably slightly premature

"INGENIOUS PRIDES ITSELF ON INVESTING IN RAPIDLY CHANGING INDUSTRIES"

for the company to branch out away from media at that time, the idea was put on hold until 2009, with Speight in particular championing the opportunities raised by investment in clean energy.

"I was able to persuade the business that this was a sector that not only offered a very compelling investment opportunity for our investor base, but was also one that chimed with their aspirations in terms of where they wanted to invest", he explains. "It had similar values associated with it."

And so, a year after bringing the idea onto the table as a serious business strategy, Ingenious launched its first solar fund in 2010. Soon after that, a designated clean energy division was built, with Speight at the forefront of the operation.

Following the first solar fund, Ingenious launched a second UK solar fund and the energy efficiency fund which closed in April, and is now fundraising on a second energy efficiency fund and a new renewable energy fund. But what kind of things does the company look for when building up its portfolio?

"Currently, we're more focused on investing in companies which undertake projects rather than in early-stage companies that are developing new technologies", Speight describes.

"We would typically invest in a company which is operating a business model of constructing and operating renewable energy plants, but in proven technologies where they're not taking some of the very early adoption risks. That's one of our criteria.

"Clearly another is that the business model has to be constructed on sound grounds and offer us a very healthy prospect of making a sensible return for our investors on that investment."

After comfortably reaching its £10m benchmark, Ingenious' first energy efficiency fund is currently negotiating its first investments. Speight explains that they're looking at UK buildings – be they public sector or private buildings such as hotels, warehouses and large industrial plants – where significant reduction in energy can be achieved.

As of 2007, larger consumers of energy have been faced with government-forced emissions reduction policy in the form of the Carbon Reduction Commitment (CRC) Energy Efficiency Scheme. Under the scheme, businesses are obliged to report and price carbon emissions. Those that adhere to the energy efficiency measures will see significant benefits with regards to lower energy bills, and will not be obliged to buy carbon credits – a certificate that companies have to buy if they exceed a certain amount of annual emissions.

Speight says that this, along with a number of other sustainability measures, is positive a development implemented by the government. He believes the coalition has rather unfairly come in for somewhat of a hard time from the industry.

"It hasn't been easy for it in terms of managing the subsidy for the smaller-scale renewable energy", he says. "Subsidies are there to build capacity, and once that capacity is built they're meant to be scaled down as the costs in the value chain are reduced, and the government has been successful in doing that, so accordingly it has been paring down the subsidy, just as has happened across other European countries.

"The manner in which that has been handled has not been perfect and a number of people within the industry, particularly in the developer community, have been impacted adversely and perhaps that could have been handled better, but the broad thrust of the degression of the feed-in tariffs should not be unexpected and is a sign of success.

"On the whole, I will give the government positive marks for what it has done to stimulate

growth in the sector."

Speight also highlights the possible impact of the Green Investment Bank – a £3 billion scheme set to play a pivotal role in driving forward the green economy in the UK. The bank made its inaugural investment in April this year, and announced the appointment of two directors – Lord Smith of Kelvin and Sir Adrian Montague – in May.

"Rolling out funds along with fund managers is perhaps the easiest route for them to take, make sense of, and get to know the impact", Speight advises.

"I think to be able to get the maximum leverage for the government money, it has to balance very carefully the need not to be profligate with that money, but at the same time, take the position in the capital structure of the areas that they wish to support to really stimulate private capital to come in. If it is prepared to take first loss positions or fund subordinate positions, I think that it can make its money go a lot further, but clearly it must be careful how it does that."

Capitalising on the opportunities laid out by clean energy appears to have been a very good decision indeed for Ingenious Investments, with renewables investment reaching a record high globally last year. According to two reports, by the United Nations Environmental Programme and the Renewable Energy Policy Network for the 21st Century (REN21), some $257 billion (£165 billion) was pumped into the sector in 2011 – six times the amount invested in 2004.

"Investing in clean energy provides you first and foremost with a compelling use of your capital on which you can earn a sensible return", Speight highlights. "At the same time, it provides you with an investment that you will be very rewarded by in terms of your personal interest, and the outcomes that you're achieving for your community and the planet more widely.

"What we in the clean energy sector are trying to do is optimise the energy supply mix for the 21st century, and that means affordability and security as well as a more long-term aspiration to reduce carbon. That is an important objective and is one that is much more pragmatic than people sometimes associate with the idealism of the green movement."

With fossil fuels running out at a rate of knots, it's no coincidence that a synonym for 'ingenious' is 'resourceful'. Ingenious Investments' strategy ought to be the catalyst for your own backing of a new, clean, renewable, abundant and limitless selection of energy sources.

American anthropologist Margaret Mead is often quoted to have said, "Never underestimate the power of a small, dedicated group of people to change the world; indeed, that is the only thing that ever has." And if the current, encouragingly positive trend in clean energy investment continues, those dedicated and extraordinarily innovative individuals will have succeeded in their task.

"WHAT WE IN THE CLEAN ENERGY SECTOR ARE TRYING TO DO IS OPTIMISE THE ENERGY SUPPLY MIX FOR THE 21ST CENTURY, AND THAT MEANS AFFORDABILITY AND SECURITY AS WELL AS A MORE LONG-TERM ASPIRATION TO REDUCE CARBON"

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ENCOURAGING AN INTELLIGENT ENERGY DEMOCRACY

B&GT SPOKE WITH JULIET DAVENPORT, CEO AND FOUNDER OF THE UK'S ONLY 100% RENEWABLE ELECTRICITY SUPPLIER, GOOD ENERGY. ADOPTING AND INVESTING IN RENEWABLE ENERGY ISN'T JUST ESSENTIAL IN TACKLING CLIMATE CHANGE, SHE SAYS, BUT IT'S ALSO ESSENTIAL FOR LONG-TERM ECONOMIC STABILITY.

Good Energy provides electricity to more than 30,000 customers. And it's at that point where it breaks the mould and its similarity with mainstream suppliers ends.

These 30,000 people are different. Each of them have made a conscious decision to get their power from Good Energy because of its status as the UK's first and only dedicated 100% renewable electricity supplier. It sources energy from wind, water, sunlight and sustainable biomass from 35,000 small generators across the UK, and in doing so, has won a number of high-calibre awards.

And the driving force behind this remarkably innovative company is Juliet Davenport.

"When somebody tells me I can't do something; that tends to inspire me to go and find a way to do it", she says, about her inspiration behind creating the business.

"Nobody seemed to be considering clean energy technologies as an alternative here in the UK. I looked at the policy work, there was nothing, and then I looked at the commercial side, and there was nothing. Really, there was a void of anybody doing anything."

The energy industry's reaction to Davenport's pledge to set up a wholly renewable supplier was one of bemusement. She recalls how questions such as "What are you doing?" and "Why are you doing it this way?" both often cropped up in conversations with big market players.

Despite the best efforts of mainstream suppliers to inadvertently put her off the idea, she remained confident that the business model could still be a successful one, and in 1999 she established Unit[e] – the company that four years later would transform into Good Energy.

It was after having completed an MSc in economics and environmental economics in 1994 that the important role energy played in the economy really became clear to Davenport. She outlines two key reasons as to why renewables are therefore central to a sustainable future. The first, she says, is its role as a part-solution to climate change. The second is to do with the domestication of the UK's power sources.

> "WHEN SOMEBODY TELLS ME I CAN'T DO SOMETHING; THAT TENDS TO INSPIRE ME TO GO AND FIND A WAY TO DO IT"

"As a country, we now import just under 60% of our energy requirements. The issue you have there is that when Russia gets a cold or something quakes

in Japan, these events affect our gas prices. This means we have no predictability. Instead, we have a volatile energy system and this puts up costs. So individuals are trying to manage this hugely volatile pricing that is affected by world situations that they can do nothing about, and they just think that they're on the end being wagged around.

"Renewables provide a really good long-term stable price that comes through the whole thing. It's weather dependent, but weather comes and goes, it doesn't get affected politically. That's a fundamental shift that we need to start thinking about."

THE GREENEST EVER GOVERNMENT?

And government's role in this shift is vital, though questions have been raised regarding how much it has actually lived up to David Cameron's "greenest government ever" claims. George Osborne's budget statement in March did little to reassure the renewables industry over its future role in the UK economy, with the greater emphasis instead placed on gas, which, the chancellor said, "will be the largest single source of our electricity in the coming years".

"The government really needs to focus on understanding the shift from large centralised players to decentralised smaller generators, and what additional benefits, other than the traditional low-carbon side, this might bring to the market", says Davenport.

"We have a lot of diverse generators spread all across the UK. That it gives us a really fantastic risk management platform, so that if one generator fails, it doesn't mean we've got a big problem because we've got lots of others. If the weather

systems in the south-west are different from Scotland, that's great because that gives us a balance in weather as well.

"The big key thing that government needs to understand and get its head round is how the market structure that it's implementing is affecting the smaller players – the non-traditional energy suppliers."

However, not all green vibes emerging from Downing Street are negative. In Ed Davey, the government has a secretary of state who started life as a green campaigner, and who, Davenport says, "fundamentally has a heart".

"I think we feel engaged with government more than ever before", she ponders.

"Whether that means it's the "greenest ever", I'm not sure. I think it definitely has talked to more people than any other government. The previous government made policies without really thinking about them. It slightly threw money at green projects, and I think this was as a result of putting too much money over one project.

"This government has got to make sure that it doesn't allow Treasury to chip away at this marketplace, and it needs to make sure there are horses for courses within organisations."

REAPING THE BENEFITS OF DOMESTICALLY-PRODUCED POWER

In the fourth quarter of 2011, renewables contributed to a record 11.9% of the UK's electricity demand – an increase of 4.6% from the year before, according to the Department of

→

Energy and Climate Change. And given the fact the country boasts one of the biggest renewable resources in Europe, this figure is likely to keep on rising.

"We've relied on North Sea oil and gas for too long", points out Davenport.

"We haven't looked at what our other natural resources are, unlike somewhere like Norway, which produces something like 95% of its electricity from renewables and tries not to use any of its oil and gas. As a result, it's a fairly rich country. I think the UK needs to look to its own resources to see what we've got here naturally on our own land, before we try and import everybody else's."

The statistics on importing electricity to the UK are telling and concerning. Earlier this year, Good Energy undertook a project called Electricity Miles, which looked to expose where in the world the UK got its electricity from. It was revealed that a clear majority – 57% - came from outside the country, with Asia & Middle East (16.87%) and North America (10.71%) the biggest contributors. Good Energy's head of external affairs, Ed Gill, wrote a piece for *B&GT* in May about why Electricity Miles matter.

"Investing in renewables in Britain means that the money remains in the country", he said. "On the other hand, investing in technologies that rely on world markets for fuel means that cash just pours from our shores. Investment in renewables is not just sustainable environmentally, but also economically too; so long as we can harness renewable energy, the jobs necessary to do so will need to exist. Spending money on other, unsustainable energy resources is nothing more than a short-term investment."

THE IMPORTANCE OF COMMUNITY RENEWABLES

One of the ways to encourage domestic energy generation, Davenport adds, is to focus on community engagement. She picks out Adam Twine's work with the Westmill Wind Farm Co-operative as a particularly good example of this. The surrounding community around the farm, which is a supplier of Good Energy, invested in it in its early stages, and now reap the benefits of producing clean, locally-sourced power.

"Not all communities will want to own their wind farms, but they might want to buy the power from them at a better rate and they may want to get some kind of additional benefit for the community", Davenport says.

"I think we need to move away from just signing the project with the local landowner when you want to develop a wind farm, to go and sign a contract effectively with the local community that brings value back as a result of having the wind farm or the solar farm or the renewable energy power station in their mix."

However, not all communities can afford the investment. But Davenport insists that this doesn't mean they can't still benefit from renewable energy, saying that Good Energy is working on developing a "flexible model" whereby those communities that do want to invest can get some form of investment, and those communities that simply want to buy the power off the site can also do so.

Presenting people with the opportunity to invest in renewables is paramount to widespread adoption. But Davenport believes that a more

important point than this is actually speaking to someone who has taken the clean energy leap already.

"I think a lot of people are put off by new things", she explains. "Part of it is just about feeling confident that somebody else has done it and therefore it's going to be OK.

"There are people who have had solar panels on their roofs for years. These are the stories we need to tell to make people feel more comfortable. We do so many extraordinary things in our lives if you think about it: we get in a car, we get on a train and we get on a plane. We feel terribly comfortable doing all these, in a way, highly risky activities. Yet we feel very uncomfortable putting a solar panel on a roof which isn't going to move or go anywhere and is a relatively low-risk situation. This is because it's not normalised enough in society, and that's the point: renewable energy needs to become much more normalised."

STRONG ETHICS AND SATISFIED CUSTOMERS

Davenport's positive principles filter right through Good Energy's business model. And it shows. The company has won a number of awards since its inception, including being voted the most ethical electricity supplier in the UK by The Ethical Company Organisation for eight years running and topping the Which? Annual Customer Satisfaction Survey in February.

"I think part of that is because the company believes in what it does", Davenport describes.

"Most people who come and work for us are interested in what we're doing. Most of our customers when they're ringing up don't just ask us about their bills – they ask us about renewable energy, the Renewable Heat Incentive, feed-in tariffs and so on. So first of all, our guys on the phone get asked fantastically diverse questions which makes it more interesting for them, and secondly they're really interested in answering the questions.

"So that combination means that customers' experience when they speak to the company is a positive one, and I think that's why we've come top. That, and also the fact that we've had relatively stable prices. The thing that tends to drive complaints and problems is when you get lots of price changes."

"RENEWABLE ENERGY NEEDS TO BECOME MUCH MORE NORMALISED IN SOCIETY"

ALL EYES ON A SUSTAINABLE FUTURE

So what's in store in the future for Good Energy? After joking that she should simply "take over one of the big companies", Davenport says, "The dream really is to set the blueprint of being an investable vehicle for renewable energy in the UK, and to transform from within a market contribution that is currently only just into double figures to a much larger percentage – 50%, maybe even 100%."

It's going the right way about it, too. All the statistics surrounding the UK's energy market read incredibly positively for Good Energy, especially when it comes down to fuel mixes. Whereas other suppliers might have a varied portfolio consisting of coal, gas, nuclear and renewables, the only column that has any data in whatsoever on Good Energy's part is renewables. And being the first company in the UK to boast an entirely renewable portfolio, its innovation and market influence is clear to see.

In Juliet Davenport, Good Energy has a powerful CEO whose refusal to sit back and do nothing is an inspiration to us all. Her numerous awards and tributes, including an honorary doctorate for her contribution to renewable energy, point to tireless dynamism and determination in setting a blueprint for the industry's future.

In Good Energy, individuals will find a competitive, customer-orientated company that is succeeding in its attempts to change the marketplace for the better, and not only supplies renewable energy, it specialises in it.

And finally, in renewable energy lies a potentially game-changing opportunity to revolutionise economic prosperity, leading to a more sustainable future for the planet and its people.

The question is; will you join it for the ride?

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HARNESSING THE POWER OF A COMMUNITY

IN JUNE 2008, AFTER A 12-YEAR PLANNING PROCESS, FIVE WIND TURBINES STARTED SPINNING AT WESTMILL WIND FARM. OWNED AND FUNDED BY 2,300 MEMBERS, MANY FROM THE SURROUNDING COMMUNITY, IT'S A STUNNING EXAMPLE OF LOCAL SUSTAINABILITY. B&GT CAUGHT UP WITH ADAM TWINE, THE DYNAMIC FOUNDER BEHIND THE TRULY INSPIRATIONAL PROJECT.

There are a few moments in life when one feels a true sense of pride, achievement and glory. For Adam Twine, it'll be difficult to beat the day that five wind turbines went live at his farm near Watchfield, South Oxfordshire. They were the result of over a decade of planning battles, but more importantly, were evidence of genuine community spirit.

The five turbines, which stand in formation on a disused RAF runway in the Vale of White Horse, have 2,300 owners – each of whom shared Twine's passion enough to invest an average of £2,000 into the development. Westmill is therefore the largest community-owned wind farm in the UK.

"I was looking at the resources on the farm and thought that farming was going to get tougher as we go forwards, so I was thinking about the resources and what I could do", says Twine, when asked about his inspiration behind setting up the co-operative.

"I looked at how I could integrate some of the environmental campaigning into my working business, rather than just doing it on the side, and I looked at what we were doing about energy, and what I could do about it. I was lucky enough to make various connections and pressed on from there.

And so, in the late '90s, he began planning Westmill Wind Farm. He was adamant that the surrounding community should be able to benefit from such a project, so founding it as a co-operative was seen as the most appropriate way forward.

"If I'm going to fly any flag, it's going to be for community ownership", he says, proudly.

"It's a no-brainer to me that still a lot of people don't get. Enabling community ownership feels like a really sound way of enabling local people, if they're able and want to invest in it, to get their pockets back, so that all the money isn't disappearing to shareholders around the world.

"Having the opportunity to own and generate their own

> **"MOST PEOPLE IN PRINCIPLE ARE IN FAVOUR OF RENEWABLES AND MOST PEOPLE WHEN IT COMES DOWN TO IT BEING IN THEIR BACKYARD, ARE ACTUALLY OK WITH IT"**

electricity locally is fantastic, and being paid for it is a really good way of people engaging with the climate change debate, and getting a sense of the issues which we're all facing and are very important."

A video on the co-operative's website proves just how passionate each of Westmill's shareholders are about the project. One man, Dennis Belcher, describes his excitement in seeing the turbines being constructed, saying how he stayed up all night to watch the work being done. Another, John Willmer, talks about the "viability" of wind power, based on the vast resources available to the UK. However, the most poignant testimonial in the video comes from Derek Quinn, who said, "If my grandchildren were ever to say to me, 'Why on Earth did you let the world get like this?' I can say, 'I tried'".

The 2,300 owners of the Westmill Wind Farm Co-operative helped raise around £4.5m to fund the development. The electricity from three of the five 50m-high turbines – each of which have a generating capacity of 1.3 megawatts – is sold to Good Energy, the UK's only 100% renewable power supplier, which supported Twine through the financing process. The electricity from the remaining two turbines goes to Co-operative Energy.

The fact that it took so long for the wind farm to actually go live, though – over 12 years in total – is a telling reminder of the notorious, and usually unjust, opposition that wind power receives.

"The fact that I was local, and the fact that it was going to be community-owned, didn't cut any ice with anybody because it was too wacky a concept – nobody understood what that meant", explains Twine.

MARK CHILDS

"Some of the opposition we received was from people who were genuinely anxious, and that's entirely reasonable. Some people do find turbines aesthetically hideous or certainly very disturbing and out of place, and that's reasonable enough, too. You're never going to change those attitudes. The stuff which is more complicated is the arguments that say the turbines weren't very well financed, and although the political machinations were very keen that we pressed on through local planning rather than took it out to appeal, but we kept it in there and in the end, although it bounced around in lots of different directions, it came through."

The people in opposition of the development, though, Twine says, were certainly in the minority.

"We did a lot of work on local response and the acceptability", he states.

"My experience is that most people in principle are in favour of renewables and most people when it comes down to it being in their backyard, are actually OK with it. They might have reservations, and they might be swayed by some of the arguments going around, but in the end, most people think that it's alright and that they've got bigger things in their life to worry about."

With the Westmill Wind Farm having been in operation for


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NEIL MAW

four years now, Twine has set his sights on another similar project – this time focused on solar power. The Westmill Solar Co-operative share offer was launched on June 23 this year, and could become the largest community-owned solar power station in the world once it is able to raise the £4m equity needed to purchase it.

Like the wind co-op, individuals can invest from £250 to £20,000 in the project, which will be funded by a 25-year feed-in tariff contract from the government. Westmill predicts the average return over the 24-year investment period to be 11% a year. A total of 21,000 panels have been installed at the site, beside the wind turbines, and the farm will produce 4.8 gigawatt hours of power every year – enough to provide electricity to 1,400 local homes.

"The exciting bit about is as far as I can see", Twine begins, "is that solar is generally less contentious than wind.

"We will be the only solar farm in the UK that is doing community ownership at this moment in time. Hopefully there will be more – I really hope so. We've got the successful Westmill Wind Farm model now, so people can see what it is, can see it works, and that it does what it set out to do. I really hope that we're going to get a much more significant amount of immediately local ownership. I think it's a really exciting opportunity The share offer closes on July 31, and if it's oversubscribed, priority will be given to local members."

WESTMILL WIND FARM CO-OP

The Westmill Solar Co-operative began as a concept two years ago. After applying for planning permission in December 2010, consent was given three months later in March. Construction of the wind farm began in May last year. Whilst trying to source funding for the co-op, the developers, Low-Carbon Solar and the Westmill board came into contact with Cheshire-based company, Blue Energy [http://www.blue-energyco.com/], which had been hoping to do a rooftop industrial large-scale project, but hadn't managed to secure any planning permission. Realising that each had something that the other one needed, Low-Carbon Solar and Blue Energy shook hands and the panels were swiftly installed, with a call option put in place for Westmill Solar Co-operative to purchase it back if it could raise sufficient capital within the year.

Westmill's two community-owned renewable energy projects are proof that communities can do incredible things towards the UK achieving its various climate change targets. We have arguably the most plentiful wind resources in Europe, yet we're not even close to becoming the European leader in the technology. Community-led projects like Westmill are vital in ensuring this isn't the case.

"There's clearly the climate change argument, and also energy security", concludes Twine, when asked why renewable energy is so important.

"And then I guess I'd say not just renewables, but a community-owned project is an important and exciting opportunity that we should all be getting to grips with. A couple of weeks ago, for two days, over 50% of the whole of Germany's electricity was supplied by solar PV. Most of it is from peoples' roofs, not even from large solar farms. It is owned, it is embedded, it is decentralised, and it's just a different and exciting model going into the 21st century."

WWW.WESTMILL.COOP
WWW.WESTMILLSOLAR.COOP
WWW.GOODENERGY.CO.UK

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WHY WE SWITCHED TO GOOD ENERGY

BLUE & GREEN TOMORROW CHATS WITH EMILY LEADBETTER, A GOOD ENERGY CUSTOMER, WHO DESCRIBES HER FAMILY'S EXPERIENCES WITH THE UK'S FIRST AND ONLY 100% RENEWABLE ELECTRICITY SUPPLIER.

How long have you been a Good Energy customer and what encouraged you to switch?
I've been a customer for about 10 months. The reason I switched was because I wanted to power my house with renewable energy and Good Energy was the only company that were 100% renewable.

What were the main drivers in switching to a completely renewable energy supplier, and did you consider any other companies to switch to?
The world's resources are finite, especially oil and gas. I believe that every person needs to do what they can to preserve them. I did look at other companies, I can't remember their names now, but none came close to Good Energy's use of renewables.

What has your experience been like in terms of the service received from Good Energy?
The staff are always polite and helpful. I like the news leaflet it sends with each bill.

In your opinion, what advantage does Good Energy have over mainstream suppliers?
It supplies renewable energy. At some point other suppliers will run out of gas! But with the nature of supply and demand, before that happens, their prices will become astronomical.

What's more important for you: the source of your energy or the price of your bill? And does Good Energy satisfy both?
The source of my energy is the most important thing. My bill also matters of course! They do satisfy both.

What would you say to someone to encourage or inspire them to make the switch to renewable energy?
Lighten your footprint on the Earth. Imagine when you turn on a light it is powered by the wind. Recycling is more time consuming and I know you do that. Take the leap and find another reason to feel good about yourself.

In one sentence, describe Good Energy.
It powers my house using energy that doesn't cost the Earth.

WWW.GOODENERGY.CO.UK

CAPITALISING ON THE UK'S RESOURCES:

THE ATTRACTIVENESS OF RENEWABLES INVESTMENT

CHARLES HENDRY MP, MINISTER OF STATE FOR ENERGY AND CLIMATE CHANGE, TELLS BLUE & GREEN TOMORROW ABOUT THE GOVERNMENT'S ROLE IN EMPOWERING A RENEWABLE ENERGY UPRISING.

What role do you see renewable energy playing in Britain's energy mix by 2020? We're very committed to seeing a major rollout of low-carbon electricity. The market reform proposals we're putting before parliament now are all designed to stimulate up to £100 billion of investment in the low-carbon sector. Renewables are a key part of that, alongside nuclear and carbon capture technologies. We've got legally-binding requirements that we need to get 15% of our energy and 30% of our electricity from renewables by 2020, and we want to see investment in a wide portfolio of different technologies to help to deliver that. People who are high net-worth and are keen to involve themselves in the low-carbon sector will find this an attractive place to be.

While we've discovered plentiful supplies of gas, it remains a finite fossil-based resource, when we have a limitless supply of clean, renewable energy. In the current period of austerity, does it make sense to divert scarce research and development budgets to a finite and polluting source of energy? In particular when you consider that the global investment in renewable energy has overtaken global investment in fossil fuel energy. The North Sea has been producing oil and gas now for 40 years, and with policies designed to enhance the rate of extraction, it can provide a very strong amount of material for the next 30 or 40 years. That's very much in our national interests that we do so. That's worth well over £1 trillion if we get the right policies in place to encourage the development of those resources. We shouldn't lose sight of our national interest in that respect and so we continue to focus on that. But we do also want to see investment in low-carbon technologies.

One of those potentially is carbon capture and storage, which can be linked to gas plants. And so that would make it a clean, long-term source of generation. There's also a very strong case right alongside that for investment in renewables, which have an added advantage because we know the resource is free, infinite, it may be

> **"WE RECKON THAT BY 2020, WE'LL MEET THE TARGET OF 30% OF OUR ELECTRICITY COMING FROM RENEWABLES, AND 15% OF OUR TOTAL ENERGY. THAT'S CERTAINLY SOMETHING THAT WE CAN ACHIEVE"**

unpredictable but it's there for all time, and we see this as being a very attractive area to invest in when the UK has some of the best renewable resources anywhere in Europe.

If the UK has some of the best resources in Europe, why then are other European countries leading the way in a lot of renewable technologies? In many areas, we are now leading the way. We've got more offshore wind deployed here than anywhere else in the world. The changes we're proposing on tidal and wave power will make this an absolute magnet in the UK for people to come and invest in those emerging technologies. We need to look at the technologies where we have a particular strength, and where we want to see much more investment. An enormous amount of the £100 billion of investment is in the renewables sector. That shows an extraordinary commitment from government to driving forward the sector and it also shows a very strong investment opportunity.

Putting aside issues of climate change, the burning of fossil fuels is known to contribute to air particulates that damage public health. Are the Department of Health and the Department of Energy and Climate Change looking at the relationship between the relative cheapness of fossil fuels and the high cost of public health? We look at the cost of different technologies, we look at the emissions associated with them, and if there are health issues that need to be associated with them, then the Department of Health would lead on those. We have been leading Europe certainly in terms of cleaning up

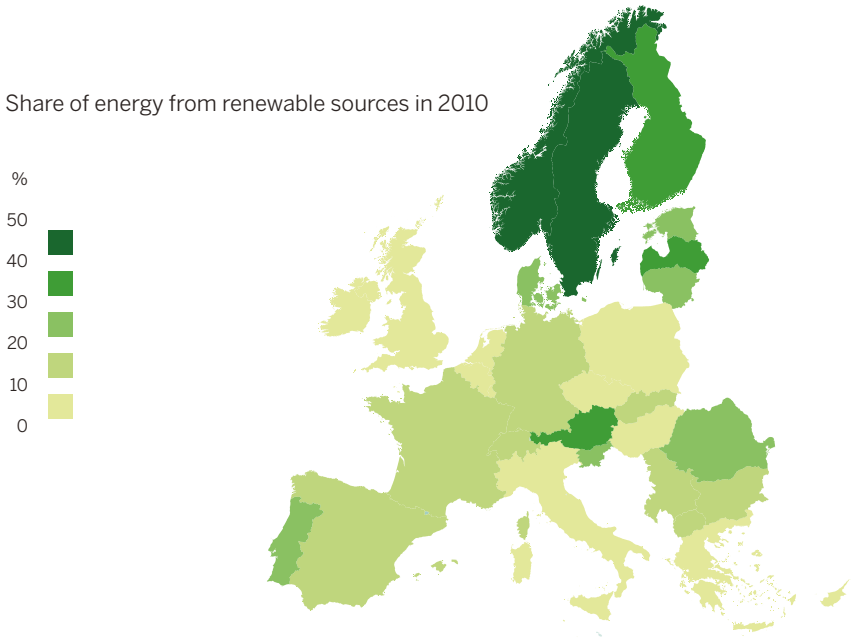
our power stations, where there are very strict rules. We're going to be seeing the closure of about a third of our coal plants over the course of the next few years as we tighten up on emissions standards, so Britain is really in a very strong position in this in terms of the changes that we're seeing, and we care very strongly about the environment and health, and we also need to get the investment to keep the lights on into the future. So looking at a balanced portfolio is an important part of this process.

One of your areas of responsibility is nuclear policy, safety decommissioning and non-proliferation. If we commit to the next generation of nuclear reactors, how do we address the issues of future generations cleaning up nuclear waste and how do we maintain the moral high ground in asking Iran not to develop its own civilian nuclear capability? We have no objection to Iran developing civil nuclear power. Our concern is about them using it to develop enriched plutonium which can be of a weapons grade. Certainly, nuclear power we see as an important part of the low-carbon mix. We believe the UK's security supply is benefitted by having a portfolio of different technologies, and nuclear is the lowest cost, large-scale of low-carbon generation, so we think it should be a part of the mix. We said we weren't going to subsidise it, and we're keen to see new investment coming forward. New reactor designs are built with decommissioning in mind. We've got a major issue of the old waste legacy to resolve, but the new reactors are key part of our future energy mix.

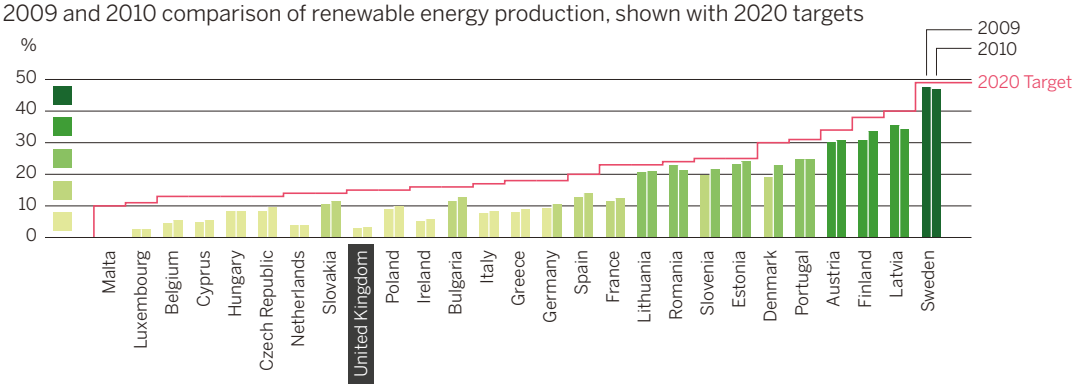
How would you answer the charge that the government is weakening its emphasis on green growth in favour of growth of any kind? We've been

RENEWABLE ENERGY IN EUROPE

HOW IS EUROPE DOING WITH INCORPORATING CLEAN SOURCES OF POWER INTO ITS ENERGY MIX? THIS INFOGRAPHIC COMPARES THE RENEWABLE ENERGY GENERATION OF 27 EU COUNTRIES WITH THEIR 2020 TARGETS.



2009 and 2010 comparison of renewable energy production, shown with 2020 targets



Source: EurObserv'ER
bit.ly/energy_mix2

very clear that we want to see a major investment in low-carbon technologies, that if you look at the opportunities for offshore wind, then that is tens of billions of pounds of investment, with many, many thousands of jobs. If you look at the proposals we've made on the banding review for the Renewables Obligation, which is the main mechanism for supporting renewables, then we're looking at how we can give much greater support to emerging technologies like tidal and wave power.

We set up the Green Investment Bank which has £3 billion of core funding from the outset. Alongside that, we set up a body called UK Green Investments to start investing many millions this year, and then right across the spectrum, we've been very keen indeed to secure much greater levels of investment in the sector.

What's the ultimate aim of the Green Investment Bank and how far do you think it can go? The purpose of the Green Investment Bank is to make a step change in our ability to make investment in green technologies. The choice has to be made as to whether you make a big impact in a major area, or whether you do lots of small steps. We believe the best way in the early days is to have a significant impact to identify a number of key areas which you can leverage in hundreds of millions of pounds from other investors alongside it. The whole approach of this is to make a real difference. It's the first of its kind in the world dedicated to green investment in this way.

> **"BRITAIN IS REALLY IN A VERY STRONG POSITION IN TERMS OF THE CHANGES IN ENERGY THAT WE'RE SEEING"**

£3 billion upfront is a very significant commitment from government, but we have to establish priorities and see where it can make the biggest difference. It shouldn't be just replacing traditional forms of finance, and investors should see a very strong signal indeed that where the Green Investment Bank decides to put significant funding, then that will be an attractive area for them to invest as well.

Could you ever envisage a situation where the UK was 100% powered by renewables? My focus is on what we need to get to in the course of the next decade or so. We reckon that by 2020, we'll meet the target of 30% of our electricity coming from renewables, and 15% of our total energy. That's certainly something that we can achieve. In terms of after that, I think we need to be looking at a broad range of low-carbon technologies, so I think that there is a strong role for renewables, but it's alongside nuclear and carbon capture and storage.

We're also looking at a more interconnected world and how we can provide back-up to intermittent wind from geothermal power in Iceland, hydro power in Norway and wind power in Ireland. We're looking it in a much more cohesive, big picture way than before.

Any final comments that you would like to make to our readers? Renewable energy is a major growth area. Not just for the UK, but for Europe and for the world as a whole. We're seeing enormous amounts of money coming into this sector, it's growing at a much faster rate than economies overall, so it's not just about cleaning up the planet, which we need to do, it's not just about energy security; this is an outstandingly good investment opportunity. Through the market reform proposals that we're putting in place, we're ensuring that this becomes an even more attractive place for people to invest in this sector.

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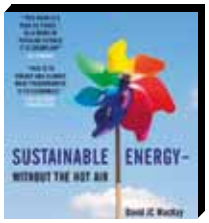
Italy – TA049 – Centrally located Tuscany is set within a gentle hilly region known for its vineyards and olive groves. Therefore stay in a rustic farmhouse or a cosmopolitan town house and enjoy the Mediterranean fayre and of course the wine.

FURTHER READING

IF BLUE & GREEN TOMORROW'S GUIDE TO LIMITLESS CLEAN ENERGY HAS WHETTED YOUR APPETITE FOR THE SECTOR AND YOU WANT TO READ MORE, WE RECOMMEND THE FOLLOWING EXCELLENT BOOKS.

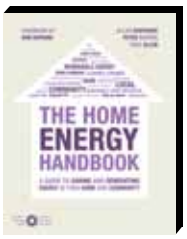


Sustainable Energy – Without the Hot Air (by David JC MacKay)

Described as the "most important book on this topic for the next 20 years", MacKay's *Sustainable Energy – Without the Hot Air* seeks to highlight how we can be sensible with energy. It fulfils this objective excellently. And what's more, it's even available to download for free at **www.withouthotair.com**

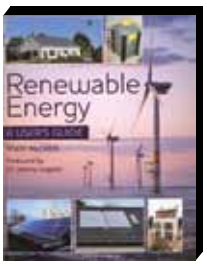
Ten Technologies to Fix Energy and Climate (by Chris Goodall)

Split into ten chapters, each tackling a different game-changing technology, *Ten Technologies to Fix Energy and Climate* is the 2009 follow-up to Goodall's 2008 book, *Ten Technologies to Save the Planet*. It says how wind, solar, electric cars and seven more sustainable technologies can help reduce emissions.



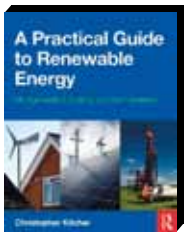
The Home Energy Handbook: A Guide to Saving and Generating Energy in Your Home and Community (by Allan Shepherd, Paul Allen, Peter Harper, Nicky Ison and Jarra Hicks)

Written by a team of researchers at the Centre for Alternative Technology, *The Home Energy Handbook* is a bible for individuals that want to become more energy efficient or want to use renewable energy to power their homes or communities. See page 8 of this guide for more information.



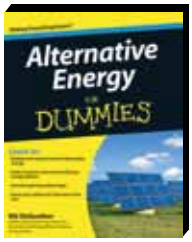
Renewable Energy: A Users' Guide (by Andy McCrea)

In this book, renewable energy consultant Andy McCrea emphasises the need for an increased adoption of clean technologies to produce energy and electricity, and highlights the important role they have to play in helping to meet carbon dioxide reduction targets.



A Practical Guide to Renewable Energy: Power Systems and their Installation (by Christopher Kitcher)

Essential reading for beginners, academics or for people who want a career in renewable energy. Kitcher's *A Practical Guide to Renewable Energy* explores and introduces micro-generation systems and offers up an abundance of useful nuggets of information relating to generating clean power.

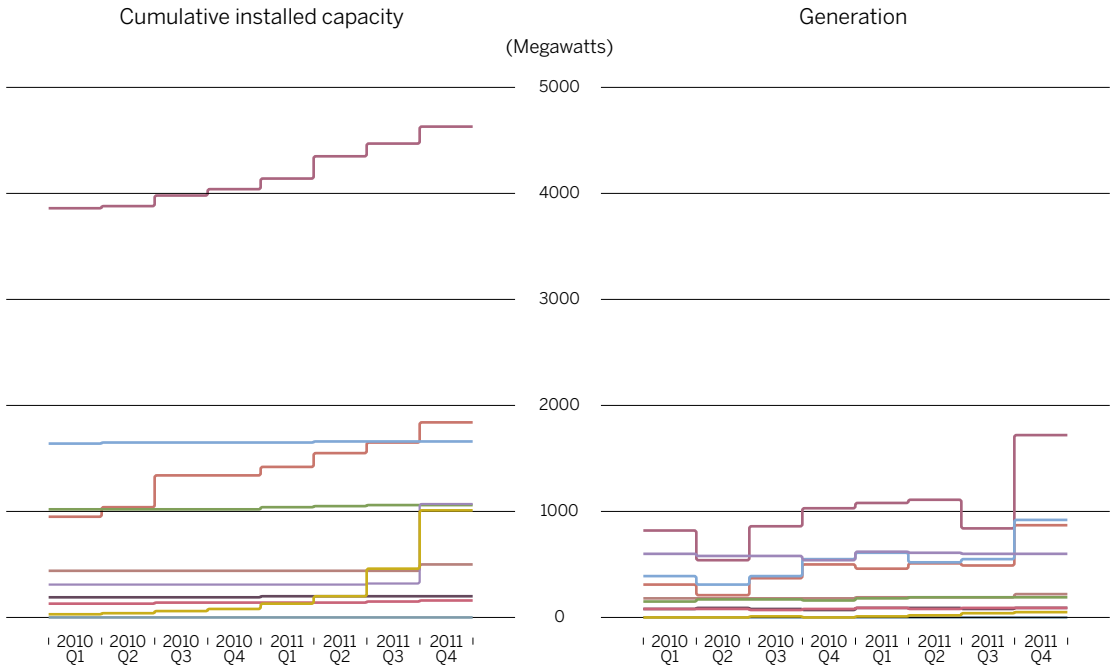


Alternative Energy For Dummies (by Rik DeGunther)

As with all the instalments in the For Dummies series, Alternative Energy For Dummies is a plain-English guide to renewable energy. "Get the truth about alternative energy and make it part of your life", urges the book's official website. You heard them.

RENEWABLE ENERGY IN THE UK

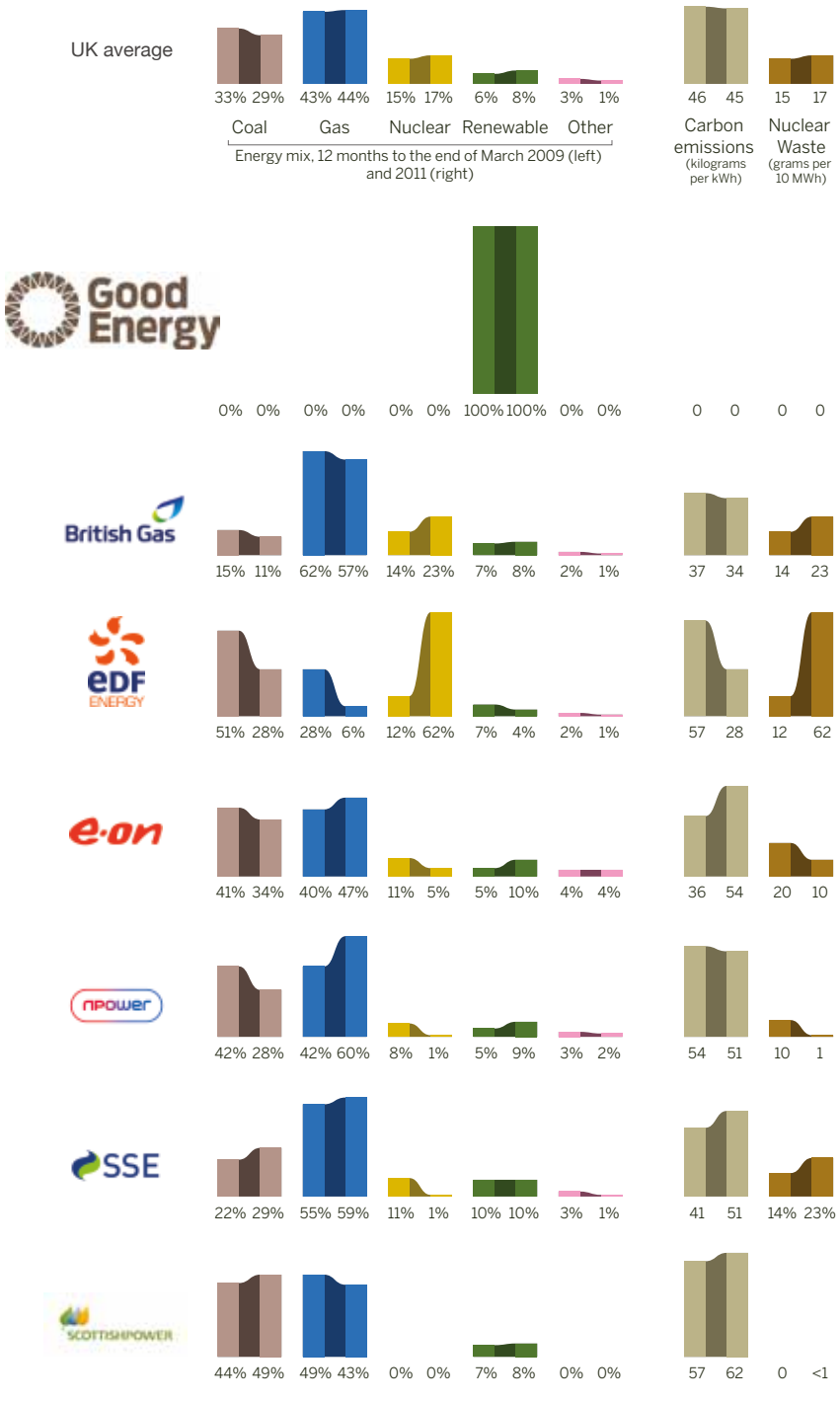
WE VISUALISE THE ENERGY SHARE OF ALL THE UK'S RENEWABLE TECHNOLOGIES BY QUARTER BETWEEN 2010 AND 2011.



Source: Department of Energy & Climate Change
bit.ly/renewables_2011

HOW CLEAN IS YOUR ENERGY SUPPLIER?

DATA RELEASED BY CONSUMER FOCUS ANSWERS THE ABOVE QUESTION, AND HIGHLIGHTS THAT SOME INTERESTING FUEL MIX SHIFTS WEWRE MADE BETWEEN 2009 AND 2011.



Source: consumerfocus.org.uk
bit.ly/suppliers_mix

ETHICAL IFA DIRECTORY

Firm: Barchester Green
Coverage: Wiltshire
Contact: Bernard Lovesey, Tim Bradford or Andrew Faulkner
Address: Barchester House
45-49 Catherine Street
Salisbury SP1 2DH
Phone: 0800 328 6818
Website: barchestergreen.co.uk
Email: info@barchestergeen.co.uk

Firm: Bromige
Coverage: East Sussex
Contact: Christian Thal-Jantzen
Address: 22 Hartfield Road
Forest Row
East Sussex RH18 5DY
Phone: 01342 826 703
Website: bromige.co.uk
Email: invest@bromige.co.uk

Firm: Ethical Futures
Coverage: Edinburgh
Contact: Julian Parrott
Address: 9 Mansfield Place
Edinburgh EH3 6NB
Phone: 0845 612 5505
Website: ethicalfutures.co.uk
Email: invest@ethicalfutures.co.uk

Firm: Equity Invest
Coverage: Wimbledon
Contact: Richard Hunter
Address: 60 High Street
Wimbledon Village
London SW19 5EE
Phone: 020 8879 1273
Website: equityinvest.co.uk
Email: advice@equityinvest.co.uk

Firm: The GAEIA Partnership
Coverage: Manchester and Stockport
Contact: Helen Tandy
Address: 1 The Arcade
829 Wilmslow Road
Manchester M20 5WD
Phone: 0161 434 4681
Website: gaeia.co.uk
Email: office@gaeia.co.uk

Firm: Lighthouse Impact
Coverage: Derbyshire
Contact: Ash Rawal
Address: 132 Station Road Mickleover
Derbyshire DE3 9FN
Phone: 01332 517 120
Website: ethicalinvestments.uk.com
Email: arawal@lighthouseifa.com

Firm: The Ethical Partnership
Coverage: New Forest and Channel Islands
Contact: Jeremy Newbegin

Address: 180 Woodlands Road
Woodlands
Southampton SO40 7GL
Phone: 08456 123 411
Website: www.the-ethical-partnership.co.uk
Email: jeremyn@the-ethical-partnership.co.uk

investingethically

Firm: Investing Ethically Ltd

Coverage: To be confirmed
Contact: Lisa Hardman

Address: 33 Whiffler Road, Norwich,
Norfolk, NR3 2AW
Phone: 01603 309020
Website: www.investing-ethically.co.uk
Email: contactus@investing-ethically.co.uk

stewart
investment planning

Firm: Stewart Investment Planning
Coverage: Bristol & North Somerset
Contact: Martin Stewart

Address: 1 The Courtyard
Leigh Court
Bristol
Phone: 01275 371900
Website: stewartinvestmentplanning.co.uk
Email: sip@stewartinvestmentplanning.co.uk

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Firm: Smythe & Walter chartered financial planners
Coverage: London & Kent
Contact: Benjamin Walter or Lee Smythe
Address: 2nd Floor Berkeley Square House
Berkeley Square London W1 6BD
Phone: 020 7887 1989
Website: smytheandwalter.co.uk
Email: lee@smytheandwalter.co.uk
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Image: 5kW solar PV array
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Fulvio Conti, CEO and General Manager, *Enel S.p.A* and President, *EURELECTRIC*
Tony Hayward, CEO, *Genel Energy*
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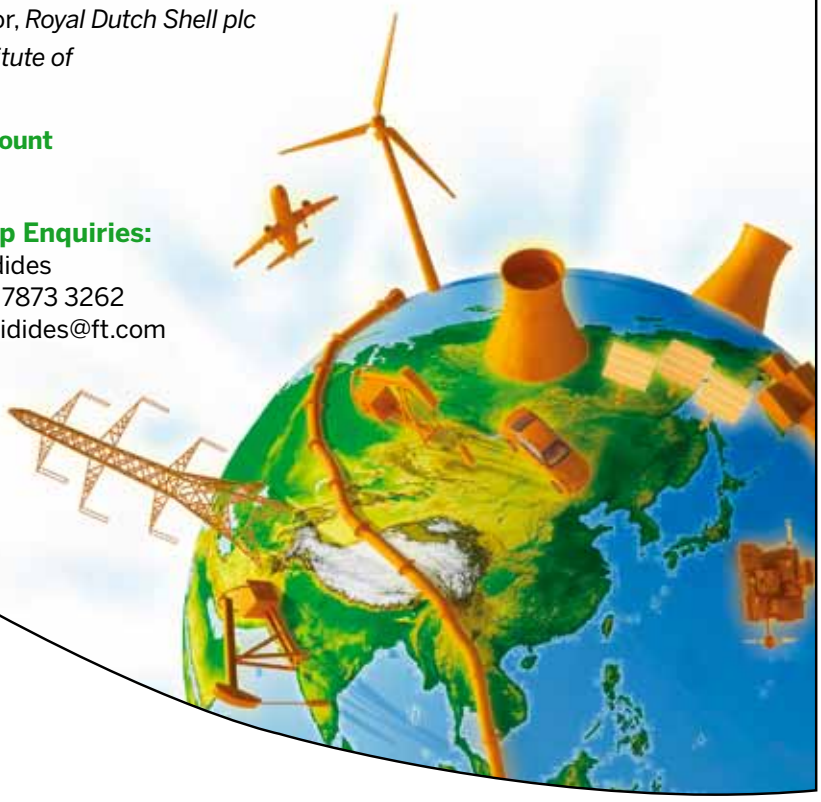

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