PRIVATE SECTOR MOVES TO THE FORE AS GREEN INVESTORS

Business is in the lead in driving the green agenda, as government's capacity in the greening of the environment appears to wane. Up to now, companies and public bodies have worked very closely together, supporting each other's projects. Government indeed has been a key funder of environmentally progressive schemes. We have only to look at the very important Green Investment Bank for evidence of creative state initiatives in the UK to drive forward environmentally beneficial schemes.

It is quite possible, indeed likely, that politicians still have goodwill towards the environmental project, but they are postponing making the massive expenditure it requires to fund projects that have more immediate attractiveness in political terms. They have lowered the priority of the environment as a destination for scarce public money. There will always be those who continue to deny that global warming is man-made (and therefore reversible by our endeavours).

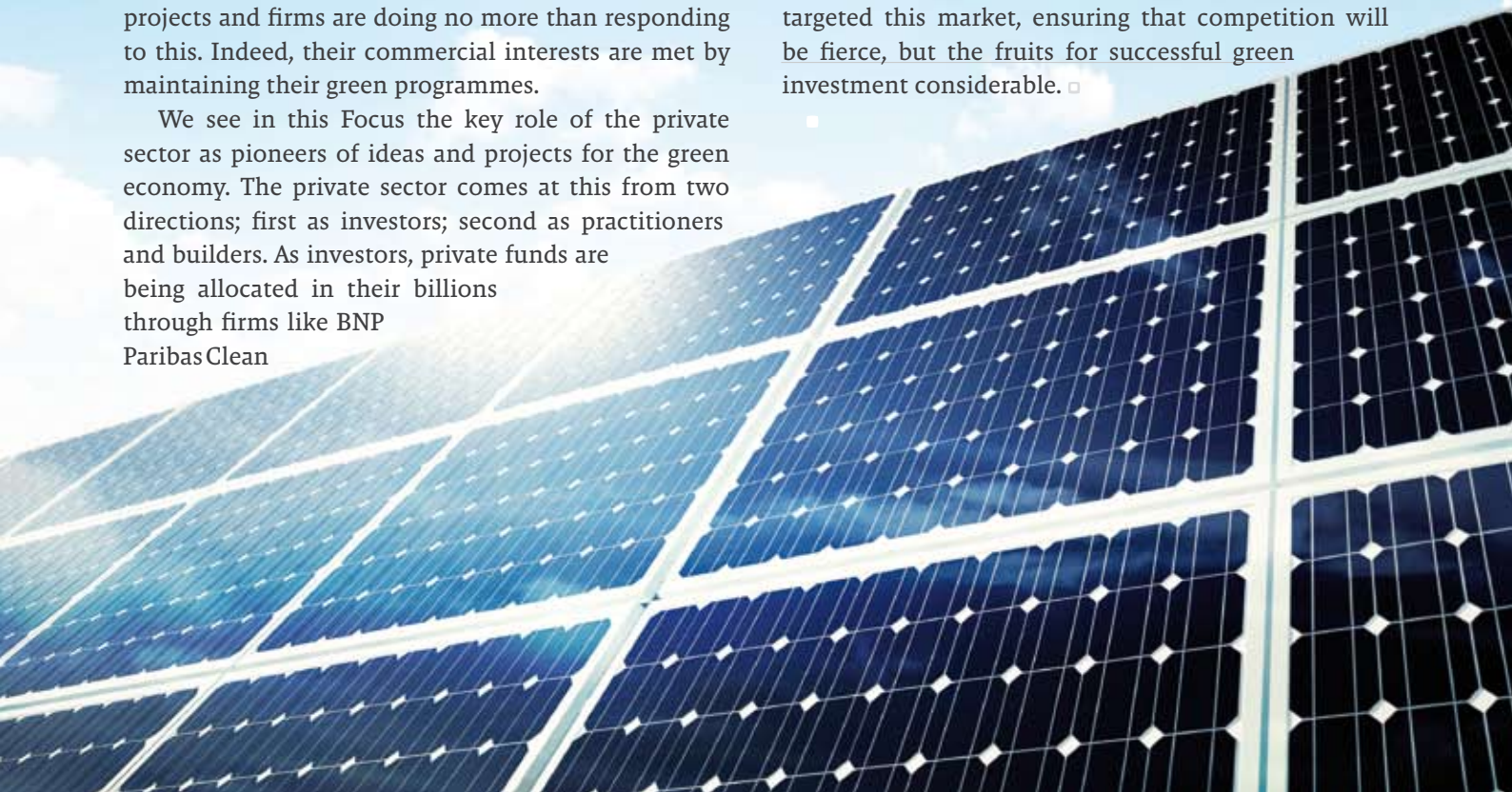
Meantime, the great majority of private companies remain committed to their environmental projects. Two factors will be driving these. First, they have made long-term financial commitments to such projects, from which they cannot retreat. Second, it will be argued that customers are pressing for environmentally sound projects and firms are doing no more than responding to this. Indeed, their commercial interests are met by maintaining their green programmes.

We see in this Focus the key role of the private sector as pioneers of ideas and projects for the green economy. The private sector comes at this from two directions; first as investors; second as practitioners and builders. As investors, private funds are being allocated in their billions through firms like BNP Paribas Clean Energy Partners to energy efficient projects.

But firms are putting their own funds into massive green projects. Veolia Environmental Service's Magpie project described in our Focus shows how environmental requirements can stimulate both pioneering industrial work and have a strong commercial rationale. Vinci Construction Grands Projets has likewise made environmental elements an intrinsic part of their building of the Lee Tunnel, an important project, which in its own right, has an overwhelming environmental rationale. Consumers will increasingly turn to experts such as Faseo Energy and their pioneering technology for making houses more energy-efficient as regulatory and cost constraints increasingly reflect true costs.

We also see how Eurostar has turned environmental issues to its commercial advantage by regularly reminding customers that travelling by train expels a tenth of the CO_2 emissions compared to travel by air. Likewise energy generated by nuclear fission puts a fraction of CO_2 emissions into environment, compared to coal and gas fired power stations, says EDF Energy.

There may be fewer public subsidies in future for firms that service the environmental space. But they can be reassured there is a pressure from the marketplace for such products. They will also see that China has targeted this market, ensuring that competition will be fierce, but the fruits for successful green investment considerable.



Green Timeline

1970
UK Prime Minister Edward Heath creates the office of Secretary of State for the Environment

1956
Norman Phillips develops the first mathematical model to predict seasonal patterns in the troposphere

1920
Arthur Cecil Pigou, an English economist, mentions the 'polluter pays principle' in his work *The Economics of Welfare*

1972
The first UN Conference on the Human Environment, held in Stockholm, Sweden, marks a turning point in international environmental politics

1995
British Environment Act mandates a non-departmental Environment Agency, which starts work the following year

1997
160 nations meet in KYOTO, Japan, to limit CO_2 emissions in developed nations

2009
Copenhagen hosts the UN Climate Summit. This comes two years after leading figures in business and science joined together to form the Copenhagen Climate Council

2007
Instigated by Nicolas Sarkozy, Le Grenelle Environnement is a multi-party debate defining actions to tackle environmental issues

2006
British Antarctic Survey reports CO_2 levels 'substantially higher now than at any time in the past 800,000 years'

2010
Green Party wins its first seat in the British Parliament when party leader Caroline Lucas is elected MP for Brighton Pavilion

2010
The European Commission launches the 2020 Strategy and sets the following targets: greenhouse gas emissions 20% lower than 1990, 20% energy from renewables, and a 20% increase in energy efficiency

2010
The United Nations Climate Change Conference takes place in Cancún, Mexico

Future Key Events

2011
The United Nations Climate Change Conference takes place in November and December in Durban, South Africa

2012
Rio Earth Summit, referred to as the Rio+20 or the Earth Summit 2012 due to the initial conference held in Rio in 1992. The objectives of the Summit are: to secure renewed political commitment to sustainable development; to assess progress towards internationally agreed goals and to address new and emerging challenges.

Focus Contents

Part one: Overview of the green economy

Taking the Lead: The Chamber's Climate Change Forum

The pressure for businesses to raise green issues to the top of their agendas is unabated, despite concerns about wider economic issues. Here, Richard Brown, Chairman of Eurostar International and of the French Chamber's Climate Chamber Forum, outlines the seriousness of the issue

Richard Brown

Tacklingclimatechange may be, temporarily, off the political agenda, but it is still very much on most corporate radars. There is a huge amount of change underway, with large investments planned in new technologies, in recycling systems, and in improving industrial and business processes to increase energy and resource efficiency. Businesses are increasingly ahead of governments in taking practical action to tackle climate change.

What is driving all this? For many businesses, it is quite simply their customers. Most supermarket groups, for instance, have extensive carbon reduction and environmental programmes in order to satisfy more environmentally conscious consumers and differentiate themselves competitively. Even if only 10 per cent of consumers are "shopping around" for greener products and services, in a competitive market, a 10 per cent swing in customer demand can have a huge impact on business results. The supermarkets are in turn leveraging their buying power as customers to drive carbon reduction and better environmental practices right through their extensive supply chains.

In our case at Eurostar, it was our business customers who required and inspired us to develop our "Tread Lightly" programme to reduce our carbon footprint and tackle other, more visible waste streams by reuse and recycling.

Many businesses see the transition to a low-carbon economy as a good business opportunity. This is certainly the case for a number of the founder members of our Forum. Renault is determined to ensure it is a leader in the electric car market. EDF sees great opportunity to apply its experience to the next generation of nuclear power plants in the UK. Veolia is applying its longstanding skills in waste management, to offer increasingly sophisticated recycling and recovery systems. There are many other examples.

For other businesses, the drivers are more defensive. High energy and commodity prices are forcing an increasing emphasis on energy and resource efficiency to keep costs down. Most businesses have found they can improve their process efficiency and save costs, and at the same time reduce their environmental impact.

But in relatively few businesses is government policy and regulation the main driver. This may change in the future as the EU Emissions Trading Scheme is extended to many more sectors, and policies such as the UK's Carbon Reduction Commitment kick in. It will be important to ensure government initiatives reinforce, not hinder, what businesses are already doing on carbon reduction.

In short, there is a lot going on right across the business world. Many businesses are reasonably aware of what is happening in their own sector, via industry research organisations, trade associations and their trade press. But frequently, they are much less aware of what is happening in other sectors. This is an important gap which the Chamber's Climate Change Forum is aiming to fill – by sharing experience and progress between sectors, encouraging the cross-fertilisation of ideas and showcasing the inspiring work being done by individual companies to all Chamber Members. With its broad and diverse membership, and many leading companies from both France and the UK, the Chamber is uniquely placed to offer a broad comparative perspective, and cross–fertilise experience in what works best. It is also potentially well placed to make representations to either government on how policy can best reinforce the efforts businesses are making to reduce their carbon impact. ■

Different paths towards a common goal: UK vs. France

We need to move towards a more sustainable economic model, but whose responsibility is it? asks Simon Myers, CEO of Figtree, as he compares the British and French approaches to green economy

Despite the current financial crisis, there is widespread understanding at a consumer level in both the UK and France that we need to move towards a more sustainable economic model operating within the constraints of one planet for the good of all. The big questions are: how are we going to get there? Who is going to make this happen?

Both countries' approach to bringing about a more sustainable economy have a lot in common, both being mature economies, part of the EU and subject to the relevant environmental directives and laws. However, it is interesting to reflect on the differences and how they are influenced by French and British socio-cultural and political traditions.

For years in the UK, the change has been led by think-tanks and independent campaign groups such as Greenpeace, WWF, Friends of the Earth and Christian Aid. Vocal and relatively well funded, they have attempted to capture the imagination of the public as a means of putting pressure on UK government to take specific action. Recently, all the main supermarkets have been engaged in implementing (and celebrating) programmes that reduce their carbon footprint and introducing more sustainable practices (e.g. M&S Plan A).

This represents a British belief that no government can really be trusted to take the necessary action if left to its own devices. It will be up to individuals, consumers, us, and business. Many government announcements confirm this situation by seeking to find ways to get businesses and consumers to "share the burden". Leadership, in short, comes from below, not above.

In France, there seems to be a more confident state apparatus as well as a long list of global environment and energy business players – Veolia, GDF SUEZ, Schneider Electric and EDF are all pursuing a more technocratic approach to building a more sustainable economy. With a powerful engineering heritage and an arguably more powerful and confident state function, the answer lies not in getting consumers to change their behaviour, but in providing big and bold solutions. From an incredible railway infrastructure to nuclear plants, to electric cars, to strong government encouragement of "bio".

So, while Britain makes an emotional appeal to the individual to get involved, the French are busy taking huge collective decisions to produce the necessary change. Perhaps these different nuances make sense in that the UK is a more consumer and consumption-orientated society than France and therefore personal behaviour is an issue.

Both countries face the challenge of finding mass solutions, and to that end getting people to move from passive consumers to "consum-actors" who are part of change is a big part of a sustainable future. The most encouraging sign has been the rise of an entrepreneurial class determined to be "bright green" and use new business models and innovative approaches to shift consumption patterns. Here are two to cheer on: in France – Tristan Lecomte and www.altereco.com/fr, in the UK – www.goodenergy.co.uk led by Juliet Davenport. And my favourite in a tough sector with a radical business model – the People's Supermarket, set up by Arthur Potts Dawson, chef-turned-social business leader at www.thepeoplessupermarket.org.

Why don't you pop in, buy something and become a "consum-actor"? ■

Why the Green Economy?

Andrew ZP Smith, Senior Research Associate at the **UCL Energy Institute** speaks of the need for revolutionary changes to how we generate energy, and explains why the green economy leaves us better off

The Green Economy is worth hundreds of billions of pounds (euros/dollars) each year; it spans many sectors including the most fundamental ones of energy, food and water supplies, and in the last fifty years, it's gone from fringe to mainstream, growing in value and coverage each year. For example, in 2010, global investment in renewable power was €150bn and there are electric cars on the market that can outrun a Porsche.

But the Green Economy has been around for quite some time and its academic foundations, such as the "polluter pays principle", date back to the early decades of the twentieth century. However, more recently, the problems have become global in scale, and the solutions have required international co-operation, for example in banning the industrial production of some of the worst ozone-depleting chemicals. The next wave of problems and solutions dwarfs what has gone before, requiring revolutionary changes to how we generate electricity, how we heat our homes and offices, how we power our transport systems, how we manage our livestock and fertilise our crops. The economic risks (and opportunities) are orders of magnitude greater than what has gone before.

Over-investment in traditional sources of energy, such as oil, has led to under-investment in green substitutes

But how did we get to this state?

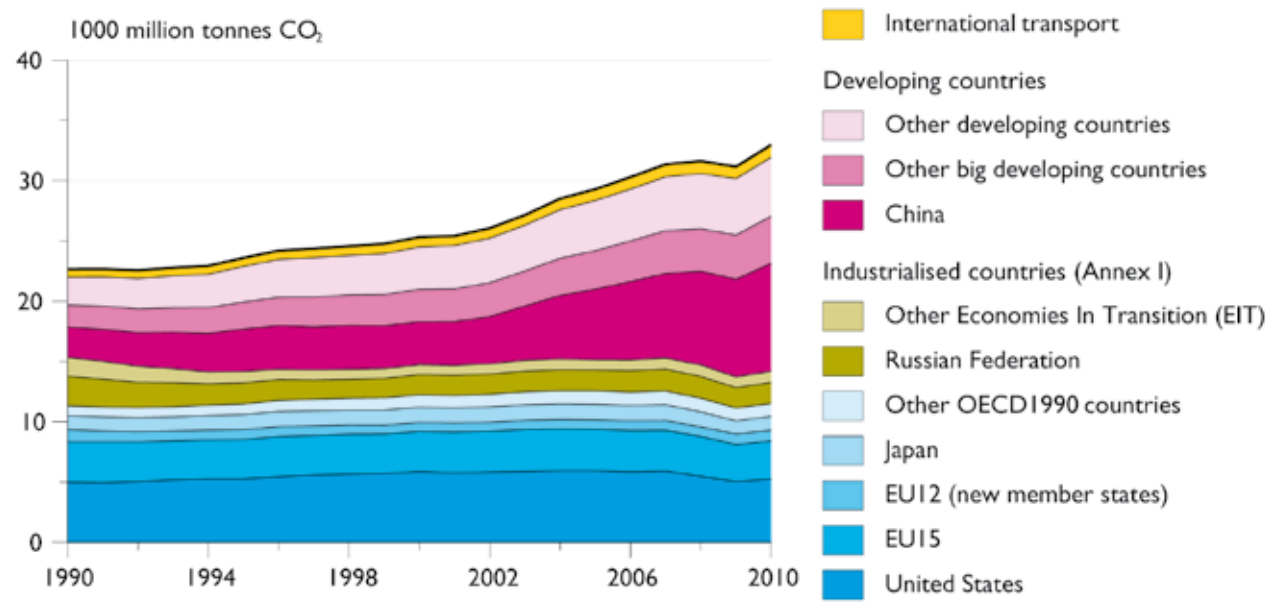
The market encourages innovation to bring down costs. One way to do this, is to externalise them: that is to say, to get others to pay them so that the costs are removed from the chain of production which ends up as goods on the shelf. That way, the costs can be removed from the price that the customer pays at time of purchase, leaving a lower price and higher profit. If a change in production would result in lower costs and higher pollution, then that change will happen whenever that pollution is unregulated and untaxed. Economists have a phrase for these externalised costs: negative externalities. Profit-maximising must lead to costs being externalised wherever possible – at least, insofar as risks to corporate reputation allow.

But these negative externalities have consequences that are not just environmental, but economic too. When some costs are ignored, the result is an inefficient allocation of resources.

Environmental economics, a theoretical foundation stone of the Green Economy, frames the situation in terms of an additional body of assets in addition to the capital found on companies' balance sheets: these additional assets are those common to all of us – the oceans, the atmosphere, and so on – they are our natural capital. Just as corporate capital, natural capital has an economic value. And activities that decrease the value of our natural capital damage humankind's balance sheet.

For example, negative externalities in power generation have resulted in a situation where the price of electricity has been low, relative to its actual cost. Now, that's small comfort when people are facing the coming winter with rising utility bills, but nevertheless true: a large part of the cost of our electricity has been externalised, so that we don't pay for it in our bills. We pay for it instead in environmental degradation, in the dangerously rising emissions of greenhouse gases. And, as with any normal product, under-pricing leads to over-consumption of that product, and under-consumption

CO2 emissions worldwide have risen by 45% since 1990



Source: EDGAR4.2 (1970-2008); IEA, 2010; USGS,2011; WSA,2011; NOAA,2011

of the substitutes. This, in turn, leads to over-investment in its production and under-investment in production of the substitutes. In the case of power generation, that means we've systematically under-invested in renewables and energy efficiency, and over-invested in the oil, coal and gas industries. This is economically inefficient, and has run up large debts on our environmental balance sheet: we have depleted some of our natural capital (the finite reserves of fossil fuels), and degraded our atmosphere (again, reducing the value of natural capital). And those debts will have to be paid for, out of future economic productivity.

We risk losing all that we have built up to date, if we carry on with business as usual: the impact assessments for higher climate sensitivities and higher impact sensitivities show a loss of global GDP that could exceed 90%. We don't know how likely these higher sensitivities are: we are tangoing through a minefield. We do know that the costs of avoiding climate change crisis, (even at much lower impact sensitivities), are much lower than the costs incurred as a result of such a crisis.

The economic imperatives that lead to the spiralling of negative externalities into an environmental crisis is well-documented: back in 1968, the inevitable tragedy of the commons[1] was first written of in scientific journals: that a resource used by all but owned by none, would inevitably be over-used until it turned to dust. Though this was not the first description of the phenomenon; approximately 2300 years previously, Aristotle wrote: *"that which is common to the greatest number has the least care bestowed upon it."*

The inevitability of the tragedy of the commons became economic orthodoxy. However, more recently, Elinor Ostrom has documented several cases showing that the tragedy of the commons was not inevitable. In many cases, communities had formed joint-stewardship agreements to sustainably manage common resources, such as fishing grounds, groundwater supplies, and grazing commons. They used frequent mutual monitoring and discussions between themselves to ensure that agreements were kept and offenders were sanctioned with penalties determined and agreed in advance by all. Ostrom won a share of the 2009 Nobel Memorial Prize in economics for her work.

This common stewardship is one form of Green Economy complementing other solutions to the problems of negative externalities: those other solutions include taxing or imposing quotas on pollutants, subsidising cleaner alternatives, privatising property rights, and nationalising industries that need cleaning up. Even without a crisis, negative externalities are economically inefficient: when pollution goes unpriced, we're all worse off.

The Green Economy, in all those forms, is here because it fixes problems that have been accumulating for decades. Why the Green Economy? Because in the long run, the Green Economy leaves us better off, environmentally and economically. ■

[1] **Tragedy of the commons**: a dilemma arising from the situation in which multiple individuals, acting independently and rationally consulting their own self-interest, will ultimately deplete a shared limited resource, even when it is clear that it is not in anyone's long-term interest for this to happen.

Business from scratch

Established brands and start-ups alike are taking a look at the big picture, and finding new ways to prosper, says Anna Simpson, the Managing Editor of Green Futures

In recent years, we've sent the fixed-line phone, the fax machine and the CD player to the dinosaur graveyard. Once at the forefront of technology, these devices have fallen by the wayside thanks to rapid changes in how we store and share information. Brands that failed to question, for instance, the future of the camera film, or to foresee the shift of the camera itself from a stand-alone gadget to a smartphone feature, have found themselves without a market.

There's a growing appetite among leading businesses to anticipate change, and even to be the driving force behind it. It's partly down to increased awareness of unsustainable pressures on natural resources, and the need to defend against sudden supply shortages or price hikes. Recent research by WWF documents this appetite for change in a series of interviews with Chief Executives called 'Talking Transformations'. As Paul Polman, CEO of Unilever, puts it, "We need to grow responsibly, we need to grow differently." This means looking beyond the immediate interests of the company, to the bigger picture: the social, environmental and financial systems in which it plays a part and on which it depends.

Unilever and Sainsbury's have been working with Forum for the Future on a project called 'Consumer Futures', which asks what consumerism might mean come the year 2020. What will consumers actually want? What difference will new regulations make? What will smart technology do for us?

When you hold a whole system up to the light

A banking pioneer whose time has come

Chancellor of the Exchequer, George Osborne

The UK's Green Investment Bank, announced in 2010, will provide a fund of £3 billion, dedicated solely to the financing of the transition to a green economy. The brief of the Green Investment Bank is to put private funds to work financing private sector investments related to environmental preservation and improvement. This fulfils UK government goals of injecting private capital into green projects.

The fund is intended to overcome private sector concerns about the viability and risk entailed in clean energy projects. The bank could also play a role in financing the Green Deal home energy efficiency scheme, which aims at reducing the UK's energy bill. The government's most optimistic scenario sees the bank raising extra capital and borrowing just like a private sector bank. However, this idea remains politically controversial. Critics insist that the bank will not be able to borrow until the UK debt mountain is falling, which the Chancellor says might not happen until 2015. It therefore remains to be seen when and if banking will turn green. One agent of this is likely to be this innovative project. ■ ***AK***

in this way, inefficiencies become apparent, and opportunities shine through the cracks. More often than not, the outcome is an original idea: a practical innovation for doing things differently.

Take transport. For decades, the assumption has been that the most freedom and highest quality of experience come from owning your own wheels. But newcomers like Zipcar and WhipCar remind us that ownership itself can be more a hassle than a help. Why pay parking and maintenance costs when you can use your neighbour's car for the weekly trip to the game? Or why not lease your own car and let it earn some pocket money for you, while you're stuck in the office?

The potential for sharing resources goes far beyond transport. "Businesses can cut their use of natural resources dramatically by harnessing the value of things we, as individuals or communities, already own", Dax Lovegrove, Head of Business and Industry at WWF, writes in *Green Futures* [see Issue 82, p43]. He cites peer-to-peer lending and leasing schemes, facilitated by start-ups Ecomodo and Zilok, which simply take a cut from the fee at the expense of the borrower. Some high street retailers, most notably DIY giant B&Q, are considering a shift away from the traditional 'buy and sell' model, in favour of leasing and maintenance services.

"There's plenty of evidence that simply acquiring more and more 'stuff' doesn't make us any happier", says Sally Uren, Deputy Chief Executive at Forum for the Future [see 'Shopping for tomorrow', *Green Futures 82*, p27]. "In a sustainable future, we might find that the endless search for novelty and the implied personal status that goes with it are far less important than they are today. Instead, we could find ourselves buying local food from inner-city vertical farms, say, which provide jobs for our unemployed neighbours and fresh veg for our children's school."

We may find that our future economy depends much less on stuff and more on services: from entertainment to education to health and wellbeing. We can't predict the future, but we can count on change. Some resources will become too expensive or disappear altogether; new sources of energy and income will become mainstream. The winners are already preparing for tomorrow's world.

Don't throw – pass it on

A throwaway economy that grew out of the western industrial societies is no longer a viable model. Now, what has been used once, should, and often can, be re-used. And increasingly, recycling is not limited to sorting plastic bottles and cardboard, but extends to services.

Take the concept of carpooling. Whilst in France, it is known to be the domain of students looking for ways to travel on the budget, Britons too have in recent years embraced this economically, and above all environmentally, beneficial idea. The concept is not new, but it is only recently that collaborative consumption has been theorised and publicised by Rachel Botsman and Roo Rogers, co-authors of "What Is Mine Is Yours: The Rise of Collaborative Consumption" (2010). Based around the idea of goods being passed on to members of a group, the system of sharing prevents over-consumption and helps reduce the amount of waste created.

The popularisation of the idea has already led to the creation of online platforms facilitating shared usage, many of them based in the US, which can be an inspiration for the creation of similar initiatives on this side of the Atlantic. Most common examples include peer-to-peer rental of household appliances and gardening equipment **(thesharehood.org, neighborrow.com)**, textbook rental **(chegg.com)** and the good old car sharing **(e.g. zilok.com)**. There is even something for the little ones as websites offering toy rental grow in number **(dimdom.fr)**. Perhaps sharing is the new recycling, and the prevention of environmental damage might work better than trying to fix it. ***AK***

Part two: Investing in Green Energy

Renewables take the brunt

As we look forward ten years, the share of renewables in the energy mix grows. But the availability of each power source is constrained by costs amongst other factors, says Phil Heptonstall, Research Associate at Imperial College London

The UK Government has set ambitious targets for electricity generation from renewable sources during the next decade, and the UK's national target under the EU 2008 Renewables Directive is for 15% of total energy consumption to come from renewable sources by 2020. The relative cost and difficulty of increasing the share of energy from renewables in other sectors, such as transport, means that it is expected that electricity generation will have to bear a greater proportion of this target than other sectors. It is anticipated that more than 30% of electricity will have to be generated from renewable sources by 2020 if the Renewables Directive target is to be met, compared to a current figure of around 7%.

Whilst the UK Government does not have specific targets for the share of this total that will come from each resource or technology, it is widely expected that by far the largest share will come from wind power. Offshore wind in particular is expected to make a major contribution, partly because of the abundant offshore wind resources which the UK has, and partly because moving offshore avoids some (but not all) of the issues which have led to public opposition to onshore wind farms. Some commentators suggest that if the renewables targets are to be met, then the UK will require more than 15 gigawatts (GW) of offshore wind generation installed by 2020, with further substantial increases in installed capacity beyond this date (for comparison, a typical large coal or gas-fired power station in the UK is around 1.5-2GW, and current peak demand for the whole of the UK is around 60 GW). The current installed capacity for UK offshore wind is around 1.3 GW, compared to around 3.9 GW of onshore wind. Development rights for offshore wind in the UK have been awarded in three rounds to date. Rounds one and two granted rights for a total of around 8 GW of development, and round three rights, awarded in early 2010, were for over 30 GW of potential development. Much of the focus for the offshore wind industry is on driving down the costs of the technology, through a combination of incremental improvements in design, installation techniques and maintenance regimes. Further cost reductions in the medium and longer term are hoped for with increasing turbine unit size and more radical departures from current designs. The onshore wind industry is usually considered to be relatively mature, as although it may benefit from incremental improvements, radical changes seem unlikely at this stage since there are practical constraints related to turbine size (for example, the limit on the size of a turbine blade that can be moved by road).

The view that wind is likely to make the major contribution to the UK targets is a recognition of the fact that the UK resources for other large-scale renewables are more constrained.

In the case of hydro power, most of the large sites have already been developed, and the remaining potential sites are located in environmentally sensitive areas where large-scale development is highly unlikely. As a result, this technology is unlikely to make any additional major contribution to the UK's renewable targets, although large-scale hydro does, of course, continue to make a valuable contribution to the generating mix, and there is still scope for development in small-scale hydro in the UK.

The potential contribution from solar power in the UK (more specifically photovoltaic (PV) arrays that convert sunlight directly into electricity) is not, in principle, limited primarily by the resource so much as the current high cost and the mismatch between generation and demand patterns; peak electricity demand in the UK is on winter evenings when it is dark so no solar PV-generated electricity will be available. Solar PV does, however, offer the advantage of being particularly suitable for 'decentralised' generation with, for example, small arrays on domestic roofs.

Wind power is set to lead the way if the Government expects to reach its Renewables Directive target

Nevertheless, major contributions from solar PV are likely to require a combination of substantial cost reductions (certainly possible) and more sophisticated electricity grid and demand management processes.

Some commentators have suggested that over 10% of the UK's annual electricity demand could be met from tidal power, exploiting either the tidal range in locations such as the Severn estuary or the energy in tidal streams. The technology for electricity from tidal range schemes is well proven, not least by the La Rance scheme in northern France, which has run successfully for over 40 years. Devices to exploit tidal streams are currently in the early stages of deployment in pilot schemes, although they are not expected to reach the commercial deployment stage for some time. The primary limiting factors for tidal range schemes are the very high capital costs of the civil engineering works to build the barrages required, and the fact that the proposed schemes typically involve the permanent flooding of large areas of environmentally sensitive inter-tidal zones.

Whilst the resource potential from wave power is very considerable, with some suggesting that it too could contribute over 10% of the UK's electricity needs, the major obstacle is that the technologies are still at a very early stage of development. The emergent industry is characterised by a plethora of different approaches and designs, and whilst this is certainly encouraging for the long-term prospects of the sector, it is too early for a clear leader, capable of full commercial deployment, to emerge.

Lastly, some large UK coal-fired power stations have plans to substantially increase the amount of biomass that they burn with the coal, and this may turn out to make a significant contribution to renewable electricity generation. However, the major constraint is on the domestic availability of the biomass resources and the potential need to import large quantities from overseas.

The overall picture that emerges is one where all these technologies either have the portential or are already making a significant contribution to renewable electricity generation in the UK. Wind power is likely to make by far the largest contribution, with solar PV occupying something of a niche and the marine renewables options of wave and tidal power representing a longer term prospect. All these technologies (alongside options such as nuclear power, and carbon capture and storage) will require a supportive policy environment if they are to fulfil their potential. ■ ***Phil Heptonstall, Research Associate, Centre for Energy Policy and Technology, Imperial College London***

Green is cheaper

Most shoppers acknowledge that green products are better for the planet and our health, but very few would agree that they are cheap, and certainly not cheaper than mainstream products. Do companies share the same view when they invest in green solutions and technologies?, asks Romain Daumont, International Business Development Director of LowendalMasaï

In 2006, *Green to Gold*, a best-selling book by Daniel C. Esty and Andrew Weston made quite a change in the perception of what 'being green' meant for companies. Until then, promoting sustainable business had been seen as a costly advertisement for brand image purposes or at best as a way of pleasing governments, employees and environmentalists. Now, green could lead to gold: projects reducing CO2 emissions could also bring massive cost reduction through a smarter use of resources.

To convert green to gold, the secret is to be really serious about green: if the upfront investment is significant enough, the reward will naturally flow. Look, for example, at Adobe: in 2001, their investment of $1.4m to improve energy efficiency at their San Jose headquarters reduced their annual operating costs by $1.2m, and since they also received about $0.4m in energy rebates, they managed to get a nine-month payback. Not too bad.

Cash-rich multinationals clearly have an advantage when it comes to significant investments. When IKEA in the UK goes greener, they aim to power all their stores with renewable energy and then decide to install 39,000 solar panels as well as purchase a 12.3 megawatt wind farm in Scotland: you can't get much more serious than that. And for the small and mid-cap, there is no reason to stay behind: they just have to be more agile and think outside the box.

Adobe invested $1.4M to improve the energy efficiency of their San Jose headquarters

Look at what Pure Impression did in 2008: this €11m French printing company closed an 8-year deal with its waste management supplier who invested €310K to install an on-site, centralised paper waste vacuum system. By having different types of paper waste automatically sorted, Pure Impression gains a total of €123K annual savings. In return, the waste management supplier purchases the paper waste at a discounted price, saving them €84K. In other words, the outcome is a win-win situation, which for Pure Impression adds up to positive annual savings of €39K – a huge benefit for such a company.

Since green projects can generate gold, there is always a way to finance them. The key is to take a good look at the Total Cost of Ownership (TCO) of the entire portfolio of goods or services being produced, including all the waste and recycling costs right from the conception. In others words, adopting the so-called 'eco-design' that companies like General Electric live and breathe by today, embedding green and sustainability at the company's core strategy.

So, back to our lives as consumers; would our shopping habits change if we were to apply this TCO approach? Think of it this way: take palm oil-based crisps, cheaper than the ones containing organic, eco-friendly oil - if we were to value the number of days we might lose by clogging up our arteries with their high level of saturated fat and the associated medical costs, wouldn't we agree that the extra cost of buying green is actually the golden choice? ■

Funding renewables in the UK

As the government begins to encourage green action, it remains unclear how the development of renewables will be funded. Simon Evans, a Director in the London corporate finance team at BDO, explores available options

It is a time of change in the UK renewables market. With the introduction of the Feed-In Tariff[1] (FiT) in 2010 and the Renewable Heat Incentive[2] (RHI) this year, government climate change policy has moved away from penalty-based measures, such as landfill taxes, the Renewables Obligation and the Code for Sustainable Homes, to measures which promote positive action by companies and individuals.

Despite such encouraging initiatives, questions remain about how renewables development will be funded. Even solar PV, generally thought of as a relatively low-cost renewable solution, still has an upfront capital cost of approximately £10,000 for the average home. That is beyond the financial means of most British householders.

Getting the banks interested...

Investing in a low-risk technology asset with a 20-25 year guaranteed income stream should be straightforward. British banks and finance houses, however, have yet to see it in these terms. Businesses looking to finance a FiT or RHI investment have to enter a process similar to normal corporate lending, which requires credit committee approval, business plans, detailed financial models, due diligence and so on.

Incentives are relatively new and are subject to change, so many banks favour an off-the-shelf financing solution. Most will only provide standard products when the market is large enough to warrant the investment. As the cost of renewable technology falls (think solar PV) and parts of the sector reach grid parity, the market may increase sufficiently – but this may be several years away. So what financing options are open to businesses and individuals in the meantime?

Solar bounty for householders

In solar PV, a "rent a roof" model allows a developer to put free solar PV panels on a householder's roof in exchange for the guaranteed 25-year Feed-In-Tariff income. The householder benefits from the free electricity generated by the solar panels, which provides a creative solution to his or her funding problems.

To retain complete control of the project and maximise return, the business/individual needs to develop the project themselves. And which option is most suitable depends on how much capital the project developer is willing to invest.

Venture capital trusts (VCTs) can offer up to 100 percent of a project's funding, compared to approximately 70 per cent for a bank. However, under applicable tax legislation only certain types of investment qualify for VCTs; and from April 2012 FiT investments will not qualify, although RHI still will.

Long-term returns

Pension funds are another potential source of finance as they are interested in the kinds of long-term, stable returns provided by FiT or RHI-backed projects. Both VCTs and pension funds can be flexible in terms of deal size if the projects can be bundled together – as is the case in the "rent a roof" model.

In lease finance, by contrast, lending is based on the value of the underlying assets. So the quantum of financing available is usually lower than that supplied by VCT or a pension fund, and will require a greater level of funding from the developer.

Overall, although the government has finally put in place a workable incentive scheme for renewables, the financing structures to support the exploitation of these incentives are still in their infancy and are likely to be the real brake on renewables development for the foreseeable future. ■

[1] **Feed-In Tariff** - a policy mechanism designed to accelerate investment in renewable energy technologies by offering long-term contracts to renewable energy producers.

[2] **Renewable Heat Incentive** - a payment system for the generation of heat from renewable energy sources due to be introduced in the UK on 30 November 2011. In the first phase of the RHI, cash payments will be eligible to owners who install renewable heat generation equipment in non-domestic buildings.

Investors tell a warming tale

Some initial scepticism about the promise of investing in the clean energy sector has been overcome, as regulations and technologies have ironed out the bugs, says Joost Bergsma, Founder of BNP Paribas clean Energy Partners

The clean energy sector has attracted significant investment from the private sector. It is important to note that the above subsidies such as the Feed-In Tariffs (FITs) are not actually borne by the relevant EU member states. The local utility is required by law to purchase the electricity from the wind farm (or solar park) owner. The costs of the electricity are then passed on and charged to electricity users. In other words, governments are shaping the framework to invest in clean energy rather than providing the actual capital and making the investments themselves.

Investing in clean energy has, to a very large extent, come from the private sector. Investments have come from utility companies who need to reshape their power generation mix and attain a certain proportion of clean energy by 2020, as well as financial institutions who are debt-financing many projects. For equity investors, there are opportunities across the listed space mostly in the form of environmentally focused funds. However, the universe of pure play, clean energy investment has been small on the listed side. The short track record has made clean energy a natural sector to attract private equity. On the unlisted side – there are investment opportunities in venture to fund new technologies (ranging from batteries, smart grid to new fuels, to infrastructure).

Wind power can be intermittent

The backdrop of Feed-in Tariffs makes this a natural haven for infrastructure investing. Many institutional investors, such as ATP, PGGM, AXA and Allianz, have all made significant investments in clean energy. These investments were not made for a green feel-good factor or to include a nice wind farm picture in the annual report. Given the structure of Feed-In Tariffs (fixed price for a long period and inflation-protected) the revenue lines of wind farms and solar parks are very predictable. As such, wind farms, solar parks and biomass power plants are producing stable cash and long-term cash flows for equity investors. These cash flows are very attractive to investors who require regular dividends and a steady long-term return without too much risk.

So is the sector meeting expectations? On the whole, yes – the sector is delivering. Nonetheless there have been a number of challenges to overcome.

Green promise – gold diggers flushed out

Particularly pre-financial crisis, the clean technology sector was characterised by a flurry of investment opportunities looking for capital jumping on the green bandwagon. These were often very high-risk and of a holy grail type promising very high growth and providing the world with an endless supply of clean zero-carbon energy. Naturally, some equity investors turned somewhat sceptical. However, the financial crisis has accelerated the flight to quality investments and investors have particularly focused on the asset-heavy infrastructure side, away from very speculative technology plays. Wind farms and solar parks, when well structured legally, are proving their reliability.

Resource forecasting - learning curve completed

Particularly wind can be intermittent (solar less so) and

70,000 solar panels configured to form a giant photovoltaic array collecting solar energy at the Nellis Air Force Base, Nevada

wind varies not just throughout the year but also year by year (in the same way as we have good summers and bad summers). The performance of a wind farm cannot be judged on a single year but should really be ranked on the basis of at least a five-year analysis and ideally longer. A thorough so-called MCP (Measure, Correlate Predict) analysis using statistical data and tools to predict the wind for the specific site where the wind farm will be built is critical. In the early days, the tools used and the analyses were not very robust. As a result, in recent poorer wind years, some older wind farms have somewhat under-delivered compared to their forecasted mean.

However, the statistical tools and analysis have significantly improved, and the database to correlate data is today much deeper than five years ago. As a result, wind forecasting has become more accurate and we are less likely to see great deviations from predicted means over a five-year performance.

Rapid change in regulations – more volume at lower pricing

Although the longer-term EU commitment to clean energy is legally underpinned – the individual countries' Feed-In Tariffs have changed more quickly than expected. This is particularly true with respect to solar, which is understandable because the price differential between solar and the market power price is largest. Germany, France, the UK, Spain and Italy (the five largest EU economies) have all changed their solar FITs in the last twelve months. It should be noted that – with the exception of Spain – all changes were made forward looking and are not affecting existing investments which have been fully grandfathered.

With respect to new regulations applying to new projects – investors typically were given the time to reflect and incorporate the new economics of these FITs prior to deciding to invest. Generally, the purpose of the changes in the framework is to reduce the costs for new projects and force the market to produce solar electricity more cheaply. The purpose is not necessarily to cap or reduce solar investment. So, Feed-in Tariffs have worked in attracting investment capital. The regulation is now becoming more mature and thus, if anything, more predictable, and we see volumes of new solar projects rising despite the lower Feed-In Tariffs. ■

Joost Bergsma founded BNP Paribas Clean Energy Partners in mid-2008 whilst working at ABN AMRO Asset Management. BNP Paribas Clean Energy Partners is owned by BNP Paribas Investment Partners.

$46 trillion investment needed for a clean environment

The burden of investing in the energy infrastructure for a low-carbon economy until 2050 will fall on the private sector. Rewards for such investment may be as high as $112 trillion in savings, together with a cleaner environment. But will companies be prepared to pick up the bill? Nick Robins, the Head of the HSBC Climate Change Centre of Excellence, enquires

Global energy markets are in a state of increasing stress. The age of "easy oil" is over, with oil prices up 60 per cent in the year to the end of May. Much of this increase took place before the "Arab Spring", at a time of anaemic growth in the industrialised world – with higher energy costs in turn dampening future economic prospects. The incidents at Fukushima since the tsunami in March have compounded this stress, challenging the growing global consensus around nuclear as an important low-carbon energy source.

And the "arid spring" in Europe and Asia has highlighted the vulnerability of power systems to water stress, with China's worst drought in 50 years depressing production from the country's hydroelectric facilities. But this is only the beginning. By 2050, a tripling in global economic output doubling energy demand seems likely.

In our "if only" scenario, where environmental factors are not a constraint, oil demand would grow to 190 million barrels per day to fuel the extra one billion cars on the global highways. Annual CO2 emissions from energy would soar to 56 billion tonnes, more than five times the threshold needed to restrain global warming to the 2°C target agreed in Cancun last year. And climate change would intensify water constraints. In India, for example, the World Resources Institute estimates that 79 per cent of new power capacity will be built in areas that are already water-stressed.

The good news is that there is growing agreement that a more resource-efficient, low-carbon energy future is not just necessary, but also entirely possible and highly cost-effective. In HSBC's "solution" scenario for 2050, energy efficiency takes the strain, with demand from buildings, industry and transport 37 per cent lower than in the "if only" world. The energy mix also shifts, with the proportion of fossil fuels declining from today's 81 per cent share to just 43 per cent – and most of this deployed with carbon capture and storage technology. Renewable energy, notably solar and wind, grows to fill the gap, rising from 3 per cent to 23 per cent of the total; energy from biomass also climbs, excluding "first generation" biofuels which compete with food production.

A doubling of the share of nuclear power in the global mix, in spite of Fukushima, is expected, reflecting strong projected growth in emerging economies such as China and India.

Three forces are likely to get us from here to there: energy security concerns, the search for new sources of industrial competitiveness, and the climate imperative.

In the next decade alone, we expect the global market for low-carbon energy to triple from $740bn to $2.2trn. Importantly, the demand-side becomes the largest market segment, on the back of rising energy costs and government programmes to improve building efficiency and roll out electric vehicles.

On the supply side, we expect renewable energy to show the largest growth. In 2020, we still expect the European Union to be the largest market for low-carbon energy solutions, but its share will slip as China overtakes the US and India overtakes Japan.

To avoid a bumpy ride on global markets, governments will need to deliver pre-emptive policy reforms. The major policy levers are familiar: remove perverse subsidies for fossil fuels, price carbon, and regulate energy performance in buildings, industry and transport. We see particular scope for greater efforts to improve energy efficiency; in Germany, the accelerated exit from nuclear will intensify the existing emphasis

on demand reduction, with the government aiming to cut power consumption by 10 per cent by 2020. Critically, a more concerted approach to energy innovation and deployment is required.

Globally, energy's relative share of total research and development fell from 12 per cent in 1981 to just 4 per cent in 2008. The "green stimulus" that followed in the wake of the global economic crisis boosted public spending on energy innovation, but as these programmes come to an end, they are being replaced by "green austerity" in much of the industrialised world.

By contrast, China's commitment to low-carbon growth is laid out in its new five-year plan (2011-2015) approved in March. Along with goals to improve energy efficiency, and reduce the share of fossil fuels in the energy mix, China is also launching an unprecedented programme to place low-carbon innovation at the heart of its economic model. By the end of the decade, China wants the share of seven "emerging strategic industries" to expand from 3 per cent of GDP today to 15 per cent in 2020, at a time when the economy is growing rapidly. All seven sectors are powerfully aligned with the climate agenda: energy-saving and environmental protection, next-generation IT, biotechnology, high-end manufacturing (including high-speed rail), new energy, new materials (including rare earth metals) and clean-energy vehicles.

Hydroelectric power

The biggest challenge in making the transition happen is no longer technological but financial. A low-carbon economy is generally a more capital-intensive economy, substituting the consumption of natural resources with technology and brainpower.

The International Energy Agency has estimated that an extra $46trn in upfront investment is required by 2050 to improve energy efficiency and decarbonise energy supply. But this will deliver $112trn in fuel savings, along with enhanced energy security and reduced emissions. The bulk of this capital will need to come from private sources, with public finance helping to "crowd in" private capital.

In Germany, for example, the country's infrastructure bank, KfW, provided €25bn for the environmental sector in 2010, up from €19bn in 2009. In the UK, the new Green Investment Bank is being positioned to play an equivalent role, supporting the expansion of offshore wind as well as the roll-out of the Green Deal efficiency programme.

For the UK, the prize is to build on London's traditional leadership in carbon trading and climate investing on global stock markets, to develop a new market in fixed-income bonds aligned to the low-carbon economy.

Across the world, a shift is under way – away from a narrow climate agenda focused solely on carbon costs to a development strategy designed to deliver a package of economic, industrial and environmental outcomes.

East Asia is in the vanguard, with South Korea committing to invest 2 per cent of GDP in its "green growth" ambitions. The task is to bring this new perspective to the global climate talks, which are in need of a new narrative following the setbacks at Copenhagen. We need to deliver real results before the commodity crunch really begins to bite. ■

Looking at clean technology through a public market lens

The clean technology and renewable energy sectors have underperformed with the burst of a bubble formed in 2008. Jean-Philippe Verdier , Director of Global Mergers and Acquisitions at Jefferies International, presents a diagnosis and estimates whether recovery is a likely scenario

Dismal share price performance has come to characterise a sector once hailed as the wave of the future. The CleanTech index, a global stock market indicator of clean technology firms, has lost 34 percent of its value since 1st January 2007, compared to the 13 percent loss registered by the FTSE 100 over the same period. A peak-and-trough analysis shows an even more dramatic picture, with a 70 percent decrease in value. Many recent IPOs[1] have not made millionaires with share price falls of 50 percent.

Disappointing valuation levels

The business models of a US wind developer, a European solar integrator and an energy storage company arguably have little in common. Indeed, valuation levels vary significantly (see chart). What is common to these companies, however, is that all trade at low levels: most companies are at par or at a discount to a traditional index like the FTSE 100 (10.8x), and at an even bigger discount when compared to higher growth companies listed on the NASDAQ at 18.4x.

This indicates that investors worry about growth prospects and still perceive a high level of risk, even after a significant correction. Investors crave clarity and stability, notably in terms of regulatory environment. The retroactive cuts to Feed-In Tariffs for solar projects in Spain last year, for instance, have hit investment in this area. It appears that business models are not

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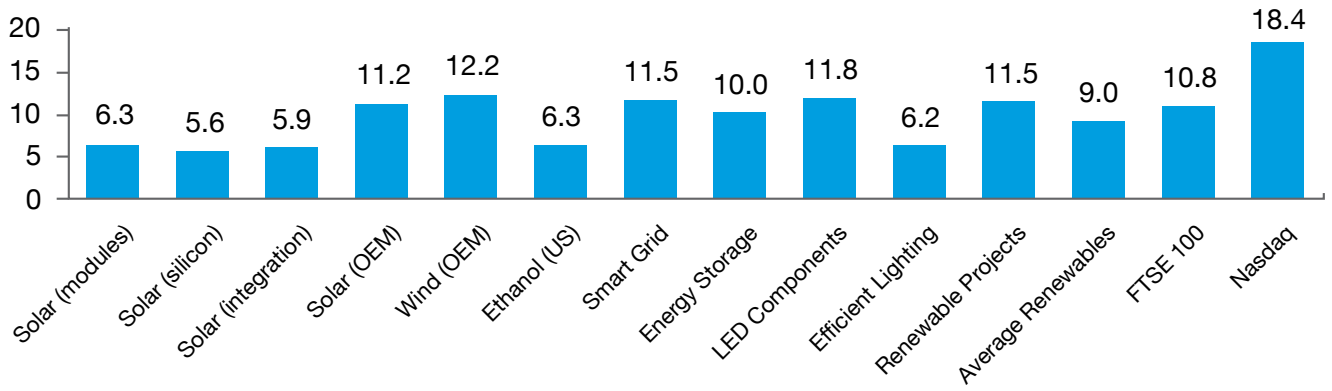
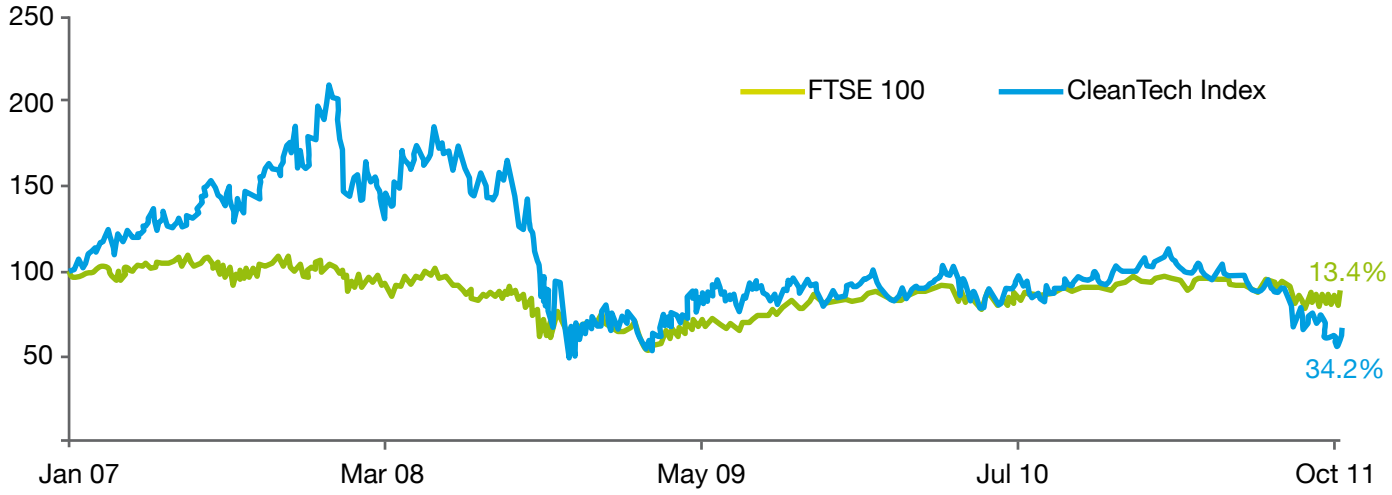
Chinese companies attract precious capital and build a platform for future expansion

PRICE EARNING RATIO



CLEANTECH INDEX VS FTSE 100



immune to reappraisal of regulatory risk, and that governments currently have different priorities, such as budgetary discipline.

In light of the turbulence in the equity and debt markets, the poor share price performance of many players in the sector and the current valuation levels, most clean-tech companies see access to funding as virtually shut.

Hopeful signs from China...

One notable exception has been Chinese companies that still dominate the public capital-raising market with several successful IPOs. In that field Chinese companies attract precious capital and build a platform for future expansion, including overseas. Europe, for instance, is expected to become a destination for investment by Chinese renewable energy companies that seek technology play for their home market, and to meet the demands of the new five-year plan, such as the $2.1bn acquisition of Elkem by ChemChina Corp.

Beyond China, there are potentially hopeful signs from multinationals seeking lucrative mergers. So while the level of activity has generally been subdued and transaction size have been at the lower end of the scale, non-renewable energy companies do make strategic acquisitions. For instance, there is the oil major Total's purchase of a 60 percent stake in a US-based manufacturer of silicon cells, modules and trackers, SunPower Corp, for $1.6bn. This deal has a lot to do with strategic diversification and leveraging Total's balance sheet and financing capabilities.

Equally, utilities are expected to remain very active as they optimise their portfolio of renewable energy assets but also take the opportunity to snap up attractive targets that fit their strategic requirements.

Let's hope the *annus horribilis* is over. There are reasons to believe a recovery would be on the cards, although probably not back to previous levels over the short term. There are some increasingly attractive projects out there, and long-term investors, such as pension funds, are beginning to look at them anew. ■

[1]Initial Public Offerings: the first sale of stock by a formerly private company

Think long-term when building green...

Planning ahead and harnessing the latest technology means we can build structures that are both greener and save money in the long run. So argue Cécile Fénérole, energy and environment engineer, and Dominique Lin, business manager, both of Faseo Energy

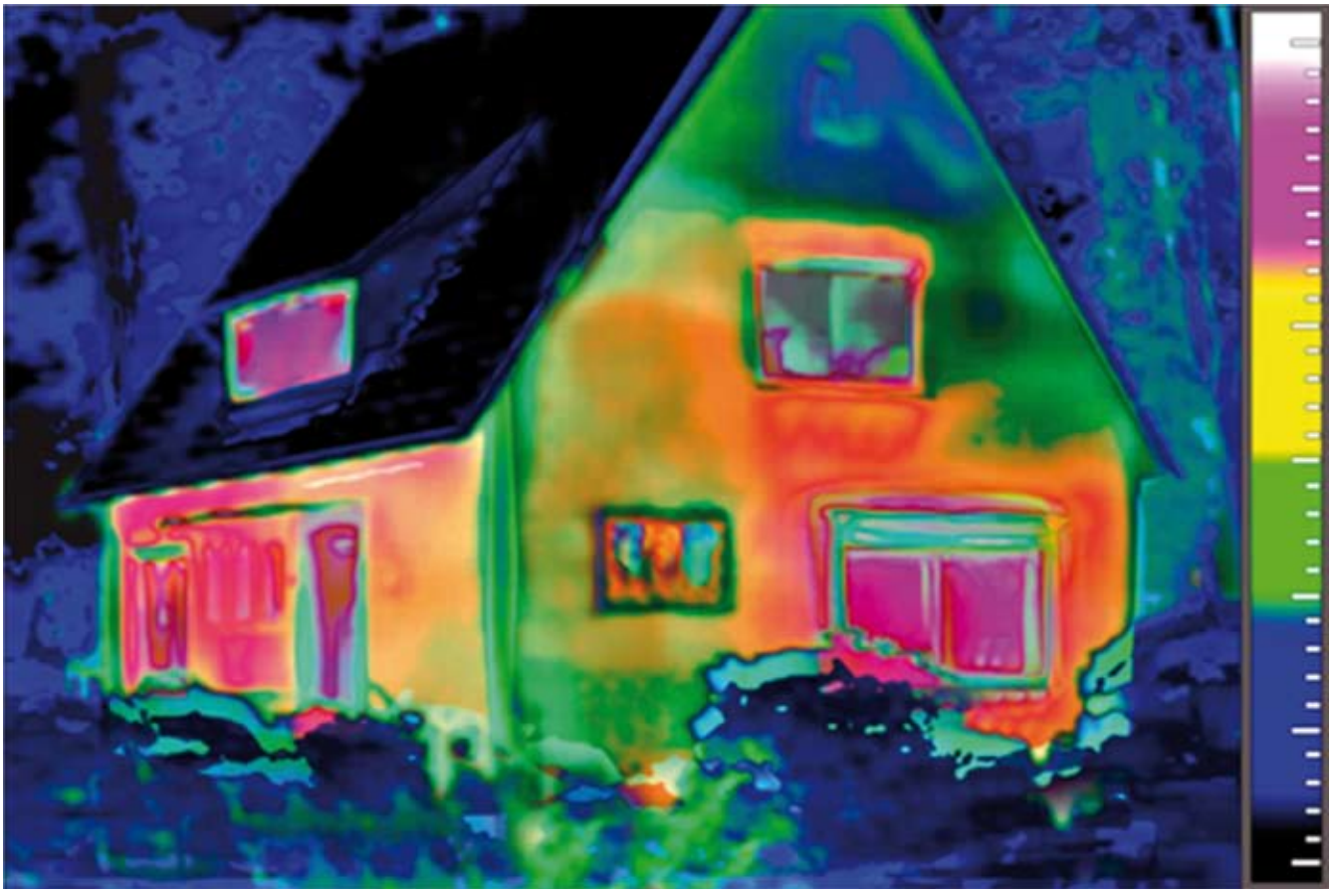
Industry and transport play a key role regarding climate change, pollution and the depletion of natural resources. However, we often forget the building sector, which accounts for 45 per cent of all energy consumption in the UK.

About half of this is used for heating purposes and our picture illustrates how much thermal depletion of a house is important.

The good news is that European governments have begun to address this area. France, for instance, has recently tightened its thermal regulation (RT2012) and reduced by three the maximum average rate of consumption of primary energy in new buildings. Now the Renewable Heat Incentive (RHI) will enable the UK to be the first country to provide a support scheme for renewable heat.

Hi-tech breakthroughs

Legal regulations and political incentives are one way of reaching the ambitious objectives of sustainability.



Thermal simulation of a house

Another is technology; think of high-performance interior and exterior insulation, double-glazing, renewable energy, high-efficiency equipment and condensing boilers.

Nor should we ignore domotics, essentially domestic robotics, or the fully integrated hi-tech home. Consumers can now choose the right technology for a specific project at the design stage and also consider ecological aspects. Plus wise site choice or building orientation at conception can reduce the building's impact on the environment and add value for the end user.

These days, a good design integrates all the interactions between architecture, mechanical heating systems and electrical equipment, thereby rendering a selective approach irrelevant.

The UK's retrofit sector, for instance, clearly shows how complementary technologies can achieve sustainable building. Energy savings through insulation, renewable solar energy from photovoltaic cells, or thermal devices, improve environmental performance and also benefit from the RHI and Feed-In-Tariffs (FITs).

Upfront cost / Ongoing cost

Naturally, contractors worry about paying a higher upfront cost for sustainable building while the building sector is still facing economic difficulties. Yet even if construction costs seem high, efficient design can generate significant operation savings if we consider the whole life cost (WLC) of a building. Today, maintenance, energy consumption and insurance represent up to 75 per cent of a building's WLC.

A close-knit partnership between different services and structural elements thus helps us better quantify the economic effect of an alternative design – an important consideration given that the prices of fossil fuels will continue to increase in the future...

Communicating opportunities...

Property owners concerned about market position and rental premium can also benefit from a project's environmental performance, as assessed by a green building rating scheme such as BREEAM[1] or HQE[2]. We can do more to raise public awareness about 'green building' and to change both the way we build and our financial approach to building.

The economic crisis has at least taught us that we should not focus exclusively on short-term profit. We are now taking the first steps in this new area. ■

[1]**BRE Environmental Assessment Method** - a voluntary measurement rating for green buildings. It was established in the UK by the Building Research Establishment in 1990 as a tool to measure the sustainability of new non-domestic buildings.

[2]**High Quality Environmental standard** - a standard for green building in France, based on the principles of sustainable development first set out at the 1992 Earth Summit.

Innovation in waste technologies

Cross-section of a metal core catalytic converter

Innovation is crucial in increasing recycling rates. Currently on trial at Veolia Environmental Services UK is the Magpie – a new way of sorting mixed plastics. The device is designed like a luggage carousel, and the waste passes at high speed under an infra-red scanner, which fires a beam at the item. The beam bounces back and tells the Magpie what type of plastic it is by the wavelength and it is then deposited into the appropriate bin by an air nozzle. The scanner counts each piece of material to identify the most common types of waste on the belt. The device can sort up to five tonnes of different types of plastic per hour. Recycling just 1% more plastics, cuts carbon emissions by 300,000 tonnes.

When it comes to recycling, every little counts and so Veolia has been researching a new and innovative street cleaning technique. Recycling street litter is tricky because all the waste gets mixed up: cigarette butts, twigs, leaves or food. Whilst some of this can be manually separated by street cleaners at source, what is left is then sent to landfill or burned at an Energy Recovery Facility. 90% of the waste collected by street cleaning has value and can be recycled. Veolia's innovative technique means valuable materials from the waste and street sweepings can be extracted. Notably, palladium, a rare and precious metal, which is deposited on the streets from catalytic converters in cars, can be segregated from the sweepings. The palladium recovered from road dust has a market value of many tens of thousands of pounds.

Such innovative approaches to environmental issues are highly valuable. In the case of Veolia, they will enable us to turn more waste into a resource and prove Dick Whittington was right – the streets of London really are paved with gold. ■ ***Richard Kirkman, Head of Technology, Veolia Environmental Services (UK) Plc***

Part three: Green values and business

Master of all trades

The green economy offers tremendous opportunities for construction industry professionals, yet can they meet 2020 energy efficiency targets? Lindsey Walker, strategic marketing leader for construction materials company Saint-Gobain, explains how training can unlock a low-carbon future

As the target for achieving low or zero-carbon standards fast approaches, there has been a definite shift in the way the construction industry operates – we're now seeing more collaboration across all levels of the supply chain, as well as greater integration between different product sectors, as the industry gets to grips with a more systems-led approach to construction. The trend towards the use of comprehensive systems and solutions, as opposed to products in isolation, is echoed throughout the supply chain as the industry adopts a joined-up approach to meet legislative requirements.

As a result of legislative changes, builders and contractors are faced with the need to adopt new construction techniques to comply with tighter standards in relation to, for example, air tightness and thermal performance. Ensuring the workforce is equipped with the skills and knowledge is therefore vital if the UK and France are to meet carbon emission reduction targets.

Already, we are seeing changes in the industry as a result of the move towards systems-led specification. For example, solid wall or 'hard to treat' properties make up a large proportion of the existing housing stock in both the UK and France. To improve their energy efficiency, the insulating properties of the outer walls are typically improved using external or internal wall insulation or, increasingly, a combination of the two. As a result, we are already seeing a number of companies branching out and extending their offer, such as drywall contractors offering External Wall Insulation (EWI) expertise.

Despite this, we simply don't have enough trained practitioners to meet the likely demand over the next few years. This was a key driver behind our decision to launch a UK network of Technical Academies earlier this year – so far one in Leicestershire and one in Bristol. Last year, we also launched the Greenworks Training Academy in Birmingham, which offers a range of courses on sustainable product solutions and a renewable technologies, such as solar PV and thermal systems, heat pumps and biomass boilers. They bring together expertise and knowledge from across our UK manufacturing businesses to give customers access to up-to-the-minute information and training on a wide range of products and systems that will enable them to meet the requirements of the sustainable building agenda.

Education is helping the construction industry to go green

Ultimately, if we are to comply with increasingly stringent requirements on the journey to low or zero-carbon construction, it will be essential for all elements of the supply chain, Government and local communities to work together to develop solutions that will not just meet this target but which will leave a legacy of sustainable, comfortable living environments for future generations. ■

Working green at the Lee Tunnel construction site: a case study

MVB, a joint venture of Morgan Sindall, VINCI Construction Grands Projets and Bachy Soletanche, have announced the completion of the excavation of the first shaft at the Beckton site. The shaft is part of the £635m Lee Tunnel project currently underway by Thames Water

The four-mile Lee Tunnel will help prevent 16 million tonnes of sewage entering the River Lee each year during heavy rainfall – a result of London's Victorian sewers not being big enough to cope with a 21st century city which has trebled in size and continues to grow, and has areas of natural drainage concreted over.

The seven-meter diameter tunnel - the width of three London buses – will capture discharges from London's largest combined sewer overflow at Abbey Mills Pumping Station in Stratford, following heavy rain. The tunnel will transfer the flows to Beckton sewage works, which is being expanded by 60 per cent to deal with the increased volumes. The tunnel will reach depths of up to 75 metres.

The Lee Tunnel is one of three schemes that make up Thames Water's London Tideway Improvements programme, to create a cleaner, healthier River Thames. It is the largest project awarded in the UK water industry since its privatisation in 1989. Whilst it remains true that its aim is to improve environmental sustainability, its scale and duration (its completion is expected for 2014) inevitably entail negative consequences for the environment itself. MVB have liaised with the Local Authority to discuss ways in which the disturbance to wildlife could be mitigated. The initiatives that have already been implemented seem simple, but their overall impact should not be underestimated.

The most important project was to compensate for the loss of potential habitats as a result of the works. On the Beckton site, the company has created what they call a 'Hotspot' – an area where around thirty fruit and nut-bearing trees and shrubs have been planted. Bird boxes have also been erected and bird feeders sited outside the main office kitchen window to the delight of the office staff.

MVB's green initiatives are not limited to the construction site itself – their offices too are equally important sites of green activity. One of the initiatives, in which all staff are involved, is the composting of biodegradable waste. The compost produced has been used in on-site planters in which the Environment Team have grown vegetables to distribute among the employees. Apart from the obvious environmental benefits coming from recycling, there is the benefit of having fresh food straight from the garden!

Environmentally-friendly waste disposal options are also in place. For the waste from the main site office, instead of using skips, which need to be emptied frequently thus increasing the company's carbon footprint, MVB opted for two recycling containers (one of them being a combi container), which have only been emptied twice since last August. As a result, the company's choice proved beneficial, both economically and environmentally.

The green spirit of the people working on the Lee Tunnel site is also evident in the company's sustainable travel scheme, encouraging employees to car share or cycle to work. Details of every sustainable journey are recorded and £1 is given to a nominated charity for each of them. This led to £716 being donated to MacMillan Cancer Support in 2010.

The lesson that can be drawn from this case study is that potential side-effects of green projects, such as the Lee Tunnel, can indeed be balanced by positive green initiatives. And it is not only up to companies, but individual staff too, as the MVB example demonstrates. ■ ***AK***

Turning green desires into economic realities

What can corporations do to encourage consumers to choose the sustainable option? More than you may imagine, argues Peter Bragg, General Manager - Environment & Energy at Eurostar International Limited

Ask any group of consumers whether they care about the environment, if climate change concerns them, and whether we should be doing more, and the resounding answer will almost certainly be 'yes'.

Even ignoring the limited effect of the voices of 'climate change denial', most people still recognise a need to act for reasons of energy cost and future supply worries, protecting against loss of biodiversity and habitat, water shortages and ever diminishing landfill space. And if you ask those people, across different sectors, what they are doing about it, most will mention home recycling of their waste, use of energy-efficient light bulbs and perhaps washing clothes at 30˚C.

Those are the easy questions for consumers to answer. From then on, it gets more difficult. If you ask people what more they think should be done, and what they could do, most start to struggle and wonder if their own small actions really make any difference.

Why pay more for green?

These days many consumers expect corporate organisations to help them to become more sustainable. Perhaps the most poignant question is whether people are prepared to spend more to achieve this goal. Research has shown that in most consumer groups, there are perhaps 10-15 percent of people who are committed to buying green products and services and are prepared to pay extra to do so.

On the flip side, 5-10 percent will refuse to engage in any way with the green debate and will absolutely refuse to pay more for a so-called 'greener' product. This group can pretty much be ignored as no matter what you offer them, it is highly unlikely to make a difference to their buying habits or behaviours.

The challenge for organisations today is what to do with the large group in the middle – the 80 percent of people who want to do the right thing but they are unsure where to start, and are unwilling to pay a large premium to do so. Affordability is ever more critical in these difficult economic times and it is patently unrealistic to expect people to pay a premium to be green when many are struggling to afford the basics.

Guaranteed sustainability

So what is the answer? Clearly, offering two products where one is green (but expensive) and another is less sustainable (but cheaper) will have predictable results. However, what many organisations are now doing is helping the consumer by making it simple and only offering products and services that are sustainable. For instance, on a Eurostar journey, a large majority of the food is locally sourced from the country of departure, and it is organic or Fairtrade.

Marks and Spencer have committed themselves to ensure that every product has a sustainable attribute by 2020 as part of their 'Plan A' initiative. By making sustainability the only choice, consumers can be sure that by buying from that retailer, or travelling by Eurostar, they are buying into a sustainable ethos.

Of course the immediate concern is that a premium then has to be paid across the board, but this does not have to be the case. More and more organisations are realising that the new Green Economy provides huge opportunities, not just because it increases revenue on the basis of green credentials and reputation, but also because it delivers significant cost efficiencies (both direct and in the supply chain). In that way, a price premium does not have to be passed on to the customer. By changing the whole organisation to a more sustainable business model, offering a greener product can instead offer real opportunities to gain competitive advantage – and ensure the business's future viability and success. ■

Bringing nuclear into the mainstream of power generation

The industry is facing fewer challenges from political campaigners. Today the core issue for the industry is pricing, and even here, obstacles are being overcome

Nuclear power is expected to account for up to 40% of the British energy mix by 2030. This will be the culmination of a remarkable leap for a fuel source which has been a steady but relatively limited part of the UK scene. Other energy sources on the ascendant alongside nuclear are similarly low-carbon – in particular wind and carbon capture. The UK's position on wind-driven energy is regarded as having great potential, particularly wind harnessed through offshore turbines. The technology of carbon capture lags the two other sources; indeed, some informed industry observers question whether it will perform the part suggested for it by the British government. This will open the way for other energy sources, perhaps including wave, to play a greater role in the mix.

The success of the nuclear component will be adjudged by the speed and efficiency of the primary builder and operator, EDF Energy, to put in place four new facilities in an affordable and timely fashion. The challenge to the nuclear industry is to show that it can handle a new design, namely the European Pressurised Water Reactor, successfully. The UK units built by EDF Energy, working with its co-investor Centrica, will be using a similar design to EDF's Flamanville facility, and Paul Spence, the Director of Strategy and Regulation at EDF Energy argues that by the time the units will be up and running in the UK, the company will benefit from the experience of building and operating it elsewhere.

Further benefits will accrue as each plant is built, using the experience gained in the construction of each previous plant. Mr Spence accepts that electricity produced by the first plant will be more expensive, but as each successive plant is built and operated, the cost per unit will decline. He expects electricity created from nuclear power to compare very favourably to the £140 to £150 per unit cost for offshore wind-generated electricity. The value of multiple units was discovered by the company from its long-established experience in France, where it found costs falling with each unit constructed. 'France built three generations of standard families of the same design and they were able to get the benefits of how quickly and how cost-effectively they could do it.'

The nuclear industry has clearly had to rebuff critics who have been particularly vociferous following the Tsunami and consequent problems at the Fukushima nuclear station in Japan. Here, Mr Spence says that the company has studied the lessons to be learned from what happened in Japan and implemented some protective measures. The industry's strongest riposte to the critics is quite simply the security of supply that nuclear provides, combined with the very low carbon levels emitted, as opposed to gas or coal-fired stations. He says nuclear produces twenty times less carbon than gas, and fifty less than coal. Nuclear is on a par with offshore wind in terms of carbon output.

While the nuclear industry has won the argument with the environmentalists over carbon output, it has still to prove that it can make the technology profitable in a UK environment. But here the industry has welcomed the UK Government's 'Electricity Market Reform' programme. This includes the option of a fixed price for electricity from new low-carbon technologies, an emissions performance standard and capacity payments. It has put a predictable price – the so-called carbon price floor – on carbon emissions. These moves are vital steps to give industry confidence to make the massive and long-term investment that will see a nuclear Britain take off at the time when the country needs it. ■ ***NK***

Unit 1 Fukushima before the disaster

M&S: because there is no Plan B

Marks & Spencer is leading the way in greening the retail sector. Their Plan A, launched in 2007 with a view to becoming the most sustainable major retailer, revolves around five major themes: combating climate change, waste reduction, the use of sustainable raw materials, ethical trade and encouraging customers to lead healthy lifestyles. These, in turn, are divided into as many as 180 specific points, which have to be ticked off by 2015. Among the many commitments the company has made to tackle climate change are: working towards carbon-neutral operations, energy efficiency in stores, warehouses and offices, and turning their transport green.

The project is vast and the deadline is looming. To facilitate the work towards a greener and more sustainable future, the retailer has put a number of partnerships at the heart of Plan A. The World Wildlife Fund, for example, is one of the partners who are helping the change happen. The Fund provides the company with necessary knowledge associated with sustainable sourcing of raw materials. Oxfam, the leader of second-hand retail, has contributed to the plan by sharing their priceless expertise in clothes recycling. Marks and Spencer's carrier bag charging scheme, in turn, has contributed to the work of the environmental charity Groundwork. Little did customers realise that the pennies they spent on plastic bags would help improve parks, play areas and public gardens around the country.

And this is all thanks to the customers themselves – as the company says, it was their own customers' willingness to green their local shop that provided inspiration for the project. ■ ***AK***

Why recycle when you can upcycle?

Upcycling simply means reusing unwanted items by turning them into new products. As opposed to recycling, which relies on extracting useful materials from a product to create a new product of lesser quality, upcycling allows for the creation of a product of better quality or a higher environmental value.

Such a system can help reduce the use of raw materials and the energy used in the process of the manufacturing of raw materials. Apart from being green, upcycling is also economically viable. In developing countries, this method is favoured due to the high cost of raw materials. Apart from the obvious practical reasons, however, upcycling encourages creativity and innovation. This aspect of upcycling is highly valued in the world of design. One example is Inhabitat, a design blog with environmental leanings, which holds an annual upcycling design competition with entries submitted from around the globe **(inhabitat.com)**.

Europe-based businesses with an interest in sustainability could have a chance to bring this rather niche trend into mainstream by creating partnerships with upcycling groups. This has already been attempted with a success in the US, where a creative company Terra Cycle co-operated with brands such as Kraft-Foods, BIC and Aveeno to turn their packaging into items such as bags, toys and garden decorations, and thus contributing to the elimination of waste which is difficult to recycle **(terracycle.net)**. ■ ***AK***