

# Spotlight

## ENERGY: POWERING CHANGE

Alan Whitehead / Claire Perry / Ian Liddell-Grainger



# Spotlight



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# Could higher bills be a good thing?



**F**or anyone who feels that the government doesn't value them, there is now a simple solution: buy an electric car. Last week's Autumn Budget gave the UK's 100,000 EV owners (in a nation of more than 25 million cars) £400m in subsidies for public charging points. This is £50m more than was allocated to support the NHS through the winter.

Once – if – you're able to ignore the beneficence shown to a demographic that has a minimum of £14,000 to spend on a car, it can at least be said that in doing this the Autumn Budget made a commitment to transforming energy use. But the opposite is true for energy generation; alongside the Budget, the Treasury also published the Control for Lower Carbon Levies. This document removes the levies – extra charges added to consumer energy bills – that have subsidised growth in wind farms, solar parks and other renewable energy projects. No new funds will be allocated by the government through low-carbon electricity levies until at least 2025.

For consumers in a country preparing to kick itself into the north Atlantic, any drop in utility bills is unquestionably a good thing. But when the National Audit Office published its most recent research into renewable energy levies last October, it noted that such schemes “can reduce energy costs as well as add to them”, and that “the estimate of the total average annual energy bill in 2020 fell by £268 to £991 between November 2014 and July 2016”. An increasing share of the consumer electricity bill will still be spent on renewables, as private companies invest and generate more; this month also saw the announcement of plans for the UK's biggest ever solar park on a 900-acre site in Kent, to be built subsidy-free. Disruption will happen anyway. But it is up to the government to decide how quickly, and to what extent the country gets to share in the benefits.

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**Spotlight** is the British Society of Magazine Editors' 2017 Launch of the Year. The paper in this magazine originates from timber that is sourced from sustainable forests,

At this year's COP23 summit the Climate Change Minister, **Claire Perry**, launched the Powering Past Coal Alliance – an international commitment to drop unabated coal as a power source. Will Dunn asked what else the government is doing to push green energy up the agenda

# Planning for a coal-free future



## Why is it vital that the world stops using unabated coal for power?

Unabated coal is the dirtiest, most polluting way of generating electricity and there is an urgent need for nations to stop using it. Replacing it with cleaner technologies will significantly reduce our greenhouse gas emissions, improve the health of our communities, and benefit generations to come. The UK is a world leader in promoting clean growth and has reduced emissions on a per-person basis faster than any other G7 nation. We want to share the benefits around the world and want to help other countries do the same.

## What has the UK committed to in forming Powering Past Coal?

Our ambition is to lead the rest of the world in committing to end unabated coal power. Through the declaration, the UK has committed to taking action such as

setting coal phase-out targets, committing to no further investments in coal-fired electricity here or abroad, and supporting clean power through government policies. We are committed to supporting the phase-out of coal through climate finance and technical assistance, aiding other partners in the development of clean energy plans and targets.

## Which power sources do you want the UK to move to as it replaces coal?

The Clean Growth Strategy sets out our ambition to create a diverse range of power that is secure, affordable and clean. This means developing low-carbon sources of electricity, upgrading our system so that it is smarter and more flexible, and taking advantage of innovation, such as energy storage. There is no magic bullet. As we've seen with offshore wind, the approach of



**– but the UK imports millions of tonnes of wood from the US and Canada. Is biomass green?**

Biomass plays an important role in the energy mix – it provides a cost-effective and transitional means of decarbonising the electricity grid, replacing coal used in UK power plants. We have strict criteria in place for biomass power plants in the UK, to ensure that we protect biodiversity, the environment, water quality and ensure sustainable harvesting.

**The campaign group Biofuelwatch found that levels of particulates from Drax, the UK’s largest biomass power station, were equivalent to three million diesel cars. Is biomass clean?**

The Environment Agency imposes robust conditions upon power stations to ensure that they do not put the environment or communities at risk. The company must carry out monitoring for particulates as part of their day-to-day operations, and officers regulate the site closely to ensure that it complies with the requirements of the permit. Drax is currently fully compliant with its permit, which specifies conditions such as limits for emissions to air.

**Will Brexit negatively impact the UK’s ability to meet climate change targets?**

Brexit will not affect the UK’s emissions reductions, as our domestic legislation is more ambitious than targets we have been set by the EU. Whatever the nature of the future UK-EU relationship, the UK will remain committed to international efforts to tackle climate change, and working closely with the EU will remain very important. We are leaving the EU but we are not leaving Europe. We want to continue to be reliable partners, willing allies and close friends with European countries. This includes our relationship with the EU on climate change.

**What’s the next target fuel to reduce in UK power production?**

The UK has shown that tackling climate change and growing the economy, can, and should, go hand in hand. Since 1990, we have cut emissions by more than 40

per cent while our economy has grown by two thirds. Now we want to help other countries do the same. The Clean Growth Strategy sets out a number of pathways for the UK to reduce its carbon emissions in the power sector. As the prices of renewable technologies fall, we will continue to ensure that Britain has the diverse and reliable energy mix it needs while continuing to prosper.

**Does the UK rely too much on gas?**

No – it provides the flexibility and reliability we need. The National Grid estimates that gas demand is not expected to rise but it is still expected to be an important part of the energy mix in the next two decades, accounting for at least two thirds of current demand.

**Is there one technology that you see as being really transformative in the UK’s energy production?**

We expect to see a mix of technologies in the future, including gas, nuclear and renewables. At present, nearly half of all our electricity is generated from low-carbon sources such as offshore wind, solar, biomass and nuclear. Our Clean Growth Strategy sets out a pathway for 2032, in which 85 per cent of energy will come from clean sources. We are also ensuring that energy supplies are reliable and there is always enough electricity to keep the lights on. We have introduced a Capacity Market where companies sell their electricity capacity so that as we phase out unabated coal power, there is no impact on the reliability of our electricity supplies.

**Is better energy consumption as important as better production?**

We need to reduce the emissions created by heating our homes and businesses, which account for almost a third of UK emissions. If done correctly, cutting emissions in these areas can benefit us all through reduced energy bills, which will improve the UK’s productivity, and improved air quality, while the innovation and investment required to drive these emissions down can create more jobs and more export opportunities.

allowing technologies to compete with one another drives down costs for consumers and has made the UK a global leader in the sector. On Monday we will publish our Industrial Strategy setting out how we will help young people develop the skills to do the high-paid, high-skilled jobs of the future. It will propel Britain to global leadership of industries including clean energy.

**Bioenergy accounted for 71 per cent of renewable energy in the UK in 2015, and many coal-fired power stations are converting to biomass. In February, a Chatham House report found that burning wood pellets can lead to higher emissions than coal when comparing technologies of similar ages. The World Wildlife Fund has said that bioenergy “only makes sense when using waste, not wood”**

# Why catching up with climate change must be a policy priority

**Alan Whitehead**, shadow minister of state for energy and climate change, talks to Rohan Banerjee about the urgency surrounding decarbonisation



**W**hile Alan Whitehead welcomes the government's Clean Growth Strategy (CGS), which sets ambitious decarbonisation targets and aims to protect energy-intensive industries, he says it has taken an "unconscionably long time" to release. This means that the United Kingdom is "still playing catch-up when it comes to the fourth and fifth carbon budgets." The CGS, published in October – almost a year later than initially planned – is replete with positive language. The Prime Minister writes in her foreword of the 165-page document: "Clean growth is not an option, but a duty we owe to the next generation, and economic growth has to go hand-in-hand with greater protection for our forests and beaches, clean air and places of outstanding natural beauty." Whitehead suggests that this is really a smokescreen for the harsh realities of the strategy's delay. "The point is that it doesn't get us where we need to go. There's a question mark

still hanging around the government's level of commitment."

The CGS is meant to legislate for the fourth and fifth carbon budgets, spanning 2023-27 and 2028-32, by which the UK must cut its greenhouse gas emissions to below 57 per cent of 1990 levels. These were set out by the 2008 Climate Change Act and are staging posts towards a long-term goal of cutting emissions to 80 per cent below 1990 levels by 2050.

Whitehead warns that the CGS is at a "clear risk of overshooting" on "what it was actually meant to achieve in the first place. It's fallen short of the expectations of the Committee on Climate Change [the independent, non-departmental public body set up in 2008] and while it's encouraging to see that the government wants to address these issues, it's not very clear on exactly how it intends to do that. It looks like we're going to be over-emitting by six per cent on the fourth carbon budget and by nine per cent on the fifth. I know that doesn't sound like a lot but it does mean that on present policies, we'll be leaving out huge amounts of carbon in the atmosphere which will need to be abated more steeply in future budgets."

Whitehead says that the merits of the CGS actually partly lie in "undoing the work of the previous Conservative government". He considered the last government's "effective outlawing of onshore wind and the attack on solar deployment" to be "a series of retrograde steps on carbon reduction following the scrapping of carbon capture and storage (CCS) projects". And the Member of Parliament for Southampton Test notes that spending, rather than cutting, on green issues, is a sea change from the aims of former Prime Minister David Cameron and his chancellor George Osborne, who were privately reported to have targeted the diminishment of "green crap" in the UK's budget. To this effect, Osborne's decision to deny Enterprise Investment Scheme (EIS) tax breaks to companies benefiting from the renewables obligation certificate (ROC) or renewable heat incentive (RHI) meant

that investment in renewables quickly became a less attractive prospect.

Under the current Tory government, Whitehead admits, energy policy “seems to be taken more seriously” but still needs work, specifically on how it delivers low-carbon heat. The government has been slow in looking at alternatives to natural gas and Whitehead personally favours a strategy with CCS at its core. “Carbon storage is central to taking us away from a reliance on baseload and huge redundancies in the system. The heat sector has woefully underperformed in terms of emissions reductions. The targets for the early 2020s are indicative. The conventional wisdom is to solve problems by electrifying everything. Eventually, you might envisage pulling out lots of boilers and replacing them with ground source and air source heat pumps, and other forms of electric heating. But if you were to do that, it would be unbelievably costly and the effect on the electricity system would be immense.”

CCS technology, Whitehead explains, can capture “up to 90 per cent of carbon dioxide (CO<sub>2</sub>) emissions” produced from the use of fossil fuels in industrial processes, stopping it from entering the atmosphere. He suggests that the Labour Party’s preferred route to heat decarbonisation would include “medium-term injection of green gases such as biomethane”, with a longer term shift planned towards a full hydrogen supply. This would complement an expansion of district heating schemes in more densely populated areas, such as Whitehead’s own constituency.

CCS with renewable biomass, Whitehead says, is one of the few carbon abatement technologies that can be used in a “carbon-negative” mode – actually removing CO<sub>2</sub> from the atmosphere. The CCS chain consists of three stages: capturing the CO<sub>2</sub>, transporting it and safely storing it underground in depleted oil and gas fields.

CCS, Whitehead says, will be “vital in keeping energy-intensive industries afloat.” He adds: “It’s a turnkey that’s essential – a lot of other stuff won’t

happen if you haven’t got it in place. It’s not just for power generation – capturing and storing carbon outputs – but when you get into the 2030s then carbon-intensive industries won’t be sustainable without it.” Why not? “The world needs increasing energy supplies to sustain its economic growth. But energy resources are under pressure and CO<sub>2</sub> emissions from our current energy consumption already threaten our climate.”

CCS, Whitehead also points out, could mean that CO<sub>2</sub> is used as a raw material itself. “Converting captured CO<sub>2</sub> into other products might even be viable.” CO<sub>2</sub>Chem, which is an arm of the Engineering and Physical Sciences Research Council, aims to help realise the potential of science that is 20-40 years away. Its recent research suggests that CO<sub>2</sub> could be used directly in

## “Green energy is not a niche activity anymore”

chemical reactions such as cyclic polymers.

Whitehead’s enthusiasm for CCS does not appear to be matched by the incumbent. The Clean Growth Strategy does commit £100m to CCS, but that is just 10 per cent of the £1bn CCS scheme that was promised, and scrapped, by the previous Tory government in 2015. Whitehead states that the new £100m allocation is “frankly not enough”.

While CCS may pose a number of benefits to the energy sector, its opponents – including Greenpeace – warn that it shouldn’t be viewed as a silver bullet, or distract from the importance to ramp up investment in existing renewable schemes. Confronted with the costs of a mass roll-out of CCS, Whitehead acknowledges that additional funds would ultimately have to come

from the Treasury, but countered that making energy efficiency an infrastructure priority would help to deliver wider net economic benefits, such as safeguarding the jobs of people working in energy-intensive industries. Whitehead says that CCS isn’t meant to replace renewables investment, but rather accompany it. “It’s meant to be in addition to, not instead of.”

Given that much of the debate surrounding energy and climate change takes place within an international context – emissions targets are global – Whitehead recognises that the UK’s decision to leave the European Union complicates matters. “Brexit makes things interesting,” he says; but Green Party MEPs Keith Taylor and Molly Scott go further, labelling the CGS “not worth the paper it’s printed on”. As Brexit goes on, there is uncertainty surrounding the terms of the UK’s relationship with the EU; and Whitehead highlights “continued membership of the [EU-affiliated organisations] EU ETS and Euratom as priorities.” He continues: “We’ve still got to have substantial interconnections and also substantial back up capacity across the system and that is where I think Brexit is a particular issue. We need to manage negotiations to remain in the European energy market and the prospects of getting the levels of interconnection we need to back up the system are remote.”

Ultimately, Whitehead argues that any government’s long-term industrial strategy must centre on its cleaner energy commitments. “You’ve got to look at everything in the economy as part of the green paradigm. Green energy is not a niche activity anymore.” And how does the Labour Party intend to supplant the Green Party in leading the left’s charge on environmental issues? “We’ve adopted it [energy policy] as one of our core industrial missions – that some 60 per cent of energy will be renewable or from low-carbon sources by 2030. We’re looking at what green energy policy looks like in terms of skills and employment. We want to convert the UK economy in a wholesale green direction.”

# Making the energy market work for the customer

**Iain Conn,**  
group chief  
executive at  
Centrica plc,  
explains the  
reasoning behind  
the scrapping of  
their Standard  
Variable Tariff,  
and why this  
will benefit their  
customers

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Everyone agrees that the UK retail energy market needs to change. Despite the proliferation of suppliers and price comparison sites in recent years, it is still a confusing place for the average consumer to find the best deal. Many people are simply put off.

Increasing engagement is the main goal of the far-reaching proposals we made on the 20th November. The headline is that we are withdrawing our British Gas Standard Variable Tariff, and we're asking the Government and the regulator to ban this sort of rolling tariff across the industry.

This sounds technical, but it is a radical change. The Standard Variable Tariff is the type of energy bill that most household customers pay. Their supplier can vary the price up or down and there is no end date to the contract. This open-endedness reduces customer engagement, because there is no natural trigger point for them to consider switching to another deal.

From next April, we will offer all new customers only fixed-term contracts. At the end of the period, they'll be offered a choice of at least two other fixed-term deals, and will only be put on a default contract if they don't choose one of them. The default will also be a fixed one year deal. We believe it will encourage customers to engage in their energy choices and it will prevent most people from ending up on a default rate. We will also encourage those people left on legacy Standard Variable Tariffs to move off them, increasing the number of people shopping around. This will encourage better offers from suppliers,

increase competition and so result in better deals for customers.

Instead the government wants to place a price cap on Standard Variable Tariffs. This is not the right solution for customers. There is plenty of evidence from around the world which shows that price caps don't work. Where they have been tried, customers actually end up with less choice and, in many cases, average prices have gone up, not down. Prices also tend to cluster around the cap, as has been seen recently with university tuition fees in the UK.

We think there are better ways in which the government, and the regulator, can help to create a fairer market. We're calling for energy policy costs, which subsidise new forms of renewable power generation and keep power stations open, to be moved off the bill and paid for another way, such as through general taxation.

This would cut the average household energy bill by around £200 a year. It will have to be paid for somehow, such as through taxation, but today the cost of government energy policy is borne disproportionately by those who can least afford it. We don't think that's fair. If the cost were paid for out of taxation, it would be linked to ability to pay.

Protecting and helping customers who need it should also be a priority for all energy suppliers. Today, many firms are exempt from the legal obligation to help vulnerable customers. But the UK is now a mature energy market, with more than 60 suppliers. Every energy company should do its bit and we are asking the government to end exemptions in this area.

People have said that withdrawing our Standard Variable Tariff is simply a tactical response to the threat of price caps. It is not. We have consistently called for it. Our proposals are a comprehensive package of measures which will deliver a fairer, more competitive and sustainable energy market for customers and will be significantly more effective than temporary government price controls.

Visit us at [www.centrica.com/energymarket](http://www.centrica.com/energymarket)

# Avoiding the costly dangers of energy procurement

Consultants can help companies anticipate and sidestep common mistakes when it comes to annual energy procurement, explains **Joe Anderson**, chief executive of Black Sheep Utilities

**F**or all but the largest businesses, energy procurement is at best an annual inconvenience and at worst an annual opportunity to make a costly mistake. Every business uses energy: it's not particularly exciting, but it is essential. You may as well follow some simple guidelines to get the most value from your energy procurement.

Black Sheep Utilities is one of the fastest growing and successful business energy consultancies. As founder and CEO, I saw an opportunity to stand out from the 1000's of energy brokers and do something different.

I wanted to change the way companies look at energy brokers, to make it simple and easy to understand. We only exist because the energy companies do not look after their customers properly and make things far too complicated. Our team enjoys helping people save the most time and money possible. We come across companies all the time who have made terrible procurement decisions in the past and it can cost vast sums of money if you get it wrong.

Here's a few of the most common mistakes companies make with their energy procurement.

## **"Basket deals" or "group buying"**

"Basket deals" or "group buying deals" are marketed as opportunities for many businesses to get together and buy energy on mass. The benefits should be greater buying power and better prices. Sounds logical, right? Wrong! These basket deals are almost always more expensive, and it means you lose any control over which supplier you

choose, or which contract you agree to. The suppliers charge admin fees and brokering fees and the organisers have complete control over your energy procurement and often earn large margins. Everyone gets a good deal except the end user.

## **Going direct to a supplier**

Sometimes businesses get lucky and buy at the right time and call the right supplier and arrange the right contract. However, 80 per cent of businesses with an energy expenditure of more than £20,000 per annum use a broker or consultant. 80 per cent of businesses can't be wrong. They get better service, better value and better advice. So we would advise the use of the services of a broker or consultant.

## **Buying short-term, or at the last moment, in the hope energy prices will go down**

In the past many companies have left securing their energy contracts until they received their renewal letter and then, at the last minute, negotiated better rates. Unfortunately, this is not the case. In a rising market, prices are 20-30 per cent higher now than they were 12 months ago. If you start the procurement process early you have the option to wait, but if you leave it too late you have less options.

## **Getting many brokers to supply quotes**

Suppliers must price larger energy quotes manually and on a bespoke basis. All brokers and consultants get very similar prices from suppliers. Getting 20 different quotes will just get you the same prices in different formats. It will make it harder to make the right decisions. Find one or two consultants you trust and ask them to give you a full analysis of the market.

Energy procurement shouldn't be complicated; it should be simple and easy to understand. That's what we do. We are ranked in the top one percent of all the UK business brokers and it's down to the simple way we look at your energy.

**Black Sheep Utilities can be contacted on 01273 914000 or visit us at [www.blacksheeputilities.co.uk](http://www.blacksheeputilities.co.uk)**

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Are the big six at risk of being displaced by an increasing number of council-owned, not-for-profit energy companies?  
**Augusta Riddy** investigates

# Energy nationalisation is already happening



In September 2015 Robin Hood Energy, owned and set up by Nottingham City Council, started supplying energy to Nottingham residents on a not-for-profit basis. It has since partnered with Leeds, Liverpool and Derby councils, supplying them with energy and continuing to challenge the “big six” established providers. Bristol City Council followed suit in February 2016, setting up Bristol Energy to serve Bristolians, and customers further afield.

The increasing prevalence and reduced price of the green energy sources rapidly changing our energy mix, combined with turbulence in fossil markets, is putting pressure on the established energy providers known as the “big six”. GB Energy went bust last year, citing “swift and significant increases in energy prices”. “They hadn’t bought [energy] for their customers,” explains managing director of Bristol Energy, Peter Haigh.

Centrica, big six provider and owner of British Gas, suffered a 15 per cent loss in the value of its shares in a single day last week, and is expected to only break even this year, in part due to “highly competitive [UK] market conditions”. The last few years have seen a number of sprightly, council-owned companies take on the tired energy market. With a greener future almost inevitable – something that will harm the more fossil-reliant established energy providers – and local authorities keen to claw back control over basic services, the market is ripe for disruption.

Laurie Laybourn-Langton, senior research fellow at IPPR, says these new municipal companies have three main aims: to alleviate fuel poverty, generate revenue for otherwise austerity-stricken councils, and increase the levels of green supplies in energy usage. He points out that the business model of these

companies is the exact opposite of large corporates. “These council-owned energy companies are actively seeking to bring customers onto lower tariffs to provide them with the ability to use less energy, which is an exact inversion of the business model of the big six.”

According to Bristol Energy, 25,000 households in Bristol alone are experiencing fuel poverty, and that number is growing. The provider now has 110,000 customers. It buys a mixture of energy “from the national grid, and renewables under separate contracts,” explains Haigh. Its relationship with Bristol city council, which owns the shares, is largely like any other stakeholder-company board relationship, but it is also about “governance and ethos. It’s about serving the citizens of Bristol.” Any revenue is invested back into the city as the council sees fit. “We’ve already saved the city millions of



pounds in terms of savings that have gone back into the local economy.”

This year Ofgem found that the average standard variable tariff is £300 more expensive than the cheapest one available. Bristol Energy offer a range of tariffs, and claim that their cheapest tariff is £260 a year cheaper than the average big six deal. “We always make sure that the pricing of those tariffs, whatever mechanism a customer

## Revenue is invested back into the local economy

SHUTTERSTOCK/MARK ATKINS

chooses, is fair,” says Haigh. Central to its business model is the concept of inclusivity. “From the outset, you’ve got to look at as many channels as you can for your customers to be able to engage with you. Most of our customers will be very happy using the internet and the portal, [but] some will want to wander into the hub, right here in the centre of Bristol. We’ll make you a cup of tea, we’ll go through the paperwork, and we’ll tell you why your old supplier is telling you a load of rubbish.”

A huge part of the success that companies such as Bristol Energy are experiencing is reported to be due to high levels of trust “because they’re associated with local authorities,” says Laybourn-Langton. For Haigh, it all comes down to trust, and he doesn’t pull his punches. “We never, ever lose sight of the fact that the stuff we sell heats your home and cooks your food ... If

your business model is absolutely pivoted on ripping off customers who displayed loyalty to you then you deserve to be found out and action deserves to be taken against you.”

Laybourn-Langton explains that evidence points to a sharp increase in competition. “We can measure [regions’] competitiveness when it comes to the price of energy and the East Midlands moved from somewhere around 7th position to 1st position after Robin Hood Energy was created.” For the big six, he argues, these municipal providers present a serious problem; it is difficult to outdo a company whose motivation is not profit. “How are [the big six] going to come up against this wall where their business model is still geared around massive scale energy that is not de-carbonising, and they do earn extraordinary amount of profit from exploiting the fact that people aren’t switching or aren’t aware

## “We want to see London generating its own energy”

that switching exists?”

The trend is escalating, no doubt to the dismay of the big six. In her 2017 conference speech, Scottish first minister Nicola Sturgeon announced her intention to create a publicly-owned energy firm for Scotland by 2021. The SNP’s business, innovation and energy minister Paul Wheelhouse explains the reasoning behind this commitment: “In 2015 almost a third of Scottish households were in fuel poverty, largely as a result of fuel price increases rising far faster than wages. The UK government have repeatedly failed to provide the competitive and fair market which hard-pressed consumers deserve, so the Scottish government is looking to establish a publicly-owned energy company to help deliver lower, and fairer, prices. Once established, it is our intention that the company will provide more choice for consumers and the option of a supplier whose aim is to secure the lowest possible price for them.”

Emma Hughes from Switched On London – a group campaigning for a London-based, not-for-profit energy provider argues that London is the perfect market for the introduction of a fully-licensed publicly-owned supplier. “The size of London actually makes it particularly appropriate for an energy company. There is a viable supply market.” She believes City Hall could make sure that there was adequate demand from the off. “The Mayor could set up contracts to supply a certain amount of, say, TFL’s energy, the Metropolitan Police’s energy. It has a guaranteed customer base. It’s really much less risky

for London to do it than other cities.”

During Sadiq Khan’s 2016 campaign to be Mayor of London, he made a bold pledge to create a not-for-profit municipal energy company to serve Londoners. Since then, he has backed away from this promise, instead opting for a white label, or “license-light” company, in which a partnership is created with an existing energy provider, such as the arrangement existing between Robin Hood and Leeds, and other city councils. “License-light is where you pair with a big supplier, you put your branding on top and they’re working behind the scenes,” Laybourn-Langton explains.

The Institute For Public Policy Research (IPPR) believes that for a meaningful reduction in fuel poverty, and an increase in green energy usage, the company must be fully licensed, and autonomous. “It’s only through being a fully licensed supplier that you could provide the full range of things that London really needs,” argues Laybourn-Langton. He points out that a private company working with City Hall, or the Greater London Authority, will have no motivation to scale demand management and reduce the rate of consumption, especially of fossil fuel energy. “You’re still locked into their conflict of interest for their business model, whereas if you’re a fully licensed supplier you are your own separate entity.”

Hughes says that by the Mayor’s own measures, a license-light option will not provide the solutions for London’s requirements. “His own study showed that a white label is not going to deliver the same amount of job creation and it’s not going to give us control over tariffs. There’s a concern that the local energy companies created through a white label would end up with a higher prevailing market tariff that the standard market rate, so it’s going to do nothing to alleviate fuel poverty.”

She believes the City Hall retreat from a municipal provider is “political opportunism at its worst” as the time taken to set up a fully licensed supplier is likely to outlive Khan’s mayoral term. A

lot of work was already completed under the Johnson administration to put a white label company in place, and would only take roughly two years to implement.

Hughes believes that, ultimately, London could not only be providing energy, but generating it. “London could be buying wind farms in the North East ... putting solar panels on bus shelters. We want to see London generating.” Laybourn-Langton agrees with this long-term vision; “you want to also be getting energy from the assets that you’re encouraging the investment in and creation of throughout London.” Bristol city council is leading the charge in this respect, as Haigh explains: “Bristol as a shareholder already has quite a bit of its own generation. It has wind farms out at Bristol dockside; you’ve got solar panels that are on the roofs of a number of buildings across the city.” Bristol Energy is the only provider to offer the choice to use 100 per cent renewable energy.

Greenpeace supports the growth of municipal energy companies as a means of speeding up transition to green energy usage in the UK. “Clean power projects run by communities or councils have a real potential to shake up our energy market for the benefit of bill payers and the environment,” says energy campaigner Elizabeth Whitebread. “Especially now that the costs of renewable energy are falling fast, the government should look to remove barriers for community energy projects while councils should seize the opportunity to step into this market.”

Hughes thinks the creation of these companies says a lot about the failure of the established energy suppliers to fight back. “I think the story that isn’t being told here is that the big six are actually in trouble ... [they] aren’t doing well.” When Bristol Energy first entered the market, did the big firms apply negative pressure? “To be fair, they didn’t,” Haigh says. “I think the days of the big six acting out that way are behind us.” City Hall may be dithering, but for consumers the lines are starting to be drawn between the price of fuel, both in monetary and carbon terms, and those who provide it.

# Is green the new black?

**Chris Anderson, chief executive of 4C Offshore, argues that green energy is now, more than ever, a realistic and affordable alternative to oil and gas**

**C**oal, oil and gas used to be the measure of a nation's wealth. Trading fossil-based stocks led to key exchanges that dominated the world's economies. However, mounting evidence shows an association with fossil fuels is seen more as a liability than an asset. In fact, companies are disassociating oil and gas from their corporate identity.

The former Danish Oil & Natural Gas became Dong Energy and recently renamed itself Ørsted, after a Danish scientist who discovered electric currents create magnetic fields. Chairman Thomas Thune Andersen stated "the reason for the name change is ... the comprehensive strategic transformation from black to green energy."

In April 2016, RWE, Germany's largest utility, moved its renewable energy, network and retail businesses into the newly formed innogy, leaving the traditional carbon and nuclear assets behind. Peter Terium, innogy CEO stated that "innogy is ideally positioned to benefit from the megatrends of decarbonisation, decentralisation and digitalisation in helping to shape the energy transition."

The Royal Dutch Shell CEO, at CERAWEEK, strangely proposed policies be put in place that include government-led carbon pricing mechanisms, regulations that speed up investment in low-carbon technologies and move demand away from high-carbon energy.

Norway, whose wealth was built on oil and gas, has been advised by the bank handling their sovereign wealth fund to drop investments in oil and gas, reducing vulnerability to a permanent drop in price.

## So what is happening?

There are obvious pressures from climate, pollution and emissions agreements.

However, I suggest a number of external factors have now collided. The 2014 drop in oil prices followed by an unusually slow recovery demonstrated the destabilising effect that dependence on oil and gas can have on nations. When UK energy prices dropped so did exchequer revenue, and jobs were lost.

Furthermore, newer green solutions are being implemented, or are imminent.

Capital expenditure costs for renewables have seen a dramatic fall. Offshore wind, once considered an expensive experiment, halved its subsidy requirement in only the second UK government competitive auction. It is set to be subsidy-free in 3-5 years. Solar is on a similar trajectory.

Renewables' contribution to the UK electricity grid reached 25 per cent of total supply, showing that renewables work. Plans for offshore wind developments alone by 2030 show a pipeline of projects worth over 90GW of capacity in 40 countries.

Technologies are now available to allow transport to be electrified. Major vehicle manufacturers either offer or are preparing to offer a range of electric vehicles to compete with their diesel and petrol counterparts. New larger trucks are being planned, capable of pulling 36 tonnes over a 500 mile range.

Recharging infrastructure is being rolled out in countries worldwide. New building materials and construction technologies have improved energy conservation that enables lower energy intensities to control building comfort. This is good news for electricity-based systems as they can now be used cost effectively.

It has been argued that without coal, oil or gas we would have to curb our long-term energy needs. The indication is that this is no longer true. There is much to do, but the new energy transition is happening, and as new energy technologies improve, there is a promise of an abundant, affordable green energy future.

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# Why Hinkley Point C is an investment well worth the wait



**Nuclear power has transformative potential for the UK's energy sector which should be embraced, according to Ian Liddell-Grainger, chair of the APPG on energy studies**

**I**t is a strange feeling to be part of a new industrial revolution in the United Kingdom – that is what I believe the construction of Hinkley Point C really means. It will bring thousands of jobs into Somerset and secure the future of many more elsewhere across the country. Big-name British companies will benefit; and hundreds of smaller firms with specialist expertise in forgings, valves, pumps, cranes, electronics, refrigeration and every other industrial discipline are also in line for contracts.

The impact upon my constituency is enormous. It is no exaggeration to say that Hinkley C is changing life in Bridgwater and West Somerset for the good. This is an infrastructure scheme that dwarfs the London Olympic Games. It is the largest project ever undertaken in Europe. The investment will top some £20bn.

I was a twinkle in my mother's eye when the diggers arrived on that windy stretch of land by the Bristol Channel and started to prepare the site for Hinkley A, Britain's first new Magnox power station. Back then, as is the case now, there was national concern about

meeting ever-increasing demands for electricity. Nuclear power provided a timely and cost-efficient answer. Hinkley A was completed in 1957 and came into operation around my sixth birthday. It generated power for 35 successful years. Many of the technicians who ran the plant still live in the area. Who can blame them? This part of Somerset is special.

Hinkley B was a more advanced version. It was switched on in 1976 and has been generating ever since. Chances are it will still be going strong until Hinkley C is ready to roll. During that time the policy of different governments towards nuclear energy wavered and changed. Incidents and accidents elsewhere in the world turned public opinion sour about the risks. But perhaps the biggest deterrent to investment by the state was the size of the sums involved.

The old nationalised Central Electricity Generating Board wanted to build a new pressurised water reactor at Hinkley as long ago as 1990. The government of the day balked at the cost. Instead, they privatised the industry and allowed the French company EDF to purchase all the assets of British Energy,



**Hinkley B has been generating electricity for 35 years**



## The nuclear solution is accepted as carbon-friendly

EDF ENERGY

including Hinkley. Throughout this change of ownership Hinkley B kept on generating power. By the time Hinkley C comes on stream its predecessor will have clocked up 50 years of active service.

Such a lifespan is rare in industry. Computers, mobile phones, washing machines and cars are all considered out of date after a very few years. It requires a completely different commercial or governmental mindset to pioneer and manage such projects. I have watched EDF at work in my constituency for almost two decades. I have come to understand – and admire – their patience and dogged determination to pursue an idea that will not earn them a single penny piece for at least 25 years.

Power stations like this require exacting standards and astronomic investment. They have to be built to last. The development of this project could never afford to ride rough-shod over the anxieties of local residents. The planning, and public information provided by the company has been exemplary – helped, it must be said, by the painstaking efforts of Sedgemoor District Council to negotiate generous compensation

agreements from EDF and ensure that Whitehall was always on side.

The rewards are already significant. Bridgwater is now recognised nationally as a vital hub in the development of nuclear energy. We are training tomorrow’s nuclear engineers. We now have a new, vibrant Somerset Energy Innovation Centre helping to link local companies to the ever hungry Hinkley supply chain. There are job opportunities, business openings, and a real buzz in an area that survived the recession and is now heading for a new prosperity.

The safety records of Hinkley A and Hinkley B have been excellent. The public have good reason to believe that all the risks – and, of course, there are a few – have been properly calculated and intelligently minimised.

Inevitably, there are those who continue to argue against nuclear power. But they are a shrinking minority. Every reliable poll of public opinion now suggests that the nuclear solution is widely accepted as carbon-friendly. And the high price of installation is evened out by the very long life of every new power plant. Most people realise that “when the sun don’t shine and the wind won’t blow” we cannot rely on so-called “green” technologies of solar and wind power. Renewable energy is not the only answer to meeting Britain’s electricity needs. The “strike” price – to be paid by the government for power that Hinkley C will eventually produce – was always controversial. EDF struck a bargain that many consider hard. But I know the government worked equally hard to secure that fine balance between paying a fair price and looking after public interest.

So-called “Little Englanders” may be miffed that this is a French innovation financed with French money. But the ancient history of Hinkley has some important lessons. In Neolithic times a tribe, known as the Beaker people, arrived from France and settled on the peninsula. They came with something entirely new: the vital know-how to extract metal from the ground and make it work for mankind. Today, if you drive out to Hinkley, you can still see Wick Barrow, the Bronze Age burial mound, where the Beaker people’s remains were discovered. The French have been innovating at Hinkley for 4,000 years.

# How fuel poverty is burdening the UK economy and the NHS



**More than 2.5m households across the country are struggling to pay their heating and electricity bills. Rohan Banerjee talked to industry experts and policy influencers about the links between energy policy and people's wellbeing**

**F**uel poverty is a quiet crisis affecting millions of low-income households across the United Kingdom.

According to the Warm Homes and Energy Conservation Act, the term describes the inability to “keep a home warm at a reasonable cost” and figures from the Department for Business, Energy and Industrial Strategy (BEIS) indicate that almost 60,000 households in Birmingham alone can be considered fuel-poor. Local authorities further north, including Liverpool, Manchester and much of Yorkshire are also under particular pressure.

Dr Lucie Middlemiss, of the School of Earth and Environment at the University of Leeds, signposts three core drivers behind fuel poverty. “Inefficient buildings and appliances, inadequate incomes, and high-cost energy bills in the UK all contribute. People on low incomes often experience all three of these drivers, given that they are more likely to live in poorly maintained buildings, and to have limited access to opportunities to switch supplier. There are also other factors that

tend to exacerbate people's vulnerability to this problem – if you are ill, or if you are a rental tenant that does not dare challenge their landlord to improve their property.”

Peter Smith, director of policy at National Energy Action (NEA), a pressure group dedicated to tackling fuel poverty, says the situation in the UK is more serious than the government would like to let on. Like Middlemiss, he links the hikes in energy prices – for example, British Gas customers were hit with a 12.5 per cent rise (£76 per year) on their electricity bill in September – to wider problems relating to physical health and wellbeing. “There are thousands of people with existing medical conditions facing a winter without any effective space heating or hot water, which presents yet another issue to an already stretched National Health Service. Whatever definition of fuel poverty is applied, the point is that living in damp, cold homes impairs people's health and this contributes to an excess of 31,250 winter deaths which occur in the



## “Cold homes contribute to 31,250 deaths each winter”

SHUTTERSTOCK/MONKEY BUSINESS IMAGES

UK every year. This is not acceptable in the fifth-largest economy in the world.” NEA’s research estimated that over the past four years approximately £5bn of taxpayers’ money has been spent treating conditions worsened by insufficiently heated homes, including heart disease, asthma and arthritis.

The MP for Barnsley Central Dan Jarvis points out that the health risks associated with fuel poverty are most pronounced in elderly communities. He recalls the experiences of one of his constituents. “Some of the stories from those most at risk over the winter months are heart-breaking, like that of William – a low-income pensioner struggling to get by. It is a choice between heating and eating. William served in the navy, but he is now reduced to living in a home he calls a ‘shack’. He suffers with respiratory problems and has to keep his flat warm to protect his health, but the money he spends on heating often stops him from putting a decent meal on the table.”

As well as the rise in energy costs – which Middlemiss attributes to an

“under-regulated market” – recent NEA research suggests that government cuts to support for replacing and repairing boilers have consolidated the fuel poverty problem. The number of replacement boilers being fitted through the energy company obligation (ECO) has dropped from a high of 85,000 in 2013 to an all-time low of 7,000 between April and June this year. The scheme, set up by the government in 2013, has had its annual budget slashed from £800m to £640m. The ECO is paid for by the so-called big six energy firms in the UK, adding around £50 annually to the average gas and electricity bill, and each obligated supplier has a target set for based on its share of the market.

The money generated by the ECO is spent on making housing stock more energy-efficient by introducing measures such as loft insulation. It also helps low-income households to replace old or inefficient utilities. But recently the scheme’s budget has been concentrated on replacing a small number of defective boilers, rather than repairing them. While reducing ECO commitments might drive down the initial cost of an energy bill for the consumer, the “short-termism” of such thinking, Smith highlights, is exposed if one considers the long-term costs, in both monetary and health terms, to a household unable to pay for repairs or replacements themselves. Indeed, NEA’s findings showed engineers and local authorities were liaising regularly with people who had their utilities identified as sub-standard but could not afford to fix them because of a lack of financial support from the state.

Maria Wardrobe, NEA’s director of communications, outlines the organisation’s Warm Homes Campaign as part of a potential solution. She says: “NEA is calling for five key actions this winter. An immediate priority is to stop families having to go the entire Christmas period not heating. The government needs to reverse the freeze on working-age benefits, energy discounts and tax credits by uprating them in line with inflation.” She adds: “NEA calls for

## “The price cap now has the support of MPs from all parties”

smaller suppliers to deliver energy rebates via the Warm Home Discount scheme, helping to extend the planned price cap to other vulnerable customers. The chancellor should provide emergency assistance for low-income households that are living without a functioning heating system.”

Reducing ECO commitments becomes even more of a challenge if suppliers are able to raise their prices at will anyway. The ECO scheme has attracted criticism from the big six, who claim that it puts them at a disadvantage because smaller rivals don't have to do the same. And Lucie Middlemiss says: “It is difficult to incentivise energy efficiency for the energy companies – given that this reduces the amount of profits they can make. Some companies do engage with this agenda, but it does not make sense to leave it entirely to the market, given that the main purpose of energy companies is to sell more energy and to make a profit.”

The management of the UK's energy market is certainly a political football and increased regulation has been touted by



both the Conservatives and Labour in recent years. The Prime Minister pledged a “crackdown on rip-off energy prices” in her 2017 manifesto, her proposed relative caps not massively dissimilar to a policy tabled by former Labour leader Ed Miliband four years previously; a policy which the *Daily Mail* called “Marxist” and “dangerous”.

The big six have reasoned their price hikes by pointing towards a blend of rising wholesale costs, installation of smart meters and government policies with decarbonisation targets paid for through bills. Subsidies added to bills to support renewable power, they say, mean that prices have to rise in order to cover them. Middlemiss says: “If energy policy was paid for through general taxation instead of levied on energy bills, this would make for a fairer distribution of costs. This could also be a way of ensuring more substantial investment in energy efficiency.”

Smith warns that energy policy must not be viewed in isolation but rather as an “infrastructure priority”. The wider

impact of poor energy policy, Smith explains, stretches beyond the cost of the initial bill and into the overall economy and people's welfare. “Beating fuel poverty will contribute towards achieving other government objectives, including delivering a successful industrial strategy, carbon emissions reductions and reducing health and social care costs.”

While public appetite for nationalisation of the energy market might have been whetted by the blue-skying of Labour's 2017 manifesto, the editor of *Management Today* Matthew Gwyther notes: “The shareholders of these [energy] businesses are not going to go away quietly without massive pay-offs.” Strengthening regulation, then, both in the context of the energy market itself, and in housing maintenance standards, seems to be the more viable for any government to take. Jarvis says: “Ofgem must be given the ability to bring real pressure to bear on energy companies – and implement the price cap which now has the support of MPs from all parties.”

# “Green” gas could unlock our future energy needs

**Mike Foster,**  
**chief executive**  
**of the Energy and**  
**Utilities Alliance**  
**(EUA), explains,**  
**from an industry**  
**perspective, what**  
**is needed to get**  
**the UK firmly**  
**on the path to**  
**carbon reduction**

**E**nergy underpins everything we do. Without it the world in which we live would be radically different. In order to maintain our current and future energy demands, we must manage the energy trilemma – affordability, security, and sustainability. To do that it is imperative that we have the supporting policy, to drive down emissions and drive up energy efficiency standards. The existing policies are insufficient and coupled with the current political backdrop, means that we have investors unwilling to invest and businesses confused.

In addition to improving energy efficiency, if we are serious about tackling climate change we must utilise all of the “tools” and energy sources available to us. As a result of natural gas abundance, the UK has the world’s leading gas grid infrastructure in place, directly supplying the energy to heat 85 per cent of UK homes. It would be a travesty not to use this existing infrastructure as part of the solution to the trilemma, and “green” gas could be the key.

There is no definition of what “green” gas is; indeed, this is part of the attraction in that there is no winner or silver bullet but instead a range of green gases. Perhaps “low carbon” gas is a better description.

## **Biomethane**

This is the gas captured from waste processing, typically anaerobic digestion. The technology is proven – it has worked for years. For example, Severn Trent clean up the biomethane from their Minworth sewerage works and inject the

“green” gas into the grid.

## **BioSNG**

A “green” gas that achieves its status because it uses waste materials, usually sent to landfill or incineration, to create the gas. The process is technically complex; it involves Advanced Plasma technology. Ofgem has awarded Cadent funding to develop a commercial scale plant in Swindon, having seen the success of smaller trials of the technology. The alternative use of waste gives the gas its “green” credentials. The Swindon plant envisages supplying gas for HGVs but there is nothing to stop it being fed into the gas grid for everyday use once it is blended to reach the gas quality standards required.

## **Hydrogen**

Currently produced from natural gas using Steam Methane Reforming, where the carbon can then be captured, so when used it emits no carbon dioxide. The question is how much hydrogen can be used and in what manner? It is possible, within existing gas quality guidelines, to mix up to 2 per cent of hydrogen into the blend that flows through the gas grid. The HyDeploy project will examine the feasibility of blending up to 20 per cent hydrogen with methane directly into a gas grid – remember this makes the overall mix of gas “greener”. Before conversion to “natural gas” locally produced “town gas” was roughly a 50:50 mix of methane and hydrogen. However, Northern Gas Networks are conducting a feasibility study into 100 per cent hydrogen through the gas grid. Their Leeds 21 study is arousing considerable interest within the industry on the basis that it envisages using the existing gas grid, conventional heating systems such as central heating in the home saving about three quarters of the overall carbon emissions.

This article is not designed to reach the conclusion that one single option can solve the UK’s energy trilemma. There is no silver bullet but gas and the existing network are invaluable tools at our disposal.

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# Is CCS a solution in waiting?

**Carbon capture and storage technologies can help the fight against climate change, says research associate at the UCL Institute for Sustainable Resources and standup comedian, Matt Winning**

**A**s a standup comedian and environmental economist my two jobs mostly revolve around trying to create a good atmosphere. And here I'm going to talk about the elephant not yet in the room – carbon capture and storage (CCS).

The transition towards a low-carbon global energy system, which is required to stop dangerous climate change, is now well underway. In a year where new offshore wind is considerably cheaper than new nuclear energy in the United Kingdom and with solar costs dropping like it's hot – since 2010 new solar PV costs have dropped 70 per cent and Mexican solar just reached 1.77 cents/kWh in November – it feels like things are finally kicking into gear.

However, if we go all Mystic Meg and look further into the future then things appear to get as tough as finding someone who is doing Tough Mudder not talking about doing Tough Mudder. Tough! So what do we do once, not only the low-hanging fruit has gone, but we've also climbed our only ladder and picked all the fruit we know exists? Well, we need to rely on new reverse-ladders that



suck the fruit out of the trees. Or a giant peach. Okay, ignore the fruit metaphor!

The problem is that we have a growing global population and resultant energy demand which needs to be met while simultaneously reducing our net emissions to zero (just like Captain Planet always told us) in the second half of the century. And pretty much all studies suggest that to achieve this we need to deploy CCS technologies across many sectors.

CCS refers to a range of technologies that capture the CO<sub>2</sub> from a variety of processes, for example coal power generation, and then store the resulting carbon in the ground. All of the good stuff without the side-effects. Like whisky without the hangover. Imagine if you could eat all the donuts you wanted but your digestive system removed all the fat and stored it in your toenails. You could literally have your cake and eat it.

In the context of achieving the Paris Agreement goals, almost all Integrated Assessment Models used in the IPCC reports deploy CCS to varying degrees. In particular, these computer models rely on the availability of coal, gas or oil with

The Statoil Sleipner Platform in the North Sea has had an operational CCS project since 1996



## Without CCS, the Paris targets are infeasible

CARBON CAPTURE & STORAGE ASSOCIATION

CCS in order to cut emissions as well as negative emissions technologies such as Bio-energy with CCS (BECCS) or even direct air capture – another slightly more expensive option where we actually suck CO<sub>2</sub> out of the atmosphere rather than removing the emissions at source. Imagine a giant Dyson vacuum cleaner but probably less expensive.

The benefit of CCS is that it allows current, proven technologies to be continued in tandem with newer technologies as part of a portfolio of supply-side mitigation options, and is importantly able to balance issues surrounding less developed technologies, such as the intermittency of renewables.

The main problem with CCS, and it's a rather big one, is it doesn't really exist yet. Certainly not at scale. Yeah, that's a bit of an issue. Basically we're dependent upon something that doesn't yet exist to solve climate change. I'm not going to sugar-coat that fact for you because it would require more deforestation to grow the sugar cane and simply make things worse. And there are other issues including security of storage, scaling up, economic viability and public acceptance.

What has been most surprising to me is the lack of investment by fossil fuel companies into CCS. If you were a terminally ill rich person and found out about a magical technology which might save, or at least prolong, your life you'd probably invest in it. Instead many coal, oil and gas companies have continued spending revenue on fidget spinners and searching for new reserves which may well become stranded in the future, rather than focus on developing a technology which would allow them to burn their current reserves even in light of movements to stop unabated coal, such as the UK's commitment to phase it out in electricity by 2025. Coal, gas and oil is also the name of a very good Earth, Wind and Fire tribute act.

In particular, CCS appears critical to reduce emissions in hard-to-decarbonise industries such as cement, iron and steel,

and paper, where there is less ability to substitute towards alternatives.

Also, CCS cannot simply be considered the same as renewables as it doesn't produce energy but instead simply removes the negative externality of producing energy. Therefore there is an extremely important role for government here to help development as without strong incentives such as a carbon price then the necessary investment will not occur. In fact there are a number of extra actors (not Benedict Cumberbatch) and more complex supply-chain considerations in the development of CCS plants and with this more complicated regulatory framework can come extra associated costs and risks.

Therefore government can help mitigate these by providing whole-chain support. In the Clean Growth Strategy the UK Government has committed £100m for CCS demonstration. This is ten times less than we were going to invest a few years ago before George Osborne cancelled the initial CCS competition. Basically nothing. And we're still ahead of the curve.

It is my opinion that the risks of not having CCS outweigh the risks of developing the technology, in light of achieving a "well-below 20°C" world and especially for a "towards 1.50°C" future. A "best case" without CCS means the costs to the energy system are significantly larger than would otherwise be and a "worst case" without CCS simply makes the Paris targets infeasible.

Therefore, steps (not the band) need to be taken now so that the technology properly exists in 20 or 30 years' time as the other options are either too dangerous, too costly or require fundamental change in our economies, for example large-scale demand reduction. None of which we can rule out either. It seems a fairly simple solution, then – support and develop CCS. But given the distinct lack of coordinated action thus far, I think we should also be considering some of these plan Bs (not the musician).

# Winning strategies in a subsidy-free market

**Jeremy Sainsbury,**  
director at  
**Natural Power,**  
explores how  
renewable energy  
can continue  
to stay competitive  
and attractive in  
the international  
energy market

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**T**en years ago few would have predicted the tumbling prices that have been witnessed in the renewable energy markets this year. In September's UK Contracts for Difference (CfD) auction, 3.2GW of support across three strategic offshore wind projects was announced with lower than anticipated bids making headlines in the mainstream press. In fact, prices for offshore wind have fallen 60% in the UK and Denmark since 2013. Competitive auctions for onshore wind and solar energy have also seen dramatic price drops. In the three months between German EEG auction rounds this year, prices fell by a quarter to €42.8/MWh.

Renewable energy has proven that it can compete in the price war, but in order to keep the industry attractive by maintaining investor returns, generation will have to be optimised to match market needs while keeping costs low.

Picking a winning strategy will require developers and asset owners to consider a number of factors. The market will reward predictable, reliable power so particular care should be given to which technology will provide optimal power for the site. Matching wind turbines to site terrain and wind speed produces the cheapest output, but accurate forecasting of dispatch, weather, and market demand make that output more valuable. Further, technologies and portfolios that manage flexibility will also be favoured. Sites/portfolios that feature a mix of wind, energy storage, solar, aggregation or power to gas will win out. Those who understand the wholesale market and the new market tariffs will also be better

equipped to design their sites to maximise revenue while managing costs.

For investors to be convinced of the long term viability of onshore wind, we also need to look at the 11.42GW of assets that are already operational in the UK. Improving the way in which these sites operate will maximise revenues. In turn it will make the sites ready to receive revenue solely from the sale of electricity and ancillary services when their initial support under the RO or CfD ceases. Developing operational and maintenance strategies that will improve generation performance whilst optimising OPEX are key to the profitable life extension of sites and cheaper power for consumers. If the industry can find cost savings and performance gains here, investment in onshore wind will continue to be attractive. Lessons learned in the operational phase will also benefit new developments where a reduction in the cost of energy is a key driver.

Just one example of this strategic approach to whole site improvement can be seen in the way Natural Power uses clients' site data in conjunction with wider asset benchmark data to inform their servicing and maintenance programmes, and the KPIs set for their site teams. In these programmes, the prioritisation of maintenance on the most productive turbines, allows quick and pro-active identification of performance deviations which focuses efforts on the maintenance of faulty components with improved efficiency. Over the course of one year, a 50+ turbine wind farm was able to produce an additional 2.5 per cent in generation, equating to a circa 10 per cent increase on equity IRR.

Performance analyses like these can make a significant impact on output without incurring large costs, in fact they can identify where budget should be spent to maximise return.

Finally, customer engagement and an understanding of the changing market will play a critical part. Those who are able to understand their customers' demand profile, develop closer links to the industrial users and sell locally will inevitably reap the rewards.

# The Faraday Institution: Leading the charge

**Professor Peter Littlewood, founding executive chair of the Faraday Institution, explains the importance of batteries for an electric future, and what the Institution is doing to develop them**

**I**magine a fully electrified UK: energy drawn from wind farms off the coast of the North Sea, solar arrays in the South West, and wind turbines in Scotland and Wales powering your homes, your devices, your fully electric vehicles. Imagine driving your family from London to Glasgow on a single charge, a charge you could infuse in just minutes. Our air will be cleaner, and our children will be able to take part in energy careers that work for everyone.

However, even the most aggressive plans for energy storage – the key technology that enables this future – predict that these capabilities will only become viable around 2035; introduction into society at scale will be longer. Energy storage will require science breakthroughs to become efficient, economical, and safe. For transport, it means batteries with an energy density three times higher than today, and a similar reduction in cost. For energy storage to effectively support renewable generation when the wind is not blowing and sun not shining, we need a cost reduction of around a factor of 10. To get there, we need to transform battery materials and chemistry; we are not likely to reach these goals by improving what we have now.

We founded the Faraday Institution to be the nation's independent institute for electrochemical energy storage science, technology, and education. It will initially be funded by government investment as part of the Faraday Challenge project. Through collaborative research and development (R&D) competitions led by Innovate UK, the most promising research coming out of

the Institution will be developed for real-world use and application by the Advanced Propulsion Centre. This model will discover new materials, leading to game-changing tech breakthroughs.

The Faraday Institution will bring together scientists, industry partners, and government funding with a common goal. We will invest in collaborative research to reduce battery cost, weight, and volume; to improve performance and reliability; to develop scalable designs; to improve our manufacturing; to develop whole-life strategies from mining to recycling to second use; and to accelerate commercialisation. We will sponsor a national curriculum in energy storage science and provide technology education opportunities to invigorate regional and national workforce development. This will provide new models of education and training for skilled workers while creating new and expanded employment.

The UK auto industry will benefit. Currently, it produces a quarter of Europe's supply of low-emission vehicles and is manufacturing battery packs. However, at present the UK owns no large-scale cell manufacturing facilities. For 75 per cent of the UK's car production to consist of electric vehicles or plug-in hybrids by 2030, the equivalent of two Tesla gigafactories will be necessary. If we continue to rely on cell manufacturing from Asia, our costs will continue to be higher than those of our competitors, and our production capacity may be constrained. There are strong economic and security of supply arguments for siting cell manufacturing and auto manufacturing close together.

For the UK to join China, the US, Japan, and Korea in the battery revolution, we must strengthen the pipeline. A fully electrified economy where electricity is a service and not a utility will open untold economic opportunities.

This is the hope energy storage offers the UK and the promise the Faraday Institution seeks to deliver.

*The establishment of the Faraday Institution is funded by EPSRC through the government's Industrial Strategy Challenge Fund (ISCF)*

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