NEW ERA

PIPE DREAMS

SECURING ALL OUR ENERGY FROM RENEWABLES IS THE ULTIMATE GREEN GOAL. IS IT ACHIEVABLE ... AND IF NOT, WHAT BALANCE OF POWER SOURCES SHOULD WE AIM FOR? BY STEVEN VASS

AS Mexican stand-offs go, this one takes some beating. The negotiations between the UK government and French energy company EDF about the deal to build a new nuclear power station at Hinkley Point in Somerset have dragged on for months longer than expected.

This might be a long way from Scotland, where First Minister Alex Salmond has ruled out any new nuclear, but it will have a profound impact on how renewable energy develops north of the Border. The greater the level of subsidy that the government shows it is willing to pay to nuclear, the less it is likely to make available for other low-carbon technologies such as onshore and offshore wind all over the country.

As most people are aware, we are in the process of completely changing the way that electricity is produced in the UK. This is one of the key planks of meeting the country's obligations to cut carbon emissions, which we have committed to reduce by 34% from 1990 levels by 2020 and then by 80% by 2050 (they are currently about a quarter below 1990 levels).

The government estimated in its Carbon Plan in December 2011 that this is going to need between 40GW and 70GW of new low-carbon power capacity by 2030 – the equivalent of roughly between 15 and 30 new Longannet power stations. This is to cope with the extra power needed to tackle things like car electrification and the closure of around 19GW of old coal and nuclear stations.

THE three realistic contenders for low-carbon power in future are wind, nuclear and carbon capture and storage (CCS). Working out how much of each should go ahead is one of the toughest tasks confronting energy policymakers at present, and will be the subject of a debate at the Global Energy Systems Conference in Edinburgh later this month.

The starting position is that the market should be left to decide what gets built, but the reality is not so simple. The subsidy levels for each technology that the government sets through this year's Energy Market Reform process, starting with the nuclear deal with EDF, will be vital for determining what investors decide to do with their money.

The subsidies are being set through what is known as strike prices, which are guaranteed income at a fixed rate for producing green electricity. For example if the strike price for a technology is set at £100/megawatt hour (MWhr) but the price of electricity was £40/MWhr, this would mean that the government – ultimately the consumer – would pay the producer a £60 subsidy for each MWhr.

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In an ideal world, it would just be a question of choosing the cheapest technology and setting the subsidies at a level that would encourage the right amount of construction. In practice, it is very hard to say what each technology would cost now, let alone in years to come.

Wind has made all of the strides in the past few years. We now have 6.3GW of turbines installed on land and a further 3.3GW at sea – roughly 10% of the total national electricity capacity – with plans to add about another 17GW in the immediate pipeline.

Things could get harder for the sector in future, however. It has become increasingly difficult to get planning permission for onshore wind in the face of mounting public opposition.

Meanwhile, offshore wind is expensive, particularly the deeper-water sites that are categorised as Round Three and Scottish Territorial Waters. Yet these will have to be built in substantial numbers to make a meaningful contribution to the targets. Hence the industry is currently in a race against time to get costs down to below £100 per MWhr by 2020. This would put it within touching distance of onshore wind, and not far behind the cost of building and operating a gas-fired power station (circa £80/MWhr, according to the UK government).

The UK currently has almost 9GW of nuclear power at eight stations, including 2GW in Scotland at Hunterston B in Ayrshire and Torness in East Lothian. All except Sizewell B in Suffolk are due to close before the mid-2020s.

Until relatively recently, the government was bullish about the prospects of building about five replacements by 2025, estimating that new nuclear would be cheaper to build than even gas stations. This was despite the fact that serious power players like SSE, E.ON and RWE had all walked away from the technology in the UK because they didn't like the look of the costs. The government's EDF negotiations have certainly confirmed that nuclear is more problematic than expected, owing to the risks of serious technical delays and high construction costs.

EDF appears to have been holding out for a strike price of £100/MWhr, £20 higher than what the government wants to pay.

It looks as though EDF is trying to get guarantees for the cost of the project in exchange for a slightly lower strike price, and may well be succeeding, in view of rumours that the two sides are finally in sight of a deal.

It is a huge decision for the government, affecting not only what will happen with other low-carbon technologies but whether Hitachi, Iberdrola and GDF Suez go ahead with their own plans to build new nuclear stations. The wrong choice could tie in consumers to paying excessively high electricity bills for decades, or alternatively could mean that too little low-carbon power gets built to meet the country's targets.

IF possible, the future of CCS is even harder to gauge. The technology removes carbon emissions from traditional power stations and pipes them into disused oil wells, allowing us to continue to burn gas and coal in large amounts while meeting the carbon targets.

This might not be sustainable, but most experts see it as an important component of the current energy mix. It counteracts the problem that wind power only works when the wind is blowing.

Until we get to the point where we have invented commercially viable storage facilities for the electricity from wind farms, this means that they need to be backed up by a power source that can be turned up or down easily. The same goes for nuclear, which burns all the time but takes weeks to shut down or start up. CCS also helps to justify a big push into the country's shale gas reserves, which involve the controversial extraction process known as fracking.

The argument is that you build new gas stations now to help keep the lights on as numerous gigawatts of power retire from the system in the coming years, and then you retrofit them with CCS once the technology is ready. The UK has been claiming pole position in the race to make CCS viable for nearly a decade now, but several government interventions have collapsed because the companies involved ultimately decided the costs were too uncertain – a problem which has also killed various European projects.

At present the government is running a competition which will see it give £1 billion to either SSE/Shell at gas-fired Peterhead or Drax's coal-fired White Rose project in Yorkshire to build a demonstrator over a portion of their power stations. There will be no final decision from the government until 2015, which makes it likely that there will not now be any stations fully covered by CCS in the UK until well into the 2020s.

As things stand, this is creating serious doubts about the costs. As far out as 2030 the government reckons that only gas stations with CCS, as opposed to coal stations, look affordable.

So where does this leave us? Running out of space for onshore wind, uncertain about the costs for offshore wind and nuclear, and uncertain about the technology for CCS. And that is before you start looking at the politics. From gas producers to environmentalists, from the nuclear industry to anti-wind-farm campaigners, there are scores of lobby groups pushing their own interests. This will not make it any easier for the government to see what the right way forward should be.

We'll next get a sense of where the policy is heading when the draft strike prices are published. This was supposed to be this month, but now looks likely to be later in the year. Don't be surprised if they show that the affordable and the politically possible are two rather different things.

The debate on what to invest in for the electricity system of the future will take place on Thursday June 27 at Our Dynamic Earth in Edinburgh as part of the first Global Energy Systems Conference, which runs from June 26 to June 28. For more details visit http://globalenergysystemsconference.com

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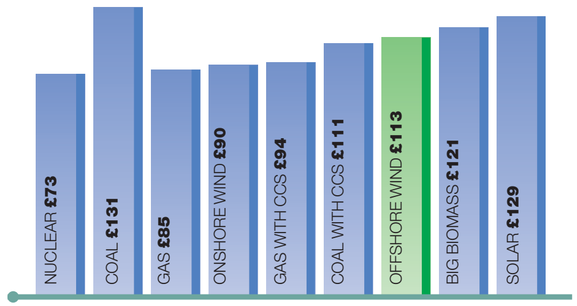
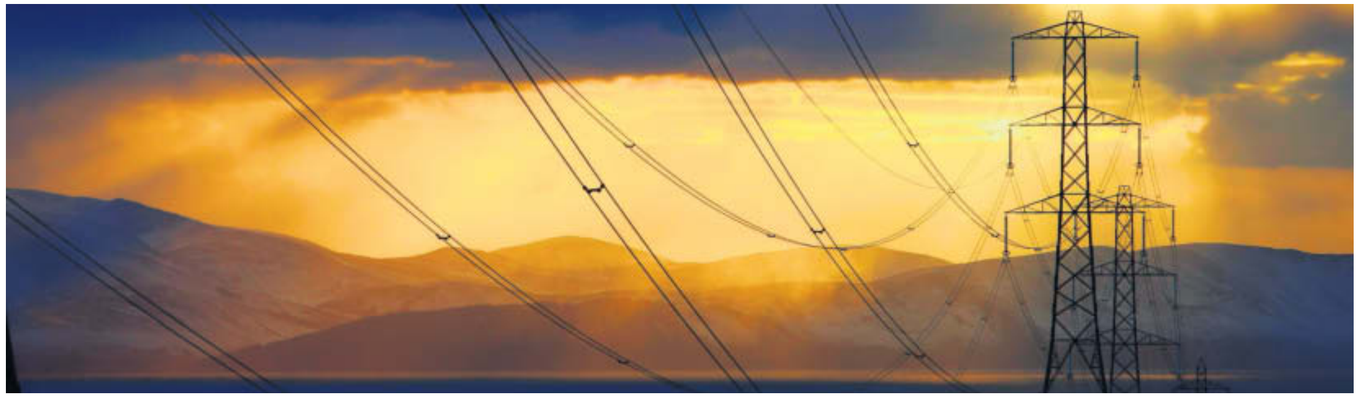
THE BOTTOM LINE

Estimated Costs For Power Station Projects Starting in 2018 (£/MWhr)

Source: DECC Electricity Generation Costs report October 2012





Finding a viable storage method for wind-farm electricity is one of the conundrums facing the government

Previous pages: Hunterston B nuclear power station in Ayrshire

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HOW CAN WE RAISE OUR CHILDREN WITHOUT ADDING TONNES OF BARELY USED TOYS TO LANDFILL?

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