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1. Sustainable Development – a new narrative for 2014

Tony Juniper former Director of Friends of the Earth (EWNI) says the prime minister's alleged call to "*get rid of the green crap*" (See NuClear News No.57) rather summed up the dire political situation regarding energy policy and the environment. What we need is a new narrative. Rather than arguing about growth versus the environment we need to describe the social and economic benefits that could come by embracing sustainability. (1)

For instance, we might think that George Osborne is finally coming round when he says things like: "*going green doesn't have to cost the earth*", but actually it is a very negative way of looking at the future. It is possible to conclude that the Chancellor has finally realised that he should explicitly commit to managing the transition to a low carbon economy in the most cost effective way possible. Possible but sadly inaccurate. As James Murray, editor of *Business Green* says:

"If the Chancellor was serious about delivering decarbonisation in the most cost effective way possible he would not have just engineered a cut in energy efficiency schemes when every analysis shows energy saving is the lowest cost means of cutting emissions. He would not be actively trying to restrict onshore wind when it is the lowest cost form of renewable power. He would not be blocking a decarbonisation target that the Committee on Climate Change has highlighted as a mechanism for lowering the cost of decarbonisation. He would not have just opposed the closing of a loophole on coal emissions that represented one of the simplest ways of cutting emissions in the 2020s. And he would not be pointedly ignoring the huge climate and energy security costs that come with a failure to decarbonise rapidly enough - it is that which will really cost the Earth." (2)

What the Chancellor should be doing is celebrating renewable infrastructure developments and recognising that the cost of clean energy technologies is already falling and will fall further if we implement a stable policy. It will support a UK supply chain that will create jobs, and bolster energy security. And by prioritising energy efficiency he could be reducing consumers' energy bills, which would mean more money staying in the country rather than increasing the profits of mostly foreign utilities. The coalition should be committed to a package of long term cost effective policies that will drive billions of dollars of investment and deliver decarbonisation over the coming decades, creating export opportunities and minimising climate change costs in the process.

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2. Business Green 5th Dec 2013 http://www.businessgreen.com/bg/james-blog/2317487/going-green-doesnt-cost-the-earth-not-going-green-does

2. The future doesn't have to be based on nuclear and fracking

As we reported in NuClear News No.48, March 2013, the Department of Energy and Climate Change (DECC) is planning for a sudden levelling off in the growth in renewables between 2020 and 2030 and a rapid growth in nuclear and gas. (1) The Government's National Policy Statement on Energy, published in July 2011, originally foresaw a need for 113 gigawatts (GW) of electricity generating capacity in 2025 compared with 85GW now. 59GW of this would be new capacity, of which 33GW would be renewable energy, mostly wind, and 16GW would be new nuclear, with 26GW left for industry to determine. (2)

But by the end of 2012 the Government's expectations for nuclear had fallen with only the 3.3GW of Hinkley C expected to be on-line by 2025 and only 9.9GW by 2030. (3)

With increasing climate change scepticism in the Tory Party, and growing concerns about energy prices Chancellor George Osborne now appears to think it is stupid to commit billions of pounds to subsidising renewables when we could soon have a plentiful source of energy under the ground at a fraction of the price – shale gas. But he still seems to be willing to subsidise new nuclear, just a bit more slowly than originally expected.

While Ed Davey may be fighting a time-consuming "guerrilla war" with Tory party climate sceptics who are determined to undermine his attempts to green Britain's electricity supply (4) if we can meet our climate objectives with some renewables along with nuclear and fracked gas, he will be happy. To this end he is fighting to stop the European Commission introducing a new renewable target for 2030 to allow that to happen.

As we have shown in NuClear News over the year, this is not the only way of meeting climate change objectives. In this issue we recap and update some of these alternative scenarios. If instead offshore wind were allowed to continue growing at the rate it is expected to grow between now and 2020 and we started to bring on other renewable technologies, including solar, geothermal, hydro and wave and tidal, then we could move towards a more sustainable renewable energy system which does not require new nuclear power or large-scale gas.

But a nuclear energy-free future for the UK is not something the Coalition Government "*is thinking seriously about*", according to the government's chief science adviser Prof Sir John Beddington. He says "*we really can't see a future for the UK energy sector, if we are to meet our climate change obligations and have resilience in the power sector, without a significant component of nuclear. A non-nuclear scenario is not one the government is thinking seriously about.*" (5)

Yet in much of Europe, and increasingly in the U.S. and the developing world, 100% renewable energy goals are becoming the new normal.

As we shall see, Government plans are currently missing out on:

155TWh/year of electricity generated by offshore wind;

~40TWh/year by implementing a comprehensive domestic energy efficiency programme by 2030;

100TWh/year of electricity saved through other efficiency measures;

22 – 140TWh/yr of electricity from solar PV on domestic roofs;

30TWh/yr of electricity from solar PV on industrial and commercial roofs;

140-190TWh/yr from solar farms – just using land currently used for growing biofuels;

3TWh/yr from micro-hydro in Scotland.

This compares with total electricity consumption of around 328TWh/yr and energy consumption around 1635TWh/yr (6) and the 25TWh/year which might be produced by Hinkley Point C if it manages to operate at an unlikely 90% load factor.

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1. http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo48.pdf
2. Overarching National Policy Statement for Energy, DECC, July 2011 https://whitehall-admin.production.alphagov.co.uk/government/uploads/system/uploads/attachment_data/file/37046/1938-overarching-nps-for-energy-en1.pdf
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2. Inside the Coalition: Tories and Energy Policy, NuClear News No.54, September 2013 http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo54.pdf
3. 100% Renewables, NuClear News No.49, April 2013 http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo54.pdf

3. Offshore Wind – an end of year review

There has been a dramatic reduction in the Government's ambition for offshore wind. In the space of a few months the amount of offshore wind envisaged for the grid in 2020 has halved. (1) In 2009 the Government announced that 32GW of offshore wind would be deployed "by the early 2020s", but a few years later this had fallen to 18GW. Then this year with the unveiling of the strike prices in the Energy Bill, the Government said it was now looking at somewhere between 8GW and 16GW. Worryingly when Nick Clegg unveiled an offshore wind industrial strategy it envisaged 8-16GW by 2020, but rising by only another 2GW to 18GW over the next decade to 2030. (2)

DECC is now predicting the lower end of the range, - just 8-10GW could be built by 2020. (3) And according to Bloomberg New Energy Finance (NEF) there is now a danger the UK will fail to reach the 10GW the Government says is possible by 2020. (4) NEF says the government is struggling to secure the £20 billion investment needed to install 10GW. (5)

The expansion of the market has been impressive. There is now a capacity of around 3,650MW (3.65GW) of offshore wind which is fully operational and another 1,180MW under construction, up from just 500MW in 2008. Yet 2013 was also the year that saw RWE pull the plug on its massive 4GW Atlantic Array project, claiming site-specific difficulties and Scottish Power shelved its planned Argyll Array project. (6) And in January RWE announced that it is cutting the size of its Triton Knoll offshore windfarm development, off the Lincolnshire coast, from 1,200MW down to 600-900MW. The company claimed the changes would make the site more competitive. (7)

Chris Goodall, writing on the Carbon Commentary Blog, says RWE was at pains to point out that its withdrawal from the Atlantic Array was largely driven by unexpected technical difficulties, but it seems implausible that a major European utility which has devoted years of effort to the project has now found that the water was quite deep in the Bristol Channel. (8)

The future of Scotland's offshore wind industry was thrown into doubt when none of the Scottish projects which applied for early financial support through the government's new subsidy regime were successful. The UK government confirmed that it considered four offshore wind farms cheap enough to apply for support in March 2014 under its Contract for Difference regime. But all four were off the coast of England. Mainstream Renewable Power's Neart na Gaoithe wind farm off the Fife Coast, SSE's Beatrice in the Outer Moray Firth, and the Inch Cape wind farm developed by Repsol Nuevas Energias UK and EDPR off the Angus coast did not score highly enough in the affordability rankings, creating fresh uncertainty for 2.45GW of new capacity in Scotland. Energy Secretary, Ed Davey, was more optimistic, said those projects which failed to score highly enough were now "incredibly well placed" to apply for the next round of CfDs in October 2014, and were still eligible to apply for subsidies under the current Renewables Obligation (RO) regime. (9)

Lack of political support

The government hasn't been managing the discussion very well according to industry group RenewableUK. "*The sector needs to see that there is general political support for renewables. Investors want to see that the market works across technology. Politicians, while they debate the cost of energy, need to remember that keeping the politics out of policy-making keeps the cost down.*" (10)

Despite the "stubbornly expensive" label often given to offshore wind, there is a huge potential to reduce costs. The Government wants this reduced to £100/MWh by 2020, but DONG Energy which has just built the world's largest (630MW) wind farm in the Thames Estuary – the London Array - believes it can undercut this and reach £85/MWh by then. An in depth study in 2012 by the Crown Estate found that the costs could go down by a third for projects approved in 2020, with greater cuts possible in the 2020s as well. Shortly after, a report by Cambridge Econometrics also found that a stable deployment of offshore wind could increase UK GDP by some £20bn annually by 2030, reduce UK gas imports by £8bn a year and provide higher net employment compared to a scenario where the UK produced most of its electricity from gas plants. (11)

Portraying offshore wind as "stubbornly expensive" ignores the fact that there is an awful lot that can be done to reduce the costs of the technology in the near-term. Part of the answer is scale: bigger turbines and bigger wind farms. Also a significant chunk of its cost comes from the financing of a project, mainly in the form of interest rates. To illustrate this, the Crown Estate study found that for every 1% reduction in the costs of borrowing, the overall costs of offshore wind farms was likely to go down by around 6%. By providing the right political "mood music" and showing that it is committed to helping the sector grow over the long-term, the Government could play a key role in reducing borrowing costs. Failure to include a binding decarbonisation target in the Energy Bill, in favour of a delayed decision on whether to impose such a target after the next election, has left the offshore sector dangerously exposed to uncertainty and developers are similarly concerned about the UK's opposition to a new EU target for renewable energy in 2030.

IPPR say the Government has done too little to attract wind turbine manufacturers to set up in the UK, with the result that only a small proportion of the tens of billions of expected investment in offshore wind will benefit British manufacturers. Consequently, the public subsidy for wind, paid for on energy bills – and which will also run to billions – will reap much less in jobs and benefits to the UK economy than it could have. (12) If the levels of ambition and policy stability are not high enough to entice manufacturing to Britain, the wind turbines that power UK wind farms may still be built, but they are likely to be built from France, Germany or Denmark.

Ed Balls seems to have recognised the potential. He says the UK could gain a world leading position in offshore wind, wave and tidal power:

"By refusing to agree a decarbonisation target in the Energy Bill, by raising the prospect of a new 'dash to gas' instead of renewables, by shackling the Green Investment Bank, and by failing to implement the scale and certainty of policy needed to effectively de-risk investment, the government has actively undermined business plans to create jobs and growth."

Balls says Osborne has fostered exactly the kind of policy uncertainty that scares away long-term investment. By talking up the possibility of an implausible shale gas bonanza to justify tacking away from renewables after the 2020 renewable targets run out, he has cast further doubt on the government's long-term commitment to a low carbon future. Business is being denied the confidence of knowing they will have a market and a price structure they can rely on over the investment horizon they need. (13)

There was relief when the final figures for the level of financial support for offshore wind were released in December. Rather than falling from £155/MWh to £135/MWh by 2018/19, the fall will now be to £140MWh. In response Brent Cheshire, chairman of Dong Energy, offered an enthusiastic

assessment: "*It is game on... what this clarity gives us, after all the noise over the last year, is sufficient confidence to invest,*" he explained. (14) And there was more good news when the government granted final approval for ambitious plans to build a new £450m marine energy hub on the banks of the Humber, which aims to deliver state of the art port facilities specifically designed to support the North Sea's offshore wind industry. (15)

The next 12 months will be crucial for the future of the industry. As the UK prepares for a general election in 2015 the environment could become an increasingly high-profile battleground as the three main parties seek to draw dividing lines on environmental and energy policy. How these disagreements are handled will be vital for investor confidence and future development.

During 2012 the 3.4GW of installed offshore wind generated 7.5TWh of electricity. (16) If the Government manages to achieve its objectives 18GW could be installed by 2030. This should generate almost 40TWh/year. Under Friends of the Earth's scenario offshore wind generates around 195TWh/year by 2030.

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2. Building an Offshore Wind Manufacturing Base, No.54 September 2013, http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo54.pdf
3. Offshore Wind in Trouble? NuClear News No.57, December 2013 http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo57.pdf

4. Renewable targets

Catherine Mitchell, Professor of Energy Policy at Exeter University says European energy policy is a key driver of Member States energy policies. At the moment, the key European Union energy policy is the so-called 20-20-20 policy: to cut CO_2 emissions by 20%; to provide 20% of energy from renewable energy; and a 20% improvement in European energy efficiency, and all by 2020. Discussions of a 2030 target are already underway with the green groups arguing for 50-40-30 (50% cut in CO_2, 40% of energy from renewables and a 30% increase in efficiency by 2030). (1) European countries have been battling over what new targets should be set for 2030.

The UK Government has teamed up with Poland and the Czech Republic to minimise all 2030 targets - arguing for no renewable or energy efficiency targets but supporting a 40-50% CO_2 reduction target. This would allow individual countries the freedom to reach the target as they choose, for example by relying heavily on nuclear power. But Ministers from eight other EU states have urged the Commission to include a 'robust' renewables target in its 2030 plan. The ministers - from Germany, France, Italy, Denmark, Belgium, Austria, Ireland and Portugal – said a renewables target will "strengthen European competitiveness and lead to more jobs and growth". (2)

Over half a million new jobs over the next two decades could be at risk if there is no new EU targets for green energy, according to a leaked official report from the European commission. Maf Smith, RenewableUK's deputy chief executive, says: *"The EU needs to show leadership here and set a 2030 renewable energy target as a matter of priority. It would send a crucial political signal on the continuing direction of travel away from fossil fuels to clean energy sources across Europe. If the EU were to fail to step up to the mark on this, it would be more difficult for renewable energy developers to attract much needed investment in their projects, as it would push up the cost of raising capital."* (3)

Even the Opposition's commitment to new EU renewable energy and efficiency targets has been called into question, after Shadow Energy Minister Tom Greatrex appeared to signal the Labour could oppose European Commission plans to introduce a new renewable energy target for 2030. "*Tackling the complex challenge of climate change requires policies and targets which are sufficiently flexible to accommodate ever-evolving solutions. We remain unconvinced that a 2030 renewables target provides this necessary optionality, since it overlooks a number of low carbon but non-renewable technologies, such as carbon capture and storage (CCS)*". (4)

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5. Energy Price Freeze

In just three sentences in his speech to the Labour party conference in September Ed Miliband managed to transform the energy scene in the UK, according to Nick Butler writing in the FT. (1) The speech left the coalition government struggling to respond to a completely unexpected outbreak of populism. The consequences, intended and unintended, continue today and could yet force a change in energy policy across the EU.

The focus of debate quickly moved on to the impact of green policies designed to reduce emissions and prevent global warming. So far that impact is limited but it is set to grow and grow. This negative focus was not Mr Miliband's intention. Many of the current energy policies were initiated when he was Secretary of State but the speech marked the end of three decades of consensus on energy policy and at the next election there is a strong chance that the Tories will advocate at least some scaling back of the decarbonisation programme.

Labour is ahead in the polls and the freeze is the most popular policy it has produced. The man who came up with the idea, Mr Miliband's head of policy Greg Beales, is now a hero, and known in the leader's office as Mr Freeze. The details may not have been worked out – including the question of what happens on January 1st 2017 when the freeze is due to end but it would now be very hard for Mr Miliband to drop the policy.

The UK has some of the lowest gas and electricity prices in Europe and relatively high household incomes compared to the other countries. And yet it has the highest rate of fuel poverty and amongst the highest rate of excess winter deaths. The poor energy efficiency of our housing stock is the main cause of these problems. The UK is best characterised as the 'cold man of Europe'. (2) So the best way for Labour to make sure its price freeze policy doesn't compromise its policies on climate, and offers help to all those suffering from fuel poverty permanently, rather than just a temporary respite, is to implement an ambitious energy efficiency programme.

Luciana Berger, Shadow Minister for Energy and Climate Change until the Autumn reshuffle, said Labour would forge ahead with delivering the energy efficiency by replacing the failing Green Deal with a new 'Energy Save' scheme. She says they will be consulting with the insulation industry in the months ahead on how best to offer cheaper loans, drive take up through minimum standards and target support for the fuel poor by redirecting £1.3bn of ECO funding into an area based scheme. (3)

Shadow Energy and Climate Change Secretary, Caroline Flint says "*One of the best ways we can really protect people struggling with their energy bills is helping them to make their homes better insulated and energy efficient. Even if the unit cost of energy is going up, helping people to use less energy can mean their bills are actually lower*." Flint "*want*[s] *to encourage more discussion about the different ways we can achieve the kind of transformation we need to make our homes and workplaces warmer and less wasteful*." (4) But there isn't actually much in its Ten Point Plan about energy efficiency. (5)

Former Labour MP, Alan Simpson writes that "*Ed Miliband's price freeze proposal was a brilliant opening ploy. But in the vacuum that followed, it looked more like a policy space the Party didn't know how to fill. The moment called out for a radically different plan of what tomorrow's energy*

market must look like … Some 70% of Britain's fuel poor live in properties with 'bottom of the barrel' energy efficiency ratings of E,F or G. A genuine 'fuel poverty' strategy would commit to lifting all these properties to Band D standards by 2020, and raising the rest of our housing stock to today's 'new build' standards by 2030."

Writing in *The Guardian* in October, fuel poverty expert Brenda Boardman said the real solution is to make the homes of the fuel-poor more energy efficient. At the moment, they have to buy expensive heat, because most of the heat they create quickly flows out of the house, through cracks and poorly insulated fabric. If the home is properly insulated and made energy efficient, they can buy cheap heat, because they need so much less of it – it stays indoors with them. All the time fuel prices have been rising, the government has been receiving an increasing amount of VAT and keeping it. These receipts have risen by at least £1bn a year since 2004. Also, the major utilities participate in a European Emissions Trading Scheme (EUETS), which now requires them to go to auction to buy permits to emit carbon. This is bringing in a further £4bn a year for the Treasury. So there is £5bn sitting in the government coffers that could be used to help the fuel poor, without adding to the costs of their fuel bills. The government has not been trying to find ways to deliver the strategy. Instead, it has focused on redefining fuel poverty (which results in cutting the numbers) and on working towards a new strategy, that will be published shortly before the general election. (6)

A key part of any non-nuclear energy scenario should include a much greater emphasis on energy efficiency measures. A study for the Government by consultants McKinsey showed there is a massive 155 Terawatt hours (TWh) which could be saved every year through such measures – 140 TWh of which would be at a negative cost. (7) UK electricity demand in 2010 was around 370TWh. FoE's energy scenario sees this increasing to 470TWh by 2030. (8)

In the residential sector the McKinsey report says potential efficiency savings amount to 66TWh of electricity per year. In fact the Government expects its existing policies to capture two thirds of this - 44TWh which breaks down as follows:

Products Policy 25TWh

Building Regulations 3.3TWh

Green Deal/ECO and predecessors 7.5TWh

Smart Metering 3.2TWh

EU Emissions Trading Scheme 4TWh

According to the Pathways to 2050 report, gas heating is expected to fall rapidly after 2020 with electric-powered heat pumps largely taking its place. (9) So building fabric improvements in the domestic sector which reduce gas and oil demand today will ultimately reduce electricity demand as these forms of heating are switched to electricity.

According to the Association for the Conservation of Energy the original ECO (before the recent changes) was expected to save around 1.6TWh/year (energy, not just electricity) over the period it was in operation in 2014 and the first quarter of 2015. (10) If a similar scheme were to operate until 2030, making savings at the same rate, this could save 20TWh/year. This would ultimately reduce the need for new electricity generating capacity. (out of a total of 363TWh of

electricity produced(11) and 25TWh/year is expected to be generated by Hinkley Point C if it manages to operate at an unlikely 90% load factor.) But at the rate ECO was supposed to operate during 2014 it would take 88 years to complete solid wall insulation installations, 14 years to insulate all walls with unfilled cavities and 40 years to insulate all lofts to the required level. If this work were speeded up cumulative savings by 2030 could be much higher – perhaps as much as 40 or 50TWh.

There are around 100TWh of electricity savings detailed in the McKinsey report which the Government currently has almost no plans to capture. Building fabric improvements and lighting could save almost 40TWh more than the Government is currently planning. In the industrial sector around another 15TWh could be saved by replacing motors and pumps with more efficient models.

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6. Looking for a phoenix in ECO's ashes.

As expected the government announced plans to reduce the Energy Companies Obligation's (ECO's) key energy efficiency target by 30% and extend the scheme for another two years until March 2017. This means that energy firms will not have to install so much expensive solid wall insulation in hard-to-treat homes. Instead, they will be given greater freedom to install cheaper cavity wall and loft insulation in easy-to-treat homes. Only 100,000 solid wall insulation installations will have to be made over the next four years, or 25,000 per year. That amounts to a massive reduction – there were 80,000 solid wall insulation installations in 2012 alone. Building groups said this would severely damage the industry and mean thousands of people will lose their jobs in coming weeks. It also means much less free insulation for fuel poor households, half of whom live in solid wall properties. (1)

David Cameron and Nick Clegg expect the proposed changes to reduce the average energy bill by about £50 per year. In addition, people buying a new home will be offered £1,000 to spend on energy efficiency. Private landlords, schools and hospitals will also be given incentives to make their properties more energy efficient. (2)

It's not the price of energy that is the problem in Britain but the poor insulation of our homes – which means we use more fuel to heat them, says Geoffrey Lean writing in *The Telegraph*. EC figures show British gas prices to be the lowest in Europe. But our bills are among the highest, because we use a lot of fuel – since our homes are among the least energy efficient. Compare us to Sweden, with an almost identical per capita income, but a much colder climate. We have four times their percentage of people in fuel poverty, though we pay only half as much for gas. As our homes are poorly insulated, they lose three times as much heat through their walls. The answer should be a no-brainer – insulate. (3)

UK homes are some of the most expensive to heat in Europe because of poor maintenance and insulation, according to new figures from the EU compiled for *The Guardian*. The analysis of official EU data also found that the UK has the highest levels of fuel poverty of a dozen comparable EU nations, as well as one of the worst proportions of homes in a poor state of repair. Over 10m British families live in a home with a leaking roof, damp walls or rotting windows. The expense of heating leaky homes means government plans to cut a programme that insulates properties in an attempt to trim energy bills is "*unforgivably perverse*", according to the government's fuel poverty adviser, Derek Lickorish. Andrew Warren, director of the Association for the Conservation of Energy, said: "*It is absolutely disgraceful that the big energy companies have orchestrated this unscrupulous campaign that appears to be succeeding in blackmailing the UK government into cutting by half its established policy to help customers stop wasting money by wasting fuel*." (4)

Only 120,000 lofts were insulated in the first six months of 2013 compared with 860,000 in the last six months of 2012. There was a similar decline in the number of cavity walls insulated over the same period, down from 360,000 to 110,000. Solid-wall insulations fell from 60,000 to 5,000, according to the Green Alliance think-tank, which based its report on figures from the Department of Energy and Climate Change. At this rate it would take 24 years to insulate the remaining 5.7 million poorly insulated lofts and 770 years to insulate 7.7 million solid-wall homes, the report said. (5) Similarly, *The Guardian* reported that 1.61m lofts were fully insulated in 2012, but in the year to the end of October 2013, just 110,000 had been treated, a pro-rata fall of 93%. For cavity wall insulation, measures fell from 640,000 in 2012 to 125,000 in the year to October 2013, a pro-rata fall of 77%. (6)

Friends of the Earth Energy Campaigner Sophie Neuburg, responding to the ECO cuts said: "*The Government has crumbled in response to pressure from the Big Six, leaving the fuel poor and the environment to pick up the bill. The effect of all the measures announced today is that funding for energy efficiency has fallen by over £700 million, condemning thousands of people to shiver in heat-leaking homes. If Ministers were serious about tackling fuel bills they would introduce a comprehensive energy efficiency programme and take urgent steps to wean our economy off increasingly costly fossil fuels – the real driving force behind rocketing fuel bills*." (7)

Energy companies lobbied the government to cut 'green levies' from bills. The policy rollback could mean companies reap the rewards of selling energy that would not be needed if energy companies were made to stick to their efficiency targets. *The Times* reported that Energy companies will profit from selling an extra £360 million worth of gas and electricity under the Government's plans. (8) But the Government maintains that the policy changes will save as much energy as the previous package. (9)

Alan Whitehead, a Labour MP who site on the House of Commons Energy and Climate Change Committee says we know that energy efficiency in homes is the only really effective way to combat fuel poverty in the long term. And we know that for any serious climate change emission targets to bite we need many more UK homes, commercial and industrial buildings being made more energy efficient and these goals will only be achieved by the methodical implementation of measures in a reliable, extensive, year in and year out fashion until we get there. It is time for a fundamental rethink of how we get ourselves anywhere near back on track, because we know we will have to do so sooner or later.

Even if the plans of the admirable Energy Bill Revolution people were to be adopted, with their proposed root and branch energy efficiency programme which uses the proceeds of future green taxes to vault English and Welsh homes up through the energy rating bands, we would still need to look at how such a programme might be delivered. And here I think is where much of the effort, even when it was better and publicly funded, has come unstuck. Where programmes have worked or started to do so, they were through area partnerships between energy companies and local authorities. Along with social landlords it is because of these unsung heroes that much of the progress to date has been made. We know that local authorities were highly successful in delivering programmes including insulation in the General Improvement Areas and Housing Action areas of the 70s and 80s. Whitehead says local authorities should have the obligation for reaching targets for treated properties in their areas, and once programmes have been put into place, energy companies should be obliged to compete to secure the right to fund an agreed part of them. (10)

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2. Independent 1st Dec 2013 http://www.independent.co.uk/news/uk/politics/coalition-strikes-deal-on-green-taxes-8975179.html
3. Telegraph 29th Nov 2013 http://www.telegraph.co.uk/earth/energy/10483854/The-Swedes-dont-feel-the-cold-like-we-do-in-Britain.html
4. Guardian 29th Nov 2013 http://www.theguardian.com/environment/damian-carrington-blog/2013/nov/29/uk-homes-most-expensive-heat-eu-fuel-poverty
5. Times 2nd Dec 2013 http://www.thetimes.co.uk/tto/business/industries/utilities/article3937676.ece

6. Guardian 30th Dec 2013 http://www.theguardian.com/environment/2013/dec/30/number-households-insulation-lofts-plummets-green-deal
7. FoE Press Release 2nd Dec 2013 http://www.foe.co.uk/resource/press_releases/energy-bills-govt-caves-big-six_02122013
8. Times 29th November 2013 http://www.thetimes.co.uk/tto/environment/article3935156.ece
9. Carbon Brief 3rd December 2013 http://www.carbonbrief.org/blog/2013/12/will-the-big-six-profit-from-lobbying-to-keep-the-uk's-homes-energy-inefficient/
10. Alan Whitehead's Blog 7th Jan 2014 http://alansenergyblog.wordpress.com/2014/01/07/why-eco-should-become-eco/

7. Solar futures

Ben Cosh of TGC Renewables, writing a guest blog on the Solar Power Portal website (1) argues that government energy policy is based on the outdated notion that solar electricity is expensive. The Electricity Market Reform (EMR) delivery plan (2) suggests that only 2.4 - 4GW of large scale solar will be deployed by 2020. However, the 2009 Element Energy Report suggested the technical resource for solar is much greater: 22 TWh/yr for domestic roofs and 30 TWh/yr for commercial & industrial roofs. Even in Britain, with 1MWp DC of solar requiring two hectares of land it's up to 25 times better than the next best crop. So if you put solar farms just on the land currently planted with biofuels (around 1.1m acres) then you could generate 190TWh/yr and displace no food production. Farmers Weekly suggests two-thirds of the biofuel land will be cut by new EU biofuels regulations. DECC's own 2020 pathway calculator puts rooftop output potential from south-facing domestic roofs alone at 140TWh, and an equivalent number from solar farms. There is clearly some work to do to reconcile these numbers, but even if you're massively conservative, solar could provide a lot more electricity than currently planned at low risk and relatively cheaply.

As we reported last month Mark Turner, a director at the UK's leading solar power generator Lightsource Renewable Energy, has written to David Cameron to point out that Britain's solar industry has the capability to deliver the same energy production at Hinkley Point C within 24 months and at comparable cost. Hinkley won't be able to contribute to reducing dependence on fossil fuels for ten years. Solar power, on the other hand, could provide energy security quickly, reduce electricity bills and protect the environment at the same time. In his letter, Turner describes how solar power will not be the entire solution "*but if we supported its deployment then within a couple of years we could have 10% of the UK's energy mix completely free from the vagaries of the global fossil fuel markets*". (3)

The EMR Delivery Plan unveiled in December shocked the Solar Trade Association (STA) because it foresees a future with little utility solar power capacity installed for the next 16 years. (4) As 2013 draws to a close the UK sits on the fringes of the global top 10 for solar power production. In just three years half a million British homes (or other small roofs) have gone solar. However, conspicuous by its absence in the UK is the mid/large solar roof market covering schemes upwards of 100kW right up to 5MW - the size of the Bentley car factory scheme, which is currently the largest roof scheme in the UK. Climate Change Minister Greg Barker often says we could deliver his entire 22GW solar aspiration from a fraction of commercial and industrial roof space and the industry was delighted when Barker announced that 2014 would be the year to unlock this market. (5)

Barker promised those attending a Solar Trade Association event that more would be done to develop the "crucial" rooftop solar sector in the UK. He acknowledged that the government needs to work harder to address the current barriers that are hampering the growth of the domestic, mid-scale commercial roof and community generation sectors:

"*There is a lot more we can do to drive deployment in that all-important mid-scale solar sector. If I see a challenge for 2014, it's to mobilise that mid-scale solar market – that is where I really what I want to get my teeth into in 2014. I want to use that to drive my ambition of a challenge to the big*

six energy companies that doesn't come from one or two more competitors but actually comes from the creation of an energy sector of the big 60,000."

He said that in the crucial medium-scale for industrial and commercial rooftops, only about 800MW has been installed and "*that's not nearly good enough. Especially when you consider that it has been estimated that just 16% of industrial and commercial rooftops could realise my ambition of driving to 20GW*." (6)

But the devil is in the detail, including the level of resourcing under the Levy Control Framework. The STA wants to see FITs restructured to allow very generous capacity triggers, particularly for 250kW+ solar, which is now cheaper than most other centralised renewables, and a new band for Building Integrated PV to support British manufactured solar tiles, which are also very aesthetically attractive.

The European Photovoltaic Industry Association anticipates this mid-size of solar, which competes directly with retail electricity prices, will reach parity with grid electricity prices first in many countries. Now that is electricity market reform. It makes no sense at all to suppress this scale of solar. It would be like saying to the wind industry, "build offshore and microturbines, but don't bother with onshore". But that is what is happening now and looks set to continue under the new electricity market reform package.

However, if we have a policy chasm for mid-scale solar now, DECC has engineered a canyon over the horizon. Contracts for Difference are only eligible for 5MW+ solar. The Renewables Obligation goes in 2017. So unless FITs are dramatically realigned there will be no serious resource for 50kW-5MW solar. In modern energy terms, that is an insane prospect. DECC urgently needs to understand that mid/large solar roofs are on a par with onshore and offshore wind in terms of potential capacity. And mid/large roof solar needs to be resourced commensurately under feed in tariffs - particularly because it is already 20 per cent cheaper than offshore wind.

But the EMR Delivery Plan's projected future expenditure under FITs is relatively small. Even more bizarrely the Delivery Plan includes three 'scenarios' out to 2030 that include no solar whatsoever. Jonathon Porritt told the industry recently people who think solar is just "a part" of the solution have missed the plot. We're talking about a technology with a projected global market of 60-115GW per annum in 2020. Utility solar could take a lower strike price than new nuclear and be on a par with onshore wind by 2018/19. If you're serious about value for money, go solar. Unlocking the mid-scale of solar will mean nothing less than total transformation of choice, competition and ownership in our electricity markets.

Meanwhile, Greg Barker, the energy minister, is expected to disclose plans soon for one gigawatt of electricity generated by solar panels on the "government estate". Four million solar panels covering land the size of 3,400 football pitches should be built on government land and property including schools and prisons. The plans are understood to be a "personal ambition" of Mr Barker's and are not an official Government target. (7)

In Scotland the renewable energy industry is celebrating hitting the 100MW milestone of installed photovoltaic capacity. Analysis of Ofgem figures for December reveal Scotland now has 106MW of solar PV, an increase of 36% since this time last year. The figures also reveal that 465 businesses, more than 28,000 homes, 56 communities, and 22 industrial sites have fitted solar

arrays in the country. The numbers are in stark contrast to 2010, when 429 solar installations were recorded, offering just 2MW of capacity. Now the Scottish Solar Energy Group, Energy Technology Partnership, and WWF Scotland are calling on the Scottish government to ensure its policies deliver even more solar. (8)

Across the whole UK half a million homes now have solar panels installed on their roofs and the industry wants the number to reach one million by 2015. (9)

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1. Solar Portal 20th Dec 2013 http://www.solarpowerportal.co.uk/guest_blog/the_treasury_and_the_cost_of_solar_in_the_uk_2356
2. Electricity Market Reform Delivery Plan, DECC, December 2013 https://www.gov.uk/government/publications/electricity-market-reform-delivery-plan
3. Nextgen 24th October 2013 http://www.nextgenmedia.co.uk/news/solar/809-renewable-energy-boss-tells-pm-solar-power-could-match-hinkley-in-2-years
4. Business Green 20th Dec 2013 http://www.businessgreen.com/bg/opinion/2320143/is-the-government-missing-the-plot-on-solar-power
5. Business Green 16th Dec 2013 http://www.businessgreen.com/bg/interview/2319084/greg-barker-predicts-solar-resurgence-in-2014
6. Solar Portal 12th Dec 2013 http://www.solarpowerportal.co.uk/news/greg_barker_promises_to_mobilise_the_mid_scale_solar_market_in_2014
7. Telegraph 30th Dec 2013 http://www.telegraph.co.uk/earth/energy/10542014/Energy-minister-wants-four-million-solar-panels-installed-on-government-land-and-buildings.html
8. Business Green 27th Dec 2013 http://www.businessgreen.com/bg/news/2320521/scottish-solar-industry-hits-100mw-milestone and Herald 27th Dec 2013 http://www.heraldscotland.com/news/environment/campaign-calls-for-more-solar-power-use.22999384
9. Telegraph 19th Dec 2013 http://www.telegraph.co.uk/finance/newsbysector/energy/10529090/Solar-panels-on-half-a-million-homes-by-end-of-the-year.html

8. Hydro in Scotland

There are around 120 hydro schemes of various sizes operating in Scotland. These produce around 5TWh of electricity each year which represents roughly 12% of current demand. The Scottish Government recently reported a potential for up to 7,000 hydro developments across the nation which could generate around 3TWh of additional electricity per year. Because many of these would be micro-site developments there is great potential to deliver real benefits to local communities across Scotland.

Meanwhile the Scottish Energy Minister, Fergus Ewing, has granted planning consent for the 600 megawatt (MW) Coire Glas pumped storage power plant, which will store excess power produced by Scottish wind farms and release it again when needed. The huge plant, which would take between five and six years to build and create 150 construction jobs, is now legally ready to be developed. However, SSE said a lack of long-term policy support from the British government, which does not award renewable energy subsidies to pumped storage sites, and high transmission charges threaten the project.

1. Scotsman 23rd Dec 2013 http://www.scotsman.com/news/hydro-power-can-help-scotland-s-energy-goals-1-3242592
2. Reuters 13th Dec 2013 http://uk.reuters.com/article/2013/12/13/uk-britain-sse-storage-idUKBRE9BC0G420131213

9. European Commission launches investigation into Hinkley subsidies

Brussels has launched a full investigation into whether Britain is providing up to £17bn of potentially illegal public guarantees to the proposed Hinkley Point C nuclear power station. The European Commission will examine the contract between the UK government and EDF. The inquiry, expected to last at least six months, is justified on the grounds that the commission "*in particular has doubts that the project suffers from a genuine market failure*". This puts into question the rationale for the UK offering support such as a guaranteed price for nuclear power and a financing "guarantee" to entice the private sector into building a series of nuclear reactors. Brussels estimates total government support would amount to almost £17bn, depending on future electricity prices and the actual capital costs of the operator.

Joaquín Almunia, the EU's competition commissioner, described the UK effort to attract investment in nuclear as "*complex*" and of an "*unprecedented nature and scale*". "*The commission therefore needs to investigate thoroughly its impact on the UK and the EU internal energy markets*," he said. Any disagreements between the UK and Mr Almunia over the contract terms could force a substantial renegotiation with EDF or put the entire project into doubt. (1)

The investigation was launched on the day the coalition's controversial Energy Act was finally given royal assent. The EC warned of the risk of a "*subsidy race*" between member states. (2)

UK officials are hopeful the case will come to a conclusion by the summer of 2014. EDF has made clear it cannot make a final investment decision on Hinkley or bring in co-investors – two state-owned Chinese groups, China General Nuclear Power Group and China National Nuclear Corp have expressed an interest in taking a stake – before state aid clearance is received. (3)

The UK government will dispute that the 'contract for difference' constitutes state aid. It contracts the government to compensate EDF if the market price for energy is lower than the agreed price – and EDF to compensate the government if the market price rises above the guaranteed price. The UK's secondary argument is that, if this is considered state aid, it should be permitted because the project would not be funded without it and the project is necessary to meet the government's decarbonisation and energy security goals. A public consultation will begin in January, once commercially sensitive information has been removed from the UK's evidence to the Commission. (4)

The Guardian reported on speculation in Brussels that the commission has already made up its mind that the Hinkley move is in effect an unfair subsidy, with the only question being what kind of changes or sanctions it may demand or impose on Britain. Günther Oettinger, the European Union's energy commissioner, warned in November that the 35-year subsidy regime "*may be a problem*" while earlier describing the UK nuclear project in an unguarded moment as "Soviet" in style. (5)

The Competition Commission will weigh up whether the benefits of the State Aid proposed for Hinkley Point C outweigh the disbenefits of the market distortion in an internal energy market that everybody agrees is already significantly distorted. Mark Johnston Advisor at the European

Centre for Policy Studies (EPC), says the principles behind the case, if the Commission were to allow them, would effectively put the Single Market into reverse, and as those principles were exploited by other governments it would, in effect, be the beginning of the end of the Single Market. Other countries such as Hungary, Czech Republic and Poland have expressed interest in the UK model.

Questions have been asked about whether the forthcoming UK referendum on membership of the EU put a pressure on the Commission to give the State Aid scheme a green light? The main argument of those opposed to UK membership of the EU is that the EU is a protectionist force, so it would be a little contradictory to complain if the EU were to take action to promote the free market. (6) However, UKIP Energy Spokesman Roger Helmer described the European Commission's investigation as "*appalling interference*". (7)

On the other hand, the latest disclosures from the Snowden files with allegations that the US and UK intelligence services have been spying on Joaquín Almunia may provoke a backlash against the UK. (8)

More than 100 politicians, industry experts and green energy campaigners have called on the European Commission to reject public support for new nuclear power plants. There is "*no valid justification for subsidising nuclear power*," they argue in an open letter to Joaquin Almunia. "*It diverts resources from other options that are better and cheaper*."

Labour MP Martin Caton tops the list of signatories, followed by Plaid Cymru MEP Jill Evans and Green MP Caroline Lucas. Dale Vince, founder of renewable energy supplier Ecotricity and Andrew Warren, director of the Association for the Conservation of Energy have endorsed the message. (9)

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1. FT 18th December 2013 http://www.ft.com/cms/s/0/9558c152-67e3-11e3-8ada-00144feabdc0.html and European Commission Press Release 18th Dec 2013 http://europa.eu/rapid/press-release_IP-13-1277_en.htm?locale=en
2. Guardian 18th Dec 2013 http://www.theguardian.com/business/2013/dec/18/hinkley-point-c-nuclear-subsidy-european-commission
3. FT 18th December 2013 http://www.ft.com/cms/s/0/9558c152-67e3-11e3-8ada-00144feabdc0.html and European Commission Press Release 18th Dec 2013 http://europa.eu/rapid/press-release_IP-13-1277_en.htm?locale=en
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6. ViEUws, In Focus, 18th Dec 2013 http://www.vieuws.eu/energy/in-focus-brussels-launches-state-aid-probe-into-camerons-nuclear-project/
7. UKIP Press Release December 2013 http://www.ukip.org/newsroom/news/1077-ukip-slams-eu-s-appalling-interference-in-hinkley-point-nuclear-project
8. Guardian 20th Dec 2013 http://www.theguardian.com/world/2013/dec/20/snowden-revelations-almunia-anger-european-commission
9. Utility Week 3rd Dec 2013 http://utilityweek.co.uk/news/campaigners-call-on-europe-to-block-new-nuclear-subsidies/952672

10. Hinkley judicial review fails

Ireland's main heritage group, An Taisce (the National Trust for Ireland), unsuccessfully challenged plans for two new nuclear reactors at Hinkley in the British High Court. The conclusion of the judicial review of the grant of development consent for Hinkley Point C was issued on 19th Dec 2013.

A summary and analysis of the judgement was published by Angus Walker of Bircham, Dyson and Bell. The case was heard by Mrs Justice (Frances) Patterson, who only became a High Court judge on 1 October.

In essence, the challenge was that the Irish government should have been consulted on the application under the UK's obligations on 'transboundary effects' of projects (i.e. potential environmental effects on other member states). These arise from the Espoo convention, embodied in the Environmental Impact Assessment directive and then in the EIA regulations for infrastructure planning. Although this was a 'rolled up' hearing of the permission stage and the substantive hearing simultaneously, the judge ruled that she wouldn't have given permission to go to a substantive hearing.

The arguments centred around the need to consult other countries if environmental effects there were 'likely', and what 'likely' actually means in this context, particularly since a nuclear accident, although unlikely, could have severe consequences. DECC's argument was that the ordinary meaning of 'likely' is more than 50% probability. This turned out to be the persuasive point. (1)

Jonathan Swift QC, counsel for the energy secretary, said the Irish Government had repeatedly raised questions about the operation of Sellafield but concerns about the new Somerset plant at Hinkley Point "have never been raised". However, files lodged in the case include two letters to British ministers from Irish ministers. They were sent by the former Green Party minister for the environment, John Gormley, in February 2010 and his successor, Fianna Fáil's Éamon Ó Cuív, in January 2011. In his letter, Mr Gormley said it was not "*immediately apparent*" that the cumulative effects of Sellafield's "*continuing discharges*" and new nuclear power stations had been "*satisfactorily assessed*" by the British. The case made for extra nuclear capacity relied "*heavily on claims that nuclear power generation is a necessary part of the UK's response to climate change*", said Mr Gormley, even though the carbon bill left by stations over their lifetimes was unknown. (2)

1. BDB Law 6th Jan 2014 http://www.bdb-law.co.uk/our-insights/blogs/planningact2008blog/2014/01/515-an-taisce-loses-challenge-to-hinkley-point-c-consent
2. Irish Times 10th Dec 2013 http://www.irishtimes.com/news/environment/irish-ministers-raised-nuclear-concerns-1.1623324

11. Hinkley C to cost £6bn more than building elsewhere!

The reported costs of the proposed Hinkley Point C nuclear power plant rose from an expensive £10bn in 2012 to an eye-watering £16bn within the space of a year. Why so much? During a 21st October investor conference call, the CEO of the French state-owned utility EDF, Henri Proglio, estimated the construction cost of the 3260 MW, twin EPR reactor project at £14bn, "*in line with the amounts committed to the EPR at Flamanville*," i.e. £7bn each. EDF estimates a further £2bn will be necessary due to the specifics of the UK regulatory regime and site specifics of Hinkley Point C. The total estimated project cost, therefore, is £16bn. Pressed on this by a curious journalist from French newspaper Les Echos, who was clearly wondering why the "series effect" seemed to have no effect on the construction cost of EPRs, Proglio gave this contradictory response:

"*The lessons learned…are offset by the site specificities for Hinkley Point, the regulatory environment in the UK and all specificities for HPC. The significant decrease offsets the additional incremental work that we have to perform and to carry out at Hinkley Point*."

Proglio tried to explain. "*We have to have many ancillary buildings at Hinkley Point C that we don't need for Flamanville. The site has a geologically different nature, softer ground and we have to do more earthworks and to put more concrete underground as a consequence. We have to take into account the fact that the Severn estuary is the large tidal flow location and there are many issues of that nature which leads to a more expensive cooling system when you are going to get the water in the sea to cool the power station*."

Although EDF says a new EPR in France would now cost £5bn, in Britain it is, in effect, £8bn. As Hinkley Point C is a twin reactor project, the difference between a 'new' twin-reactor Flamanville 3 and Hinkley Point C would be effectively £6bn.

Hinkley Point C will be too expensive for manufacturers according to Jim Ratcliffe, the chief executive and founder of chemical firm Ineos, one of the UK's biggest energy consumers. (2)

1. Millicent Media 4th Jan 2014 http://millicentmedia.com/2014/01/04/why-will-hinkley-point-c-cost-16bn/ and Transcipt of EDF's Conference Call 21st Oct 2013. http://millicentmedia.com/2014/01/04/electricite-de-france-sa-update-on-hinkley-point-cs-project-conference-call-21-october-2013/
2. Energy Live News 17th Dec 2013 http://www.energylivenews.com/2013/12/17/hinkley-nuclear-power-%e2%80%98too-pricey-for-manufacturers%e2%80%99-says-ineos-boss/

12. Hinkley Safety

The safety assessment for the Hinkley C reactor design has failed, reports Emma Bateman. Faced with 724 unresolved concerns about the EPR design, the UK regulator went ahead and issued the licence anyway. The Generic Design Assessment (GDA) is a process which was set up in order to examine the designs for new power stations and iron out any flaws in them before the power stations are constructed. Allowing the regulators to get involved with designers at the earliest stage was supposed to ensure an open and transparent process resulting in several competing designs with all significant design issues fully resolved. (1)

Extra safety features are to be installed at Hinkley designed following the nuclear disaster in Fukushima, according to *The Telegraph*. Details of the upgrades emerged after the worst storm surge in 60 years flooded 1,400 homes on the east coast of England. Among the major changes to be made is the installation of a 66 million gallon water tank to flood and cool the nuclear reactors in an emergency. This is aimed at averting the kind of uncontrolled meltdown that occurred at Fukushima when pumps used to cool the reactors failed. Flood defence walls are also to be built higher around the diesel motors that drive the cooling pumps while the motors themselves will also be bigger. Hinkely Point C will also be the first nuclear power station in the country to have an outer shell designed to withstand a large plane crash. (2)

1. Ecologist 26th Dec 2013 http://www.theecologist.org/blogs_and_comments/commentators/2209776/hinkley_c_the_generic_design_assessment_has_failed.html
2. Telegraph 15th Dec 2013 http://www.telegraph.co.uk/earth/energy/nuclearpower/10516997/Hinkley-Point-C-nuclear-power-plant-to-have-extra-flood-defences.html

13. Hinkley Jobs

Ed Davey claims that British companies will win most of the work - up to 57 per cent of the contracts - to build Hinkley, but his remarks were contradicted a government report, according to *The Times*. The claim ignored the conclusions of a report commissioned by the Department for Business, published in March, which found that domestic suppliers would be able to win only 44 per cent. Indeed, consultants reviewing Oxford Economics' report estimated privately that even that figure was unrealistic, suggesting 41 per cent, instead. According to the Oxford Economics report, the British supply chain lacks "nuclear culture" and has difficulty adapting to new technology and standards. The consultancy estimated that UK content could rise to 63 per cent, but this would apply only from the third new reactor onwards as part of an 11-reactor programme. It also assumes that British companies are confident that the new-build programme will go ahead to make the investment in R&D needed to secure the work and that the Government intervenes to help them. (1)

In response Ed Davey said his claims about British companies winning most of the work did not contradict the Government report about the benefits of improving the UK's nuclear supply chain. (2)

1. Times 9th Dec 2013 http://www.thetimes.co.uk/tto/business/industries/utilities/article3943264.ece
2. Times 16th Dec 2013 http://www.thetimes.co.uk/tto/opinion/letters/article3949779.ece

14. The Bonkers Scenario – Volunteers for 4 nuclear dumps please?

In April 2013 (NuClear News No.49) we reported that the government's high-nuclear scenario was one of four set out in the 2011 carbon plan. (1) This envisaged 75GW of nuclear capacity in 2050 providing 86% of the UK's electricity. (2)

In order to achieve 75GW of nuclear capacity by 2050, (which incidentally would require an eye watering 30GW of new capacity to be built between 2030 and 2040 and another 30GW between 2040 and 2050) the Government expects to need newer fission technologies such as evolutionary LWR's, small modular reactors (SMRs) or Generation IV (mainly fast reactors); options for closing the uranium fuel cycle and reprocessing spent fuel; progressing the development of fusion; and consideration of alternative fuel cycles such as thorium. (3)

On nuclear waste the Government said demonstrating that the UK has a credible programme to deliver a disposal route for higher activity wastes and have it in operation as soon as safely practical is a foundation stone for the UK's short, medium and long term nuclear strategies.

Now the Committee on Radioactive Waste Management (CoRWM) has looked at the waste implications of a 75GW nuclear programme which equates to over 50 new large-scale modern reactors. CoRWM said "*There is a need for clarity that any data given for, for example, 16GWe, are an example rather than either an expectation or a limit.*" (4)

CoRWM says the maximum allowable inventory in any individual Geological Disposal Facility (GDF) has to be determined by the Safety Case. It would therefore be prudent to keep open the possibility of multiple GDFs:

"Whilst CoRWM understands why the Government has given the example of new build wastes arising only from developed proposals where information on the waste types is known, 16GWe is only the 'first tranche' figure and substantially below the 75GWe upper limit being examined in DECC … This issue reinforces the requirement to leave the option open for more than one repository."

Dr David Lowry, an environmental policy consultant and nuclear specialist, told The Observer that a 75GW scenario was a "*nuclear fantasia at its worst*", and failed to explain how huge amounts of radioactive waste generated by the plants would be stored. (5)

The Environment Agency (EA) has set a limit on the risk that may be caused by the burial of radioactive wastes of 10^{-6} (i.e. one in a million). (6) However, the NDA Disposability Assessment Report for waste arising from new EPR reactors states:

"…a risk of 5.3 x 10^{-7} per year for the lifetime arisings of a fleet of six EPR reactors" (7)

This is more than half the total risk of 10^{-6} allowable for a GDF. Clearly a GDF with spent fuel from more than 12 new EPR reactors, as well as legacy waste, would exceed the risk targets set by the EA.

A back-of-the-envelope calculation, therefore, would suggest that a 75GW programme could require around 4 GDFs.

A cross-government review, undertaken in response to the House of Lords' Science and Technology Committee's report on UK nuclear research and development (R&D) capabilities, has resulted in the publication of a suite of documents available on the Government website. These include the Nuclear Industry Strategy, a Nuclear Energy Research and Development Roadmap, a Nuclear Industrial Vision Statement, a Long Term Nuclear Energy Strategy, and a Civil Nuclear Research and Development Landscape Review.

The Technology Strategy Board (TSB), the Nuclear Decommissioning Authority (NDA) and the Department of Energy and Climate Change (DECC) are now investing up to £13m in collaborative R&D and feasibility study projects, to stimulate innovation and strengthen the UK's civil nuclear supply chain. The competition is open to all sizes of businesses and research organisations who may already be engaged in the nuclear sector or who are considering entering this growing market for the first time.

DECC says its work includes considering how the UK energy system might evolve in the future and the roles that different types of energy generation may play in it. This may include new designs of nuclear reactors and new types of fuel. Most of the world's nuclear power reactors tend to run on uranium fuel, be cooled by water and, in order to sustain the heat-giving nuclear reaction in the reactor core, they must slow down the neutrons that the fuel emits. However, there are a range of reactor designs in various stages of development that differ from these and that may offer advantages over currently available reactor systems. Some of these also offer the possibility of using thorium, rather than uranium as a fuel, which also may offer desirable characteristics. (8)

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2. The Carbon Plan: delivering Our Low Carbon Future, DECC, December 2011 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47613/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf
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7. NDA (22nd Jan 2010) Generic Design Assessment: Disposability Assessment for wastes and spent fuel arising from operation of the UK EPR. Part 1 Main Report. para 5.4 page 97.

8. DECC 8th Jan 2014 https://www.gov.uk/innovation-funding-for-low-carbon-technologies-opportunities-for-bidders

See also

Higher Level Radioactive Waste: Likely inventory range; the process for altering it; how the community might influence it and understanding the implications of new nuclear build. Presented to West Cumbria Managing Radioactive Waste Safely Partnership, Pete Roche, 5th August 2010 http://www.nuclearwasteadvisory.co.uk/wp-content/uploads/2011/05/Inventory_presentation_to_WCMRWS_Aug2010.pdf