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- 1. Editorial – Nuclear Power won't “disappear in a puff of logic”**

What makes God laugh? Answer people who say they have plans. That old one-liner could now become the motto of the world's nuclear industry. After a decade during which nuclear power has gradually regained its credibility in the eyes of the public, a single uncontrollable event has reminded everyone of the risks associated with nuclear power plants. (1)

It has been a momentous month for nuclear power. While the Deputy Prime Minister says a consequence of the Fukushima disaster is that the next generation of UK nuclear power stations may never be built because they will be too expensive, (2) there are those who insist that far from shaking faith in the nuclear industry, the Fukushima crisis should strengthen it. (3)

Nick Clegg says the new uncertainty for the nuclear industry could raise its liabilities and in all likelihood entail some kind of public subsidy – which the coalition would be unable to provide. (4) On the other hand, former Government chief Scientist Professor Sir David King says that, despite events in Japan, "*the economic, safety and carbon case for a new-build programme in the UK has never been stronger*". (5) And Chris Huhne launched an astonishing attack on Nick Clegg, according to the *Daily Mail*, accusing him of behaving like a 'headless chicken'. He ridiculed his suggestion that the meltdown at the Fukushima reactor could lead to soaring costs of nuclear power stations in the UK. (6)

Whilst March may have been a momentous month, it is still too early to predict how things will turn out for the UK nuclear industry. It may be tempting to question the sanity of those who want to spend £3bn on a new plutonium fuel plant, when the existing plant at Sellafield has squandered £2bn of taxpayers' cash, (7) and others who slash solar subsidies in the middle of a major nuclear accident. (8) But the truth is there is only one thing we can be sure of, now is not the time to sit back and wait for the nuclear industry to “disappear in a puff of logic”. (9)

The Government confirmed at a meeting with NGOs in Whitehall that both the designation of the National Policy Statements (NPS) and the Generic Design Assessment (GDA) will be delayed. The NPS will be delayed until at least after the publication of the interim report by Mike Weightman, the Chief Inspector of Nuclear Installations, on the implications for the UK nuclear industry of the Fukushima disaster which is due in mid-May. (10) The GDA will be delayed until after the final report has been completed in September. Specific dates are still being considered but the Government doesn't want to commit until the incident in Fukushima settles down and decisions over nuclear reactor stress tests are clarified. The GDA was originally expected to be completed in June this year. Officials also told NGOs that the Committee on Medical Aspects of Radiation in the Environment (COMARE) report on the German Government's KIKK study was now complete, and is expected to be published in a few weeks time.

The NGOs presented the Government with a series of demands at that meeting. These were:

- The UK Government's nuclear safety review must be undertaken in public and be fully open and transparent. It should include non nuclear industry representatives and consider nuclear reactors, spent fuel stores and reprocessing plants.
- The HSE's 'exclusions' arrangement in the Generic Design Assessment (GDA) process and those arrangements, such as deferring issue resolution in order to artificially meet the nuclear new build timetable, must be abandoned. The GDA process and the governance regime of nuclear safety in the UK should be reviewed as a result of the Fukushima incident.
- There should be NO public subsidies for nuclear new build as per the UK Government coalition agreement. All the groups oppose the development of new nuclear build in the UK and are concerned that the development of the low carbon price gives an indirect subsidy of up to £3.2 billion on the nuclear industry.
- The health effects of low level radiation on land and in the marine environment need to be independently verified.
- UK Government Ministerial statements that they have confidence that the proposed arrangements for new build radioactive waste management will exist should cease or be required to be justified or qualified.
- The UK Government should commission an urgent independent security review on current and projected radioactive waste and spent fuel interim storage arrangements.
- The UK Government and the Nuclear Decommissioning Authority need to resolve over 100 identified scientific and technical uncertainties before developing a deep-underground radioactive waste repository.
- The UK Government should abandon the option of using separated weapons-useable plutonium as reprocessed Mox fuel for use by domestic and overseas customers. (11)

(1) FT 14th March 2011 <http://www.ft.com/cms/s/0/41651652-4e70-11e0-98eb-00144feab49a.html>

(2) Telegraph 30th March 2011 <http://www.telegraph.co.uk/earth/energy/8415028/Nick-Clegg-Britains-proposed-nuclear-plants-may-not-be-built.html>

(3) Telegraph 30th March 2011 <http://www.telegraph.co.uk/comment/telegraph-view/8414734/Nuclear-power-is-the-low-carbon-future.html>

(4) Guardian 30th March 2011 <http://www.telegraph.co.uk/comment/telegraph-view/8414734/Nuclear-power-is-the-low-carbon-future.html>

- (5) Telegraph 30th March 2011 <http://www.telegraph.co.uk/comment/telegraph-view/8414734/Nuclear-power-is-the-low-carbon-future.html>
- (6) Daily Mail 4th April 2011 <http://www.dailymail.co.uk/news/article-1373069/Huhne-attacks-headless-chicken-Clegg-nuclear-plant-comments-amid-claims-Lib-Dem-leadership-challenge.html>
- (7) Independent 30th March 2011 <http://www.independent.co.uk/news/science/top-scientist-backs-1633bn-sellafield-plant-despite-1632bn-failure-on-same-site-2256766.html>
- (8) Business Green 18th March 2011 <http://www.businessgreen.com/bg/news/2035346/decc-reveals-crippling-cuts-solar-feed-tariffs>
- (9) <http://answers.yahoo.com/question/index?qid=20090701141340AA5ZEw5>
- (10) HSE 29th March 2011 <http://www.hse.gov.uk/nuclear/fukushima/statement-290311.htm?ebul=gd-nuclear&cr=02/mar-11>
- (11) Full Statement is available here:
http://www.nuclearpolicy.info/docs/news/NFLA_NGO_nuclear_demands_joint_statement.pdf

2. Moratorium? It's the money stupid.

Despite the catastrophe in Japan, environment groups seem unlikely to get a full-scale moratorium on new nuclear reactors but a moratorium isn't the only thing that can derail the nuclear element of Britain's energy policy. *The Independent* estimates that private sector companies are being asked to find £50bn to invest in new nuclear plants over the next decade in the UK. They do so not out of the goodness of their hearts but because they expect to make a return on that money. If they judge the return less likely to be delivered, they are less likely to make the investments in the first place.

Chris Huhne, the Energy Secretary, may have put his anti-nuclear past behind him but he has only been able to persuade fellow Liberal Democrats to do the same by pledging there will be no public subsidy for new nuclear. There was already a row over whether Mr Huhne had breached that commitment with his plan for a carbon price floor and minimum prices for electricity generated from non-carbon fuel sources. (1) As the *Daily Telegraph* reported:

"Despite the Government's claims that nuclear has not been subsidised, a range of new incentives to encourage the construction of nuclear plants will substantially raise the price of electricity bills for customers". (2)

The newspaper has not been afraid to call a subsidy a subsidy. When the Electricity Market Reforms were announced in December last year it said:

"Years of lobbying by nuclear companies has finally paid off, as the Government ...plans to subsidise the price that they are paid for generating electricity." (3)

Former Government Advisor, Tom Burke, writing in the ENDS Report says there has been a vigorous, focused and well-resourced campaign for several years to get the first new reactors open by 2017. But the "dreadful economics" of nuclear power collided with the need for no subsidies.

"It soon became clear that neutering the planning system, capping the cost of radioactive waste management, continuing to accept the bulk of the nuclear industry's third-party liabilities and putting in a floor price for carbon would not be enough."

So a decision has been taken to use much needed reform of the electricity market to disguise nuclear subsidies. Consequently we have ended up with an assemblage of measures with no clear analysis to back them up. What the whole thing amounts to is *"the weird sight of a government actually picking a technology loser while pretending it is not in the business of picking technology winners"*. (4)

The Japanese disaster might well strengthen the resolve of Liberal Democrats to fight back against nuclear subsidies. The opposition could coalesce now around the proposed energy market reforms.

Chris Huhne has urged us not to panic. Britain doesn't have huge earthquakes, he said. There will be an inquiry. Lessons will be learned. (5) But even he admits that the investment required for Britain's ambitious programme may be hit by the crisis in Japan. He told the House of Commons Energy and Climate Change Committee that there was an "*on-going potential risk*" that investors would lose appetite for nuclear power following the third explosion. (6) Huhne told MPs that he had asked Dr Weightman to report into Britain's nuclear safety standards and insisted the Government would wait for its conclusions. However he assured MPs that Dr Weightman would "not dilly-dally". Neither would there be pressure on him to recommend changes in the wake of the Japan disaster. "*There is no intention for us to do anything but learn the lessons... for example, about the back up for cooling,*" he said.

Chris Huhne told the Nuclear Development Forum on 17th March (7) that the Government will consider the Nuclear National Policy Statement (NPS) in light of the emerging nuclear crisis in Japan before proceeding with the ratification process. (8) He set out further details of the UK Chief Nuclear Inspector's (Dr Mike Weightman's) report into the implications of events at Japanese nuclear reactors on existing and new plants in the UK. (9)

The six energy NPSs were originally published in draft in November 2009 and then revised drafts were published in October 2010. A second consultation closed on the revised versions earlier on 24th January 2011. The Government's recent Carbon Plan said that it was planning to present final versions to Parliament in May this year, and then 'designate' them in June. Now Huhne says the Nuclear Power NPS will take Dr Weightman's interim report into account, which logically suggests that the final version of the NPS may not be published in May after all. However, according to Building Magazine, (10) a government spokesman said it was too early to say if the process meant the ratification of the nuclear planning statement will be delayed. (11)

Huhne told the *Observer* on 20th March that events in Japan could have profound long-term implications for UK policy. He conceded that the Japanese disaster was likely to make it more difficult for private investors to raise capital to build the eight new reactors planned by the government. "*There are a lot of issues outside of the realm of nuclear safety, which we will have to assess. One is what the economics of nuclear power post-Fukushima will be, if there is an increase in the cost in capital to nuclear operators.*" (12) So he appeared to be raising the prospect of scaling down or even abandoning the country's new nuclear programme. Any move away from nuclear – while certain to be welcomed by many Lib Dems – would alarm many in the Tory party. Tim Yeo, the Conservative chair of the environment and climate change select committee, said any such shift would be a huge mistake. "*If Britain abandons or significantly delays its programme of building new nuclear power stations, there are three inevitable consequences. First, electricity prices will rise. Second, Britain will not be able to meet its carbon emission reduction targets. And third, the risk that the lights will go out will significantly increase.*"

Huhne said: "*We can do the 80% reduction in emissions by 2050 without new nuclear, but it will require a big effort on carbon capture and storage and renewables.*"

The Liberal Democrat MP for Cheltenham, Martin Horwood, has tabled an Early Day Motion (No. 1615) (13) calling for a suspension of the Government's plans for new reactors. (14) At the time of writing the motion had attracted 32 signatures, including 11 Liberal Democrats and two Conservatives. North East Liberal Democrat MEP Fiona Hall also called for a halt on further nuclear power developments in the UK to allow for an urgent public debate on safety issues. Fiona played a leading role in the Druridge Bay campaign in the 1980s to stop nuclear power on the Northumberland coast. (15)

The Government's determination to build a new generation of nuclear power plants is unsellable after the Fukushima crisis, says former Liberal Democrat leader Lord Ashdown. He said that he had recently been persuaded of the need to build more nuclear power stations to solve Britain's looming

energy crisis, but now thinks the unfolding Japanese crisis has critically undermined public confidence in the technology. Simon Hughes, the party's deputy leader, said the pursuit of new reactors in Britain should be abandoned. Some of us have taken a consistent position that for practical reasons, rather than theological ones, we should not go down the nuclear road, he said. Jo Swinson, another Liberal Democrat MP says nuclear is too expensive and will crowd out investment in greener forms of energy. The costs of decommissioning these plants and the underwriting costs mean it is difficult to build them without any public subsidy, she said. (16)

- (1) Independent 18th March 2011 <http://www.independent.co.uk/news/business/comment/david-prosser-money-will-decide-new-nuclears-fate-in-uk-2245273.html>
- (2) Daily Telegraph 31st March 2011 <http://www.telegraph.co.uk/finance/newsbysector/energy/8416955/EDF-committed-to-nuclear-despite-Nick-Cleggs-cost-fears.html>
- (3) Telegraph 16th December 2010 <http://www.telegraph.co.uk/finance/newsbysector/energy/8204683/UK-government-agrees-to-subsidise-nuclear-power-companies-prices.html>
- (4) Tom Burke, "Say yes to negawatts, no to nuclear subsidy". ENDS reports March 2011.
- (5) Reuters 13th March 2011 <http://uk.reuters.com/article/2011/03/13/uk-britain-japan-nuclear-idUKTRE72C2C520110313>
- (6) Telegraph 16th March 2011 <http://www.telegraph.co.uk/finance/newsbysector/energy/8384145/Chris-Huhne-Japan-is-a-risk-to-UK-nuclear-plans.html>
- (7) At the time of writing the minutes of the 17th March meeting were not available but will soon be at: http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/nuclear/forums/develop_forum/develop_forum.aspx
- (8) DECC Press Release 17th March 2011 http://www.decc.gov.uk/en/content/cms/news/PN11_026/PN11_026.aspx
- (9) New Civil Engineer 18th March 2011 <http://www.nce.co.uk/news/energy/nuclear-national-policy-statement-to-be-re-examined-following-japanese-crisis/8612683.article>
- (10) Building magazine requires a subscription, but the article is reprinted here: http://www.youngsconsultancy.com/index.php?option=com_content&view=article&id=1511:nuclear-planning-policy-to-be-reconsidered-in-light-of-fukushima&catid=3:newsflash&Itemid=78
- (11) Bircham, Dyson Bell 18th March 2011 <http://www.bdb-law.co.uk/blog/anguswalker/225-likely-delay-nuclear-and-other-nps-and-mps-news>
- (12) Guardian 19th March 2011 <http://www.guardian.co.uk/politics/2011/mar/19/huhne-says-uk-might-have-to-drop-nuclear-option>
- (13) <http://www.parliament.uk/edm/2010-11/1615>
- (14) This is Somerset 18th March 2011 <http://www.thisissomerset.co.uk/news/MP-launches-bid-halt-nuclear-stations/article-3346774-detail/article.html>
- (15) Northumberland Gazette 18th March 2011 http://www.northumberlandgazette.co.uk/news/local-news/nuclear_warning_1_3187749
- (16) Times 26th March 2011 <http://www.thetimes.co.uk/tto/news/politics/article2962116.ece>

3. Climate Change could spell the end for nuclear

Natalie Kopytko, an environment researcher at York University, writing in the *Guardian*, says climate change could spell the end for nuclear power, not vice versa. Incident reports from nuclear power plants provide examples of safety doors being left open during a hurricane, communication problems, access roads flooding and, of all things, algae regularly causing reactors to shut down. No matter how well they build them, nuclear power plants require lots of water. As such, the plants need to be either on the coast or near a large body of water at an inland site. The loss of off-site power commonly happens during storms, particularly at coastal locations. So a strong storm, probably stronger than the historical records used in the estimates for design, could cause flooding that leads to an accident similar to the one we are witnessing. Flooding can be an issue at inland sites as well, and the probability of catastrophic floods is probably increasing as a result of climate change.

"Every time an accident happens, exceptional circumstances get blamed", says Kopytko. "What will be the next exceptional circumstance?"

- (1) Guardian 18th March 2011 <http://www.guardian.co.uk/commentisfree/cif-green/2011/mar/18/nuclear-power-climate-change-risks>

4. UK Industry and Investors respond to Fukushima

The nuclear industry is uniting with contractors to ramp up a campaign to restore public confidence and press ahead with plans for new UK nuclear reactors. (1) It is largely convinced that nuclear is the only way to meet our mounting energy needs. Huhne is thought to be unlikely to conclude that Japan's choice to build a plant near a major fault line bears any relation to a facility located on a headland on the west coast of England. At least that's what British business is hoping.

Officials in Whitehall are privately trying to reassure energy firms and their contractors that the nuclear programme is not under threat. *"We're not building reactors in areas of seismic activity [and] the designs of these reactors will be two generations on from Fukushima."* (2)

At the Nuclear Development Forum on 17th March, EDF's chief executive Vincent de Rivaz said:

"While we understand the importance of adjusting the timetable to take into account [Weightman's] report, it is equally important that establishing the framework for new nuclear should not be subject to undue delay. The events in Japan do not change the need for nuclear in Britain."

So there seems to be an acknowledgement that a report is necessary to help reassure a sceptical public that nuclear will be safe, but EDF is confident its projects will proceed virtually on schedule. (3) Mr de Rivaz said his *"determination to press ahead was undimmed ... Everybody is holding their nerve, government is holding its nerve, the regulator is holding its nerve – and I am holding my nerve."* (4)

De Rivaz used an appearance on BBC One's The Andrew Marr Show to justify continuing with the proposed Hinkley Point C nuclear reactor despite the Fukushima accident. He said he believes the disaster will delay Britain's nuclear programme by "a couple of weeks", at most. (5) On the other hand, former Government advisor, Tom Burke says he believes a 2018 is no longer a viable timeline for EDF to open Hinkley Point C. (6)

Volker Beckers, the chief executive of RWE Npower, took a slightly different tone. He warned that RWE could be forced to delay plans to build UK plants, especially if any major safety changes prompted by Japan's atomic disaster push up the cost of reactors. He expects the schedule to slip by "three to six months" as a result of the Fukushima disaster. (7) Tom Burke says *"apart from EDF this has basically killed any interest in nuclear because anyone with a half open balance sheet - RWE and E.On - will have a hard time persuading investors; they will now be a lot less serious. I think (even) Vincent de Rivas is going to have a lot of trouble to convince his board to spend so much money for five years."* (8)

Chris Huhne acknowledged in an interview in the *Observer* that events in Japan could make it harder to find investment for nuclear projects. (9) A senior industry figure speaking on condition of anonymity to *The Telegraph* said it might be necessary to delay the introduction of the carbon floor price. *"It is getting very difficult to persuade investors to fund new projects ... especially given what's going on in Japan."* He said we can't just carry headlong into the carbon price support and introduce it as soon as 2013 because it may cause coal-fired plants to close early. (10)

The Fukushima crisis is likely to hurt the nuclear power industry's credibility more than Chernobyl according to UBS AG. The accident in the former Soviet Union 25 years ago *"affected one reactor in a totalitarian state with no safety culture,"* according to UBS analysts. *"At Fukushima, four reactors have been out of control for weeks -- casting doubt on whether even an advanced economy can master nuclear safety."* (11)

Whatever your view on the science of nuclear power, the industry will be changed forever by this crisis, and will certainly be made more expensive, says *The Independent on Sunday*. It's taken the nuclear industry more than three decades to shed its toxic image. If you look back to the accidents at Three Mile Island and Chernobyl, it's quite extraordinary how nuclear power has gone from being seen as dirty and dangerous to being low-carbon and safe. In no time at all, the nuclear lobby has become one of the most powerful industrial complexes on Earth. What has made this conversion so interesting is the way policy-makers, politicians and even green campaigners bought into the re-branding because of our dependency on expensive and limited fossil fuels but also because nuclear power has been seen as the cleanest and quickest way to cut carbon emissions. The new EPR plants cost at least £5bn to build and some estimates suggest extra safety will add at least another 10 per cent to that, which in turn will feed through into higher electricity prices. Are these costs which the private sector – which will have to pay for the nuclear programme – can stand or will tolerate in the light of Fukushima? Or will governments have to subsidise construction?

Jeremy Leggett, one of nuclear power's fiercest critics who also runs one of the fastest growing energy firms, Solar Century, thinks the nuclear sector is dead. What's more, he predicts a devastating energy crisis unless the Government moves swiftly to build up all energy sources as alternatives to sky-high and volatile Middle Eastern oil and gas supplies. (12)

While Labour's shadow energy secretary Meg Hillier accused Chris Huhne of "*failing to be emphatic about the government's position on nuclear*", Green MP Caroline Lucas asked if "*the Japan accident will make it more difficult for private investors to raise capital to build the eight new reactors that are planned by the Government*". Huhne said: "*Although I spent many years in financial markets I do not claim to know how they will react to particular events as they can often react in a rather faddish and fashionable manner. I think we will just have to wait and see.*" (13)

EDF dismissed claims that nuclear power may be too expensive for Britain in the wake of Japan's atomic disaster because of extra safety requirements. However, EDF said work was continuing with its investment and insisted it would not need extra subsidies. The company is planning to spend about £10bn building the UK's first two new nuclear stations by 2018 with its partner Centrica. (14) Meanwhile National Geographic asked: Would brand-new reactors have fared better in the power outage that triggered dangerous overheating at one of Japan's oldest power plants? The answer seems to be: Not necessarily. (15)

- (1) Construction News 24th March 2011 <http://www.cnplus.co.uk/news/nuclear-industry-rallies-on-new-build/8612864.article?referrer=RSS>
- (2) Independent 20th March 2011 <http://www.independent.co.uk/news/business/analysis-and-features/fukushima-what-will-the-fallout-be-for-british-nuclear-power-2247039.html>
- (3) Daily Mail 19th March 2011 <http://www.dailymail.co.uk/money/article-1367980/Japans-radiation-crisis-unlikely-delay-Britains-nuclear-rebuilding-programme.html?ito=feeds-newsxml>
- (4) FT 17th March 2011 <http://www.ft.com/cms/s/0/6e1ba3f2-50df-11e0-9227-00144feab49a.html>
- (5) This is Somerset 24th March 2011 <http://www.thisissomerset.co.uk/whereyoulive/bridgwater/Energy-chief-defends-nuclear-industry/article-3367386-detail/article.html>
- (6) Construction News 24th March 2011 <http://www.cnplus.co.uk/news/nuclear-industry-rallies-on-new-build/8612864.article?referrer=RSS>
- (7) Telegraph 23rd March 2011 <http://www.telegraph.co.uk/finance/newsbysector/energy/8399058/Japan-earthquake-Crisis-may-force-up-cost-of-UK-nuclear.html>
- (8) Construction News 24th March 2011 <http://www.cnplus.co.uk/news/nuclear-industry-rallies-on-new-build/8612864.article?referrer=RSS>
- (9) Observer 20th March 2011 <http://www.guardian.co.uk/commentisfree/2011/mar/20/observer-editorial-nuclear-power-japan>
- (10) Telegraph 23rd March 2011 <http://www.telegraph.co.uk/finance/newsbysector/energy/8399058/Japan-earthquake-Crisis-may-force-up-cost-of-UK-nuclear.html>

- (11) Bloomberg 4th April 2011 <http://www.bloomberg.com/news/2011-04-04/fukushima-crisis-worse-for-nuclear-power-industry-than-chernobyl-ubs-says.html>
- (12) Independent on Sunday 20th March 2011
<http://www.independent.co.uk/news/business/comment/margareta-pagano/margareta-pagano-is-the-nuclear-industry-dead-and-buried-2247038.html>
- (13) ePolitix 24th March 2011 <http://www.epolitix.com/latestnews/article-detail/newsarticle/huhne-pressed-on-nuclear-safety/>
- (14) Telegraph 31st March 2011 <http://www.telegraph.co.uk/finance/newsbysector/energy/8416955/EDF-committed-to-nuclear-despite-Nick-Cleggs-cost-fears.html>
- (15) National Geographic 23rd March 2011
<http://news.nationalgeographic.com/news/energy/2011/03/110323-fukushima-japan-new-nuclear-plant-design/>

5. Growing body of evidence shows we don't need nuclear

The nuclear industry and its supporters continue to insist that “only new reactors can stop the lights going out”. (1) Yet there is a growing body of evidence showing we can keep the lights on with renewable power if we cut the amount of energy we waste. (2)

Experts from the Department of Energy and Climate Change's chief scientific adviser, David MacKay, to the respected European consultancy Ecofys, agree that it is possible to provide the energy we need and reduce carbon emissions without nuclear. (3)

Nuclear power is a gamble we don't need to take, says Mike Childs, head of Energy at Friends of the Earth. Studies show that the UK can meet its energy needs and tackle climate change without resorting to nuclear power or burning fossil fuels – all that is lacking is the political will. Over the years, the nuclear industry has survived on massive subsidies from UK taxpayers while cleaner forms of energy have been starved of cash. (4)

Andrew Warren, Director of the Association for the Conservation of Energy asks how it is that Germany has the confidence to go down an entirely non-nuclear route, even with the same 2050 objective of an 80% reduction in greenhouse gases. The difference between where we believe our electricity consumption will be by then – twice, even three times, present levels – and where the German government thinks electricity demand can be via a purposeful and consistent efficiency programme - 25% below present levels – gives the answer. (5)

The issue is very simple: the Government is drawing up plans for increased energy demand and expensive new infrastructure – but they have admitted they have NOT carried out an assessment to compare the costs and benefits of energy efficiency against those of generating energy. This is a particularly perverse since it has been agreed by current Ministers, and the former Labour Government, that energy saving and efficiency is the most cost effective way of meeting energy policy objectives. (6) Warren says in 1981 the House of Commons select Committee on Energy posited this specific criticism: *'Why has Government still no idea whether investing £1,300m in a single nuclear plant is as cost-effective as spending a similar sum to promote energy conservation'?*

This report was issued at a time when Government had just announced its intention to promote a new generation of nuclear power stations (of which just one was finally built). A generation later Government is still failing to address this most basic question. Perhaps up until now, it has been considered only of academic interest. But with the Coalition Government seeking to expedite expenditure of upwards of £200bn in new generation sources, it really is high time the question was answered. (7)

The Government's Revised Draft Overarching National Policy Statement for Energy (8) (Para 3.3.14) states unequivocally: *“Department of Energy and Climate Change analysis...shows that reductions in electricity consumption resulting from improvements in energy efficiency will be far outweighed by*

increases in electricity demand, potentially leading to a doubling of electricity demand between now and 2050.... (and because of possible intermittency) total installed capacity might need to treble."

Warren says that ACE has been trying for months to get hold of a copy of this analysis, but has finally come to the conclusion that the analysis doesn't exist. There is something called the Pathways Analysis, which consists of various scenarios but far as energy efficiency is concerned, none of these 2050 scenarios assume penetration of basic energy-saving measures like solid wall insulation into more than 1 in 3 homes. Similarly, it is assumed that the commercial sector can only improve its energy efficiency by just 20 per cent over the next 40 years.

For decades governments have fawned over fossil fuels and nuclear power at the expense of renewable power and energy saving. Nuclear has had billions of pounds of taxpayers' money – and still cannot produce electricity at a competitive price, says Craig Bennett of Friends of the Earth in *The Guardian*. (9) By contrast, after just a few years' support in Germany, solar panels are expected to be producing power without the need for public subsidies. Energy saving is much the same – our dilapidated buildings leak much of the energy we spend billions producing. A nationwide refit of homes (10) which could be kick-started by the government via its current Energy Bill would create jobs as well as saving energy.

Once Europe's buildings have been brought up to a reasonable standard of efficiency, larger urban areas have the potential to meet such reduced energy demand from the renewable energy-generating potential of their land and buildings, according to the Network of European Metropolitan regions and areas. (11) Metropolitan energy self-sufficiency is conceivable and achievable, with all the benefits for energy security, stable energy prices and competitiveness that this could bring. Energy saving can fund the required renewable energy investment. We could have a decarbonised urban Europe in 20 to 30 years and greenhouse gas emissions would not then be an issue. A major European project is coming to its conclusion shortly and the evidence will be made public. (12)

- (1) Express 3rd April 2011 <http://www.express.co.uk/posts/view/238361/Only-nuclear-power-will-stop-the-lights-going-out-in-Britain>
- (2) Friends of the Earth Blog 18th March 2011 http://www.foe.co.uk/blog/no_nuclear_27442.html A list of useful reports is available here: <http://www.mng.org.uk/gh/scenarios.htm> and <http://www.energyfair.org.uk/pren>
- (3) Guardian 23rd March 2011 <http://www.guardian.co.uk/commentisfree/2011/mar/23/fukushima-nuclear-power-renewable-energy>
- (4) Observer 27th March 2011 <http://www.guardian.co.uk/theobserver/2011/mar/27/big-issue-nuclear-power-fukushima>
- (5) Guardian 29th March 2011 <http://www.guardian.co.uk/theguardian/2011/mar/29/the-cost-of-nuclear-power>
- (6) ACE 14th February 2011 http://www.ukace.org/index.php?option=com_content&task=view&id=610&Itemid=37
- (7) The Warren Report, February 2011 [http://www.ukace.org/publications/ACE%20Warren%20Report%20\(2011-02\)%20-%20Thirty%20years%20on%20and%20still%20waiting%20for%20an%20answer.pdf](http://www.ukace.org/publications/ACE%20Warren%20Report%20(2011-02)%20-%20Thirty%20years%20on%20and%20still%20waiting%20for%20an%20answer.pdf)
- (8) <http://webarchive.nationalarchives.gov.uk/20110302182042/https://www.energynpsconsultation.decc.gov.uk/docs/RevisedDraftOverarchingNationalPolicyStatementforEnergy%28EN-1%29.pdf>
- (9) Guardian 23rd March 2011 <http://www.guardian.co.uk/commentisfree/2011/mar/23/fukushima-nuclear-power-renewable-energy>
- (10) http://www.foe.co.uk/what_we_do/warm_homes_25659.html
- (11) <http://www.eurometrex.org/ENT1/EN/Activities/activities.asp>
- (12) Guardian 29th March 2011 <http://www.guardian.co.uk/theguardian/2011/mar/29/the-cost-of-nuclear-power>

6. The Wind Alternative

Japan's wind turbines survived last week's earthquake and as a result utilities have now asked wind farm operators to boost power output to make up for energy shortages in the country, the leader of the Japanese wind energy association has revealed. Writing on the Huffington Post website, Kelly Rigg, chief executive of the Global Campaign for Climate Action, revealed she had spoken to Yoshinori Ueda, leader of the International Committee of the Japan Wind Power Association and Japan Wind Energy Association, who told her that none of its members reported damage to wind turbines after Japan's natural disasters. (1)

Offshore wind would be cheaper than building new reactors, according to Europe's climate chief, Connie Hedegaard. Offshore wind energy has long been seen as an expensive way of generating power, costing about two to three times more than erecting turbines on land, but the expense is likely to come down, while the costs of nuclear energy are opaque, according to analysis by the European commission. (2) She said renewable energy could supply the whole of the EU's electricity. (3) Nuclear power results in up to 25 times more carbon emissions than wind energy, when reactor construction and uranium refining and transport are considered. (4)

- (1) Business Green 18th March 2011 <http://www.businessgreen.com/bg/news/2035300/japans-wind-industry-hails-earthquake-resilient-turbines>
- (2) Guardian 17th March 2011 <http://www.guardian.co.uk/environment/2011/mar/17/wind-cheaper-nuclear-eu-climate>
- (3) Windpower Monthly 17th March 2011 <http://www.windpowermonthly.com/news/login/1060535/> and Eurotribune 17th March 2011 <http://www.eurotribune.eu/index.default.php?p=18566&l=0&idioma=2>
- (4) Scientific American November 2009 <http://www.scientificamerican.com/article.cfm?id=a-path-to-sustainable-energy-by-2030>

7. Monbiot's "perverse" response.

The most remarkable thing about the response so far to the "gempatsu shinsai" (nuclear-earthquake disaster) that has engulfed Japan is that there are still people who think nuclear power has a future, says Philip White, the International Liaison Officer of the Tokyo-based Citizens' Nuclear Information Center. (1) The fact that some of these people actually call themselves environmentalists is even more bizarre.

George Monbiot led this odd school of thought by declaring he was no longer nuclear-neutral - he now supports the technology:

"A crappy old plant with inadequate safety features was hit by a monster earthquake and a vast tsunami. The electricity supply failed, knocking out the cooling system. The reactors began to explode and melt down. The disaster exposed a familiar legacy of poor design and corner-cutting. Yet, as far as we know, no one has yet received a lethal dose of radiation." (2)

He starts off his justification by saying the average total dose from the Three Mile Island disaster for someone living within 10 miles of the plant is 80 (microsieverts) μSv which is one 625th the maximum yearly amount permitted for US radiation workers (50mSv). Then there is an important clue as to where he is getting his information. He describes this as "half of the lowest one-year dose clearly linked to an increased cancer risk".

Monbiot's friends, Chris Goodall and Mark Lynas attack the 'linear, no threshold model' - the standard way of viewing the impact of radiation on human health. (3) They explain that the theory says that there is a straight line relationship between radiation dose and effect: simply put, if a 1000 mSv dose gives 10% of people cancer, then a 100 mSv total exposure will induce the disease in 1% of the population. Goodall and Lynas draw extensively on the work of Wade Allison to argue that there

is a threshold below which radiation is harmless. Professor Allison argues in a post on the BBC News web site that a figure of 100 mSv a month, or 1.2 Sv a year, would be a good level to set as the maximum exposure for human beings before real risk was incurred. (4)

Allison says no-one has died from Fukushima, nor are they likely to. There were no known deaths there from Three Mile Island and the “known death toll” from Chernobyl was 28 fatalities among emergency workers, plus 15 fatal cases of child thyroid cancer - which would have been avoided if iodine tablets had been taken (as they have now in Japan).

Writing in The Guardian last year, Dr Ian Fairlie agreed that current radiation risks are based on an unsatisfactory dataset – the Japanese survivors of the US atomic bombs in 1945. Though relevant for estimating the risks of sudden blasts of powerful types of radiation, this data is irrelevant for slow, long-term exposures or for weaker types of radiation which are more common. But many studies point to the risks being higher at low doses than this data suggests – not lower or zero. A group of newly discovered effects which occur after very low doses of radiation, known as “non-targeted effects of radiation”, can cause changes in cells temporally and spatially distant from the cells hit by radiation. These effects challenge the present explanation of radiation's effects and are hotly discussed by radiation biologists throughout the world, and are the subject of thousands of scientific articles. In other words, these new effects raise serious questions about whether existing dose limits should be tightened. (5)

Even Dr Richard Wakeford, who represented British Nuclear Fuels plc (BNFL) on the Government's Committee Examining Radiation Risks of Internal Emitters (CERRIE) (6) doesn't think much of Wade Allison's theories:

"I wouldn't say Allison's ideas are fanciful but when you weigh up all the evidence, the scientific authorities come to the conclusion that the LNT dose-response relationship for low doses is the best we can do."

Richard Wakeford, who is now an epidemiologist specialising in the health effects of radiation at the University of Manchester, says Allison's hypothesis assumes that all of the DNA damage caused below a threshold of radiation dose can be fixed by the cells' internal machinery. *"I can't see and nor do the majority of experts in the field how these processes can be 100% effective. Radiation is particularly effective at causing double-strand DNA breaks, which make it difficult for the repair mechanisms in the cells to repair them properly."* (7)

Environmental consultant, Paul Mobbs has published a 22 page critique of Monbiot's article. (8) Published as part of his 'economics' newsletter series, it takes, point by point, Monbiot's claims regarding the environment movements position on nuclear power, radiation and health, and the significance (above other kinds of human activity) of coal burning on carbon emissions. Monbiot claims that environmentalists' "exaggerate" the impacts of radiation. Mobbs says these claims are unfounded, and do not represent the current state of the scientific debate over radiation and health. There are many scientific grounds to criticise current dose models, which is why recent scientific studies have produced impacts for Chernobyl's death toll far higher than the “accepted” government and IAEA statistics. For example, a recent study published by the New York Academy of Sciences put the excess deaths from Chernobyl at 985,000 — in contrast to the IAEA's figure of 4,000. (9) In fact the head of the ICRP's scientific secretariat resigned in 2009 because existing dose models could not predict or explain the health effects of radiation exposures to human populations.

Jerry Leggett, founder of Solar Century responds to Monbiot's view that renewables will be insufficient. Renewables industries have become some of the fastest growing in the world. In 2008 and 2009 more renewables came on stream in both Europe and America than did all fossil fuels and nuclear combined. In Europe in 2009, wind and solar PV alone provided more than half all new generation. *"Energy is like medicine,"* Monbiot writes, *"if there are no side-effects, the chances are*

that it doesn't work." Were he to visit the renewables frontlines, he would discover many views to the contrary. German government and companies have run a scaled national experiment showing that the modern economy could be powered by renewables. A sophisticated American modelling exercise has shown the same for the global economy. All it requires is systematic mobilisation, and the imagination to believe what Silicon Valley believes. Ultimately it should be possible to provide power far less expensively than new nuclear. As renewables grow, costs fall. They do not need open cheques for currently unknowable billions from the taxpayer for things like waste transportation, waste disposal, decommissioning, security at sites, or accident clear-up. The chief executives of EDF and E.ON are both on record as saying that renewables would spoil the chances for nuclear, and only a minor renewables contribution can be tolerated if ministers want a "nuclear renaissance". (10)

Ricardo Coelho, a PhD student from Portugal, who blogs on climate justice, says Mobyot's arguments are "*as far-fetched as they are deceiving*". Ricardo says he heard Monbiot debate nuclear power at the KlimaForum in December 2009, when he claimed that he had changed his stance from neutrality to opposition to nuclear power because the risks are too high. Among other things, he mentioned how there is no regulatory system that is reliable enough to assure us that radioactive waste won't be just thrown into the sea, as some has been in the past. Now, he uses the most ridiculous, cynical and even dishonest arguments to support nuclear energy, destroying the image of a journalist who is serious about his use of sources. "I for one can't take him seriously anymore". (11)

Ian Macwhirter writing in *Herald Scotland* says Mark Lynas, has offered to travel to Japan and to eat contaminated spinach to prove it is safe, but he fears Monbiot et al's nuclear conversion has come a little too late - the economic case for civil nuclear power is collapsing. (12)

As we go to press Monbiot has attacked again saying "*the anti-nuclear movement to which I once belonged has misled the world about the impacts of radiation on human health.*" (13) Interestingly Dr Richard Wakeford has a letter in the same edition of *The Guardian*. He says:

"Radiological protection professionals come under pressure not only from that wing of opinion suggesting that radiation risks have been greatly underestimated, but also from those on the opposite wing who suggest that there is no risk from low doses of radiation, or even that such doses are beneficial – an example of these views can be found in an article by Wade Allison on the BBC News website. Those responsible for radiological protection have to walk a difficult fine line between these frequently vociferous camps." (14)

- (1) Kyodo News 28th March 2011 <http://english.kyodonews.jp/news/2011/03/81489.html>
- (2) Guardian 21st March 2011 <http://www.guardian.co.uk/commentisfree/2011/mar/21/pro-nuclear-japan-fukushima>
- (3) Carbon Commentary 29th March 2011 <http://www.carboncommentary.com/2011/03/29/1888>
- (4) BBC 26th March 2011 <http://www.bbc.co.uk/news/world-12860842> See also <http://www.radiationandreason.com/index.php?faq>
- (5) Guardian 20th January 2011 <http://www.guardian.co.uk/commentisfree/2010/jan/20/evidence-nuclear-risks-not-overrated>
- (6) <http://www.cerrie.org/>
- (7) Guardian 10th January 2011 <http://www.guardian.co.uk/environment/2010/jan/10/nuclear-power-irrational-fears>
- (8) <http://www.fraw.org.uk/mei/ecolonomics/01/ecolonomics-010-20110322.pdf>
- (9) <http://www.no2nuclearpower.org.uk/reviews/review06.php>
- (10) Guardian 24th March 2011 <http://www.guardian.co.uk/commentisfree/2011/mar/24/renewables-nuclear-fukushima-japan-environment>
- (11) Cool Earth 29th March 2011 <http://cooltheearth.wordpress.com/2011/03/29/why-george-monbiot-is-wrong-on-nuclear-power/>
- (12) Herald Scotland 24th March 2011 <http://www.heraldscotland.com/comment/iain-macwhirter/green-shoots-to-nurture-from-nuclear-s-death-knell-1.1092199>

- (13) Guardian 5th April 2011 <http://www.guardian.co.uk/commentisfree/2011/apr/05/anti-nuclear-lobby-misled-world>
- (14) Guardian 5th April 2011 <http://www.guardian.co.uk/environment/2011/apr/05/walking-fine-line-nuclear-debate>

8. Electricity Market Reform

Catherine Mitchell, Professor of Energy Policy at Exeter University says, now that the consultation on electricity market reform has closed, (1) many have reached the uncomfortable conclusion that the proposed regulations are simply there to pave the way for more nuclear power plants. Almost all stakeholders are critical of the proposals in the consultation, except those who want to build nuclear power plants. The widespread perception is that the four measures put forward are knowingly intended to raise the price of electricity to a point where the government can get by without breaking both the commitment made by Chris Huhne to have no public subsidy of nuclear power – and European rules on state aid. (2)

The details of the measures are complicated. But the effort of examining them is well worthwhile, as most will raise the price of electricity substantially, all have significant downsides, none seem likely to achieve their goal of delivering low carbon investment other than nuclear – and all have cheaper, less complex alternatives. The four measures are a rising carbon floor price; a contract-for-difference feed-in-tariff (CfD-Fit); a capacity payment mechanism and an emission performance standard. The latter, which limits the carbon a power plant may emit, represents a belt-and-braces approach that ought not be necessary, but could be implemented to ensure no high-carbon electricity plants are built. The other three are all hotly disputed.

The CfD-Fit will mean someone – almost certainly the government, perhaps outsourced to an agency – has to commit to pay a premium for low-carbon electricity, whether it be generated by a nuclear power plant, a demonstration coal plant with carbon capture and storage (CCS) or renewable energy. Energy consumers will end up shouldering the cost via their utility bills.

The capacity mechanism is there to compensate the owners of coal and gas power plants for providing the back-up supply that ensures the lights stay on. The carbon price support (CPS) commonly known as the carbon floor price, which will increase to £70 a tonne of carbon in 2030, is an incentive to generate low-carbon power.

If this were really about reform, then reducing energy demand would be at its centre, yet it is all but missing. The opportunity should exist for companies not to generate low-carbon electricity but instead to reduce the demand for energy through efficiency measures, so-called negawatts. In electricity markets in the US, for example, 10% total demand is routinely removed at lower costs than supply. Moreover, the institutional framework for how the complex interaction of all the mechanisms will work is also missing.

Mitchell says the government clearly wants nuclear power but cannot be seen to subsidise it, so it has had to set up this set of convoluted measures. Why the government wants nuclear power so badly, given all these unwanted outcomes and given nuclear can, at best, only provide a small proportion of the low-carbon energy needed is a mystery. That enigma will hurt those who have to pay a higher price for electricity.

Volker Beckers, chief executive of RWE npower, says the proposals may be insufficient to incentivise the £120bn of investment needed to replace ageing electricity infrastructure and mitigate climate change. Any delay in any sort of market framework will mean that investors will wait another year until they have absolute clarity on what the new energy markets will look like. (3) “It is effectively a tax on coal and other fossil fuels,” Beckers says. “*It will definitely make carbon emissions more expensive but by means of introducing a tax and penalising fossil fuels, rather than setting incentives*

for greener fuels.” The plan is to introduce it in 2013 which can only benefit those with existing nuclear stations. (4) Horizon Nuclear Power, the joint venture RWE set up with Eon last year to build up to six reactors, is casting about for another partner to share the financial burden. (5)

Climate Change Capital says the carbon floor price policy, as currently proposed, is unlikely to command investor confidence. Investors will highly discount the value of the current policy because it will be implemented through the tax system. Investors would have to hope that every year Parliament will continue to vote for increasing carbon price support until at least 2030. This is highly unlikely say the authors. They also cite a recent study commissioned by the Government that says a non-credible carbon price policy would actually lead to reduced investment in renewables and reduced security of power supply in the long term. (6)

The switch to low-carbon power will be felt by households. Ofgem says that annual energy bills could hit £2,000 by 2017, up from £1,100 today, as the costs of expensive low-carbon technologies are passed on. (7)

The Chancellor announced a carbon price floor of £16 per ton by 1st April 2013, stepping up to £30 by 2020, in this year’s budget. This will be gladly received by the energy companies funding new nuclear, according to energy experts at KPMG. The announcement certainly feels weighted towards building new nuclear and will put upward pressure on prices. (8) Dr Doug Parr, policy director of Greenpeace pointed out that the Carbon Floor Price will “*deliver a windfall profit for existing nuclear power stations and yet it won’t drive investment into clean energy and improved efficiency. It’s not so much a green tax as a stealth tax and it’s exactly the sort of measure that gives green levies a bad name*”. (9) The level of the tax was higher than many energy experts expected. Charity National Energy Action called on the government to use some of the Treasury proceeds to fund the insulation for the poorest households. (10) There is speculation that the Governments Green Deal, to be announced next year, could make matters even worse for cash-strapped households, because it includes proposals for penalties on poorly insulated homes with the aim of incentivising consumers to take up green deal loans for energy- efficiency improvements. This could hit those living in draughty Victorian houses particularly hard. (11)

- (1) Electricity Market Reform Consultation
<http://www.decc.gov.uk/en/content/cms/consultations/emr/emr.aspx>
- (2) Guardian 11th March 2011 <http://www.guardian.co.uk/environment/2011/mar/11/nuclear-power-reason-energy-regulations>
- (3) Telegraph 6th March 2011 <http://www.telegraph.co.uk/finance/newsbysector/energy/8363729/RWE-power-chief-Volker-Beckers-says-action-needed-to-avert-energy-crisis.html>
- (4) Telegraph 6th March 2011 <http://www.telegraph.co.uk/finance/newsbysector/energy/8363419/Volker-Beckers-A-carbon-tax-kills-incentives-for-power-generators-to-invest-in-greener-fuels.html>
- (5) Sunday Times 27th March 2011
<http://www.thesundaytimes.co.uk/sto/public/roadtorecovery/article587451.ece#next>
- (6) Climate Change Capital 11th March 2011
http://www.climatechangecapital.com/media/198658/0375%20thinktank%20uk%20carbon%20price%20floor_2011_03_10.pdf
- (7) Sunday Times 13th March 2011
http://www.thesundaytimes.co.uk/sto/business/energy_and_environment/article576149.ece
- (8) KPMG Press Release 23rd March 2011
<http://www.kpmg.com/UK/en/IssuesAndInsights/ArticlesPublications/NewsReleases/Pages/Budget2011carbon%20pricing%20supports%20new%20nuclear%20but%20what%20about%20everyone%20else.aspx>
- (9) FT 23rd March 2011 <http://www.ft.com/cms/s/0/1f61037a-5548-11e0-87fe-00144feab49a.html>
- (10) Guardian 24th March 2011 <http://www.guardian.co.uk/uk/2011/mar/24/carbon-tax-electricity-bills-nuclear-windfall>
- (11) Times 26th March 2011 <http://www.thetimes.co.uk/tto/money/consumeraffairs/article2961425.ece>

9. Nuclear Costs in Asia

The safety debate obscures an economic point that already was emerging before the Japan disaster, says Benjamin Sovacool writing in the Wall Street Journal. Modern nuclear plants are among the most capital-intensive structures ever built. Initial construction of a new reactor consumes close to 60% of a project's total investment, compared to about 40% for coal and 15% for natural gas power plants (the remainder goes to costs such as fuel, maintenance and operations). The nuclear industry is typically the most capital-intensive business in any country that builds nuclear plants. One study estimated that between 1966 and 1977, when most of America's light-water reactors were built, in every case the U.S. plants cost at least twice as much as expected. The quoted cost for these 75 plants was \$89.1 billion, but the real cost was a monumental \$283.3 billion and that excludes fuel storage and decommissioning. All of this ought to raise questions in a lot of minds in Asia, where nuclear increasingly has been viewed as the next big energy thing. Asian governments purport to have plans to build 110 nuclear power plants between 2010 and 2030. Achieving this build-out would necessitate hundreds of billions of dollars of continued subsidies. Conservatively estimating a per-plant cost of \$5 billion, and very conservatively estimating subsidies equal to one-third of project costs (it's closer to 70%-80% in the U.S.), that still works out to around \$180 billion in subsidies simply to build the plants, let alone operate them. Can Asia afford that? (1)

(1) Wall Street Journal 24th March 2011

<http://online.wsj.com/article/SB10001424052748704050204576218012573866874.html>

10. Justification - going to court

The government is being taken to court in a bid to derail its plans for a programme of new nuclear power stations because of fears that leaking radiation will give children cancer. (1) A 24-year-old community worker from Lancaster has won legal aid to launch an unprecedented High Court action against Chris Huhne, the Secretary of State for Energy and Climate Change. Lawyers claim the action could delay, or even stop, the nuclear programme. Rory Walker, who lives close to Heysham where new reactors are planned, is worried about having children who could suffer an increased risk of leukaemia. His court challenge is backed by radiation experts and is being pursued by one of Britain's largest law firms, Irwin Mitchell. (2)

Huhne is accused of breaching a 1996 directive from Europe's nuclear agency, Euratom. Andrew Lockley, a partner with Irwin Mitchell, said:

"The fundamental purpose of the Euratom directive is to make sure that a comprehensive and detailed assessment is made before new nuclear reactors are built. It does not permit an approach which appears generalised, generic and deferred. Justification requires that the health detriments should be considered and balanced against the economic, social or other benefits which may occur – but this doesn't seem to have happened here."

The Government could be forced to re-do a cost-benefit analysis on new nuclear power plants if the High Court challenge is successful. Re-doing the justification process, which has already taken several years to complete, could even lead to the conclusion that new reactors are not justified. (3)

(1) Guardian 25th March 2011 <http://www.guardian.co.uk/environment/2011/mar/25/chris-huhne-court-nuclear-cancer-children>

(2) Irwin Mitchell Press Release 25th March 2011 <http://www.irwinmitchell.com/news/Pages/Government-Faces-High-Court-Challenge-On-Nuclear-Power-Plans.aspx>

(3) Platts 25th March 2011

<http://www.platts.com/RSSFeedDetailedNews/RSSFeed/ElectricPower/8710048>

11. Plutonium Round-up

Kansai Electric Power Co. and Chubu Electric Power Co. will postpone sea transportation from France of uranium-plutonium mixed-oxide fuel, known as MOX fuel, planned for this spring. Kansai Electric officials said the firms decided on the postponement after the government told them that it could not ensure tight security for transportation as it is concentrating on reconstruction following the earthquake and nuclear crisis. (1)

Reactor No. 3 at Fukushima Daiichi has one characteristic that differentiates it from its neighboring reactors and from any operating reactor in Britain. Among the hundreds of standard nuclear fuel assemblies in its core, are some that contain MoX. Edwin Lyman, senior scientist for global security at the Union of Concerned Scientists in Washington, D.C., argues that MOX is more likely to cause nuclear accidents than ordinary uranium fuel and is liable to release more harmful material in the event of an accident. *“Plutonium has different properties than uranium 235 that generally tend to degrade some of the safety systems in nuclear plants,”* Lyman says. For instance, because weapons-grade plutonium fissions more readily than uranium 235, reactors may need more robust control rods neutron absorbers that shut down the nuclear chain reaction when inserted into a reactor’s core. *“You never get quite as much margin even after doing all that as you do with uranium,”* Lyman says. (2) MOX is more difficult to control than uranium fuel. The risks of accidental criticality are different. You have the same kinds of problems - they are just more intense with plutonium. And when plutonium is dispersed into the wind you want to be pretty much anywhere else. There are four kinds of carcinogenic isotopes released when a nuke plant blows: iodine-131, cesium-137, strontium-90 and plutonium-239. Plutonium is not only the most lethal of the four it also hangs around the longest. It’s half life is a whopping 24,000 years, and since radioactive contamination is dangerous for 10 to 20 times the length of the isotope’s half-life, that means plutonium emitted in Fukushima today will still be around in close to half a million years. (3)

And yet Sellafield’s management and workers are said to be *“keeping fingers crossed”* that lucrative Mox fuel orders from Japan will not be at risk. The site has secured long-term contracts with 10 Japanese power utility companies for Mox fuel fabrication and transport services. Only a few months ago some Japanese utilities threw what was regarded as a lifeline for the existing Sellafield MOX plant (SMP) by placing contracts to make new plutonium/uranium fuel for use in Japan. (4) But the deal is far from being ‘done and dusted’ and will be entirely dependent on the installation of new equipment and extensive modifications to SMP, all of which will be paid for by the Japanese. (5)

Meanwhile former Government scientific advisor, Professor Sir David King wants Britain to build a new MOX plant. He says Britain has the largest stockpile of plutonium in the world which could be used by terrorists to make “dirty bombs”. It would be expensive to process and bury in the ground as nuclear waste. Using the fuel as MoX could offset the costs of cleaning up the legacy of the UK’s ageing nuclear power plants. There could be a £10 billion opportunity in reprocessing used fuels as part of a “renaissance” in nuclear power in the UK. (6)

King’s report, published by the Oxford Smith School of Enterprise and the Environment, is intended to feed in to a government consultation on what should be done with the stockpile of nuclear material, which currently stands at 100t of plutonium, around 60,000 t of uranium and 6,000 t of used fuel from the UK’s fleet of so-called AGR reactors. Launching the report, former BNFL Director, Professor Gregg Butler of the University of Manchester, said there was “no cheap do-nothing option” for the material. The uranium and plutonium would have to be made into mixed oxide (MOX) pellets for final disposal anyway. But the cost of management could be recouped, in some scenarios at a profit, if the Mox was used in fresh fuel in new reactors. The report, titled *“A low carbon future: economic assessment of nuclear materials and spent nuclear fuel management in the UK”* puts forward a variety of scenarios for using the material. (8)

King's plan would mean British taxpayers spending up to £3bn on a new MOX fuel fabrication plant at Sellafield, despite the site in Cumbria already having a similar plant which has cost nearly £2bn and is labelled one of the biggest industrial failures in British history. The current SMP cost £440m to build and the nuclear industry has squandered a further £1.5bn of taxpayers' money in operating costs and upgrades. Designed to produce 120 tonnes of MOX fuel a year for export, it has only managed 15 tonnes over nearly a decade of sub-standard operation, which was labelled by one former government minister as a catastrophic and comprehensive failure. (9)

What King and Butler don't seem to have considered is the problems associated with dealing with spent MOX fuel, which would probably need at least 100 years to cool down before it could be emplaced in a deep geological disposal facility. There would be horrendous security problems because it is relatively easy to extract weapons-useable plutonium from fresh MOX fuel. Armed convoys would be required to deliver the MOX fuel travelling from Sellafield to reactor sites such as Hinkley in Somerset and Sizewell in Suffolk.

King also suggests keeping open and even expanding the controversial Thorp reprocessing plant at Sellafield to extract yet more plutonium from spent fuel produced in new reactors. (10) Doug Parr at Greenpeace said "*Reprocessing would also lead to increased multi-billion pound taxpayer handouts to the nuclear industry, and that's before you consider what it would mean for our ability to constrain nuclear weapons proliferation around the world.*"

THORP has also been an economic disaster for Britain. Opened in 1994, the plant was originally expected to reprocess 7000 tonnes of spent fuel in the first ten years of operation (the Baseload period) with two-thirds of the fuel coming from overseas. THORP's closure 'with all contracts completed' was originally scheduled for 2010. But it was plagued with numerous problems and accidents and completed only just over 5000 tonnes by 2004. In 2005, following a major spillage accident the plant was closed for repair for over 2 years. Re-starting in 2007, THORP now faces a permanent restriction to its annual throughput as a result of plant modifications and is unlikely to complete its contracts before 2020.

King's report was developed with co-authors Gregg Butler, Grace McGlynn and Michael Evans and contributions from Dame Sue Ion and Owen Owens. King said that Rolls-Royce and Areva had contributed.

- (1) Kyodo News 25th March 2011 <http://english.kyodonews.jp/news/2011/03/81078.html>
- (2) Scientific American 25th March 2011 <http://www.scientificamerican.com/article.cfm?id=mox-fuel-nuclear>
- (3) Time Magazine 17th March 2011 <http://ecocentric.blogs.time.com/2011/03/17/mox-the-fukushima-word-of-the-day-and-why-its-bad-news/>
- (4) Whitehaven News 24th March 2011 <http://www.whitehavennews.co.uk/news/sellafield-staff-hope-japan-crisis-will-not-hit-mox-orders-1.820885?referrerPath=news>
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- (6) Independent 29th March 2011 <http://www.independent.co.uk/news/uk/home-news/case-never-stronger-for-nuclear-reactors-2256227.html>
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- (9) Independent 30th March 2011 <http://www.independent.co.uk/news/science/top-scientist-backs-1633bn-sellafield-plant-despite-1632bn-failure-on-same-site-2256766.html>
- (10) Guardian 29th March 2011 <http://www.guardian.co.uk/environment/2011/mar/29/nuclear-industry-uk-expansion-king>
- (11) World Nuclear News 29th March 2011 http://www.world-nuclear-news.org/WR_Call_for_holistic_approach_to_plutonium_2903112.html

12. The economics of spent fuel disposal from new reactors

Nuclear consultant Ian Jackson has produced a technical presentation on the economics of spent nuclear fuel disposal prices. It looks at the costs of spent fuel disposal, the prices energy companies will be charged by government and what public subsidies may need to be paid in the future. The presentation is based on a Research Report “*Subsidy Assessment of Waste Transfer Pricing for Disposal of Spent Fuel from New Nuclear Power Stations*” (March 2011). Economic modelling was performed using our Fixed Unit Price Simulation (FUPSIM) model developed by Jackson Consulting.

Looking at the cost of disposal of spent fuel from a new generation of nuclear reactors, Jackson says the Government’s pricing structure consists of three main elements: a base cost of £193,000 per tonne of uranium (/tU) (this is what it is actually expected to cost the Nuclear Decommissioning Authority); then there is the utility disposal price set at £312,000/tU; finally this is subject to a maximum price cap of £978,000/tU. The idea is that the base cost and utility price will gradually increase over time as more is learnt about the cost of siting, constructing and operating a Geological Disposal Facility (GDF) but the prices will remain capped at £978,000/tU. Costs will rise with inflation. But nuclear costs are escalating above inflation at present. NDA nuclear liabilities, for example, have escalated at about 4.5% above inflation. Given that nuclear costs are rising faster than inflation, the obvious question is: will nuclear disposal costs rise higher than the maximum price cap? If disposal costs do rise by 4.5% more than inflation they will eventually reach the price cap by 2047.

So, how much subsidy will be needed to pay for losses made by the NDA after 2047? Assuming a reactor starts in 2020 and operates for 40 years, the Government would make a loss of £131m for a 1.35GW Pressurised Water Reactor (PWR).

Looking at the costs of disposing of spent fuel from existing reactors – the total cost of a GDF strongly depends on the amount of spent fuel it contains. Spent fuel is only 2.3% of the total volume of waste in a shared repository, but the spent fuel makes up around 44% of the total repository cost. The spent fuel unit cost is around £659,000/tU. As more nuclear power stations are built, the unit costs of spent fuel disposal gradually go down – from £659,000/tU to £473,000/tU for a reactor fleet of about 10 PWRs. Estimates of the cost of spent fuel disposal have generally been quite high until recently. In 2005 Nirex estimated the cost at £952,000/tU, but now the NDA estimates that legacy spent fuel disposal will cost around £659,000/tU. This drops to £473,000/tU if we assume a programme of ten PWRs. However DECC’s costs are even lower than this – around £193,000/tU. We need to understand why.

Why are the costs of disposing of spent fuel from Britain’s new nuclear reactors expected to be half that of legacy spent fuel? This is supposedly because the spent fuel disposal canister is optimised for PWR spent fuel assemblies rather than AGR spent fuel assemblies. However the £193,000/tU figure used by DECC (compared with the £659,000/tU cost of AGR spent fuel disposal) may be a significant underestimate. For a 1.35GW PWR operating for 40 years the taxpayer may lose around £296m.

Looking at the total public subsidy that may be needed for spent fuel disposal – there may be two different kinds of subsidy. Firstly there is the £131m per reactor which arises because costs escalate over the maximum price cap. Secondly the Government may have underestimated spent fuel disposal costs by £296m per reactor. The total subsidy needed could be £427m per reactor. (1)

(1) Spent Fuel Disposal Costs, Prices and Subsidies, Jackson Consulting. You Tube 29th March 2011 <http://www.youtube.com/profile?gl=GB&user=jacksonconsult#p/a/u/0/EmlSEYeTOIE>