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1. The Lib Dem Minister, Clever Tricks, and the Nuclear Subsidies

The Government's consultation on Electricity Market Reform is due to close on 10th March. (1) When it was launched in December *The Telegraph* said years of lobbying by the nuclear industry had finally paid off - the Government had finally agreed to subsidise nuclear power. (2) Jonathon Porritt reminded us that it was the commitment to "*no subsidy for nuclear*" which turned Chris Huhne from a "*serious sceptic*" to a compliant enthusiast. But if the Trades' Description Act applied to political pronouncements, Chris Huhne would find himself subject to prosecution for outright deception. (3) Porritt translates some of Huhne's recent statements into honest English: "*we will be perfectly content, yet again, to let the nuclear industry absolve itself of its proper responsibilities for waste management and decommissioning, and will ensure that either taxpayers or energy consumers pick up their full share of waste management costs through the nuclear levy on their energy bills or any support mechanism*". And unlike every other industry, our Government will continue to underwrite the insurance costs of the nuclear industry. "No subsidy" actually means almost limitless subsidy if that's what it takes to get the damn things built. Far from the "no subsidy" claim being a barrier to new nuclear, it simply provides a brilliant screen for devising all sorts of clever tricks to guarantee massive, continuing subsidy of the kind that the industry has always depended on. (4)

A formal complaint has now been made by the Energy Fair Group to the European Commission about the subsidies nuclear power in the UK is receiving, and describing them as unlawful 'state aid' under laws governing competition in the EU. (5) Dr Gerry Wolff, a member of the group says one of the biggest subsidies is that nuclear operators are required to pay much less than the full cost of insuring against a Chernobyl-style disaster or worse. The industry is also paying much less than the full cost of disposing of nuclear waste and for the decommissioning of nuclear plants. Without the subsidies that it is receiving, nuclear power would be hopelessly uncompetitive. But it is a mature technology that should be commercially viable without support. Those subsidies are distorting the market and working against the development of clean, green sources of power that are now urgently needed.

In the US, the Union of Concerned Scientists (UCS) has published a report entitled "Nuclear *Power: Still Not Viable without Subsidies*." Since its inception more than 50 years ago, the U.S. nuclear power industry has been propped up by a generous array of government subsidies that have supported its development and operations. Despite that support, the industry is still not economically viable, according to the report which found that more than 30 subsidies have supported every stage of the nuclear fuel cycle, from uranium mining to long-term waste

storage. Added together, these subsidies often have exceeded the average market price of the power produced.

The key subsidies for nuclear power do not involve cash payments, the report found. They shift the risks of constructing and operating plants -- including cost overruns, loan defaults, accidents and waste management -- from plant owners and investors to taxpayers and ratepayers. These hidden subsidies distort market choices that would otherwise favour less risky investments. (6)

(1) See http://www.decc.gov.uk/en/content/cms/consultations/emr/emr.aspx
(2) Telegraph 16th December 2010 http://www.telegraph.co.uk/finance/newsbysector/energy/8204683/UK-government-agrees-to-subsidise-nuclear-power-companies-prices.html
(3) 24 Dash 10th Dec 2010 http://www.24dash.com/blogs/jonathon_porritt/2010/12/10/-No-subsidy-for-Nuclear/
(4) For more on Electricity Market Reforms see NuClear News No.25 http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo25.pdf
(5) Energy Fair Group Press Release 23rd Feb 2011 https://sites.google.com/site/nonukesorguk/actions/press-release-2011-02-23
(6) UCS Press Release 23rd February 2011 http://www.ucsusa.org/news/press_release/nuclear-power-subsidies-report-0504.html

2. Escalating Nuclear Costs

On the surface, the UK's nuclear new build programme has a serene inevitability about it. But rising construction costs and low and volatile electricity prices are indications that plenty could go wrong, says Tony Roulstone writing in *Nuclear Engineering International*. (1)

Wholesale electricity prices reached a peak of almost £100/MWh in September 2008, but since then have been below £40/MWh for much of 2009 and 2010. The behaviour of the electricity market is the result of its design compounded by the effects of multiple overlapping mechanisms put in place during the last 10 or more years. Unless there is wholesale reform of the electricity market, it seems unlikely that any new reactors will be built. Capacity margins would be squeezed and new gas-fired generators built.

Roulstone says the energy review of 2006 used an overnight capital cost for new reactors (that is, excluding interest during construction) of £1400/kWe. But when MIT revised its 'The Future of Nuclear Power' (2003) study in 2007 costs had risen sharply from roughly £1250/kWe to £2500/kWe. MIT identified three main causes:

- Worldwide cost inflation of specialist components including vessels and forgings
- Increases in the price of materials such as steel and concrete
- Delays in construction of current European projects in Finland and in France.

Roulstone says long-term mean electricity price needs to be above £60/MWh for an EPR-based programme to be viable. Current wholesale prices for electricity are about, or in some cases, below £40/MWh. Therefore an investor in nuclear must expect the long-term price to rise by about £20/MWh. Electricity prices may be increased either by the effect of long-term trends in gas prices or carbon pricing. The recent traded carbon price is about €15/tonne CO2. Based on the increase in costs for nuclear construction identified above, the traded price of carbon would have to be increased to above €75/tonne CO2 to make nuclear cost-effective. If this price was applied across the board, it would increase electricity prices by 50%, provide a massive windfall for existing clean generators and distort a market already replete with revenue support mechanisms. If the carbon floor price was targeted at new nuclear alone, it would look like a massive subsidy for nuclear and it would require a new mechanism to recycle funds from polluters to 'clean' producers, separate from EU ETS carbon trading.

Companies looking to build new nuclear power plants in the UK should seek to learn from the problems reported in Europe and the successes in China and South Korea in order to mitigate budget over-runs and delays. According to a new report from KPMG International, despite a reputation for spiraling project costs and delays, the nuclear power industry is experiencing a global resurgence. To capitalise on such a substantial opportunity, the industry, however, has some critical challenges to resolve. In particular, project owners and engineering contractors must employ new approaches for better project risk management in order to attract

investment and ensure profitability.

Chief among the challenges for new reactors are the huge sums of capital that need to be raised, coupled with the uncertainties of an intensely regulated industry, and the complex interface of designers, engineers, suppliers and others parties critical to the project. The KPMG report says one possible way of mitigating construction risk is to standardise designs so that Engineering, Procurement and Construction (EPC) contractors and specialty nuclear equipment suppliers can achieve a material reduction in 'first of a kind' risks and costs. Design standardisation is currently being implemented in the US, UK, China and South Korea, with some notable reductions in plant construction costs. The regulatory approval of this standardization also has to be delivered to time and cost. (2)

(1) Nuclear Engineering International 21st January 2011
http://www.neimagazine.com/story.asp?sectioncode=76&storyCode=2058661
(2) KPMG Press Release 22nd Feb 2011
http://www.kpmg.com/UK/en/IssuesAndInsights/ArticlesPublications/NewsReleases/Pages/UKnuclearindustryneedstolearnfromEuropeandAsiatogetnewbuildsonline.aspx

3. Close to Zero by 2020? As if.

Britain is on course to break an international agreement to reduce radioactive pollution of the seas, because of an increase in activity at the Sellafield nuclear site, according to a report from Cumbrian Opposed to a Radioactive Environment (CORE). (1)

Discharges of radioactive waste into the Irish Sea from the nuclear fuel reprocessing plants at Sellafield, Cumbria, are set to double over the next few years because of a "crash programme" of reprocessing planned by the government's Nuclear Decommissioning Authority (NDA).

CORE says this would put the government in breach of its commitment to "*progressive and substantial reductions of discharges*" under the Oslo-Paris (Ospar) convention, which seeks to limit pollution of the north-east Atlantic. The convention's agreed aim is to bring levels of artificial radioactivity in the environment down to "close to zero" by 2020. OSPAR brings together 15 governments from across Europe. When Britain signed up to Ospar commitments on radioactive discharges in Portugal in 1998, the then deputy prime minister, John Prescott, said that it had shed the tag of "*dirty old man of Europe*". Now the country is in danger of regaining the label.

The report by CORE estimates that discharge of plutonium into the sea from Sellafield will rise from 120 gigabecquerels a year to more than 250. There will be similar increases in the levels of radioactive isotopes caesium-137 and cobalt-60 compared with the past five years, it says. (2)

The NDA insists that "*Increases in productivity will not, and cannot, be to the detriment of the environment. As such it is incorrect to suggest that the NDA will in any way prejudice our commitments to Ospar*." But when questioned at a stakeholder meeting last year, the NDA admitted that it needed a "contingency plan" if it failed to meet Ospar obligations. One option was "agree not to meet OSPAR deadline", it said. (3)

The NDA says: "*We categorically deny there will be a substantial increase in radioactive discharges into the sea ... technical improvements have significantly reduced dose levels. Sellafield discharges are well within authorisations and doses from discharges are very much below the legal limit*." (4)

It is almost impossible to see how the NDA's words approach anything like the truth here. Radioactive discharges to the Irish Sea, including plutonium, are dominated by those from Sellafield's two reprocessing plants B205 and the Thermal Oxide Reprocessing Plant (THORP), particularly the former. There is a clear correlation between annual reprocessing rates and subsequent radioactive discharge levels as demonstrated by the recent reduction in discharges from the site following several years of unusually low reprocessing rates. This recent reduction however will be completely reversed by NDA plans that include the reprocessing of some 4700 tonnes of spent fuel from the UK's magnox reactors in B205 in the next 6 years - requiring a rate more than double that achieved over the last 5 years – and the reprocessing of at least 3700 tonnes of spent fuel,

mostly from the UK's Advanced Gas Cooled reactors (AGR) but also including 600 tonnes of overseas fuel in THORP whose operational life has now been extended by 10 years to 2020.

CORE's assessment also highlights the extra pressure piled on the ageing B205 reprocessing plant, already under the tightest of schedules, by the extensions recently approved for the Wylfa and Oldbury power stations – a complete U-turn on earlier decisions, and one that means more magnox fuel than necessary must now be reprocessed. The assessment further shows that, coupled with NDA indecision on whether or not to reprocess part or all of thousands of tonnes of AGR fuel not specifically contracted for reprocessing, a range of technical issues currently restricting Sellafield operations - particularly the lack of capacity to treat the highly radioactive liquid wastes produced by reprocessing – could see reprocessing extended beyond its scheduled end-date of 2020.

Meanwhile Sellafield managers have been issued with a formal caution over a leak of radioactive liquid which went unnoticed for 14 months. The Environment Agency said the leak, which was reported in January 2009, caused no impact to the environment. But it said it had issued the caution to make sure it did not happen again. Sellafield said it had made changes to management systems. The leak was spotted on a day when then Prime Minister Gordon Brown visited the site. (5)

(1) CORE Press Release 17th February 2011 http://www.corecumbria.co.uk/newsapp/pressreleases/pressmain.asp?StrNewsID=286
(2) Guardian 17th February 2011 http://www.guardian.co.uk/environment/2011/feb/17/sellafield-activity-nuclear-pollution-promise
(3) See page 35 of report of NDA Stakeholder Meeting 17th & 18th March 2010 http://www.nda.gov.uk/documents/upload/10th-National-Stakeholder-Group-Meeting-Report-March-2010.pdf
(4) Whitehaven News 23rd February 2011 http://www.whitehaven-news.co.uk/news/dispute-over-sellafield-discharges-1.811701?referrerPath=news
(5) BBC 15th Feb 2011 http://www.bbc.co.uk/news/uk-england-cumbria-12462744 and Whitehaven News 17th Feb 2011 http://www.whitehaven-news.co.uk/news/sellafield-cautioned-over-liquid-leak-1.809428?referrerPath=news

4. Government Solar Disarray

The Government is in disarray over feed-in tariffs (Fits) after announcing a fast-track review of Fits for all solar PV projects above 50 kW, the size of an average school installation. This effectively pulled the rug out from under the industry, creating significant job uncertainty in one of the few industries to create thousands of new jobs in the UK in the past 10 months.

Fits have been, by the government's own admission, one of its most successful programmes to date. This review seems to have been a kneejerk reaction to concerns about super size solar and comes on top of the comprehensive spending review's cap on Fits. Constantly changing the regime breeds uncertainty, with the result that companies are put off investing in decentralised power. This is reflected in the UK's poor performance – and in weak projected performance.

Green MP, Caroline Lucas says photovoltaics (PV) are one area which could really help us deliver on capacity under FIT, yet the UK anticipates delivering just 2.7 gigawatts (GW) of PV by 2020. Germany anticipates 40GW by the same year, Italy 26GW, more than 5GW in Spain. The French government last week announced that it was trebling the solar capacity eligible annually for its FIT scheme, from 500MW to 1.5GW suggesting France may well exceed its 2020 target of 5.4GW. Even Belgium anticipates delivering more than us. Yet the UK boasts internationally significant companies working in PV. We have the largest cell assembly plant in Europe. We boast companies like Solarcentury and Romag. But unless the government starts delivering a consistent message on support for renewables, this massive potential may never be realised – to the detriment of our economy and our environment. (1)

A group of more than 60 companies, trade associations and opposition politicians have launched the "Save our Solar" (SoS) campaign, calling for ministers to reconsider plans for the fast-track review. Britain's nascent photovoltaic (PV) industry is in uproar over the FIT claiming the Government's decision to review the scheme less than a year after it was introduced is decimating investment, undermining plans for up to 18,000 new jobs.

It provides evidence of a growing gap between talk and reality. Seb Berry, head of public affairs at SolarCentury called it an extraordinary decision which damages investor confidence, not only in the PV sector, but also in renewable energy more widely. (2) Andrew Lee, head of UK sales for Sharp Solar, which recently hired an extra 300 people for its factory in Wrexham said "*One day they are standing on steps at Sharp and applauding the jobs we're creating, the next day they're cutting the tariff*."

The Government says the FIT review is vital to avoid large-scale solar "farms" squeezing out the domestic market. But solar companies say that setting the bar at just 50kW will catch out community schemes from schools, hospitals and housing associations. They also said FIT payments were just £6m in the nine months to January, a far cry from the projected first-year budget of £30m-£50m. At the very least the SoS campaign wants the Government to stick to commitments made as recently as November that it would not to review the FIT earlier than the original deadline in April 2012, unless the scheme was running ahead of projections.

More than 20 companies have hired law firm Eversheds to challenge the Government's decision to review the subsidies. The law firm has drafted a letter warning that many of the UK's largest solar companies are prepared to take the Government to judicial review for failing to consider all the consequences and not consulting widely enough. The group is raising funds for a joint case if the matter cannot be resolved through talks.

Energy Minister Greg Barker has condemned what he calls "*hot money and speculation*" pouring into the industry, after becoming concerned at the number of applications for planning permission for solar farms at sites across the south-west in particular. Ken Moss, the chief executive of MO3 Power, a solar company backed by New Look founder Tom Singh, said many emerging companies "feel insulted" at being labelled speculators when they all they want is to become large-scale clean energy providers. Emerging solar companies say they are trying to drive down costs of the early-stage of the technology by going for larger installations. (3)

The Low Carbon Economy website points out that the FIT subsidy is 41.3p/kWh for domestic installations v.s. 29.3p/kWh for larger installations – therefore for every unit of energy produced, domestic PV costs almost 30% more than commercial-scale PV. As the FIT budget is capped, incentivising smaller more expensive PV would result in up to 30% less PV installed than if the focus was commercial scale PV. Penalising the most efficient subsidies which deliver more renewable solar energy per pound spent will not help meet 2020 targets. A focus on only small-scale installations will prevent the reduction in prices delivered by economies-of-scale offered by deploying larger systems, ensuring that prices stay higher for longer (forcing subsidies to remain for longer). (4)

Meanwhile the New Local Government Network (NLGN) says renewable energy could raise up to £12 billion for cash-strapped local authorities over the next twenty years. A new report called *Power and Money*, by NLGN says local authorities should make better use of subsidies such as feed-in tariffs (FITs) and the proposed renewable heat incentive (RHI) to garner income from renewables like solar panels on social housing and other authority properties. (5) Local authorities are starting to talk about solar panels on the roofs of car parks and maybe even wind farms in the midst of council estates. Wrexham council plans to install solar panels on about 3,000 council properties. It is projecting a profit of about £29m, doubling its investment over 25 years. Kirklees council's Skills for Climate Change programme is providing support for local businesses to take advantage of the green economy – the council has already created 130 local jobs through a scheme to insulate homes in the area. In Devon, the council has successfully promoted the deployment of wood-fired central heating and hot water systems that will shortly be eligible for the renewable heat incentive. At the same time, it has provided support and advice to help local landowners make a profit from their woodlands, by converting unused land to provide wood fuel and improving the quality of existing forests. (6)

Scottish Labour has unveiled plans to oversee the installation of solar panels, domestic wind turbines and renewable heating systems to 10,000 homes over the next four years if it wins the Scottish elections in May. Scottish Government would work with councils and housing associations to retro-fit properties with renewable energy systems, to reduce carbon emissions and tackle fuel poverty caused by high energy bills. The scheme would create more than 300 jobs and 750 traineeships. (7)

To keep up with Microgeneration news, check out the weekly Micro Power News here: http://www.microgenscotland.org.uk/news.php Sign up to receive Micro Power News by e-mail here: http://www.microgenscotland.org.uk/maillist/?p=subscribe

(1) Guardian Blog 17th February 2011 http://www.guardian.co.uk/environment/blog/2011/feb/17/message-renewables
(2) Independent 3rd March 2011 http://www.independent.co.uk/news/business/news/green-power-industry-claims-government-backtracking-on-solar-2230582.html
(3) Telegraph 18th February 2011 http://www.telegraph.co.uk/finance/newsbysector/energy/8331844/Solar-firms-launch-legal-fight-over-subsidy-rethink.html
(4) Low Carbon Economy 10th February 2011 http://www.lowcarboneconomy.com/community_content/5/12888/solar_industry_reacts_angrily_to_govts_fit_review
(5) Energy Efficiency News 17th February 2011 http://www.energyefficiencynews.com/i/3811/
(6) Guardian Blog 16th February 2011 http://www.guardian.co.uk/society/joepublic/2011/feb/16/renewable-energy-ease-council-cuts
(7) Aberdeen Press and Journal 22nd Feb 2011 http://www.pressandjournal.co.uk/Article.aspx/2147586?UserKey=

5. View on the Ground

The Government has launched its My2050 simulation (1) which makes its analysis of pathways to an 80% reduction in carbon emissions by 2050 accessible to a wider audience. This is a user-friendly web application designed to help the public have a go at making the choices we face when it comes to moving to a secure, low carbon economy, and to let DECC know what they want 2050 to look like. It is possible to create your own nuclear free worlds, and when it's finished upload your myworld and compare it with the other myworlds uploaded by others so far. The Guardian bemoans the fact that costs are not included. (2) Maybe that's because accurate figures would entirely undermine the Government's pro-nuclear stance.

(1) http://my2050.decc.gov.uk/
(2) Guardian Blog 3rd March 2011 http://www.guardian.co.uk/environment/blog/2011/mar/03/power-uk-decc-carbon-calculator

Studies submitted to the inquiry to expand Lydd airport in Kent, which began in February, have cast doubt on assurances from the Health and Safety Executive (HSE) that the dangers of accidental plane crashes are too small to worry about. An analysis by an independent expert concludes that the method used by the HSE to calculate the likelihood of crashes is "flawed" and could underestimate the risk by 20%. And a previously secret report for the HSE accepts that a crash could trigger a "*significant radiological release*". The airport is three miles from the Dungeness nuclear complex.

Guardian 21st February 2011 http://www.guardian.co.uk/environment/2011/feb/21/nuclear-risk-plane-crashes

Horizon Energy has said it may need more than the 150 hectares of land it already owns at Oldbury. Horizon's Tim Proudler says: "*We have always said we may need more land for use during construction, or for landscaping, ecological or other mitigation measures. In fact, this is stated in the public scoping reports we published in 2009.*"

Gloucestershire Gazette 17th Feb 2011
http://www.gazetteseries.co.uk/news/8853441.More_land_could_be_needed_for_new_nuclear_power_station/

A practice emergency evacuation of the Island of Anglesey should be carried out in case of a nuclear catastrophe at Wylfa, according to one councilor, when councillors quizzed Horizon executives at a meeting of the full council in February. Another main concern was where spent fuel will be kept for over 100 years.

Hoyhead & Anglesey Mail 16th Feb 2011 http://www.theonlinemail.co.uk/bangor-and-anglesey-news/where-i-live/north-anglesey-news/2011/02/16/concerns-over-future-of-wylfa-nuclear-facility-66580-28173321/

6. Nuclear Waste 'Disposal System Safety Case'

The NDA's Radioactive Waste Management Directorate (RWMD) which is working on plans to build and operate a deep underground nuclear waste disposal facility which will need to keep the radioactive materials isolated from the environment for hundreds of thousands of years, has published its generic Disposal System

Safety Case (DSSC). It is a suite of scientific and technical reports which explain all of the safety factors that need to be considered when RWMD submits an application to the nuclear regulators for permission to operate such a facility. (1)

RWMD said:"*An important objective of GDF design development and safety analysis is to provide assurance that the majority of shorter-lived radioactivity will decay in situ and that the release of any longer lived types will be spread over such a long period of time that they will not lead to significant amounts getting into the environment*."

The documents show how RWMD is approaching all of the safety concerns in relation to the transport of waste to the facility, the operations of the facility and how we can insure protection to the environment over hundreds of thousands of years. The suite of documents – around 22 in all - is available on the NDA website, or can be obtained on a DVD from the NDA. (2) Nuclear Waste Advisory Associates, who have produced an Issues Register (3) of 101 outstanding scientific and technical issues which need to be resolved before we can begin to consider a safety case, will be examining the DSSC in some depth.

Bruce McKirdy of the NDA said transmutation in which lasers might cut the half-life of radioactive waste from millions of years to mere minutes, and other futuristic remediation technologies, have believers. From now on, any underground nuclear waste dumps built in the UK will be designed to allow for the possibility of such technologies. Any new sites must allow waste to be retrievable for 100 years. Although there is currently no way to reduce the half-life of high volumes of radioactive waste, huge lasers have reduced the half-lives of specks of such material. "If something like that were to become successful, the facility must not preclude the option of retrievability," he said. (4)

Meanwhile a film about Finland's deep geological disposal facility – Into Eternity – was shown at the Keswick Film Festival on 12th February. Every day, the world over, large amounts of high-level radioactive waste created by nuclear power plants is placed in interim storage, which is vulnerable to natural disasters, man-made disasters, and to societal changes. In Finland the world's first permanent repository is being hewn out of solid rock – a huge system of underground tunnels - that must last 100,000 years as this is how long the waste remains hazardous. (5) And the first phase of public consultation over plans for an underground nuclear dump in Cumbria has ended. The West Cumbria Managing Radioactive Waste Safely Partnership (MRWS) organised drop-in sessions, sent out information packs, collected comments and answered questions. It will now collate the data received during the process and publish its findings later in the spring. It will then advise the three councils whether or not they should remain involved in the process. The public will then have another chance to say what they think, probably this autumn, before any decisions are taken. (6)

(1) NDA Press Release 23rd February 2011 http://www.nda.gov.uk/news/multi-barrier-approach-key-to-safety.cfm
(2) http://www.nda.gov.uk/aboutus/geological-disposal/rwmd-work/dssc/
(3) See http://www.nuclearwasteadvisory.co.uk/uploads/11953NWAAISSUESREGISTER[Version1.1].pdf
(4) New Scientist 23rd Feb 2011 http://www.newscientist.com/article/mg20928013.100-nuclear-agency-plans-for-futuristic-waste-option.html?DCMP=OTC-rss&nsref=online-news
(5) www.intoeternitythemovie.com
(6) Cumberland News 24th Feb 2011 http://www.cumberlandnews.co.uk/first-stage-of-cumbria-nuclear-dump-consultation-ends-1.812006?referrerPath=business

7. Chernobyl 25 years on

The upcoming 25th anniversary of the Chernobyl disaster is a brutal reminder of the dangers of nuclear power, proliferation and terrorism says former Soviet president Mikhail Gorbachev. The death toll ranges from a UN 2005 estimate of 4,000 to tens or even hundreds of thousands, proposed by non-governmental groups. Environmental problems include long-term contamination of water resources and soil and damage to wildlife that is still unclear, while the economic cost has been put in the hundreds of billions of dollars. Gorbachev described Chernobyl as "a warning sign" for countries dependent on nuclear power or keen to turn to it. He voiced concern about the risk of terror attacks on nuclear reactors or radioactive waste stores and the theft of fissile material. (1)

Twenty five years after Chernobyl, a United Nations report estimates the disaster caused thyroid cancer in more than 6,000 children in the affected area. University of New Mexico Radiology Professor Fred Mettler who contributed to the report, says the number has now gone up to 7,000 – and that most of them are due to the accident. University of Paris researcher Anders Moller has researched the Chernobyl area since it opened to the West after the 1991 fall of communism. He has maintained close contact with family members of the men and women who put out the nuclear fire, and encased the plant in cement. "*That group contains many thousands of people and the most recent estimate I have heard from this group is that hardly any of those are alive today*," said Moller. (2)

An international drive is underway to raise money to seal the Chernobyl site in a $2-billion concrete shell. This 23-story-high shell will be built on rails and slid over the decaying nuclear power plant and would be the world's largest moveable structure. Britain is coming under increasing pressure to provide Ukraine with an extra €50m (£43m) to help construct the new shield before the old one collapses. Officials from the European commission said governments around the world were being urged to find €750m to help build a more sophisticated roof over the burnt-out reactor and storage for 200 tonnes of highly radioactive fuel. Jean-Paul Joulia, from the commission's nuclear safety unit, admitted the cost of just this aspect of the Chernobyl clean-up was running at €1.5bn – double the original estimate – partly due to "some delays" to some projects. But he said he was confident that foreign governments would stump up the money needed for the shield, even in today's financially difficult climate. (3)

(1) Nuclear Power Daily 1st March 2011 http://www.nuclearpowerdaily.com/reports/Chernobyl_was_lesson_in_nuclear_peril_Gorbachev_999.html
(2) Voice of America 28th February 2011 http://www.voanews.com/english/news/europe/UN-Reports-Thousands-of-Thyroid-Cancers-25-Years-After-Chernobyl-Nuclear-Disaster-117088228.html
(3) Guardian 28th February 2011 http://www.guardian.co.uk/environment/2011/feb/27/chernobyl-new-roof-british-funds

8. Generic Design Assessment (GDA)

The final substantial quarterly report before the Generic Design Assessment of two new reactor-types reaches its conclusion on 30 June 2011 has been published by the Health and Safety Executive (HSE) and Environment Agency.

The report provides an update on the assessment of the safety cases for the new designs and looks at the key challenges ahead. Subject to further progress in some key areas over the next few months, the two regulators expect to be able to complete the GDA assessment by June 2011, but only expect to be able to issue an Interim Design Acceptance Confirmation (DAC) and Interim Statement of Design Acceptability (SoDA) for both the UK EPR and AP1000. There will be some limited requirements for further work that the reactor designers will need to complete before final decisions on the GDA can be reached. These additional requirements are called "GDA Issues". The quarterly report lists the potential GDA issues. (1)

HSE says it is still reviewing a large quantity of technical information and still at this late stage identifying new technical questions that need to be addressed. Although they say they have not identified any showstoppers at this point, some of the observations are likely to result in design changes.

(1) GDA Progress Report 1st October 2010 to 31st December 2010, HSE and EA. http://www.hse.gov.uk/newreactors/reports/gda-q4-10.pdf

9. Funded Decommissioning Programme & Waste Transfer Pricing Methodology Consultations

The Government's consultations on revised Funded Decommissioning Programme (FDP) Guidance (1) and updated Waste Transfer Pricing (WTP) methodology (2) close on 8th March.

The Energy Act 2008 requires operators of new nuclear power stations to have in place plans to carry out and fully fund decommissioning, managing and disposing of the waste they produce. Operators must have a Funded

Decommissioning Programme (FDP) approved by the Secretary of State (SoS) for Energy and Climate Change before construction of a new nuclear power station begins and comply with this FDP thereafter. The Waste Transfer Pricing Methodology consultation is the latest in a series about deciding on the methodology for calculating a nuclear operator's 'fair share' of waste disposal costs.

The revised FDP Guidance consultation follows an earlier consultation carried out in February 2008, (3) and the Government's response in September 2008. (4) [See "*Funding Provision for Nuclear Waste and Decommissioning*" for a reminder of earlier discussions. (5)]

An FDP should include:

(1) A Decommissioning and Waste Management Plan (DWMP) which sets out and costs the steps involved in decommissioning a new nuclear power station and managing and disposing of hazardous waste and spent fuel.

(2) A Funding Arrangements Plan (FAP) which sets out acceptable financing proposals to meet the costs identified.

The SoS will seek the advice of the Nuclear Liabilities Financing Assurance Board (NLFAB) in assessing the constituent parts of the FDP.

When considering whether or not to approve or modify an FDP, the draft Guidance lists a series of Guidance Factors which the SoS will consider including whether the FDP contains realistic, clearly defined and achievable plans and whether it contains robust cost estimates which take due account of risk and uncertainty. But the list **does not include any mention of public consultation or parliamentary oversight. The Guidance should state that no FDP can be agreed without public input or Parliamentary oversight. Similarly significant modifications to any agreement must be open for public input and Parliamentary scrutiny.**
Decommissioning and Waste Management Plan (DWMP)

The DWMP should be able to demonstrate that decommissioning and the management and disposal of waste can be undertaken in a way which is prudent and consistent with the requirements and expectations of the safety, security and environmental regulators. It is designed to ensure that a plan, based on established techniques, is prepared prior to the construction of a nuclear power station. But it is difficult to see how waste 'disposal' in a deep geological disposal facility can be described as "*an established technique*", given that there are no operating facilities for spent fuel anywhere in the world.

The Draft Guidance distinguishes between 'technical matters' and 'designated technical matters'. The cost of non-designated technical matters are to be met by the operator from operational expenditure, but the costs of designated technical matters must be provided for in the independent fund which operators will be expected to set up. Table 3 (pages 50-52) sets out a summary of principal cost streams and whether the cost will be met from operational expenditure or the independent Fund. Operational Low Level Waste (LLW), for example, should be dealt with as part of operational expenditure, whereas dealing with decommissioning LLW should be paid for from the independent fund. Only two principle costs streams – disposal of operational and decommissioning ILW and disposal of spent fuel – are to be funded under the Waste Transfer Pricing Scheme (see below).

A "Base Case" or list of assumptions is set out in Table 2 (pp 40-49). It is assumed, for example that Intermediate Level Waste (ILW) and spent fuel will be disposed of in a Geological Disposal Facility (GDF) that the Government will construct. The terms on which the Government will agree to take title to and liability for an operator's ILW and spent fuel are expected to be set out in a contract to be agreed between the operator and the Government alongside the operator's FDP. **But again there appears to be no provision for public comment or parliamentary scrutiny of the terms of these contracts.**

The Base Case assumes that new reactors will operate for 40 years. However the Government recognises that most current station designs, including those undergoing the UK Generic Design Assessment, anticipate an operational life of at least 60 years and it will be open to operators to justify alternative station lifetimes.

The Base Case also assumes that spent fuel from new reactors will be kept in interim stores on the reactor site until it is disposed of in a GDF, and that the encapsulation of spent fuel is also carried out on-site. However regional or centralized facilities seems to be the nuclear industry's preferred option. This means the first set of approved FDPs will probably be based on long-term storage of spent fuel at reactor sites. But these could be modified later if the centralized storage option goes ahead. This raises several questions. **The most obvious place to locate a central store and encapsulation facility would be as part of the surface facilities for a GDF. But the Government's policy for siting a GDF is that it should be based on 'voluntarism'. Does this mean that communities should also be asked to volunteer for a central store and encapsulation facility? If the answer is yes, then surely communities living near new reactor sites should also be asked to volunteer for local storage and encapsulation facilities.**

Funding Arrangements Plan

The Funding Arrangements Plan (FAP) should set out the operator's detailed arrangements for one or more Funds to deliver sufficient assets to meet the estimated costs of carrying out the plans as set out in the DWMP for the designated technical matters. Any structure proposed for the Fund must ensure its independence from the operator and protection from claims by the operator, other than in accordance with the FDP.

The FAP is expected to set out an Investment Strategy designed to ensure that the assets which the Fund receives from the operator will be appropriately invested to generate the sums necessary to meet the estimated costs of carrying out the plans as set out in the DWMP for the designated technical matters. The FAP should include mechanisms to enable liabilities to be met in full and on their due date in the event of an insolvency of the operator or an associated company. The FDP should set out how a nuclear operator would make good any shortfall or risk of shortfall in the accumulated assets held by the Fund.

Waste Transfer Pricing methodology consultation

The Government is also consulting on an updated Waste Transfer Pricing (WTP) methodology. (6) This is the new name for the Fixed Unit Price (FUP) methodology, which was consulted on in March 2010. (7) And this was preceded by three discussion papers published in Autumn 2008 and Spring 2009 (8) The WTP consultation includes the Government's response to comments made on the FUP consultation.

Originally the Labour government had planned to charge the industry a high risk premium as part of a fixed, disposal levy tied to the amount of nuclear waste it produced, and had told the industry that responsibility for the waste should be transferred to the state only once the waste had been disposed of, which couldn't happen before 2130 at the earliest. Both proposals were deeply unpopular with the industry. In March 2010, the Labour government published revised proposals that made significant concessions on both issues.

Firstly it was proposed to defer the setting of the Fixed Unit Price (FUP). Nuclear operators would instead be offered an "expected Fixed Unit Price" (now just referred to as the Expected Price). The reason for the deferral is because setting a Fixed Price at the end of the deferral period, after a waste disposal site has been selected, can be expected to be much more accurate. The Expected Price provided by the Government is likely to include a smaller risk premium and therefore be lower than any Fixed Price offered at that time. The Expected Price will be reviewed every five years.

Second it was proposed that the Government should take title to nuclear waste and spent fuel much earlier, so that it is aligned with the operators decommissioning timetable rather than waiting for the Geological Disposal Facility (GDF) to be available. This means the operators don't have to be responsible for onsite interim storage of waste and spent fuel for several decades after revenues from the nuclear power station had ceased, plus it transfers a significant risk that the cost of geological disposal will escalate to the taxpayer. The Government continues to insist that taking title to radioactive waste, including spent fuel, for a fixed price is not a subsidy to new nuclear power, provided that the price properly reflects any financial risks or liabilities assumed by the state.

The latest revision of the methodology has two significant changes. Firstly the Deferral Period before setting the Fixed Price will be 30 years after the start of generation rather than 10. Secondly the Final Price will be subject to a Cap, and in return a Risk Fee will be charged. The final price each company expects to pay will not exceed the cap, no matter what happens!

The NDA estimates that a Geological Disposal Facility (GDF) will be ready to start accepting waste – albeit legacy waste at first – in 2040. The reason for the 30 year deferral period is that by 2040 upfront costs of constructing the GDF should be known and actual data relating to the costs of emplacing waste in the GDF will start to become available. But given the history of delays in projects connected to the nuclear industry, this date appears optimistic.

Given the operational 'life' of most reactors to date has been approximately 30 years the deferral period is too long. The Government has said industry will have to save money for decommissioning and waste disposal from when reactor operations begin, but the 30 year proposal risks leaving too little time to make up costs if there is a deficit or if reactors close earlier than anticipated. There is a risk of the taxpayer having to find the additional money if the industry is allowed too much time before it has to commit to a final price. Offering a maximum price cap before construction presents too much of a risk of taxpayers ending up funding for any shortfall.

The Government admits that there will be uncertainty over the size of the operator's final waste disposal liability during the deferral period and therefore a greater the risk that the operator fails to make prudent provision for their liability. (para 2.2.11) One of the uncertainties is whether or not a second GDF might be required – either because the volume of new build waste is too high to be accommodated by a single repository, or because co-disposal of legacy waste and new build waste proves to be infeasible. The Government acknowledges that a second GDF may be required (para 2.2.1)

As recently stated at the CoRWM meeting in Manchester (Feb 8th & 9th) it is clear that "*neither the baseline inventory nor the Upper Inventory* [used by DECC] *are anywhere near realistic*". 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) i.e. the risk of a person contracting non-fatal cancer, fatal cancer or inherited defects must be less than one in a million. (9) However, the NDA's Disposability Assessment Report for waste arising from the new European Pressurised waste Reactor (EPR) states:

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

This is more than half the total risk of 10^{-6} allowable for a GDF. An upper radioactive waste inventory which takes into account the possibility of a 16GW programme (ten EPRs or 6 EPRs and 6 AP1000s) and AGR life extensions will probably indicate, therefore, that two GDFs will be required.

The Price Cap

The March consultation said that deferring the setting of a Fixed Price meant the operator would be accepting the risk that a Price set at a later date could be higher than the Price on offer at the outset, if estimated costs escalate sufficiently in the intervening period. Now the Government has decided this is too much of a risk for the operators to bear. It says:

"*It will be difficult for an operator to accept such a risk, given that there is very little the operator can do to manage and mitigate it. In contrast, the Government does have capacity to manage risks around waste disposal costs, as these costs will be heavily influenced by the manner in which the Government implements geological disposal*." (para 3.2.8)

The question is **how exactly would the Government manage these risks if costs begin to escalate?** It seems that there might be two or three possibilities here:

(1) The Government could increase the limit on the risk that may be caused by the burial of radioactive wastes of 10^{-6} (i.e. one in a million) in order to reduce costs, or

(2) The Government could order the repository company to reduce costs by using inferior materials which may compromise safety, or
(3) The taxpayer could be asked to shoulder the costs over and above the cap.

None of these options are acceptable. The Government says the Cap will be set at a level where the Government has a very high level of confidence that actual cost will not exceed the Cap. If that is the case then surely the operator should be able to bear the "small" risk that the Fixed Price ends up being higher than the cap.

GDF delays

The Government accepts that First Waste Emplacement might not have taken place by the end of the Deferral Period (2048). However it believes that it should be possible to provide a fairly accurate cost estimate provided that a site has been selected. Under these circumstances the Final Price given to operators would include a risk premium. However, if a site has still not been selected by 2048 the Final Price would probably be set close to the price cap.

Fixing the Price

The Final Price will be the cost of disposing of the ILW and spent fuel on the assumed disposal date. If the Final Price is set at the end of the deferral period (i.e. not earlier because of an operator request for a fixed price) this will be in 2048. However, new build spent waste fuel will probably not be emplaced in the GDF until 2130, some 82 years later. (According to Table 3 of the FDP consultation, the Independent Decommissioning Fund should pay for the cost of storage of spent fuel after the reactor has closed – even after the Government has taken title to the waste at the transfer date when decommissioning has been completed – the Base Case assumes prompt decommissioning after station closure.) Although the price will be fixed in 2048, the money won't be handed over to the Government until the Transfer Date when decommissioning has been completed, which is likely to be much closer to the end of the century. The consultation document indicates that decommissioning should be completed for the first reactors by 2080. In other words the Transfer Date would be 50 years before the Assumed Disposal Date. So, because payment will be made by the operator earlier than the waste will be emplaced, the Government says it is necessary to adjust the payment made by the operator to reflect this early payment. This will be done through the application of an appropriate discount rate to the Final Price to reflect the time difference.

Table 4 of the consultation document shows that a Final Price of £226m in 2080 – the assumed waste disposal liability for one nuclear station - is expected to be worth £670m in 2130. But this may not necessarily be true in the real world. Basically the stock market is expected to pay almost 70% of the total disposal cost. Greenpeace commissioned independent nuclear expert Ian Jackson to undertake an impartial assessment of the March 2010 proposals. He said there are good reasons for not discounting prices in this way when faced with very long term nuclear liability cash flows. The only way to guarantee utilities pay the full costs of disposal is to charge them the actual cost. Estimating realistic disposal prices 100 years into the future is fraught with difficulty. Moreover under present financial conditions stock market returns may not be sufficient to pay for the majority of a utility's spent fuel liabilities. (11)

Decommissioning

Neither of the two consultations gives any indication of how long reactor decommissioning is expected to take. The 2080 date mentioned above must assume a 40 year reactor life, otherwise decommissioning would be getting done in two years. Waste and spent fuel storage should be funded from the decommissioning fund, rather than through the Waste Transfer Price. It's not clear from the consultation documents how this will work between the Transfer Date (2080-2100 when decommissioning is complete) and the Assumed Disposal Date (2130+). Will the remainder of the independent fund transfer to the Government after decommissioning has been completed? How will the risks associated with waste storage for half a century be taken into consideration? Will there be sufficient funds available to cover the possibility that storage systems and buildings may need to be replaced or waste may need to be repackaged? Who will pay the cost of security for 50 years?

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(7) Consultation on a Methodology to Determine a Fixed Unit Price for Waste Disposal and Updated Cost Estimates for Nuclear Decommissioning, Waste Management and Waste Disposal. DECC March 2010. http://www.decc.gov.uk/assets/decc/Consultations/nuclearfixedunitprice/1_20100324145948_e_@@_ConsultationonFixedUnitPricemethodologyandupdatedcostestimates.pdf
(8) See http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/nuclear/new/waste_costs/waste_costs.aspx
(9) *Geological Disposal Facilities on Land for Solid Radioactive Wastes: Guidance on Requirements for Authorisation,* Environment Agency, February 2009, page 46 para 6.3.10 http://publications.environment-agency.gov.uk/pdf/GEHO0209BPJM-e-e.pdf
(10) Generic Design Assessment: Disposability Assessment for wastes and spent fuel arising from operation of the UK EPR. Part 1 Main Report. NDA, 22nd Jan 2010, para 5.4 page 97.
(11) "Fixed Unit Price Simulation for Disposal of Spent Fuel from New Nuclear Power Stations in the UK (FUPSIM)", Jackson Consulting Research Report, Greenpeace 2010. http://www.greenpeace.org.uk/files/pdfs/nuclear/gpuk-fupsim-report.pdf