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1. Consultations Galore

At NuClear News we've been looking at the ever-mounting list of nuclear consultations with a growing sense of foreboding. There are so many of them! Here's an attempt to help readers who might be feeling the same.

Responses due 8th March 2011

1. Consultation on an updated **Waste Transfer Pricing Methodology** for the disposal of higher activity waste from new nuclear power stations.
<http://www.decc.gov.uk/assets/decc/Consultations/nuclear-waste-transfer-pricing/984-consultation-waste-transfer-pricing-method.pdf>
2. Consultation on revised **Funded Decommissioning Programme** Guidance for New Nuclear Power Stations.
<http://www.decc.gov.uk/assets/decc/Consultations/fdp-guidance-new-nuclear/985-consultation-revised-fdp-guide.pdf>

Comment: NuClear News will carry a longer article on these consultations in the next issue in time to inform consultation responses. In the meantime see NuClear News No.24 which included a short article when these two re-consultations were first published with links back to earlier articles.

<http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo24.pdf>

The Nuclear Free Local Authorities, New Nuclear Monitor No. 21, which looked at the two original consultations should also help with responses.

http://www.nuclearpolicy.info/docs/nuclearmonitor/NFLA_New_Nuclear_Monitor_No21.pdf

Also see in particular NuClear News No.20 – “Fixed Unit Guess – to guarantee utilities pay the full costs of disposal, Labour’s proposals must be withdrawn”.

<http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo20.pdf> This looked at an

assessment for Greenpeace by nuclear economist, Ian Jackson. This estimates that the stock market is being expected to fund around 70% of the cost of waste disposal. Has the Government estimated how many credit crunches there will be over the next 110 years while the waste is stored at reactor sites?

Response due 10th March 2011

3. **Electricity Market Reform** Consultation.

<http://www.decc.gov.uk/assets/decc/Consultations/emr/1041-electricity-market-reform-condoc.pdf>

Comment: NB the Carbon Floor Price Consultation by The Treasury has already closed.

http://www.hm-treasury.gov.uk/consult_carbon_price_support.htm NuClear News No. 25 - "Electricity Market Reform – Derren Brown-style mind tricks" looked at the proposed reforms: <http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo25.pdf>

According to calculations by WWF and Greenpeace, the proposed carbon floor price could result in windfall profits for existing nuclear generators of up to £3.43 billion between 2013 and 2026. This not only follows a long history of UK taxpayer subsidies to support the nuclear industry (including a £10bn public bailout of British Energy in 2002) but also flies in the face of the government's stated opposition to any more public subsidy for nuclear energy. (1)

(1) WWF Blog 14th Feb 2011

http://www.wwf.org.uk/what_we_do/campaigning/campaigns_news/?4625/How-can-zero-nuclear-subsidy--34bn-profit

WWF Press Release 14th Feb 2011 http://www.wwf.org.uk/what_we_do/press_centre/?4629/Energy-bills-to-rise-as-nuclear-gets-343bn-for-doing-nothing

Response due 11th March 2011

4. **Dounreay Radioactive Waste Substitution.** A joint DECC, Scottish Government Consultation. <http://www.scotland.gov.uk/Resource/Doc/333555/0108891.pdf>

Comment: Under these proposals, instead of returning the radioactive waste allocated to customers who sent research reactor spent fuel to Dounreay for reprocessing they would receive a radiologically equivalent amount of radioactive waste from a different waste stream instead. This radioactive waste could be from a different NDA facility – probably Sellafield. A conundrum for anyone opposed to reprocessing. Better not to be transporting waste of any description anywhere, but then we don't want to get lumbered, so reprocessing would have to stop too. The logic of waste substitution means that we could send some of the UK's high level waste and plutonium back to Sellafield's overseas reprocessing customers, and stop reprocessing immediately – this is known as virtual reprocessing. Jackson consulting raised some interesting points when the Government consulted on waste substitution for Sellafield in 2004 (1) and a summary of other responses is available. (2)

(1) http://www.jacksonconsult.com/content_pdf/ILW_substitution_brief.pdf

(2) Summary of other responses here <http://www.berr.gov.uk/files/file30057.doc>

Response due 28th April 2011

5. Consultation on the implementation of changes to the **Paris and Brussels Conventions on nuclear third party liability.** <http://www.decc.gov.uk/assets/decc/Consultations/paris-brussels-convention-changes/1182-cons-implement-changes-paris-brussels.pdf>

Comment: Published on 24th January, this consultation seeks views on the UK's proposed implementation of amendments to the Paris Convention on nuclear third party liability and Brussels

Supplementary Convention. Among other things the Conventions aim to ensure that victims of a nuclear incident can easily get compensation for damage as a result of a nuclear incident.

Under the proposals nuclear operators will have to pay the first £1bn towards the cost of any accident in the UK – compared with the current cap on their liabilities of £140m. The new rule is supposed to ensure that there would be no public subsidy for nuclear power. The cap was introduced because no company can obtain insurance against a nuclear accident – or would want to shoulder the risk themselves – because the costs could potentially be limitless, but clearly agreeing to cover any costs above £1bn amounts to a public subsidy. Under the European proposals, in future nuclear operators must pay a minimum of the first €700m (£590m) for any accident. Governments have the option of adding a maximum of an extra €500m towards companies' liabilities. Huhne is proposing to load the maximum liability onto companies that is allowed under the new treaties. (1)

Let's not forget that BP had to pay £20 billion after the recent Gulf of Mexico oil spill last year, and a comparative nuclear accident would cost much more to clean-up and take a lot longer before the area is 'clean' again. The cost of the Chernobyl accident can only be roughly estimated, but the magnitude of the cost is clear from a variety of government estimates from the 1990s, which put the cost of the accident, over two decades, at hundreds of billions of dollars. Belarus, for instance, has estimated losses over 30 years at US \$235 billion. (2)

Barry Jones, Emeritus Professor at Reading University says any limit on liability for the costs of nuclear accidents, albeit at a much higher level than currently, eases the burden on nuclear operators. If the government reinsures those costs, in the absence of commercial insurers, then the nuclear operators will be absolved of most, if not all, of the ultimate liability. Both moral hazard and implicit subsidy are inherent in such a situation. When compounded by the inevitable uncertainties about future decommissioning costs and associated accounting, it becomes clear that the current policy on nuclear generation encompasses a substantial measure of “smoke and mirrors”. He continues “*The potential constructors and operators of any new nuclear power stations will be commercial enterprises with profit as a major motive (and answerable, in most cases, to foreign owners). The design shortcomings and constructional faults revealed in the case of the new Finnish nuclear power station serve as a timely warning of the consequences of such a change in the philosophy and practices of the nuclear industry: shortcomings that make the inherent moral hazard of current government proposals all the more serious.*” (3)

- (1) Observer 23rd January 2011 <http://www.guardian.co.uk/business/2011/jan/23/nuclear-power-accident-clean-up-costs>
- (2) Green Facts: <http://www.greenfacts.org/en/chernobyl/1-3/5-social-economic-impacts.htm>
- (3) Letter to the FT 3rd February 2011 <http://www.ft.com/cms/s/0/dfb8e1ec-2f28-11e0-88ec-00144feabdc0.html>

Response due 10th May 2011

6. Management of the UK's **plutonium** stocks: A consultation on the long-term management of UK-owned separated civil plutonium.
<http://www.decc.gov.uk/assets/decc/Consultations/plutonium-stocks/1243-uk-plutonium-stocks.pdf>

Comment: Lord Marland told the House of Lords on 13th January that he had commissioned a cost-benefit analysis of building a new Mox plant at Sellafield. “*If we have the biggest plutonium stock in the world, we must turn that liability into an asset ... It is madness to have it sitting there if we can make it a non-cost exercise. However, we must remember that we have failed at this once already. We have a Mox plant that was not fit for purpose, so we must get it right-it is very important, with new technologies, that we do that.*” (1) Others may think that allowing Sellafield to continue making this weapons useable material at huge cost when we have no idea what to do with it, is where madness lies.

The consultation document sets out three options for long-term plutonium management: Reuse as MoX fuel; immobilisation and direct disposal as waste and continued long term storage. The Government says its preliminary view is that the best option is reuse as MOX. (2) Nuclear companies could be paid by the government to buy the MoX fabricated in a new taxpayer-funded plant. The Government admits the plan isn't economic. A Mox plant would cost an estimated £500m, but thinks it could still be the best way to dispose of the UK's stockpile of 112 tonnes of plutonium. A government subsidy would be needed to pay companies to buy the Mox fuel, which costs a third more than conventional nuclear fuel. (3) For those involved in the long battle to stop the Thermal Oxide Reprocessing Plant (THORP) (plutonium separation plant) opening in the first place it is difficult to find a suitable expletive. Denis Healey's famous saying "*when you're in a hole stop digging*" will have to suffice.

The UK's Sellafield Mixed-Oxide (MOX) Plant is "*one of the most embarrassing failures in British industrial history,*" according to a leaked US embassy cable. (4) But Platts pointed out that all the plutonium options carry significant potential costs. Direct disposal of the plutonium would require a large increase in the size of a planned geological disposal facility deep underground and could cost between £5 billion-£7 billion (\$8 billion-\$11.2 billion). Continued long-term storage would require the construction of new facilities and additional research on the aging and long-term radioactive decay processes of plutonium. The government estimated continued long-term storage could cost around £8 billion. Reuse as MOX would require "*significant expenditure*" of around £5 billion-£6 billion for the construction of a new MOX fuel manufacturing plant at Sellafield, but the resulting MOX fuel would be worth an estimated £2 billion. (5)

The NDA says it published an updated version of its Plutonium Credible Options Analysis, which now includes the option of reuse of plutonium as MOX fuel in UK new nuclear power stations for consideration. (6)

The existing Sellafield MoX Plant was built at a cost of £473 million, and despite repeated warnings that it would be uneconomic and could be a security risk, it has never worked properly. It should have produced 560 tons of fuel by the end of its first decade of operation, later this year, but has so far produced just 15. Even though the Government wrote off its capital cost, it is still haemorrhaging money. Though the annual loss is kept secret, the cable –released by WikiLeaks –says it is "*costing taxpayers £90 million a year*". What makes DECC believe we can get it right a second time? If a new plant is built it will mean removing weapons-useable plutonium from closely guarded stores and transporting it around the country. It is relatively easy to remove plutonium from MoX fuel, so if terrorists or criminals intercepted a shipment, they could use it to make a bomb capable of destroying much of a major city. (7)

At a meeting of the Committee on Radioactive Waste Management (CoRWM) in Manchester on 8th and 9th February, the question of whether this is the right time to decide on the best plutonium management option was raised. There will still be plutonium that needs to be disposed of, even if most of it is fabricated into fuel. The Government was criticised for arguing that MoX is the mature option, when it fails to mention the lack of work carried out on spent MoX fuel disposal, which could require cooling for more than 100 years and could have a very significant impact on the size of the Geological Disposal Facility footprint.

Discussion continues over the future of Thorp. Thorp would require refurbishment or replacement to handle the complete inventory of spent fuel from Advanced Gas-cooled Reactors (AGRs) as well as completing its international contracts. At least 6600 tonnes of AGR spent fuel remains un-reprocessed. (8)

Responses by the Nuclear Free Local Authorities to two consultations held in 2009 may be helpful:
http://www.nuclearpolicy.info/docs/consultations/DECC_plutonium2_response.pdf
http://www.nuclearpolicy.info/docs/consultations/DECC_response_210909.pdf

- (1) House of Lords Hansard *Column GC177* 13th January 2011
<http://www.publications.parliament.uk/pa/ld201011/ldhansrd/text/110113-gc0001.htm#11011374000025>
- (2) DECC Press Release 7th Feb 2011
http://www.decc.gov.uk/en/content/cms/news/pn11_011/pn11_011.aspx
- (3) Guardian 7th Feb 2011 <http://www.guardian.co.uk/environment/2011/feb/07/mox-plant-recycled-plutonium>
- (4) <http://www.telegraph.co.uk/news/wikileaks-files/london-wikileaks/8305283/UK-RAMPING-UP-ON-NUCLEAR-POWER-BUT-CHALLENGES-REMAIN.html>
- (5) Platts 7th Feb 2011 <http://www.platts.com/RSSFeedDetailedNews/RSSFeed/ElectricPower/8508302>
- (6) NDA 7th February 2011 <http://www.nda.gov.uk/news/pu-credible-options.cfm>
- (7) Telegraph 11th Feb 2011 <http://www.telegraph.co.uk/earth/earthcomment/geoffrey-lean/8319807/A-bomb-factory-in-our-back-yard.html>
- (8) World Nuclear News 14th Jan 2011 <http://www.world-nuclear-news.org/WR-Decision-soon-on-new-UK-MOX-plant-1401114.html>

2. Nuclear Power and Jobs

In 2008 Greenpeace International and the European Renewable Energy Council published a global energy scenario, Energy [R]evolution, which set out a vision for low-carbon global energy supply. (1) A year later the Institute of Sustainable Futures (2) compared this scenario to an energy projection put forward by the International Energy Agency (IEA), which includes nuclear power and continued use of fossil fuels. (3) The comparison showed that an Energy [R]evolution scenario would generate 2.7 million more jobs globally than the IEA scenario.

The Institute of Sustainable Futures report looks specifically at the UK. It shows that there are more energy sector jobs in the UK in the [R]evolution scenario than the IEA scenario at every stage. In 2010, the [R]evolution has about 3,000 additional jobs compared to the IEA scenario, with 79,000 more in 2020, and 78,000 more by 2030. Employment in the [R]evolution scenario shows very strong growth, reaching 130,000 by 2020 and 152,000 by 2030. (4)

In 2008 John Hutton, the then Secretary of State for Business, Enterprise and Regulatory Reform told the Unite union conference that a new nuclear programme could create up to 100,000 new skilled jobs. He didn't bother to mention that this was for a 32GW programme - twice what is now being discussed. Each twin reactor nuclear station was expected to create 9,000 construction and manufacturing jobs and 1,000 jobs to run the station. (5)

A scenario presented by the skills agency - Cogent - suggests that, if all goes according to plan, a 16GW programme with six twin unit stations (6 EPR reactors and 6 AP1000 reactors) would start to create jobs in 2012, but would be expected to employ a peak of only 14,000 workers around 2021 and then there will be around 5,000 permanent jobs once construction is completed around 2027 – a bit different from the 100,000 jobs originally promised. (6)

Nuclear power is very poor at creating jobs – only around 75 jobs per Terawatt hour (TWh) at the most. All of the areas where reactors might be built as part of the 16GW programme could be promoting themselves as suitable for the offshore wind industry to expand creating up to 2,400 jobs per TWh. (7)

- (1) Greenpeace International and the European Renewable Energy Association. 2008. *Energy [R]evolution. A sustainable global energy outlook*. GPI 2008
<http://www.greenpeace.org/international/Global/international/publications/climate/2010/summary.pdf>
- (2) Atherton, A and Rutovitz, J, *Energy Sector Jobs to 2030: A Global Analysis*, Insitute for Sustainable Futures 2009. <http://www.greenpeace.org/international/Global/international/planet-2/binaries/2009/9/energy-sector-jobs-to-2030.pdf>
- (3) International Energy Agency 2007. *World Energy Outlook 2007*. (See <http://www.worldenergyoutlook.org/> for 2010 edition)

- (4) See Ref 2 page 83-84
- (5) Hansard 21st April 2008. Column 1767W
<http://www.publications.parliament.uk/pa/cm200708/cmhansrd/cm080421/text/80421w0096.htm#08042337000028>
- (6) Next Generation: Skills for New Build Nuclear, Cogent 2010 <http://www.cogent-ssc.com/research/Publications/Renaissance2.pdf>
- (7) Goldemberg, J., 2004, *The Case for Renewable Energies*, International Conference for Renewable Energies, Bonn, http://teenet.tei.or.th/Knowledge/Paper/case_for_renewable.pdf

3. UK Nuclear Costs Double in 2-3 years

EDF Energy has estimated that the cost of two reactors at Hinkley Point in Somerset would be £9bn (\$14bn). (1) The proposed reactors would have a combined rating of 3,260MW, which puts the cost at £2,760/kW (\$4,260/kW). In 2008, when the UK government revisited nuclear economics, it assumed construction costs would be around £1,250/kW (\$2,000/kW), so the cost has more than doubled in just over two years. (2) The Government's most recent consultations on Electricity Market Reforms, (3) use a June 2010 UK Electricity Generation Costs Update by Mott MacDonald for the Department of Energy and Climate Change. This gives the capital cost for nuclear (not including Interest During Construction) as £3812/kW (\$5968/kW) for the first of a kind plant and £2,966/kW (\$4643/kW) for later plant. (4)

In the US the Government's Energy Information Administration (EIA) puts the figure at \$5,335/kW, (5) but Moody's Investor Services believe \$7,500/kW is closer to the truth. (6)

Of course it's not just construction costs that are important. The 2008 Nuclear White Paper estimated the cost of nuclear electricity at between £32/MWh for a 7% discount rate and £42/MWh for a 12% discount rate (3.3p/kWh to 4.2p/kWh). (7) More recently, Peter Atherton of Citigroup told the House of Commons Energy & Climate Change Committee that using a 10% cost of capital, the required revenue to meet that cost of capital for an EPR would be just under £70/MWh, including an assumption of pay as you go for nuclear waste, but at a 15% cost of capital, which is far more realistic, it would be about £93/MWh. (8) But if capital costs do turn out to be closer to the \$6,000+/kW being discussed in the US, according to Professor Steve Thomas electricity costs will be closer to £140/MWh - £210/MWh depending on the discount rate, and using a more realistic figure for the discount rate for waste and decommissioning costs than is used by Mott Macdonald could increase this number to £250/MWh. (9) Peter Atherton said these numbers compare with £150/MWh for offshore wind; £80/MWh for onshore wind and about £60/MWh for a Combined Cycle Gas Turbine plant.

The cost of offshore wind has doubled as well in the last five years according to a report by the UK Energy Research Centre. (10) The Centre is cautiously optimistic though that costs will fall in future, albeit gradually. Its 'best guess' is that there will be a 20 per cent reduction to £115/MWh by 2025, with further falls likely thereafter. The main cause of the recent rise has been sharp increases in the cost of materials and labour. Turbines account for up to half the capital cost of a wind farm and steel prices have risen considerably. The centre's report also notes that the industry has invested heavily in making its turbines more reliable, which increases short-term expenditure even as it reduces long-term operating costs. Currency movements, and in particular the weakness of the pound, have also been blamed. Around 80 per cent of the materials for offshore wind farms are imported from the Euro zone and the pound's 30 per cent slide against the Euro hasn't helped. In addition, there has been little competition between manufacturers, with just two supplying the UK offshore market, Siemens and Vestas. Several more are now entering the market. The centre also believes the government needs to build a home-grown offshore wind industry, by investing in port facilities for example, as currently, 80 per cent of the materials are imported. Offshore wind is still in its very early stages, with the equivalent of just one small, power station built so far. Many energy technologies have been through similar learning curves, particularly gas and nuclear power stations. (11)

- (1) FT 17th December 2011 <http://uk.finance.yahoo.com/news/EDF-reveals-strategy-UK-ftimes-1700153737.html?x=0>
- (2) Thomas, S. Prof. "EPR in Crisis" PSIRU Business School, Greenwich University, November 2010 <http://216.250.243.12/The%20EPR%20in%20crisis%203-11-10.pdf>
- (3) See "Electricity Market Reform: Analysis of Policy Options" Redpoint, December 2010. Table 23, page 125, Annex C. <http://www.decc.gov.uk/assets/decc/Consultations/emr/1043-emr-analysis-policy-options.pdf>
- (4) Mott McDonald, *UK Electricity Generation Costs Update*, June 2010 <http://www.decc.gov.uk/assets/decc/Statistics/Projections/71-uk-electricity-generation-costs-update.pdf>
- (5) Updated Capital Cost Estimates for Electricity Generating Plants, US EIA, November 2010 http://www.eia.gov/oiaf/beck_plantcosts/index.html
- (6) Blake, M. "Bad Reactors", *Washington Monthly*, January/February 2009 <http://www.washingtonmonthly.com/features/2009/0901.blake.html>
- (7) *Meeting the Energy Challenge: A White Paper on Nuclear Power*, DECC January 2008 <http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/nuclear/whitepaper08/file43006.pdf>
- (8) Q193 The Revised Draft National Policy Statements on Energy, Oral Evidence, Energy and Climate Change Committee 14th Dec 2010 <http://www.publications.parliament.uk/pa/cm201011/cmselect/cmenergy/uc648-ii/uc64801.htm>
- (9) Pers Com with Prof Stephen Thomas, Greenwich University, January 2011.
- (10) Greenacre, P., Gross, R. and Heptonstall, P. *Great Expectations: The cost of offshore wind in UK waters – understanding the past and projecting the future*. UKERC, 2010 <http://www.ukerc.ac.uk/support/tiki-index.php>
- (11) Ecologist 29th September 2011 http://www.theecologist.org/News/news_analysis/605904/offshore_wind_can_we_afford_it.html

4. The Role of District Heating

In Nuclear News No. 20 we discussed the role of district heating in tackling intermittency, (1) and the fact that the successful combination of CHP and renewables is attracting increasing attention. (2) Today in Denmark, when the wind speed drops by 1 metre per second the country needs to find an additional 350 MW of electric power capacity. Gas CHP has the capacity to respond quickly to such fluctuation, but to maintain high efficiency the system must also find a use for the heat produced when generating electricity. In Europe, traditional CHP users are beginning to find new ways (such as temporary heat storage or buffering) to meet this need for flexibility. Danish district heating companies are increasingly providing the grid with balancing services, and the Danish model shows how a combination of a high wind-generating capacity and CHP can run together smoothly. (3)

District heating networks, using gas, waste heat from power stations or heat from biomass combustion, to heat houses and other buildings collectively, are common across much of continental Europe, especially in the North. But, as Professor Dave Elliott points out, there are now some large solar-fed heat grids and many heat stores. (4) There are even some inter-seasonal heat stores, which help to deal with variable supplies over the year, and variable demand for heat, e.g. during winter evenings. There is now over 20 GW thermal of solar heating capacity in the EU, which much of it in northern countries like Germany, Austria and Denmark. A lot of it is roof top domestic-scale, but there is also now a growing contribution from large-scale systems. For example, solar district heating is now moving ahead around Europe. The District Heating network in the Austrian city of Graz has 6.5 MW of solar thermal capacity. And further North, Danish collector manufacturer Arcon Solvarme has installed a 10,073 sq. m installation in the village of Gram in the region Syddanmark, and a 8,019 sq. m system in the village of Strandby in North Jutland, which meets 18% of the average energy demand for heating and domestic hot water of 830 households. A third solar thermal system, with 10,000 sq. m, has also been installed in the town of Broager in the south of Denmark. It's claimed that schemes like this can achieve payback times of 7–9 years. (5)

Germany also has some solar district heating projects. Nine research and demonstration plants have been built since 1996, including some with inter-seasonal heat stores. Depending on their size, they can meet 40–70% of the annual heating needs of a residential estate.

More district heating projects are proposed. For example, ‘Heat Plan Denmark’ a study financed by the Danish District Heating Association, argues that District heating is the key technology for implementing a CO₂ neutral Danish heating sector in a cost effective way. They claim that the Danish heating sector can be CO₂ neutral by 2030 by upgrading and expanding the existing system, with, for example, heat pumps being used to upgrade the heat energy currently supplied and more heat stores being added. At present much of the system still uses gas as the main energy input, but they look to the use of more renewables, and more efficient waste-to-energy Combined Heat and Power (CHP) plants with flue-gas condensation. So the emphasis will shift increasingly to using large-scale solar heating, biomass /biogas CHP, geothermal energy and excess wind energy – and more heat storage.

By contrast, we have a long way to go in the UK. Heat accounts for about 44% of UK energy consumption, mostly for heating homes and providing hot water, using individual domestic boilers – 84% of UK homes are heated by gas. This may change as and when the Renewable Heat Incentive (RHI) and the Zero Carbon Houses programmes kick in and domestic-scale solar, biomass micro-CHP and so on are taken up. But what about the larger scale and all of the waste heat from power stations?

Unfortunately, DECC’s focus seems to be on the smaller scale. Work is on-going between Sweden and the UK on underground thermal energy storage techniques, but on a domestic scale. Ideas like the large-scale 6.5MW solar district heating in Graz, Austria, are still evidently heretical.

The Energy Technologies Institute is looking at the feasibility of capturing and using waste heat from power stations for warming homes and providing hot water. The six month £140,000 project will examine the feasibility of capturing and using waste heat in bulk from power stations and industrial processes and storing it underground for use later. Capturing even 10% of this waste heat would have a significant impact on the UK’s total carbon emissions and security of supply, helping reduce our need for large quantities of imported fuels in the winter months when prices are highest. Most industrial processes, especially electricity generation, produce large quantities of heat which is usually emitted as waste to our rivers, sea and air. One of the main obstacles for making use of this waste heat is that it is not available at the same time and place as the demand. However it is technically possible to store very large quantities of heat energy below ground in geological structures such as saline aquifers or disused mines. (6)

Overall, the government does not seem to see community-scale projects as very significant. The new revised National Policy Statement on Energy says: “*The government does not believe that decentralized and community energy systems are likely to lead to significant replacement of larger-scale infrastructure.*” This is despite the fact that an Energy Saving Trust report called *Power in Numbers* suggested that there were significant economies of scale available. Community-scale projects could, it says, economically meet 4.3% of total UK energy demands if householders were to act collectively. That’s 13% of total annual UK household energy demands. (7)

Meanwhile, the argument that nuclear represents reliable “baseload” power is “rapidly losing relevance,” according to former US Nuclear Regulatory Commissioner, Peter Bradford. He echoes Amory Lovins in saying that the new combinations available in the deployment of the Smart Grid, distributed generation (DG), renewables, energy efficiency, demand-side management (DSM), etc. render the idea of one constantly streaming power source archaic. (8)

Tim Smit, founder of the Eden Project, site of one of the UK’s only two geothermal projects, says he wished geothermal energy could get the same ‘lack of support’ that nuclear power gets. It’s a familiar tale of German success and British failure. Germany has 150 projects in the planning stage this year.

It has invested about €10m a year in geothermal research since 2002, whereas the coalition government cut in half the available funds to £1m and there is nothing more in the pipeline. (9)

- (1) See Scotland could meet 100% of its electricity requirements from renewable <http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo20.pdf>
- (2) Cogeneration can enhance smart grid operation by balancing the intermittent availability of renewable fuels, by Fiona Riddoch, Power Services, 14th June 2010 <http://powerservices.lakho.com/2010/06/14/cogeneration-can-enhance-smart-grid-operation-by-balancing-the-intermittent-availability-of-renewable-fuels/>
- (3) The Danish Experience: Successfully Managing Renewables and Cogeneration in a smarter grid structure. Henrik Lund, Teaming up for energy renewal conference, 2nd June 2010 <http://www.conference2010.eu/presentations/HenrikLund%20-%20The%20Danish%20experience%20in%20successfully%20managing%20renewables%20and%20cogeneration%20in%20a%20smarter%20grid%20structure.pdf>
- (4) Environmental Research Web 22nd Jan 2011 <http://environmentalresearchweb.org/blog/2011/01/green-heat---district-heating.html>
- (5) Environmental Research Web 16th October 2011 <http://environmentalresearchweb.org/blog/2010/10/solar-power-brightens-up.html>
- (6) Renew Online No.89 Jan-Feb 2011 <http://eeru.open.ac.uk/documents/ROL89.doc>
- (7) Environmental Research Web 15th January 2011 <http://environmentalresearchweb.org/blog/2011/01/is-small-and-local-beautiful-.html>
- (8) Climate Progress 29th December 2010 http://climateprogress.org/2010/12/29/nuclear-power-running-on-fumes/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+climateprogress%2FICrX+%28Climate+Progress%29
- (9) Guardian Blog 18th Jan 2011 <http://www.guardian.co.uk/environment/damian-carrington-blog/2011/jan/18/geothermal-energy-nuclear>

5. Electricity Market Reforms

A host of academics have written to *The Guardian* calling for “real feed-in tariffs” for renewable energy and not nuclear power. They say Energy Secretary Chris Huhne appears to be poised to ignore the dominant and most effective mechanism for promoting renewable energy across the world (feed-in tariffs) in favour of an auction system. This will replace the renewables obligation. The obligation is expensive, but allows good opportunities for onshore and offshore wind developers to set up schemes. The auction approach is tried and tested across the world (including the UK in the 1990s) and shown to consistently fail to deliver large capacities of renewable energy. We need a German-style system which offers open-ended opportunities to developers to take up contracts to supply renewable energy at good, guaranteed rates for 20 years, with rates tailored for different renewable technologies. Instead, in its electricity markets reform proposals, the government is proposing a thinly disguised design for channelling money from electricity consumer receipts away from renewable energy, especially wind power, and towards nuclear power. The government proposals are inspired by E.on and EDF to benefit nuclear power, which will crowd out renewable energy. (1)

Government officials have admitted that the shake-up of the electricity market to generate more green and nuclear energy will raise power prices by more than 50 per cent much higher than indicated previously. Chris Huhne previously said bills would go up by only £160 a year, with the average annual electricity bill would rise from £493 to £653 by 2030 - an increase of 32%. However the department believes that under Mr Huhne’s reforms the unit price of electricity will rise from £118 per megawatt hour to £179/MWh an increase of 52 per cent over 20 years. On that basis, electricity bills would rise on average by £255 a year to £748. When inflation is factored in, electricity bills would double to about £1,000. Mr Huhne’s electricity bill forecast was based on assumptions that households will cut consumption by 12.5% over the next 20 years. (2)

DECC is holding a consultation on Electricity Market Reforms which is open until 10th March. (3)
The Treasury’s consultation on a carbon floor price closed on 11th February. (4)

- (1) Guardian 27th December 2010 <http://www.guardian.co.uk/environment/2010/dec/27/wrong-policy-on-renewable-energy>
- (2) Times 3rd Jan 2011
<http://www.thetimes.co.uk/tto/business/industries/naturalresources/article2860642.ece>
- (3) <http://www.decc.gov.uk/en/content/cms/consultations/emr/emr.aspx>
- (4) HM Treasury 16th Dec 2010 http://www.hm-treasury.gov.uk/consult_carbon_price_support.htm

6. West Cumbrian Geology Debate

Articles by David Smythe, Emeritus Professor of Geophysics at Glasgow University and Alun Ellis, Repository Director at the NDA's Radioactive Waste Management Division (RWMD) in the winter issue of the West Cumbria Managing Radioactive Waste Partnership Newsletter (1) caused something of a stir at the recent CoRWM meeting in Manchester.

David Smythe argued that West Cumbria was 'screened' geologically 25 years ago, and £400 million was subsequently spent in the Sellafield area, at a site chosen on political and not scientific grounds, but the 1995-96 planning inquiry concluded that scientifically all of West Cumbria is unsuitable. The rocks and the underground flow of water are too complex and unpredictable.

Alun Ellis, on the other hand, argued that Nirex published information in 1997 (after the public inquiry) which showed that groundwater flows and flow paths at that location were consistent with the safe disposal of intermediate-level waste.

CoRWM decided to write to the Partnership to point out what it called "inaccuracies" in both articles. Alun Ellis should be describing the Nirex 1997 research as showing groundwater flows and flow paths which are consistent with the "possibility" of safe disposal. Several CoRWM members said Nirex didn't look at the rest of West Cumbria, only Longlands Farm near Sellafield, so the whole of West Cumbria can't be ruled out. The amount of work done of West Cumbria was minimal, but the argument seems to be there is no point doing more because of the topography - David Smythe's evidence to the 1995-96 inquiry argued that all of West Cumbria was unsuitable based on the principle that it's an area of high topographical relief. (2) Professor Smythe has also written to Copeland and Allerdale councillors to explain his case. (3)

Meanwhile, Radiation Free Lakeland has released a letter sent by the lead Inspector at the 1995-96 Nirex Inquiry, Chris McDonald to Alun Ellis, expressing grave concerns at comments he has made. Alun Ellis has been saying the outcome of the Inquiry would have been different if the Nirex 1997 research had been available to the inquiry. But McDonald disputes this.

In his letter Mr McDonald says: "*The fundamental conclusion of the expert Assessor and myself was that the Proposed Repository Zone had been chosen for these studies in an arbitrary manner, without conforming to internationally agreed, geological criteria. The Secretary of State remarked in his formal decision that the site selection process had singularly failed to impress in terms of its transparency and the rigour of its technical and scientific logic. Moreover, notwithstanding the preliminary post-closure safety assessments, he shared our concerns over uncertainties and deficiencies. The introduction of the novel concept of the chemical barrier, in order to reinforce safety, was one of those. We also concluded that the ongoing work programme would not range over an extensive enough hydrological field, nor make sufficiently lengthy observations, to resolve uncertainties. Therefore we advised that another site be sought elsewhere. Nothing claimed for Nirex 97 has changed that position, in my view: the uncertainties inherent in these theoretical exercises were still too large.*" (4)

An earth tremor in Cumbria before Christmas increased the size of the question marks against the area's potential for burying highly radioactive nuclear waste. Martin Forwood of Cumbrians Opposed to a Radioactive Environment told *The Whitehaven News*: "Our own house (at Broughton Mills)

shook with the explosion. It was a real tremor and as soon as we heard it our first thought was: ‘This has put paid to the nuclear waste dump.’ (5)

A petition has been launched to oppose the geological dumping of radioactive wastes in Cumbria Radiation Free Lakeland in partnership with West Cumbria and North Lakes Friends of the Earth, North Cumbria Campaign for Nuclear Disarmament, Sustainable Carlisle, Cumbria Action on Climate Change and Cumbrians Opposed to a Radioactive Environment. (6)

- (1) http://www.westcumbriamrws.org.uk/documents/138-WestCumbriaMRWS_Winternewsletter.pdf
- (2) See <http://www.davidsmythe.org/nuclear/nuclear.htm>
- (3) Get Noticed Online 30th December 2011 <http://www.getnoticedonline.co.uk/news/general-news/minister-criticised-over-lies-and-misinformation.html>
- (4) Get Noticed Online 14th January 2011 <http://www.getnoticedonline.co.uk/news/general-news/more-nuclear-waste-lies-exposed.html>
- (5) Get Noticed Online 22nd Dec 2010 <http://www.getnoticedonline.co.uk/news/general-news/earthquake-creates-more-doubt-over-underground-waste.html>
- (6) Northern Indymedia 11th Feb 2011 <http://northern-indymedia.org/articles/1368>

7. Green Investment Bank – not green and not a bank

The government’s Green Investment Bank could fund the building of new nuclear reactors. It is the latest form of public financial support on offer to the industry from the government which continues to insist that the industry will not receive any more subsidies. The Conservatives’ pre-election manifesto promised that the Green Investment Bank – which was also in the coalition agreement – would finance “new green technology start-ups”. But documents issued before Christmas by Vince Cable’s business department list new reactors, along with offshore wind farms and new electricity grids, as one of the three proposed “target sectors” on which the bank would initially focus. (1)

Carline Lucas MP says the proposed institution will not be a bank and it won’t be green if it invests in nuclear. (2) The Chartered Institution of Water and Environmental Management urged the Government to prioritise providing the necessary financial support to fast-track offshore wind, wave and tidal energy production. (3)

- (1) Guardian 13th Feb 2011 <http://www.guardian.co.uk/environment/2011/jan/13/green-investment-bank-build-nuclear-reactors>
- (2) Guardian 27th Jan 2011 <http://www.guardian.co.uk/environment/blog/2011/jan/27/green-investment-bank>
- (3) Chartered Institution of Water and Environmental Management 15th Jan 2011 http://www.ciwem.org/media/260778/20110113_GreenBank.doc

8. Reactor Design Assessment – call for greater transparency

Several problems with the two reactor designs under consideration in the UK have been highlighted recently. On 27th September 2010, the French Nuclear Phase out Network "Sortir du nucléaire" received internal EDF documents, showing that the design and manufacture of the vessel closure head for the EPR in Flamanville could lead to a Chernobyl-type accident. Worse still, according to a memo written by the Head of nuclear fuel from EDF in 2001, a Chernobyl-type accident is possible on all French nuclear reactors. Several EDF documents show that the number of welds and the type of steel used in some parts of the reactor vessel at Flamanville EPR may cause leaks. EDF considers that the leaks may, in turn, degenerate into a Chernobyl-type accident. This type of steel and welds are part of the emergency shutdown system of the EPR and cover 89 points of entry into the reactor vessel. (1)

In the US the Nuclear Regulatory Commission (NRC) has pushed back its target date for certifying the EPR reactor design to February 2013 from June 2012, saying more time is needed to resolve technical and safety issues. In a letter to Areva released on 14th January, the NRC said the company still has not provided sufficient details about how it will address what agency officials determined are

deficiencies in the containment sump design. The sump is part of the emergency core cooling system. NRC also said issues remain to be resolved with the EPR's digital instrumentation and control design, as well as with the application's seismic and structural modelling analysis. (2) This clearly begs the question: how can the Health and Safety Executive, which is working closely with the US NRC, expect to complete its Generic Design Assessment in June this year if it is going to take the Americans another 18 months?

Meanwhile foreign workers on the Flamanville nuclear construction site in Normandy have been complaining about severe working conditions. Some one-third of the 3 200 workers on the site are foreigners – mostly Romanians and Bulgarians but also Spanish and Portuguese. Some of them have been expressing their despair and frustration with their working conditions saying “stress, oppression, despair, we’re tired.” French trade unions have expressed concern over the working conditions of foreign workers. “*They are not quite the same as for French workers, but it is now impossible to know how much they are paid and how many hours they actually do*”. (3)

Meanwhile a consultancy called Fairwinds continues to highlight what it calls a critical design flaw in the AP1000 reactor design. (4) A former industry senior vice president says the AP1000 cannot meet safety standards due to a significant design flaw, and that the safety flaw would allow radiation during a nuclear plant accident to pour into the atmosphere without filtration. Nuclear engineer Arnold Gundersen said the U.S. Nuclear Regulatory Commission (NRC) continues to neglect regulations and its own engineering standards in its review of the Westinghouse AP1000 containment system. Even though certified inspections of operating reactors have failed to detect containment failures for years, the NRC appears to be accepting the AP1000 and its flawed design for the containment system – the primary barrier against radiation releases. (5)

UK-based nuclear engineering consultancy, Large Associates, has complained about the unnecessary complexity, shortcomings and lack of transparency of the Generic Design Assessment (GDA) being undertaken by the nuclear regulator - the HSE. How will the public know whether and how these issues have been dealt with satisfactorily? Large and Associates suggest the ongoing compilation of unresolved and/or unsatisfactory features of the reactor designs in the form of an *Issues Register*. This would be an entirely open record available and frequently updated on the internet, it would relate in understandable terms the sometimes complex engineering and technological challenges posed by the new reactor designs, and it would serve to hold the HSE regulator to account. (6)

- (1) Sortir du Nucleaire Press Release 30th September 2010
<http://www.sortirdunucleaire.org/english/presse/affiche.php?aff=725>
- (2) Go to <http://www.nrc.gov/reading-rm/adams/web-based.html> and click on "Begin Web-based ADAMS Search; on the left, click on "January 2011", then click on "January 14, 2011" - you will see the list of documents placed in ADAMS that day. At the bottom of the first page, click on the symbol to go to the second page and the AREVA letter is the 5th item on the second page.
- (3) Novinite 12th January 2011 http://www.novinite.com/view_news.php?id=124067
- (4) See “Westinghouse Reactor Design Problems” NuClear News No.19
<http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo19.pdf>
- (5) NC WARN Press Release 10th January 2011
http://www.ncwarn.org/?p=2729&utm_source=BenchmarkEmail&utm_campaign=Merger_reactor_flaw&utm_medium=email
Nuclear Containment Failures: Ramifications for the AP1000 Containment Design, Fairwinds, 21st December 2010
http://www.fairewinds.com/sites/default/files/Fairewinds_AP1000_Supplemental_Report_12-21-2010.pdf and http://www.nirs.org/reactorwatch/newreactors/fairewindsassociates_ap1000_11011.pdf
- (6) A proposal to challenge the Health and Safety Executive’s approach to Step 4 of the Generic Design Assessment of Generation III new nuclear reactor plant, Large Associates.
<http://www.largeassociates.com/1016%20ScotTrident/Q1016-GDA-2.pdf>

9. View on the Ground

Billy Bragg, Julie Christie, Emily Eavis, Dave Elliott, Caroline Lucas, Michael Meacher and Steve Thomas wrote to *The Guardian* on 5th February to express their dismay about EDF's plans to start major preparation work at Hinkley before it has permission to build a new nuclear power station. The work, covering more than 400 acres, will involve the removal of most hedges and trees, rerouting underground streams, closure of all rights of way, and the excavation of more than 2.3m cubic metres of soil and rocks. This would be enough to fill Wembley stadium twice over. It will effectively mean preparing the foundations for the proposed twin reactors. EDF should not be allowed to justify this precipitate action by saying that "national need for nuclear" demands it move forward with its plans as fast as possible.

Guardian 5th Feb 2011 <http://www.guardian.co.uk/environment/2011/feb/05/edf-disturbing-news-hinkley-point-nuclear>

A 10,000-name petition against proposals to build new reactors at Bradwell in Essex was handed in to Energy Minister Charles Hendry by 11 members of the Blackwater Against New Nuclear Group (BANNG). Varrie Blowers, secretary of BANNG, said: "*The communities around Bradwell and those with ties to them have sent a very clear message to the Government that they wish Bradwell to be removed from the list of sites for nuclear new build.*"

This is Total Essex 8th February 2010

<http://www.thisistotalexsex.co.uk/news/Nuclear-plant-protest-group-meets-minister/article-3174890-detail/article.html>

No need for nuclear is asking supporters to get their MPs to sign EDM 644 which notes that the evidence submitted by the Association for the Conservation of Energy to the recent consultation on National Policy Statements on Energy calls on the Government to carry out an assessment of the costs and benefits of investment in energy generation capacity compared with demand reduction policies.

EDMs 27th July 2010 <http://edmi.parliament.uk/EDMi/EDMDetails.aspx?EDMID=41601&SESSION=905>

10. Canadian Waste Transports, Floating and Submerged reactors.

The Nuclear Free Local Authorities (NFLA) has urged the UK government to ban a transatlantic shipment of radioactive material which will pass through waters off the north of Scotland. The group says it is "deeply alarmed" at plans to transport 16 bus-sized radioactive steam generators by sea from Canada to be cleaned up at the Studsvik recycling plant in Sweden. The groups say the shipments are highly dangerous and have asked environment ministers to stop the cargos travelling through UK waters. The three-week journey aboard the MV Palessa would include passage through the Pentland Firth between Caithness and Orkney. The Scottish Government said it would also be seeking assurances about the safety of the cargo.

Ontario-based power company Bruce Power was granted a licence by the Canadian Nuclear Safety Commission to transport the old steam generators to Sweden. A date for the ship to embark has not yet been finalised. Studsvik will decontaminate around 90 per cent of the materials and sell the resultant scrap metal on the open market. According to the Canadian Coalition for Nuclear Responsibility, the radioactive levels of the generators exceed the legal limits of the International Atomic Energy Agency (IAEA) regulations for the safe transport of radioactive materials by 50 times. Orkney Islands Council (OIC) said it will investigate the type of material being shipped and the proposed route. (1)

The Local Authorities International Environment Organisation, KIMO, says the shipment will have to go through UK, Norwegian, Danish and Swedish territorial waters after receiving permission from each Government. KIMO International is writing to these Governments to outline its concern and

request that they refuse permission for this shipments which help set a precedent that it is acceptable to ship radioactive materials around the world for treatment.

President of KIMO, Albert de Hoop stated, who is Mayor of Ameland, a small island which is part of the West Frisian Islands off the North coast of the Netherlands, says: *“These shipments go completely against the proximity principle where the communities which have benefited from the power produced should deal with the waste generated. Instead coastal communities all along the transport route are being put at risk and the treatment will result in emissions to the Baltic Sea, which is already one of the most radioactive in the world.”* (2)

Meanwhile KIMO and the Nuclear Free Local Authorities have teamed up to campaign against floating nuclear reactors. (3) Plans in Russia are well underway to roll out a fleet of floating nuclear power stations to generate electricity for the challenging Arctic environment, and likely to be sold on the global market. These high-risk vessels could be operational within a year and pose unprecedented risks to marine environments and coastal communities. Alongside these alarming developments, French studies have been commissioned to investigate the viability of small to medium sub-sea nuclear power plants to supply power to coastal communities. (4) A French engineering firm is now developing underwater nuclear power plants in partnership with the French nuclear giant AREVA, the French utility company EDF and the French Atomic Energy Commission (CEA). There now seems to be a race between the Russian and French nuclear establishments to see who will design and operate the most absurd and perhaps most dangerous new type of nuclear reactor, says former Greenpeace International campaigner Remi Parmentier in his blog. (5)

(1) Scotland on Sunday 13th Feb 2011 <http://www.scotsman.com/news/39Ban-radioactive-cargo-ship-from.6717096.jp>

(2) See KIMO website <http://www.kimointernational.org/Home.aspx>

(3) See Bellona Briefing 13th Jan 2011 http://www.bellona.org/articles/articles_2011/Russia_need_FNPPs

(4) See (2)

(5) Chez Remi 20th January 2011 <http://chezremi.blogspot.com/2011/01/coming-next-underwater-nuclear-plants.html> For a longer article about floating and underwater reactors see Ecologist 15th Feb 2011 http://www.theecologist.org/News/news_analysis/772289/underwater_nuclear_power_stations_destined_for_the_english_channel.html

11. Understanding Sellafield's Legacy

As we go to press it is being reported that Sellafield's managers have been issued with a formal caution by the Environment Agency over a leak of radioactive liquid which went unnoticed for 14 months, and was finally reported in January 2009. The EA says it has issued the caution to make sure it did not happen again. The leak was spotted on a day when then Prime Minister Gordon Brown visited the site. (1)

The clean-up of nuclear legacy waste at the Sellafield nuclear reprocessing plant – a site historically plagued with mismanagement and technical difficulties – is running behind schedule, according to the 2009-10 annual report from the Nuclear Decommissioning Authority (NDA), which was quietly released in December. The full scale and impact of existing so-called legacy waste and how it is to be dealt needs to be much more widely understood. In order to be able to debate the consequences of creating more nuclear waste, the full extent of the problems caused by the waste we have already created need to be properly addressed and debated. And proposals for storing waste longer term on proposed nuclear sites should be more explicitly discussed before new reactors are developed on sites, says former CoRWM member Professor Andy Blowers. (2)

One example of potential problems has been highlighted recently by the Norwegian Radiation Protection Authority (NRPA). The NRPA looked at the possible environmental consequences for Norway if there were to be an accident at Sellafield which involved a release of just 1 % of the total High Level Liquid Waste stored there and its subsequent air transport and deposition in Norway. It

would result in contamination 7 times higher than the fallout from the Chernobyl accident. (3) Not surprisingly Sellafield bosses played down the report, calling the Norwegian work a worst-case scenario accident of very low probability. (4)

- (1) BBC 15th Feb 2011 <http://www.bbc.co.uk/news/uk-england-cumbria-12462744>
- (2) Guardian 27th Jan 2011 <http://www.guardian.co.uk/environment/blog/2011/jan/27/nuclear-waste-legacy>
- (3) Norwegian Radiation Protection Authority Press Release 25th Jan 2011
http://www.nrpa.no/eway/default.aspx?pid=240&trg=Center_6352&Center_6352=6401:88342::0:6371:1::0:0 Norwegian Radiation Protection Authority Report 25th Jan 2011
<http://www.nrpa.no/dav/0942d3dc93.pdf>
- (4) Cumberland News 31st Jan 2011 <http://www.cumberlandnews.co.uk/sellafield-nuclear-plant-bosses-play-down-threat-to-norway-1.804415?referrerPath=business>