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1. National Policy Statements on Energy Re-Consultation: The Highlights

The Department for Energy and Climate Change (DECC) launched a second round of consultation on the six energy National Policy Statements (NPSs) on 18th October. The consultation will run until 24 January 2011. The new National Policy Statement (NPS) consultation document (1) has some significant changes, and there are changes throughout the suite of documents. Here we try to highlight some of the changes we think are most significant.

Over 3000 responses were received to the first consultation, so many of the changes are in response to these comments. A Government Response Document (2) identifies the key themes and responds to them. There is also a separate response document to the recommendations made by the Energy and Climate Change Committee and the House of Lords. (3) This has addressed each of the Commons select committee’s thirty recommendations and has responded to what it considers were the main issues raised in the Grand Committee debates in the House of Lords, and also the five motions that were debated on the floor of the House albeit withdrawn following the debate.

The revised consultation document highlights the main changes to the draft energy NPSs and Appraisals of Sustainability (AoSs). It does not attempt to highlight every change made or to discuss why the changes have been made - that discussion is contained within the Government Response document. Obviously the Government would like consultees “*to focus their responses on those aspects of the policy that have changed and on any aspects which they think should change in the light of the revised AoSs...*” (4)

The most significant changes are: (a) the selection and appraisal of policy alternatives within the AoSs for EN-1 to EN-5 (the non-nuclear energy NPSs) have been reconsidered. New alternatives have been developed and appraised; (b) the section on the need for new energy infrastructure has been updated to take account of the latest modelling and Pathways to 2050 work; (c) Kirksanton and Braystones in

Cumbria have been removed from the list of potentially suitable sites for new reactors within EN-6. Dungeness in Kent remains off the list; (d) the suite of documents now also includes a draft Appraisal of Sustainability Monitoring Strategy which will test the actual significant environmental and sustainability effects of implementing the energy NPSs against the predicted effects. Updated site assessments have been produced within the revised EN-6 for potentially suitable sites.

Responses have to be sent to nps.consultation@decc.gov.uk by 24th January 2010

The need for new infrastructure

The Government says new infrastructure is needed to replace power stations which are closing down, and to switch to low carbon forms of electricity generation. It has revised the energy need statement in response to respondents' suggestions to look further ahead than 2025. DECC's analysis for Pathways to 2050, published in July alongside the Annual Energy Statement, shows the need for even greater amounts of electricity in the run up to 2050. It claims that reductions in electricity consumption resulting from improvements in energy efficiency will be far outweighed by increases in electricity demand, (caused by, for example, the electrification of transport and domestic heating) potentially leading to a doubling of electricity demand. Generation capacity will need at least to double to meet this demand and, if a significant proportion of our electricity is supplied from intermittent sources, then the total installed capacity might need to triple. (5) The Overarching Energy NPS (EN-1) (6) has been updated to take account of the Pathways to 2050 modelling work. To have the required impact on emissions, the electricity being consumed will need to be almost exclusively from low carbon sources. Contrast this with the first quarter of 2010, when nearly 80% of our electricity was generated by burning gas and coal. (7)

The Government says it has revised the need case for all forms of energy technology, including nuclear power. The section on the "need for nuclear power" (which was Section 2 of the original EN-6) has now been moved to Part 3 of the revised draft of EN-1. (8) In response to calls for an increased focus on energy efficiency and renewable and concerns that new reactors may divert attention away from these measures, the Government says energy efficiency and demand management measures are not anticipated to be sufficient on their own. (9)

It was also suggested that new nuclear power will come online too late to be of benefit for the UK in meeting its emissions targets or filling the predicted energy gap. The Government says it is confident that new nuclear power stations can start to be deployed from 2018; and France has already demonstrated that it is technically feasible to build nuclear power stations at the rate that would be needed in the UK if new nuclear power stations were to be constructed on all of the sites listed in the revised draft Nuclear NPS before the end of 2025. (10)

The Government says "*the purpose of the consultation was not to re-open discussion of whether nuclear power should form part of our future energy mix (which was itself the subject of a separate consultation in 2007 before publication of the Nuclear White Paper)*". (11) It is Government policy that new nuclear power should be able to contribute as much as possible to the UK's need for new non-renewable capacity. (12)

The new version of EN-1 explicitly directs the Infrastructure Planning Commission (IPC) to give substantial weight to the contribution which projects would make towards satisfying the urgent need for "*a mix of all types of energy infrastructure*" in order to achieve energy security at the same time as dramatically reducing greenhouse gas emissions. (13)

EN-1 in numbers

Total Current Generating Capacity	85GW
Peak electricity demand now & 2020	60GW
Average demand	43GW
Large combustion plant directive closures by 2015	12GW
Nuclear closures over next 20 years	10GW
Generating Capacity required in 2025	113GW
Of which new generating capacity	59GW
Of which renewable	33GW
For industry to determine	26GW
Non-nuclear already under construction	8GW
Proposals for new reactors already proposed	16GW

EN-1 also draws on an “Updated Energy and Emissions Projections” (UEP) which DECC published in June 2010. (14) This has meant some slight revisions to the figures for maximum generating capacity required in 2025. The Government says it would be prudent to plan for 59GW of new generating capacity by 2025, but points out that:

“...it is not the Government’s intention in presenting the above figures to set targets or limits on any new generating infrastructure to be consented in accordance with the energy NPSs. It is not the IPC’s role to deliver specific amounts of generating capacity for each technology type.”

As in the original EN-1 the Government says it does not believe that decentralised and community energy systems are likely to lead to significant replacement of larger-scale infrastructure. But the new EN-1 no longer mentions that the “lead scenario in the UK’s Renewable Energy Strategy contains around 4GW of small scale electricity”. (15)

The Role of Renewables

There are changes to section 3.4 on renewables which probably reflect a clearer focus on what the IPC needs to know, rather than arguing the general case for renewables. Gone is the reference to half a million jobs in the original EN-1; instead the revised document says:

“Renewables have potential to improve security of supply by reducing reliance on the use of coal, oil and gas supplies to keep the lights on and power our businesses. Meeting the 15% renewables target could reduce fossil fuel demand by around 10% and gas imports by 20-30%.” (16)

Mentions of the Renewable Energy Strategy, (17) produced by the previous Government, have been almost completely removed, despite the fact that it is a White Paper, apart from two footnotes on page 25 of the revised EN-1. (18) Nor is there a single mention of the Low Carbon Transition Plan, which is also a White Paper. (19)

The Role of Nuclear Energy

The Government relies on a British Energy study from 2009 to show that nuclear power is low carbon. (20) This analysed carbon emissions from Torness and concluded emissions were 7gCO₂/kWh compared with 400g for gas and 900g for coal. The Government says it continues to monitor the results of published Life Cycle Analyses (LCAs) conducted throughout the world to ensure it keeps abreast of developments. (21) Yet it makes no reference to an analysis of 103 lifecycle studies by Benjamin Sovakool from the National University of Singapore published in Energy Policy Journal. (22) He concludes that typical lifecycle emissions from nuclear plants appear to be about 66gCO₂e/kWh.

Unlike the Government Response document, EN-1 gives a range for carbon emissions from the nuclear life cycle of 7-22gCO₂/kWh. (23) The higher figure is still one third of the 66g figure given by Sovacool. EN-1 gives as its sources papers by the Sustainable Development Commission (SDC) (24) and the International Atomic Energy Agency (IAEA) (25). The SDC gives as one of its main sources the Paul Scherrer Institute. The Institute's current web page on Life Cycle Assessments includes a list of papers the most relevant of which are authored by Roberto Dones, sometimes with others. (26) Sovacool criticises Dones for using old data regarding emissions from uranium mining and enrichment. Sovacool looks at several papers by Dones as well as the paper by SDC. Sovacool concludes that:

“Put simply, investments in nuclear power are much worse at fighting climate change than pursuing wind, solar, and other small-scale power generators. Policymakers would be wise to embrace these more environmentally friendly technologies if they are serious about producing electricity and mitigating climate change.” (27)

It seems remarkably remiss of the Government not to have looked in detail at the work of Sovacool, despite claiming to be monitoring life cycle assessments.

Nuclear Economics

The Government says it believes new nuclear will become the least expensive form of low carbon electricity generation. (28) It says cost overruns and delays at Olkiluoto have arisen partly because of changes made to the design during construction. The Generic Design Assessment process should mean design issues can be resolved early in the process, rather than addressed during construction, when resolution may be more complex, costly and time consuming. (29)

On the question of subsidies, the Government insists there won't be any. (30) Yet it admits that it intends to maintain a limit on nuclear operator's liability in the event of a nuclear accident, albeit at the increased level of €700m. (31) It also says it is considering what further interventions in energy markets may be necessary in order to ensure that developers come forward with proposals to build enough of the kind of infrastructure required. (32) Changes made to Part 2 of EN-1 reflect the new coalition Government's policies such as plans to implement a carbon floor price, reform the climate change levy and support an EU emissions reduction target of 30% by 2020 rather than 20%. (33)

Radioactive Waste

On nuclear waste, there are three points where the Government has decided to change the wording of EN-6. (34) These changes are intended to:-

- (a) demonstrate the Government's confidence that geological disposal will be implemented;
- (b) clarify the Government's expectations in relation to the likely duration of the onsite storage of higher activity waste; and
- (c) clarify the role of the IPC in relation to arrangements for the management and disposal of wastes from new nuclear power stations.

In the first Draft Nuclear NPS and associated documents, the sections on nuclear waste were a bit of a dog's breakfast. It was necessary to read Section 3.8 of the original EN-6 (35) as well as Annex G of the Consultation document (36) and a separate paper called: *“The arrangements for the management and disposal of waste from new nuclear power stations: a summary of evidence.”* (37) These now all seem to have been replaced with Annex B of EN-6. (38) There was also a document, often referred to as Annex K, (39) which was almost impossible to find. The new AoS Annex 1 on Radioactive and Hazardous Waste, (40) is exactly the same as the old Annex K.

Annex B sets out how the Government has satisfied itself that effective arrangements will exist for the management and disposal of waste produced by new reactors. As we know already, the Government assumes there will be no reprocessing so “higher activity waste” will consist of spent fuel and intermediate level waste. EN-6 says geological disposal is the way in which higher activity waste will be managed in the long term. This will be preceded by safe and secure interim storage until a geological disposal facility can receive waste. In reaching its view on the management and disposal of waste from new nuclear power stations the Government has in particular satisfied itself that:

- geological disposal of higher activity radioactive waste, including waste from new nuclear power stations, is technically achievable;
- a suitable site can be identified for the geological disposal of higher activity radioactive waste; and
- safe, secure and environmentally acceptable interim storage arrangements will be available until a geological disposal facility can accept the waste.

This is very similar to parts of section 3.8 in the original EN-6, but then the new EN-6 adds that: *“The question of whether effective arrangements will exist to manage and dispose of the waste that will be produced from new nuclear power stations has therefore been addressed by the Government and the IPC should not consider this further.”* (41)

The new EN-6 goes on to clarify that the IPC can look at proposals for waste management facilities on the site of a proposed reactor in accordance with the policies set out in EN-1 and EN-6.

Annex B is more or less the same as section 3.8 in the original EN-6. Paragraph B.3.6 is new and states:-

“As further evidence of its commitment to the implementation of geological disposal, the Government has reviewed and strengthened the arrangements, to provide oversight of geological disposal implementation and hold the NDA to account as the implementation body responsible for delivery”.

And B.3.7 continues:

“To deliver geological disposal it is necessary to have effective programme management, leadership from Government, clear responsibilities and accountabilities and a timeline and milestones against which progress can be measured. However, this must be reconciled with an approach based on voluntarism. To improve visibility of progress on the MRWS programme, the Government is developing a clear timeline for the implementation of geological disposal, while maintaining its commitment to voluntarism, and will provide annual reports to Parliament on the progress of the MRWS programme.”

The Government’s “*arrangements for the management and disposal of waste*” document published along with the first set of draft NPSs stated that it is possible to envisage that storage of spent fuel might be required for 160 years from the start of the power station’s operation. (42) The House of Commons Energy and Climate Change Committee pointed out that from the perspective of the local community it is a misnomer to describe this as interim storage as it will be several lifetimes between the commencement of a power station’s operation and the eventual removal of waste from that site. (43)

The Government says it acknowledges that prolonged on-site storage of spent fuel is a matter of concern for local communities and that more detail might allay that concern. (44) The Government’s response document discusses various measures which might be used to reduce the cooling period for spent fuel including “*mitigating actions which could reduce the heat load on each disposal canister*”. (45) The Government suggests that the period of cooling after the station has finished generating electricity could be reduced to 50 years. The source the Government uses to reach this conclusion is

the NDA study carried out for the Nuclear Industry Association which states that with “*the judicious mixing of long-cooled and short-cooled*” spent fuel the cooling period needed to allow the spent fuel to be considered for disposal could be halved from the previous estimate of 100 years to 50 years. (46)

The NPS has now been revised to indicate the Government no longer expects spent fuel to be stored on reactor sites for as long as 160 years, although it says a Geological Disposal Facility (GDF) will not be able to accept new build waste until 2130, so it’s likely to be 110 years anyway. There are two new paragraphs – B.4.3 and B.4.4 – which explain that the NDA’s current indicative timetable anticipates a GDF being available to take spent fuel from new nuclear power stations from around 2130, and the Government recognises that interim storage might be required for longer, but there are also factors which might make the storage period shorter, for example arrangements might be made to store waste in a central storage facility.

“*The Government will expect operators to ensure their waste is disposable when a GDF is anticipated to be available to take the waste.*” (B.4.3)

Nuclear Waste Advisory Associates

On the question of whether geological disposal is technically achievable the Government says several respondents “*drew attention to gaps in technical knowledge, as evidenced by ongoing programmes of research, while others raised specific questions around the evidence base used in the NPS*”. (47)

Clearly referring to the submission from Nuclear Waste Advisory Associates (48), the Government says: “*One detailed response highlighted reports by the European Commission’s Joint Research Centre (JRC), the EA and the NDA. It argued that issues raised by these reports highlighted major knowledge deficiencies with regard to technical issues, which called into question whether geological disposal would prove technically feasible.*” (49)

In response the Government says it:

“*...believes, in the light of CoRWM’s work and wider international experience, that there is already sufficient research work available to be confident that geological disposal is technically achievable.*” (50)

The Government says it has examined the reports from the JRC and the EA, but concludes that neither the JRC nor the EA have stated that the technical issues they have identified cannot be resolved. (51)

Inventory

It is worth noting that Section A of the AoS Annex 1 (previously Annex K) (52) looks at an inventory of waste from a 10GW new nuclear programme, and repository footprint, and compares this to the baseline of legacy waste. Yet the Government says it anticipates proposals being put forward for 16GW of new reactors (Up to 3.2GW at each of Hinkley, Sizewell, Wylfa, Oldbury and Sellafield), (53) which begs the question why only look at a 10GW programme. Obviously any community considering hosting a GDF will want to know what the maximum inventory could be. Consequently the West Cumbria Managing Radioactive Waste Partnership has been looking at the waste inventory and repository footprint from a 16GW programme. Information on this will appear on the MWRS website shortly. (54)

The Appraisal of Sustainability

As well as looking at alternative sites the Nuclear AoS considers whether or not the objectives of this NPS could be delivered using alternative options. The Government says it is its

“...view that none of the alternative options looked at can be relied upon to deliver the objectives of this NPS by the end of 2025.”

Chapter 3 of the Nuclear AoS Main Report looks at “Need Alternatives”. (55) Unlike the original AoS, the new one uses DECC Updated Energy and Emissions Projections (56) Again references to the Low Carbon Transition Plan and the Renewable Energy Strategy have been mostly removed. Fuel poverty has turned into “affordability”. (57)

The new AoS relies on analysis by Redpoint, (58) and MARKAL modelling for the Committee on Climate Change, (59) as does the old AoS, to show that if new reactors were excluded from the energy mix they would be replaced by gas-fired generation. But there is no comparison with, for example, an energy policy which involves a high level of Government support for decentralised energy and combined heat and power. So the AoS is basically comparing new nuclear reactors with Combined Cycle Gas Turbines and a third option in which nuclear reactors may get built but without an NPS in place to facilitate the approval of planning applications.

Interestingly fuel costs are now expected to make up approximately 5 to 8% of total costs for nuclear power (compared with 11% in the original AoS) while fuel costs for gas fired generation, are estimated to be around 50 to 60% compared with 71%. (60)

The section on Health and Safety has been extensively revised, but mainly just be changing the order of things. Radiation dose limits, regulation and the use of Best Available Techniques and OSPAR are all discussed. (61) The Environment Agency’s recent Generic Design Assessment (GDA) consultation is now referred to. (62)

The Terrorist Threat

The Office of Civil Nuclear Security now gets a mention, which it didn’t previously and there is a new paragraph about the terrorist threat:-

“The Government is conscious of the significant detriments to health that could result from an accident or terrorist attack at a new nuclear power station. However, the scale of potential damage must be seen in the light of the robust regulatory regime which exists in the UK to prevent accidents and protect against security threats including terrorist attacks. Government and industry have an emergency preparedness framework in place to mitigate health effects in the unlikely event of any accidental release of radiation into the environment.”(63)

KiKK & COMARE

There are new paragraphs on the KiKK study of childhood cancer in the vicinity of German nuclear power plants. (64) It points out that KiKK:

“...noted that the exposure to ionising radiation in the vicinity of German nuclear power stations was lower by a factor of 1,000 to 100,000 than the exposure to natural background and medical radiation, and that therefore the findings of the study could not be explained in the present state of radiobiologic and epidemiologic knowledge”.

It goes on to say that the German Commission on Radiological Protection concluded that the design of the KiKK study was not suitable for establishing a correlation with exposure to radiation from nuclear power plants. It says the database of childhood cancers being used in the UK is much larger than that used in the KiKK study.

“COMARE is currently undertaking a further review of the incidence of childhood cancer around nuclear power stations, with particular reference to the KiKK study and COMARE’s 10th and 11th

reports. This will be published as COMARE's fourteenth report later this year. COMARE is also keeping the incidence of childhood leukaemia and other cancers in the vicinity of Sellafield and Dounreay under surveillance and periodic review."

Justification

Section 2.6 of EN-6 is a new section which explains the interaction between the National Policy Statement and Regulatory Justification. This says the IPC should not delay granting development consent if the Regulatory Justification decision is subject to legal challenge, but the IPC can consider attaching conditions to the consent.

Siting

Site assessments for the eight sites included in the revised EN-6 have been updated to reflect points made during the consultation and the findings of the updated Appraisals of Sustainability and Habitats Regulations Assessments.

EN-6 sets out more clearly how an application would be handled for a site not listed in the NPS should one come forward. (65) The Government also clarifies that it doesn't necessarily expect new reactors to be built on all eight sites. This allows the IPC to refuse consent at any of the sites once it has considered the detailed applications in accordance with the NPS. (66)

The reasons why Kirksanton and Braystones have been dropped are given in the Government response to the original consultation. (67)

- (1) Planning for New Energy Infrastructure: Consultation on revised draft National Policy Statements for Energy Infrastructure, DECC, October 2010.
<https://www.energynpsconsultation.decc.gov.uk/docs/ConsultationDocument.pdf>
- (2) The Government Response to the Consultation on the draft National Policy Statements for Energy Infrastructure, DECC, October 2010.
<https://www.energynpsconsultation.decc.gov.uk/docs/GovernmentResponsetoConsultation-October2010.pdf>
- (3) The Government response to Parliamentary Scrutiny of the draft National Policy Statements on Energy Infrastructure, DECC, October 2010.
<https://www.energynpsconsultation.decc.gov.uk/docs/GovernmentresponsetoParliamentaryScrutinofdraftEnergyNPSs-October2010.pdf>
- (4) See ref (1) para 9
- (5) See ref (2) paras 1.64-1.68
- (6) Revised Draft Overarching National Policy Statement for Energy, EN-1, DECC, October 2010
<https://www.energynpsconsultation.decc.gov.uk/docs/RevisedDraftOverarchingNationalPolicyStatementforEnergy%28EN-1%29.pdf>
- (7) See ref (6) para 2.2.22
- (8) See ref (2) para 7.42
- (9) See ref (2) para 7.51 –7.55
- (10) See ref (2) para 7.58
- (11) See ref (2) para 7.15
- (12) See ref (2) para 7.44
- (13) See ref (6) paras 3.1.1 to 3.1.4
- (14) See ref (6) para 3.3.18
<http://www.decc.gov.uk/en/content/cms/statistics/projections/projections.aspx> These updated projections do not take into consideration the policies announced in 'The Coalition: our programme for government', which include a floor price for carbon. New policies will be incorporated once the impact can be modelled. Assumptions used on carbon and fossil fuels prices can be seen at chapter 2.
- (15) Draft Overarching National Policy Statement for Energy (EN-1), DECC, November 2009
<http://data.energynpsconsultation.decc.gov.uk/documents/nps/EN-1.pdf> para 3.3.18

- (16) See ref (6) para 3.4.2
- (17) The UK Renewable Energy Strategy, DECC 2009.
http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/renewable%20energy/renewable%20energy%20strategy/1_20090717120647_e_@@_theukrenewableenergystrategy2009.pdf
- (18) For example para 3.4.4 of the original EN-1 does not appear in the revised EN-1. This para looked at a scenario for 2020 in RES which foresaw 15GW of onshore wind; 12GW offshore wind and 4GW of bioenergy.
- (19) See http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/lc_trans_plan/lc_trans_plan.aspx
- (20) British Energy / AEA (2009). *Environmental Product Declaration of Electricity from Torness Nuclear Power Station: Technical Report*. pp. 1, http://www.british-energy.com/documents/Torness_EPD_Report_Final.pdf
- (21) See ref (2) paras 7.61-7.62
- (22) Energy Policy 36 (2008) pp2940-2953. (see Renew Online No.77
<http://eeru.open.ac.uk/documents/rol77.doc>)
- (23) See ref (6) para 3.5.5
- (24) Reducing CO2 emissions: Nuclear and the alternatives, SDC, March 2006. <http://www.sd-commission.org.uk/publications/downloads/Nuclear-paper2-reducingCO2emissions.pdf>
- (25) Spadaro, Joseph V. et al. (2000). Greenhouse gas emissions of electricity generation chains: assessing the difference. IAEA Bulletin, 42/2/2000. pp. 19 – 24.
<http://www.iaea.org/Publications/Magazines/Bulletin/Bull422/article4.pdf>
- (26) See <http://gabe.web.psi.ch/research/lca/>
- (27) See also Scitizen 21st July 2008 <http://scitizen.com/future-energies/nuclear-power-false-climate-change-prophet-a-14-2136.html>
- (28) See ref (2) para 7.66 & Mott MacDonald, *UK Electricity Generation Costs Update*, June 2010: <http://www.decc.gov.uk/assets/decc/statistics/projections/71-uk-electricity-generation-costs-update-.pdf> and Parsons Brinckerhoff (trading as PB Power), *Powering the Nation Update 2010*, March 2010, <http://www.pbworld.co.uk/index.php?doc=528>
- (29) See ref (2) para 7.72
- (30) See ref (2) para 7.68
- (31) See ref (2) paras 7.73-7.75
- (32) See ref (6) para 2.2.16
- (33) See ref (6) para 2.2.22
- (34) Revised Draft National Policy Statement for Nuclear Power Generation EN-6 (Volume 1 of 2) DECC October 2010 <https://www.energynpsconsultation.decc.gov.uk/docs/EN-6-RevisedDraftNuclearNPS%28VolumeI%29-October2010.pdf>
- (35) Draft National Policy Statement for Nuclear Power Generation, EN-6, DECC, November 2009 <http://data.energynpsconsultation.decc.gov.uk/documents/nps/EN-6.pdf>
- (36) Annex G of Consultation on Draft National Policy Statement for Energy Infrastructure, DECC, November 2009. <http://data.energynpsconsultation.decc.gov.uk/documents/condoc.pdf>
- (37) DECC, *The arrangements for the management and disposal of waste from new nuclear power stations: a summary of evidence*. November 2009,
<http://data.energynpsconsultation.decc.gov.uk/documents/wasteassessment.pdf>
- (38) Annexes to EN-6 <https://www.energynpsconsultation.decc.gov.uk/docs/AnnexestoEN-6-RevisedDraftNuclearNPS%28VolumeII%29-October2010.pdf>
- (39) Appraisal of Sustainability Annex K, Appraisal of Radioactive and Hazardous Waste, DECC Nov 2009 <http://data.energynpsconsultation.decc.gov.uk/documents/aos/wastematrixes.pdf>
- (40) Appraisal of Sustainability of the Revised Draft National Policy Statement: Radioactive and Hazardous Waste, DECC Oct 2010
https://www.energynpsconsultation.decc.gov.uk/nuclear/waste_annex
- (41) See ref (34) para 2.11.4
- (42) See ref (37) para 53.
- (43) See The Government response to Parliamentary Scrutiny of the draft National Policy Statements on Energy Infrastructure, DECC, October 2010. Recommendation 17, pages 22-23
<https://www.energynpsconsultation.decc.gov.uk/docs/GovernmentresponsetoParliamentaryScrutinyofdraftEnergyNPSs-October2010.pdf>
- (44) See ref (2) para 7.154
- (45) See ref (2) para 7.160

- (46) Geological Disposal: Feasibility Studies exploring options for storage, transport and disposal of spent fuel from potential new nuclear power stations. NDA, November 2010
<http://www.nda.gov.uk/documents/upload/Geological-Disposal-Feasibility-studies-exploring-options-for-spent-fuel-from-new-nuclear-power-stations-November-2010.pdf>
- (47) See ref (2) para 7.115
- (48) Nuclear Waste Advisory Associates Submission to the Consultation on Draft National Policy Statements on Energy Infrastructure, February 2010.
[http://www.nuclearwasteadvisory.co.uk/uploads/8792NPSSubmissionNuclearWasteAdvisoryAssociates\[Final\].doc](http://www.nuclearwasteadvisory.co.uk/uploads/8792NPSSubmissionNuclearWasteAdvisoryAssociates[Final].doc)
- (49) See ref (2) para 7.117
- (50) See ref (2) para 7.122
- (51) See ref (2) para 7.125
- (52) See ref (40)
- (53) See ref (6) para 3.5.8
- (54) <http://www.westcumbriamrws.org.uk/documents.asp> See document number 88 and 94 under Criterion 4, Design and Engineering.
- (55) Appraisal of Sustainability of the revised draft Nuclear National Policy Statement: Main Report, DECC, October 2010
<https://www.energynpsconsultation.decc.gov.uk/docs/Appraisal%20of%20Sustainability%20for%20EN-6%20%28Nuclear%20NPS%29%20-%20Main%20Report%20-%20October%202010.pdf>
- (56) DECC (2010) *Updated Energy and Emissions Projections*
<http://www.decc.gov.uk/en/content/cms/statistics/projections/projections.aspx>
- (57) Ref (55) para 3.3.2 compared with para 3.2.1 Appraisal of Sustainability of the Draft Nuclear National Policy Statement: Main Report, DECC November 2009.
<http://data.energynpsconsultation.decc.gov.uk/documents/aos/mainreport.pdf>
- (58) Redpoint et al for DECC (2009) *Implementation of the EU 2020 Renewable Target in the UK Electricity Sector: RO Reform, no new nuclear build sensitivities*. This particular report doesn't seem to be available any longer.
- (59) Building a low-carbon economy – the UK's contribution to tackling climate change, The Committee on Climate Change, Dec 2008 – for a detailed explanation of MARKAL modelling see page 77, <http://www.theccc.org.uk/pdf/TSO-ClimateChange.pdf>
- (60) Ref (55) para 3.59 compared with para 3.7.9 of Appraisal of Sustainability of the Draft Nuclear National Policy Statement: Main Report, DECC November 2009.
<http://data.energynpsconsultation.decc.gov.uk/documents/aos/mainreport.pdf>
- (61) See ref (55) paras 3.7.2 to 3.7.10
- (62) See ref (55) para 3.7.12
- (63) See ref (55) para 3.7.14
- (64) See ref (55) paras 3.7.21 to 3.7.24
- (65) See ref (34) Section 2.3
- (66) See ref (34) Para 2.4.4
- (67) See ref (2) Answers to questions 21c and 21g.

2. Regulatory Justification & the Terrorist Threat

On 18 October Chris Huhne, published his decisions as Justifying Authority that two reactor designs, Westinghouse's AP1000 and Areva's EPR, should be Justified, that is, that their benefits outweigh any radiological health detriment they may cause. This decision was ratified by the House of Lords on 17 November and by the House of Commons on 24 November, and came into effect on 30 November. (1)

Energy Minister, Charles Hendry told the House Of Commons Delegated Legislation committee on the two Justification statutory Instruments on 16th November:

"We considered the risk of detriments arising from an accident or terrorist incident. Such possible detriments already exist, and the risk of such incidents should be seen in the context of the regulatory regime, which is intended to prevent accidents and protect against terrorist attack. We are confident in the regulatory regimes for the safety and security of civil nuclear installations and materials in the

UK and consider that the likelihood of an accident or other incident giving rise to a release of radioactive material is very small." (2)

For a discussion about the need for an assessment of the environmental impacts of radioactive releases arising from a range of credible malevolent acts that affect the reactor core or stored spent fuel see Dr Gordon Thompson's report (of the Institute for Resource and Security Studies) for Greenpeace Canada. Thompson says an Environmental Impact Study should summarize the findings of these assessments, and should include the assessments themselves as appendices. A range of credible malevolent acts should be considered. (3)

Green Party MP Caroline Lucas asked Charles Hendry if he had assessed "*the merits of implementing force-to-force security protection exercises at UK nuclear installations*" and if the secretary of state had held discussions with his US counterpart about the effectiveness of such exercises at US civil and military nuclear sites. There was more in a similar but more detailed vein. Lucas asked whether any assessments had been "*made of the adequacy of physical protection measures at UK nuclear installations against attack from laser-guided anti-tank shoulder-fired weapons*" and whether the energy secretary was planning to discuss with his Russian counterpart "*the force-on-force security system tests on purpose! -built dummy reactor buildings which Russian security forces have conducted using AT14 Kornet/Spriggen weapons*".

Hendry replied: "*The government does not comment on the detail of security matters at civil nuclear sites. It is important that security measures adopted at civil nuclear installations are proportionate to the threat. Nuclear site licence companies are responsible for meeting the costs of security.*"

One suspects that the sort of assessments she was asking about haven't been applied to UK reactors. (4)

In a letter to *The Guardian* Professor Andy Stirling of Sussex University notes that UK civil nuclear infrastructures are uniquely implicated in all four "tier one" threats identified in the recent defence white paper. First, few "terrorism targets" are more iconic, vulnerable or potentially damaging than domestic nuclear facilities. Secondly few targets for "cyber attack" present greater potential for harm than nuclear control systems. Third, few other "industrial accidents" present greater potential for catastrophic damage than a Chernobyl-style nuclear reactor core melt with containment breach. Fourth, the foremost emerging instance of a new global "military crisis" lies in the widely mooted response to Iranian development of nuclear power. It is curious that the white paper makes no mention of this. The conclusions are not automatic. But, since other low-carbon energy options exist that are also arguably preferable on other grounds, we might expect some pretty good reasons to outweigh these concerns. To simply ignore these issues is truly indefensible. (5)

- (1) Regulatory Justification of new nuclear power stations. http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/nuclear/new/reg_just/reg_just.aspx
- (2) <http://www.publications.parliament.uk/pa/cm201011/cmgeneral/deleg2/101116/101116s01.htm>
- (3) Scope of the Environmental Impact Statement for new nuclear power plants at the Bruce site in Ontario: Assessment of Accidents and Malfunctions, by Dr Gordon Thompson, Greenpeace Canada June 2008. <http://www.greenpeace.org/canada/Global/canada/report/2008/6/scope-of-the-environmental-imp.pdf>
- (4) Utility Week 25th November 2010 http://www.utilityweek.co.uk/blogs/disconnector/2010/11/explosive_questions_about_nucl.php
- (5) Guardian 15th November 2010 <http://www.guardian.co.uk/environment/2010/nov/15/nuclear-threats-terrorism-civil-infrastructure>

3. Parliamentary Scrutiny of the NPSs

The Energy and Climate Change Select Committee decided it would only have a single evidence session with a single witness, on the revised Energy NPSs, and not invite written evidence. The session was held on 30th November with evidence from Charles Hendry MP, the energy minister. Four topics for discussion were identified by the committee, not all of which relate directly to the NPSs: (1) the implications of changes in the Planning Act 2008 for the implementation of the National Policy Statements; (2) the robustness of transitional arrangements preceding the abolition of the IPC and the creation of the MIPU (Major Infrastructure Planning Unit); (3) the implications of changes to the Appraisals of Sustainability for the assessment of the National Policy Statements; and (4) how the changes in the revised draft National Policy Statements will affect their contribution to the Government's energy policy objectives. (1)

Energy Minister, Charles Hendry MP, was accompanied by Anne Stuart and Hergen Haye of DECC. If there was a theme, it was that the government was foolish to commit itself to carbon capture and storage (CCS), which has not even been invented yet, as the solution to low-carbon electricity generation, while ignoring, or at least not sufficiently supporting, nuclear power. (2) (3)

Albert Owen discovered that the government had not decided yet which Secretary of State would decide applications for nationally significant energy projects - energy and climate change or communities and local government. DECC had the greatest policy involvement, but might be seen to have a vested interest in granting permissions.

Charles Hendry said that the main reason for the revisions was so that alternatives would be properly considered in the accompanying appraisals of sustainability (AoSs), but Barry Gardiner quoted the RSPB as still being unhappy with the revised NPSs in that respect. He read their submission which claimed that the alternatives were brief and cursory, and the findings of the AoSs were not properly integrated into the NPSs.

Alan Whitehead asked what proportion of the 18GW of non-renewable electricity generation would come from nuclear and Charles Hendry said that 16GW could be supplied by 2025 - which presumes all eight nuclear sites in the NPS coming forwards. Hergen Haye tempered this view somewhat by saying that what the industry planned might not necessarily happen.

On 1st December Charles Hendry faced the whole of the House of Commons on the same subject. (4) The debate was held over from the first round of consultation on the NPSs, but it is so late that it has been overtaken by the second round. (5) Charles Hendry gave an opening speech lasting nearly an hour of the two and a half allotted hours, but that includes several interventions. He launched into the background to the government's energy policy and was sidetracked into a discussion on the green deal, off-(gas) grid properties, and the Sheffield Forgemasters loan that was withdrawn.

Martin Horwood MP suggested that there may not be enough uranium reserves in the world to support a long-lasting expansion of nuclear energy. Charles Hendry said that the OECD disagreed with the figure he was quoting and that thorium and reprocessed plutonium could be used as well.

Charles Hendry confirmed that there would be votes on each NPS individually but there would not be scope for 'hundreds of amendments'.

- (1) Bircham Dyson Bell 24th Nov 2010 <http://www.bdb-law.co.uk/blog/anguswalker/190-parliamentary-scrutiny-energy-and-waste-water-npss-revealed>
- (2) Bircham, Dyson, Bell 30th Nov 2010 <http://www.bdb-law.co.uk/blog/anguswalker/192-minister-takes-heat-over-energy-national-policy-statements-nuclear-events-annou>
- (3) Uncorrected Transcript Energy & Climate Change Committee 30th November 2010 <http://www.publications.parliament.uk/pa/cm201011/cmselect/cmenergy/uc648-i/uc64801.htm>

- (4) Bircham, Dyson, Bell 2nd December 2010 <http://www.bdb-law.co.uk/blog/anguswalker/193-house-commons-debates-energy-national-policy-statements>
- (5) Hansard 1st December 2010 Column 889
<http://www.publications.parliament.uk/pa/cm201011/cmhansrd/chan82.pdf>

4. Hinkley Point - Delay and Manipulation

Mark Higson, Chief Executive of the Office for Nuclear Development, gave an update of the Government's so-called 'facilitative actions' to the Nuclear Development Forum on 28th October 2010. (1) He said the GDA was on track to finish in June 2011; the National Policy Statements (NPSs) on Energy are on track for ratification by Parliament in spring 2011; but the Government expects a legal challenge on Justification.

Higson's Indicative Timeline showed the first planning applications arriving between the end of the first quarter 2011 and the end of the second quarter.

The Infrastructure Planning Commission (IPC) seemed to confirm there is a delay. Sir Michael Pitt, Chair of the IPC told the Nuclear Development Forum the application for Hinkley C is expected in "winter 2010-11." (2) It was originally expected in Summer 2010, but this was changed to 1st December. IPC Chairman Michael Pitt told the meeting of the Nuclear Development Forum that the earliest dates for nuclear project submissions are "*likely to prove optimistic.*"

At a seminar hosted by planning and environment consultants, RPS Group, Richard Mayson of EDF confirmed that the planning application for Hinkley C would be made in the New Year. He said the Hinkley Point pre-application consultation had been carried out in two stages and EDF is currently digesting 800 written and other responses made during the second stage. (3)

Meanwhile a poll on whether a new nuclear power station should be built at Hinkley Point provides a masterclass in manipulation according to Ben Goldacre in *The Guardian*. (4) EDF, last month conducted a poll on whether people near Hinkley Point nuclear power station would like it to be expanded. The BBC dutifully reported the results. "*EDF survey shows support for Hinkley power station,*" ran the headline. "*Six in 10 people support a new power station at Hinkley.*" Polls like this convince locals, and politicians. But Leo Barasi at the blog *Climate Sock* has diligently obtained the original polling questions from ICM, and what he has found is a masterclass in how to manipulate answers to a single question. (5)

Campaigners have accused EDF of "jumping the gun" by applying for planning permission for preparatory work on the new Hinkley Point reactor before the main plans are approved. (6)

- (1) <http://www.decc.gov.uk/assets/decc/What%20we%20do/UK%20energy%20supply/Energy%20mix/Nuclear/nucleardevelopmentforum/782-ndf-28october2010-sitrep-pres.pdf>
- (2) <http://www.decc.gov.uk/assets/decc/What%20we%20do/UK%20energy%20supply/Energy%20mix/Nuclear/nucleardevelopmentforum/781-ndf-pitt-presentation-28-oct-2010.pdf>
- (3) Bircham, Dyson, Bell Planning Blog 18th Nov 2010 <http://www.bdb-law.co.uk/blog/anguswalker/188-lessons-learned-planning-act-regime-analysed-seminar>
- (4) Guardian 20th November 2010 <http://www.guardian.co.uk/commentisfree/2010/nov/20/ben-goldacre-bad-science-nuclear>
- (5) Climate Sock 14th November 2010 <http://www.climatesock.com/2010/11/don%e2%80%99t-just-believe-what-you%e2%80%99re-told-about-polls/#more-417>
- (6) Stop Hinkley Expansion Press Release 1st December 2010
<http://www.stophinkley.org/PressReleases/pr101201.htm>

5. New Reactor by 2018 - a “monumental challenge”

The UK is facing a "monumental challenge" to generate power from the first of a planned fleet of nuclear power stations by 2018, according to the head of new nuclear at the Department of Energy and Climate Change (DECC). Issues over planning, financing, licensing and construction delays have put the 2018 date for the first new reactor at Hinkley Point in doubt, according to Hergen Hays. Speaking at the European Nuclear Supply Chain conference in London, Hays said DECC is concerned that EDF could repeat the mistakes seen at Olkiluoto 3 in Finland, where the construction of an EPR has been delayed by four years and is 50% over budget, even though Hinkley C won't be a first-of-a-kind project. *"There is a monumental challenge ahead of us,"* he said.

Hays said DECC was facing down opposition from local residents near Hinkley Point. *"We must never take the local community for granted or there will be an uprising. When we tell local people that Hinkley Point C will take seven years to build and will be operating for 40 years, they have concerns over their quality of life."*

Hays said he was confident the UK nuclear regulator's Generic Design Assessment (GDA) of the EPR and Westinghouse's AP1000 reactors was robust. But it looks like the June 2011 deadline for the GDA may not be met and interim DACs [Design Acceptance Confirmation] will be issued. He said this shouldn't delay the licensing process. According to Kevin Allars, head of the HSE's Nuclear Installations Inspectorate, EDF has a self-imposed deadline of December 2012 for the first pouring of nuclear safety-related concrete. Professor Stephen Thomas of Greenwich University said, however, the interim DACs *"wouldn't be worth the paper they are printed on"* to potential investors.

Government policy rules out direct subsidy for nuclear power plants, but to assure investors, DECC and energy markets regulator Ofgem will announce before the end of the year the *"biggest electricity market reform package since privatization of the industry,"* said Hays (see below).

Professor Thomas predicted the UK reforms would be significantly watered down and argued that nuclear power was a non-starter in Britain's liberalized electricity market. *"Turnkey, fixed price contracts are not credible after Olkiluoto 3. Unless the UK returns to a more regulated electricity market and utilities can assume full cost-recovery then banks are not willing to take the risk."* But Hays remains convinced the 2018 deadline for Hinkley Point C would be met. *"There is a lot to be done and it is very important that all the participants work to the same timetable,"* he said. *"But I believe 2018 will definitely be achieved."*

Power Gen Worldwide 18th November 2010 http://www.powergenworldwide.com/index/blogs/tim-probert-blog-display-page/blogs/pgww-blogs/tim_probert/post987_4900360646947693679.html

6. Market Reform or Nuclear Subsidy?

The Government may be ploughing ahead with its so-called 'facilitative actions' but what is not sorted for new reactor construction is the money, according to Professor David Elliott. (1) It may be harder to reform the market and the EU-Emission Trading System enough to make nuclear viable without formal subsidy than the Government thinks.

"No subsidy for nuclear" has been the mantra of energy secretary, Chris Huhne, ever since he arrived at Whitehall. The steadfast denial of public money for nuclear has baffled experts, who say that £40bn of new stations is clearly not – with the present subsidy regime – cost competitive with gas or coal. (2) Consequently Huhne appears to have adopted a shifting definition of subsidies, raising some eyebrows. While he still says 'there will be no levy, direct payment or market support for electricity supplied or capacity provided by a private sector new nuclear operator' he now adds 'unless similar support is also made available more widely to other types of generation'. The Prime Minister told the

House of Commons Liaison Committee there would be “*no specific nuclear subsidy*” (emphasis added) (3)

Charles Hendry, the Tory Energy Minister, told *The Daily Telegraph* that two more incentives would be needed for nuclear beyond the Government’s plans for a “carbon floor price”. Hendry said he is “very much” in favour of capacity payments for low-carbon electricity generation – an option championed by EDF. This would reward companies for making their electricity generation capacity available to the grid, even if it is just as a back-up. Mr Hendry acknowledged that this would still not be enough to persuade nuclear companies to build their plants in the UK. “*There will still need to be an additional third mechanism,*” he said, adding that an obligation on suppliers to provide a certain proportion of low-carbon power or contracts-for-difference in the electricity market are two key options under consideration. (4)

“*The Government’s definition of a subsidy is literally a bag of cash delivered personally by George Osborne to each nuclear power plant,*” says Peter Atherton, utilities analyst at Citigroup. “*This is laughable. What’s going to happen will be an economic transfer of risk from company to consumer. Of course it’s a subsidy.*” Consumers will foot the bill for this increase in price, as the Government effectively taxes fossil fuel plants according to the amount of carbon dioxide they emit and incentivises the construction of nuclear power and renewables.

In interviews with *The Sunday Telegraph*, five bosses of Britain's biggest power companies argue that fundamental reform is necessary to drive investment. They favour a "carbon floor price" (artificially raising the cost of emissions allowances) as well as capacity payments (paying generators to make their plant available to provide power) and two favour a "low carbon obligation" (forcing companies to produce a certain amount of energy from low carbon sources). Some of the companies – like E.ON and Scottish and Southern Energy – are mindful that there should be no premature adverse effects on their fossil fuel portfolios, while others – such as EDF – are lobbying almost exclusively for support for nuclear. (5) No country in the world has successfully managed to persuade nuclear operators to invest without some form of Government guarantee, which is what President Barack Obama has done in the US. Will the nuclear companies, having achieved market reform and higher prices, soon open a new battlefield demanding that the UK consumer underwrites the risk?

A radical shake-up of energy markets is expected to be unveiled before Christmas. Ministers are expected to combine the long-awaited introduction of a floor price for carbon with a revamp of wholesale electricity markets. Subsidies for renewable sources, including wind and solar, will be extended and revised. Insiders say there may also be a central agency to “direct” markets and foster a new generation of nuclear power stations. Industry insiders say one of the most contentious measures being discussed is new rules or a new stand-alone regulatory body to direct the market so that it meets other policy goals, such as support for a fresh generation of nuclear power stations, which traditionally have not attracted the subsidies directed to renewable energy. (6)

There will be two consultations, one from The Treasury on setting a carbon floor price and one from DECC on mechanisms to promote new nuclear and renewables. Both are likely to raise concerns about rising power bills. Under the carbon consultation, the Treasury is expected to propose a carbon tax that would support the price of the carbon dioxide permits polluters must buy under the EU trading scheme. These permits today trade at about €15 per tonne of carbon. The power industry argues the carbon price needs to be at least around €35 a tonne. The new tax would kick in when the price of the permits falls below a set level. Under the scheme the price would start low then ratchet up over the years to 2020.

The DECC consultation is expected to propose a range of options, including; a “feed-in tariff” guaranteeing low-carbon energy generators including new nuclear a higher return; a new emissions performance standard, setting limits for the carbon dioxide any new power station could emit. This is likely to, in effect, kill off new coal plants unless they fit equipment to capture and store emissions. It

is likely that gas plants will be spared the same restrictions; new capacity payments to reward generators for building plants that will often stand idle. The government has been clear there will be no public subsidy for new nuclear and it is understood to have taken legal advice about the possible new measures on this point. (7)

Consumers can expect to pay significantly more for their power. Dieter Helm, professor of energy policy at Oxford University, estimates the increase in the average energy bill will be around 40%. (8)

- (1) Nuclear on the ropes? By Professor David Elliott, Environmental Research Web 27th November 2010 <http://environmentalresearchweb.org/blog/2010/11/nuclear-on-the-ropes.html>
- (2) Sunday Telegraph 14th November 2010 <http://www.telegraph.co.uk/finance/newsbysector/energy/8131174/Government-blinks-first-in-UKs-nuclear-stand-off.html>
- (3) Uncorrected transcript of oral evidence: Prime Minister David Cameron taken before the House of Commons Liaison Committee, 18th November 2010, See Q92. <http://www.publications.parliament.uk/pa/cm201011/cmselect/cmliaisn/uc608-i/60801.htm>
- (4) Daily Telegraph 5th November 2010 <http://www.telegraph.co.uk/finance/newsbysector/energy/8111274/More-incentives-needed-for-nuclear-says-Energy-Minister-Charles-Hendry.html>
- (5) Sunday Telegraph 14th November 2010 <http://www.telegraph.co.uk/finance/newsbysector/energy/8131700/Britains-Power-chiefs-reveal-nuclear-blueprint.html>
- (6) Sunday Times 29th November 2010 http://www.thesundaytimes.co.uk/sto/business/energy_and_environment/article462121.ece
- (7) FT 29th November 2010 <http://www.ft.com/cms/s/0/bbc23cae-fb32-11df-b576-00144feab49a.html>
- (8) Sunday Times 5th December 2010 http://www.thesundaytimes.co.uk/sto/news/uk_news/Science/article470353.ece

7. The All Electric Future?

The Overarching Energy National Policy Statement claims that reductions in electricity consumption resulting from improvements in energy efficiency will be far outweighed by increases in electricity demand, because of the need to electrify both transport and domestic heating potentially leading to a doubling of electricity demand. Generation capacity will need at least to double to meet this demand and, if a significant proportion of our electricity is supplied from intermittent sources, then the total installed capacity might need to triple. (1)

According to *The Sunday Times* all home heating and cooking will have to switch from gas to electricity by 2030, and all new cars will be electric by then. This means that although the government has already proposed sites for about eight new nuclear plants, privately ministers think we will need at least double that number by 2030. (2) The Department for Transport says that electrification of the whole of transport (not incl aviation and shipping) would add 16% to overall electricity demand but given much charging would take place during the night, this wouldn't require massively more capacity in practice. (3) So heat is the main issue.

While DECC nominally supports combined heat and power (CHP) technologies by exempting "Good Quality CHP" from the Climate Change Levy, and setting a target for at least 10,000 MWe by the end of 2010, its chief scientist David MacKay says the "...growth of gas-powered combined heat and power would be a mistake. Such combined heat and power is not green: it uses fossil fuel, and it locks us into continued use of fossil fuel." (4) Clearly the Government favours an all-electric future powered by nuclear and renewables with domestic heating provided by heat pumps.

A study done by Imperial College and Surrey University for the Combined Heat and Power Association says that while an all-electric future could be low carbon, it isn't necessarily the best way of doing things. Heat is a very important end-use of energy in the current energy system and is

expected to remain so in 2050. In 2007, heat represented 41% of total final energy consumption in the UK. Over half of this heat demand comes from the domestic sector, highlighting the significant challenge associated with decarbonising this sector particularly. No route to low carbon heat is without challenges, but the all-electric future would not necessarily be optimally efficient, since thermal losses from power generation are large. The all-electric scenario would also be contingent on overcoming certain critical issues, which are neither easy nor fully understood. If the roll-out and performance of heat pumps, insulation and low carbon generation is not as expected, then the scenario will not be able to deliver the emission reductions required. It also gives rise to a set of challenges associated with the management of power flows.

On the other hand, a diverse combination of technologies can help overcome some of these problems, and provide a more robust energy system in the long run. An integrated approach would use a range of heat options, not just gas-fired CHP, including biomass fired CHP plant, and even CHP with carbon capture and storage technologies. (5) Once district heating networks are established geothermal heat, waste heat from industrial processes, heat pumps using boreholes or rivers, solar heat, and so on can also be used.

One of the authors of the report, Dr Rob Gross, explains: *“No route to 80% carbon reduction is without challenges. But it seems clear that improvements can be made to the ‘all- electric’ approach we are currently pursuing. The integrated scenario we have identified offers a potentially extremely valuable contribution to efforts to green our energy system.”*

Keith Allott, Head of Climate Change, WWF, welcomed the report findings: *“A revolution in energy efficiency and the creation of smarter grids powered by renewable energy sources could put us on the pathway to a zero-carbon economy. But we need to think carefully about what that would mean for meeting the country’s needs for heat. A strong focus on energy efficiency is the low-risk, low-cost solution, and combined heat and power and district heating networks have a central role to play in delivering this. If the UK intends to meet its carbon targets, there simply isn’t room for ruling out these options.”*

Janine Freeman, head of Public Affairs at National Grid said: *“As operator of both the UK gas and electricity transmission systems, we share the view that we should explore the alternatives for providing low carbon heat. Electrification of heating will not provide the whole answer because it will not be efficient to build power stations and electricity networks to supply electric heat for the one or two months a year when it is really cold. Our own work on the use of biomethane for injection into the gas grid indicates this could make a significant contribution to domestic heating. And as this report sets out, other technologies such as CHP and solar thermal will also have important roles to play in a decarbonised energy future.”* (6)

- (1) The Government Response to the Consultation on the draft National Policy Statements for Energy Infrastructure, DECC, October 2010. Paras 1.64 – 1.68
<https://www.energynpsconsultation.decc.gov.uk/docs/GovernmentResponsetoConsultation-October2010.pdf>
- (2) Sunday Times 5th December 2010
http://www.thesundaytimes.co.uk/sto/news/uk_news/Science/article470353.ece
- (3) Low Carbon Transport Innovation Strategy, Potential importance of a low carbon electricity mix. DfT May 2007 <http://www.dft.gov.uk/pgr/scienceresearch/technology/lctis/lowcarbontis?page=12>
- (4) Business Green 29th November 2010 <http://www.businessgreen.com/bg/news/1906927/energy-storage-technology-promises-boost-winter-fuel-supplies>
- (5) Building a Road Map for Heat, 2050 Scenarios and Heat Delivery in the UK, University of Surrey & Imperial College, CHPA, February 2010.
http://www.chpa.co.uk/media/e9a9f61d/Building_a_roadmap_for_heat_Full.pdf
- (6) Leading scientists propose smarter low carbon future, CHPA, 2nd March 2010
http://www.chpa.co.uk/leading-scientists-propose-smarter-low-carbon-future_160.html

8. Spent Fuel Management Options Feasibility Study

The Radioactive Waste Management Directorate (RWMD) of the NDA has produced a feasibility study exploring options for storage, transport and disposal of spent fuel from potential new nuclear reactors. (1) This work was commissioned by the Nuclear Industry Association (NIA) working together with prospective new reactor operators. The work undertaken in these studies has identified that there are a number of feasible alternative options for the management of spent fuel from new nuclear power stations. In the area of storage and packaging it has been established that there are a number of feasible potential centralised storage and packaging options and that both wet and dry technology is potentially suitable for the long term management of new nuclear power station spent fuel. (2)

RWMD says it had previously identified that for high burn-up spent fuel (65 GW/tU) a cooling period of the order of 100 years would be required to comply with a temperature limit of 100°C for emplacement in a repository using bentonite as a backfill. This cooling period has been revisited. The NDA now says, for example, with judicious mixing of long-cooled and short-cooled SF the duration of storage after the end of power station operation could be reduced to the order of 50 years before disposal.

The purpose of this work is not to make decisions regarding alternative options for Spent Fuel management, but is intended to provide a better understanding of the issues and identify options. The report looks at centralised spent fuel storage; a centralised packaging plant for spent fuel; a multi-purpose cask which could be used for storage transport and disposal; alternative disposal concepts optimised for spent fuel from new reactors rather than legacy waste.

Various different storage and packaging options are considered. For example it is noted that one option would be to build a single packaging plant which is integrated with the disposal facility, rather than one at each reactor site. The disadvantage is that, unlike new reactors and associated facilities, the MRWS framework for implementing geological disposal is founded on the principles of voluntarism and partnership with local communities so communities who are involved in the site selection process would have to agree to accept the packaging plant.

- (1) NDA publish initial feasibility study into spent fuel management options, NDA 15th Nov 2010 <http://www.nda.gov.uk/stakeholders/newsletter/spent-fuel-feasibility-options.cfm>
- (2) Geological Disposal: Feasibility Studies Exploring Options for Storage, Transport and Disposal, of Spent Fuel from Potential New Nuclear Power Stations, NDA, November 2010. <http://www.nda.gov.uk/documents/upload/Geological-Disposal-Feasibility-studies-exploring-options-for-spent-fuel-from-new-nuclear-power-stations-November-2010.pdf>

9. EPR in Crisis

Professor Steve Thomas has been a researcher in energy policy for more than 25 years. He writes particularly on economics and nuclear policy, liberalization and privatization of the electricity and gas industries and trade policy on network energy industries. He is a member of the editorial boards of: Energy Policy; Utility Policy; Energy and Environment; and International Journal of Regulation and Governance.

In his new report – EPR in Crisis (1) - he examines the roots of the European Pressurised water Reactor (EPR) design, existing and potential orders for the reactor, experience with construction of the EPR, issues arising from the safety assessment of the design, and economic issues. He examines the report by the Roussely Commission, a report commissioned by the French government and headed by a former Chief Executive of the French utility, Electricité de France (EDF), and its implications for the EPR.

In 2008, when the government revisited nuclear economics, it assumed the construction cost was £1,250/kW (\$2,000/kW), but the estimated cost of new reactors now appears to have increased to at least \$6000/kW.

Thomas concludes that the EPR design is in crisis. Construction has gone dramatically wrong at the two sites in Europe where it is being built; The prices it is being offered at are so high that all contests where the EPR has been bid have either been abandoned (South Africa and Canada) or the contract has gone to a much lower bid from a competitor (UAE); Potential markets such as USA, UK and Italy all look problematic and reactor orders, if placed at all, will be much later than expected; The process of obtaining safety approval in France, UK and USA is incomplete and, even if successful, the features needed to achieve regulatory approval may add significantly to costs. The intuitively plausible notion that a new generation of nuclear reactors, starting without a blank sheet of paper could easily come up with a more rational and cheaper, yet safer design of reactor has been shown to be an illusion by the lengthy and still incomplete process of gaining safety approval. The Finnish and French authorities' decision to allow construction to start before full generic approval had been given looks particularly ill-judged.

At US\$6000/kW or more, it seems unlikely that EPR will be affordable except where huge public subsidies are offered and/or there is a strong likelihood of full cost recovery from consumers, no matter what the cost is. As the reality of these high costs hits home, it is likely that even markets in which government support for new nuclear orders has been strongest, such as the USA and UK, will find it difficult to support the costs. From a business point of view, the right course for EDF and Areva seems clear. They must cut their losses and abandon the EPR now.

Meanwhile, the capital costs of building a new generation of reactors have shifted markedly in the past year, according to the US Government's Energy Information Administration (EIA) while solar capital costs have dropped. (2) The EIA has published a special report (3) detailing the changes it will make in its assumptions on the cost of new power plants in its Annual Energy Outlook 2011. That report will come out in December. EIA found that capital costs for new nuclear and coal-fired power plants are 25-37% higher than those reported in its previous Annual Energy Outlook. The increase reflects higher global commodity prices, the small number of firms able to engineer complex projects such as a new nuclear or advanced coal facility, and the general trend of increased costs of capital-intensive projects in the power sector. EIA found the capital costs for a new dual-unit 2,236MW nuclear plant were \$5,335/kW. However, solar capital costs fell markedly. Solar thermal capital costs dropped by 25%, while photovoltaic costs were down 10%. Solar projects are extremely diverse, and the EIA gave a range of costs. A 100MW solar thermal plant's cost of capital is about \$4,692/kW, while a 7MW photovoltaic installation could cost \$6,050/kW.

Speaking to a solar industry conference in Canberra Dr Mark Diesendorf of the University of New South Wales said nuclear costs had risen from about \$US2000/kW of installed capacity in 2002, to about \$US7400/kW today. In contrast the capital cost of onshore wind power last year was around \$1900 to \$1700/kW, and solar around \$5120 to \$7000/kW (and as low as \$3000 for utility-scale projects). (4)

- (1) The EPR in Crisis Report, by Professor Steve Thomas, University of Greenwich, November 2010 <http://216.250.243.12/The%20EPR%20in%20crisis%203-11-10.pdf>
- (2) Argus Media 19th November 2010 <http://www.argusmedia.com/pages/NewsBody.aspx?id=730286&menu=yes>
- (3) Updated Capital Cost Estimates for Electricity Generating Plants, US EIA, November 2010 http://www.eia.gov/oiaf/beck_plantcosts/index.html
- (4) Sydney Morning Herald 1st December 2010 <http://www.smh.com.au/environment/energy-smart/nuclear-power-failing-price-test-20101130-18fjb.html>

10. West Cumbrian Partnership Consults

As reported last month, the West Cumbria Managing Radioactive Waste Safely (WCMRWS) Partnership has launched a major communications and engagement programme to give people the chance to find out about the Government's search for somewhere to build an underground repository for the country's higher activity radioactive wastes. (1) A series of ten Community Drop-In Events have been held across the county with an exhibition giving people the chance to talk to members of the Partnership, although oddly only three of those are in areas under consideration for the geological disposal facility. (2) The rest are either not in West Cumbria or are in the area excluded by the British Geological Survey. There is also a pack with information and a DVD available. To request a pack email your name and address to helenf@3kq.co.uk or phone 0800 048 8912.

Nuclear Waste Advisory Associates (NWAA) pointed out in a letter to *The Whitehaven News* (3) that throughout the documentation and the DVD, there is almost no mention of the issue which will be pivotal in deciding whether or not to accept a repository – safety. Safety will undoubtedly be the key factor in deciding people's views, yet information relating to the topic is virtually absent from the partnership material. Although CoRWM recommended disposal, the recommendation was heavily qualified and conditional on an intensified research and development programme to reduce the level of scientific and technical uncertainty around disposal to the point where it was felt safe to proceed. We have not yet reached that point and are indeed a long way from it.

NWAA highlights its Issues Register (4) which lists more than 100 technical and scientific issues which need to be addressed at generic and site-specific levels before the sort of confidence the NDA apparently already places on disposal could be justified. Among those issues are: how to contain and isolate radioactive material while at the same time allowing hydrogen gas to escape, an issue which contradicts the 'safety in the multi-barrier concept'; our lack of understanding of the impact of low levels of exposure to radioactivity; the fact that gassified radioactive carbon could escape from the repository over a very short space of time (decades) giving a much higher than predicted dose to the people above; the uncertainties which surround the longevity of various types of packaging; microbial activity and general swiftness of decay of packaging. These issues are recognised now. Matters relating to safety, and, moreover, the means by which these safety uncertainties are to be addressed, must be put before the Cumbrian public as soon as possible. The issues register compiled by NWAA exists today and is in the possession of the partnership. It is time the findings of the register were made known by the partnership to all interested citizens and groups of Cumbria.

The Government's response to the House of Lords Science and Technology Committee Report: Radioactive Waste Management, a further update – details Government thinking with regard to implementing geological disposal. (5)

At the Allerdale Borough Council Meeting in November Councillor Joe Sandwith called on fellow councillors to "*formally withdraw Allerdale's expression of interest*" in "*volunteering for geological disposal of high level nuclear waste*". The council heard presentations from two speakers. The first was Dr Helen Wallace, Executive Director of Genewatch UK (6) and the second was Professor Brian Clark, who serves on the Committee for Radioactive Waste Management (CoRWM). Nine Councillors supported Councillor Joe Sandwith's proposal to withdraw and 19 opposed, and there were nine abstentions, but there are 56 councillors, so 19 were absent. (7)

Dr Wallace provided councillors with an information pack which included links to the Nirex inquiry and Professor David Smythe's response to the 2007 Managing Radioactive Waste Safely Consultation showing why nowhere in West Cumbria is suitable for a Geological Disposal Facility. (8)

- (1) The advertorial included in local press is available here: <http://www.cnnwmedia.co.uk/locker/ns/image/osprey%20broadsheey%2054x10%208col%20v4b.pdf>
- (2) See http://www.westcumbriamrws.org.uk/news_more.asp?news_id=13 for the list of drop-in events.

- (3) Whitehaven News 25th November 2010 <http://www.whitehaven-news.co.uk/letters/you-say/why-are-we-still-learning-lessons-from-the-tragedies-at-sellafield-1.783478?referrerPath=letters>
- (4) Nuclear Waste Advisory Associates Issues Register, March 2010
<http://www.nuclearwasteadvisory.co.uk/uploads/8796NWA%20ISSUES%20REGISTER%20COMM%20ENTARY%20letterhead.doc>
- (5) Government's Response to the House of Lords Science and Technology Committee Report: Radioactive Waste Management, a further update, DECC November 2010
<http://www.parliament.uk/documents/lords-committees/science-technology/ScienceGovandPolicy/RespRWM.pdf>
- (6) Presentation by Dr Helen Wallace
http://www.genewatch.org/uploads/f03c6d66a9b354535738483c1c3d49e4/HW_allerdale_fin.pdf
- (7) Northern Indymedia 4th November 2010 <http://www.northern-indymedia.org/articles/1052>
- (8) Why the whole of West Cumbria is unsuitable for a nuclear waste repository, Prof David Smythe, November 2010
<http://davidmysmythe.org/nuclear/cumbria%20bgs%20exclusion%20report%20review%20for%20website.pdf>

11. Funded Decommissioning Programme Re-Consultation

In February 2008 the Government published draft Guidance on what an approvable Funded Decommissioning Programme (FDP) should contain for public consultation, (1) and is response to respondents in September 2008. (2) Since 2008 there have been some significant developments with regard to the framework concerning the financing of decommissioning, waste management and waste disposal, so the Government has decided to undertake a further round of consultation. (3)

The Government is also re-consulting on the Fixed Unit Price methodology. (4) The consultation document sets out the Government's Response to the earlier consultation in March 2010 (5) along with the key changes that have been made as a result of the consultation and an updated methodology for further consultation

The Government says it does not agree that taking title to radioactive waste, including spent fuel, for a fixed price is a subsidy to new nuclear power, provided that the price properly reflects any financial risks or liabilities assumed by the state. (6) The Government acknowledges that the approach to risk and uncertainty set out in the March consultation is conservative but, given the level of uncertainty around estimates of disposal costs, believes that such conservatism is necessary to ensure the taxpayer is protected. Both consultations close on 8th March 2011.

- (1) Consultation on Funded Decommissioning Programme: Guidance for New Nuclear Power Station, BERR, February 2008.
<http://webarchive.nationalarchives.gov.uk/+/http://www.berr.gov.uk/files/file44486.pdf>
- (2) Government Response to the Consultation on Funded Decommissioning Programme: Guidance for New Nuclear Power Stations, BERR September 2010
<http://webarchive.nationalarchives.gov.uk/+/http://www.berr.gov.uk/files/file47629.pdf>
- (3) Consultation on Revised Funded Decommissioning Programme: Guidance for New Nuclear Power Stations. DECC December 2010 <http://www.decc.gov.uk/assets/decc/Consultations/fdp-guidance-new-nuclear/985-consultation-revised-fdp-guide.pdf>
- (4) Consultation on an updated waste transfer pricing methodology for higher activity waste from new nuclear power stations, DECC, December 2010.
<http://www.decc.gov.uk/assets/decc/Consultations/nuclear-waste-transfer-pricing/984-consultation-waste-transfer-pricing-method.pdf>
- (5) 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
- (6) See Fixed Unit Guess - to guarantee utilities pay the full costs of disposal, Labour's proposals must be withdrawn , NuClear News No.20
<http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo20.pdf>