

# *Nuclear Free Local Authorities* new nuclear monitor



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## **GOVERNMENT LAUNCHES CONSULTATION ON ENERGY POLICY**

The Government has followed up publication of the Performance and Innovation Unit (PIU) report, 'The Energy Review'<sup>1</sup>, with a consultation paper on energy policy<sup>2</sup>. The consultation paper is aimed primarily at energy stakeholders, "who have a particular expertise or interest in energy issues". It states that other initiatives will be taken to seek the views of the general public.

The consultation paper focusses on a series of questions which "the Government will need to consider in producing a White Paper", anticipated towards the turn of the year. The questions on nuclear power are pitched against the background of the PIU recommendation that measures are needed to keep the nuclear option open. They include:

- How confident can we be that other low carbon options will be available to continue reducing carbon emissions as nuclear stations close over the next 20 years?
- What steps would be necessary to "keep open the nuclear option", in particular in terms of R&D?
- To what extent should industry's costs be internalised?
- What regulatory and/or other changes might be desirable to reduce the risk and uncertainty for investors?

This issue of *New Nuclear Monitor* discusses these questions. It provides comments which local authorities can draw on in making submissions to the Government review<sup>3</sup>.



## **THE LOCAL GOVERNMENT VOICE ON NUCLEAR ISSUES**

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## **CONFIDENCE IN AVAILABILITY OF OTHER LOW CARBON OPTIONS?**

A political battle of huge significance underlies this question: will the Government take determined action to put in place step changes in energy efficiency, or capitulate to the vested interests that want Government support for new investment in large capital-intensive plant<sup>2</sup>?

There is a strong case for the Government to take the energy efficiency route. As the PIU analysis shows, the UK is a very inefficient user of energy, and could take a range of cost effective measures to improve efficiency. These range from programmes to improve insulation in buildings, to using far more Combined Heat and Power to manufacture more efficient appliances and vehicles.

This view is backed up by analysis from the Carbon Trust, set up by Government to promote a low carbon economy<sup>3</sup>. This analysis shows that an aggressive energy efficiency policy could deliver two-thirds of the carbon dioxide reduction needed to achieve 60% cuts by 2050, as recommended by the Royal Commission on Environmental Pollution.

For the rest of the cuts, the Government should look to renewables, which offer a wide range of different technologies including wind, biomass, tidal, wave and solar. The argument here is not about long-term viability, but how quickly the different renewables can be brought on stream<sup>4</sup>.

The answer to the question posed in the consultation paper is therefore dependent on what the Government decides to do. If it puts determined action on energy efficiency at the top of its energy policy agenda, and enables a wide range of renewables to flourish, then we could be confident that Government support for a large, capital-intensive and inflexible programme of new nuclear power stations is not needed.

## **IDENTIFYING THE BUILDING BLOCKS OF PUBLIC ACCEPTABILITY**

Against this background, “keeping the nuclear option open” could be viewed as an insurance policy for circumstances in which energy efficiency and renewables are judged unlikely to be able to deliver required future cuts in carbon dioxide emissions.

Of course, to be implementable a convincing insurance policy has to meet a number of requirements, including public acceptability. As recognised by the PIU, to achieve the latter, public concerns about “the unsolved problem of long-term nuclear waste disposal”, and “perceptions about the vulnerability of nuclear power plants to accidents and attack”, would have to be properly addressed.

Previous issues of *New Nuclear Monitor* have argued that these concerns need to be properly explored in a series of public participation events, such as discussion groups or citizens’ panels<sup>5</sup>. These events should be used to identify the building blocks that need to be put in place before new nuclear build could become a publicly acceptable insurance policy. It is likely that these building blocks would have to address:

- *What the public would consider to be a 'solution' to the long-term management of radioactive wastes.* This might be defined in terms of reaching a significant milestone in the implementation of policy, for example, securing planning consent for new facilities for long-term storage or disposal, or construction of the facility, or a period of successful operation.
- *What the public would consider to be adequate progress in putting the rest of the 'nuclear house' in order.* This might be defined in terms of reaching significant milestones in: (a) winding down reprocessing and the accumulation of separated plutonium and highly active liquid waste; (b) immobilising potentially mobile and hazardous materials, including separated plutonium, highly active liquid waste and challenging intermediate level wastes; and (c) demonstrating an ability to decommission and dismantle existing nuclear power stations.
- *What the public would consider to be an acceptable standard of safety for a new generation of reactors.* This might be defined, for example, as there being no physically credible events which could require off-site actions. This could require the development of reactor designs that could survive the total absence of coolant and withstand high impact external events, such as the deliberate crashing of a commercial jet airliner. It might also include rejection of the use of plutonium-containing Mixed Oxide (MOX) fuel, not least because of the security risks of transporting it to reactor sites.
- *What the public would consider to be an acceptable level of expert agreement about the risks of low level radiation.* Much hinges here on the satisfactory conduct and outcome of the current review of the risks of low level radiation, and on the findings of any further research identified as necessary by that review<sup>6</sup>.

Although the consultation paper indicates that some “deliberative workshops” with the public might be organised prior to preparing the White Paper, it is difficult to see how - in the time available and with the wide range of energy issues to be addressed - these will be able to identify the building blocks that need to be put in place before new nuclear build could become a publicly acceptable insurance policy.

This suggests a more extended and focussed programme of public participation events is required. This point is reinforced by the need for a degree of coordination with similar initiatives likely to form part of the Government's review of radioactive waste management policy<sup>7</sup>. This latter review process is anticipated to take until 2007, culminating in the adoption of policy on long-term management and how it should be implemented. This timeframe coincides with a PIU recommendation that the first periodic review of progress in implementing the key elements of a new energy policy also take place in 2007<sup>8</sup>.

This five year period provides an opportunity to identify the building blocks that need to be in place. Failure to do this will increase the likelihood that any future siting proposals for new reactors will be publicly unacceptable and face concerted opposition.

## MONITORING AND REVIEWING REACTOR TECHNOLOGIES AND COSTS

Interest in the UK in the possibility of new nuclear build appears to be focussing on three reactor technologies:

- The **AP1000** (1000 MW): this is an advanced water cooled reactor, which relies on a range of novel “passive safety” features to reduce reliance on active safety systems. The AP1000 is being developed by Westinghouse, a subsidiary of BNFL, and could in principle be used to burn MOX fuel. BNFL and British Energy have signed a collaborative agreement to examine the feasibility of building the reactor in the UK<sup>9</sup>.
- The **PBMR** (110 MW): this is a high temperature, gas cooled reactor with a pebble bed core, which proponents claim is “naturally safe” because it does not require forced cooling in emergency situations<sup>10</sup>. The PBMR is being developed by the South African utility Eskom. BNFL has a 20% stake in the project.
- The **Advanced CANDU** (600 MW): this is an advanced version of the heavy water cooled and moderated reactor used in Canada. British Energy has signed a collaborative agreement with Atomic Energy of Canada Limited to examine the feasibility of building the reactor in the UK<sup>11</sup>.

Although the Advanced CANDU appears to be only at the conceptual stage, the AP1000 and PBMR are further advanced. In the US, proponents consider it feasible to deploy the AP1000 by 2010<sup>12</sup>. This would entail:

- a commitment to plant orders by 2003
- design certification by the Nuclear Regulatory Commission by the end of 2004<sup>13</sup>
- start of construction in 2006
- completion of detailed design by 2007
- finish of construction by 2009<sup>14</sup>.

In South Africa, Eskom hopes to have a demonstration PBMR in operation by 2010, despite recent set backs<sup>15</sup>.

The industry is claiming that these new reactor technologies could generate electricity more competitively than the current generation of Light Water Reactors, because of reduced capital costs, shorter construction periods and series ordering. For example, in submissions to the PIU energy review, the UK industry argued that generating costs for the AP1000 could lie in the range 2.2 - 3.0 p/kWh, which compares with current electricity prices of around 2 p/kWh.

However, as the PIU has argued<sup>16</sup>, changes in appraisal assumptions (particularly discount rates and financing lifetimes), can easily bring estimates of ‘levelised costs’ to well above 3 p/kWh. The PIU has also pointed to significant uncertainties in critical variables like construction costs and operating performance. It explains that to achieve costs much below 3 p/kWh would depend on:

- the building of a large programme of up to 10 identical units;
- construction costs significantly below the bottom end of a recently quoted range in seven other OECD countries; and
- operating performance well above the current OECD average.

The PIU argued that there are significant risks associated with these assumptions, and estimated that an overall future range of generating costs of 3 - 4 p/kWh is more realistic (which is 50-100% more than current electricity prices). Nonetheless, BNFL has subsequently argued that the AP1000 can be made commercially viable<sup>17</sup>.

The industry’s attempt to talk up the competitiveness of new reactors has a familiar ring. In the build up to the 1994 Government review of nuclear power, British Energy’s predecessor, Nuclear Electric, argued that new reactors would be fully competitive<sup>18</sup>. Then, after a warning from the Energy Minister to “ask itself some hard-edged questions”<sup>19</sup>, the industry dropped some of the excesses of its public relations stance and acknowledged that direct Government support would be needed<sup>20</sup>. It also revised its generating cost estimate for a new twin unit PWR from less than 3 p/kWh to around 3.7 p/kWh. During the subsequent review, the DTI further revised the estimate to 4.4 p/kWh<sup>21</sup>, which was over 50% higher than electricity prices at that time, but significantly less than estimates put forward in expert evidence to the review<sup>22</sup>.

The experience in the 1994 review, and the current differences of view between the Industry and PIU, show that there is a need to closely monitor and scrutinise the industry’s claims for future nuclear generating costs. This requirement is underpinned by the industry’s track record of appraisal optimism when promoting new build, and reinforced by the complete lack of experience of full-scale construction or commercial operation of the new reactor technologies. This lack of experience - combined with novel reactor design features - lead to substantial risks and uncertainties in regulatory requirements, construction costs and reactor performance.

## **INTERNALISING THE INDUSTRY’S EXTERNAL COSTS**

The PIU recommended that “DTI should ensure, using independent evaluation, that the nuclear industry fully internalises its external costs, including risks such as waste cost escalation.” This recommendation is underpinned by the ‘polluter pays’ principle and should be strongly supported.

The ‘polluter pays’ principle suggests that all the liabilities associated with the life-cycle of a new reactor, including long-term waste management, should be adequately costed, and arrangements put in place to ensure that the costs will be met by the company concerned. This is necessary to remove the risk that public subsidy will ultimately be required to meet long-term costs.

This poses a difficulty for new build: deriving robust and comprehensive liability estimates requires the establishment of clear policy on the long-term management of radioactive wastes, followed by the specification of technical requirements and the development of adequate cost models. As indicated above, the adoption of clear policy in the UK is not expected until 2007.

The lack of policy on the long-term management of radioactive wastes means that technical requirements and cost models are characterised by great uncertainty. Although this uncertainty may not impact substantially on estimates of the 'levelised cost' of electricity from new reactors, significant increases in 'back end' costs after a reactor has been operating for a number of years are highly undesirable because it is unlikely that they could be met by income from future electricity sales.

## **PUBLIC AND STAKEHOLDER CONFIDENCE**

If the nuclear option is to be kept open as a type of insurance policy then the case for new build should be kept under active review in a way which engenders public and stakeholder confidence.

Research shows that the public favours review mechanisms which are open, transparent and critical, and involve a wide range of stakeholders<sup>23</sup>. As argued in previous issues of *New Nuclear Monitor*, this suggests that a review panel should be established, which includes stakeholders from Government departments, the nuclear industry, the regulators, the trade unions, local authorities, environmental NGOs, public interest groups and academic institutions.

This stakeholder review panel should have a brief which includes:

- overseeing a programme to explore public acceptability issues;
- monitoring and reviewing international developments;
- monitoring and reviewing the case for new reactor build in the UK;
- regularly publishing its work in these areas; and
- providing advice to Government.

The proposed programme of public participation events should explore what the public would consider to be: a 'solution' to the long-term management of radioactive wastes: adequate progress in putting the rest of the 'nuclear house' in order; an acceptable standard of safety for a new generation of reactors; and an acceptable level of expert agreement about the risks of low level radiation. The stakeholder review panel should ensure that the proposed events take account of any related initiatives which form part of the Government review of long-term radioactive waste management policy.

The stakeholder review panel should also set up procedures for monitoring and reviewing international developments, covering R&D, and the construction, licensing and operation of new reactors. This work should inform the panel's ongoing assessment of the case for new build in the UK. Indeed, it is likely that some uncertainties, particularly those inherent in estimating the costs of electricity from new plant, will only be significantly reduced through the construction and operation of demonstration or commercial plant. Developments in the US and South Africa could be of particular interest to the panel.

Key features of the stakeholder review panel's work should include:

- the systematic assessment of risks and uncertainties;
- the identification of significant areas of agreement and disagreement;

- assessment of how uncertainties and disagreements can be reduced (and over what timescales);
- a strong commitment to peer review; and
- the early publication of findings for public comment.

These features should help ensure public and stakeholder confidence in the panel's work.

A good starting point for the stakeholder review panel would be to review the outcomes of the current BE/BNFL and BE/AECL feasibility studies of new build in the UK. Although the companies concerned will plead commercial confidentiality, it is important to put the principles of openness and transparency into practice. As much detail from the feasibility studies should therefore be made available to the panel as possible.

The stakeholder review panel should ensure that a substantive assessment of the case for new nuclear power stations is available in time for the first periodic review of progress in implementing the key elements of energy policy, as proposed by the PIU for 2007.

## CONCLUSIONS

This issue of *New Nuclear Monitor* has argued that two main messages should be highlighted in responses to the Government's consultation paper:

- the Government should put concerted action on energy efficiency and renewables at the top of its energy policy agenda, and not succumb to those who want state support for a large, capital-intensive and inflexible programme of new nuclear power stations; and
- if the nuclear option is to be kept open as insurance against the failure of energy efficiency and renewables to deliver, proper attention needs to be paid to identifying and meeting conditions of public and stakeholder acceptability.

A mechanism for seeking to achieve the latter - a stakeholder review panel - is proposed.

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<sup>1</sup> Cabinet Office, 'The Energy Review', A Performance and Innovation Unit (PIU) Report, February 2002. The PIU report was discussed in *New Nuclear Monitor* 3, March 2002.

<sup>2</sup> The argument here is derived from an analysis by C Hewett, a senior research fellow at the IPPR, 'Switch on to renewables', the Guardian, 14 February 2002.

<sup>3</sup> Reported in C Hewett, as above, 14 February 2002.

<sup>4</sup> In its study on climate change, the Royal Commission on Environmental Pollution stated that it did not accept the arguments of those who hold that nuclear power is indispensable for meeting future carbon dioxide targets. However, it warned that if energy efficiency and renewables cannot be brought forward on the large scale required, the case for new nuclear build would be strengthened. RCEP, 'Energy - the Changing Climate', Cm4749, 2000, Summary, para 31.

<sup>5</sup> NFLA, 'Energy Review Calls for Wide Public Debate', *New Nuclear Monitor* 3, March 2002.

<sup>6</sup> The review has been set up by the Government under the auspices of one of its advisory committees, COMARE, and is known as the Consultative Exercise on Radiation Risks of Internal Emitters (CERRIE).

<sup>7</sup> DEFRA et al, 'Managing Radioactive Wastes Safely: Proposals for developing a policy for managing solid radioactive waste in the UK', September 2001.

<sup>8</sup> Cabinet Office, as above, para 10.10.

<sup>9</sup> 'BNFL-BE team says AP1000 could be constructed in 36 months', Nucleonics Week, 28 February 2002.

<sup>10</sup> Following the events of 11 September 2001, there has been discussion of whether new reactors should be built underground. General Atomics, the developer of a rival high temperature, gas cooled reactor, claim that their new reactor could be built completely underground, whereas the PBMR could be only partially buried. See Nucleonics Week, 18 October 2001.

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<sup>11</sup> 'Next Generation CANDU', Nuclear Energy, February 2002, Vol 41, No 1, p3-4.

<sup>12</sup> 'A Roadmap to Deploy New Nuclear Power Plants in the United States by 2010', prepared for the US Department of Energy Office of Nuclear Energy, Science and Technology, October 2001.

<sup>13</sup> The AP1000's smaller sister, the AP600, has secured design certification from the NRC, but it took "more than eight years of painstaking attention to regulatory detail". This was because the "AP600 posed unique problems for regulators who initially lacked adequate yardsticks against which to judge the revolutionary new design". See, 'Westinghouse AP600 Wins Seal of Approval', Nuclear Energy Insight, October 1998, p1.

<sup>14</sup> 'A Roadmap to Deploy ...', as above, page 5-57.

<sup>15</sup> 'Exelon abandons PBMR project', Nucleonics Week, 18 April, 2002, and 'South African Government appointed expert panel fails to support feasibility of PBMR', Business Day, 22 April 2002.

<sup>16</sup> PIU, 'The Economics of Nuclear Power', Energy Review Working Paper, February 2002.

<sup>17</sup> 'BNFL leaders say UK should not wait for new generation reactors', Nucleonics Week, 14 March 2002.

<sup>18</sup> Nuclear Electric, 'Nuclear Electric - Aiming to be Number 2', News Release, 27 July 1993, and B Hawley, contribution to open forum, 'Progress: Nuclear Power in the UK', British Nuclear Industry Forum', 23 November 1993, p23.

<sup>19</sup> Eggar T, 'Speech to Trade Unionists for Safe Nuclear Energy, 25 November 1993, DTI Press Notice, P/93/672, p8.

<sup>20</sup> Nuclear Electric, Submission to the Government's Review of Nuclear Power, 'Further Nuclear Construction in the UK', Vol 1, June 1994, paras 213-214.

<sup>21</sup> DTI, 'The Role of Nuclear Power in the Carbon Dioxide Abatement beyond 2000', May 1995. This paper was produced for the nuclear review by economists in the DTI's Energy Policy and Analysis Unit.

<sup>22</sup> COLA, 'Main Case: Submission to the Nuclear Review', Volume 2, September 1994.

<sup>23</sup> See, for example, The Future Foundation, 'Establishing the Value of Wider Public Consultation', a report for UK Nirex Ltd, November 2000, p20-28, and the findings of the 'front end consultation' of the ISOLUS project (<http://www.lancs.ac.uk/users/csec/isolus/isolusfinal.pdf>).