

No Security Marking



15/12/2004 14:41

To: "[REDACTED]" <[REDACTED]@Webershandwick.com>
cc: [REDACTED]/Group Office/Risley/BNFL@BNFL
Fax to:
Subject: the case for nuclear

[REDACTED]
Good to see you again today...attached is the note we just discussed



The case for nuclear energy december 04.c

No Security Marking

THE CASE FOR NUCLEAR ENERGY

1. Nuclear energy can be competitive with gas, and may in future be the cheapest form of electricity

1.1 The **operational economics of new nuclear reactors** are well understood and, on a cost per unit basis, are competitive with other forms of generation.

1.2 The most recent **independent comparison of the costs** of different sorts of electricity generation in the UK – *The Costs of Generating Electricity* carried out by the Royal Academy of Engineering – concluded that lifetime nuclear power costs were comparable with those for CCGT (even without allowing for a cost of carbon dioxide under the upcoming EU Emissions Trading Scheme). Other studies in France, Finland and the US have also concluded that nuclear power is an economic option

1.3 Moves to bring the **costs of carbon emissions** into the market will further benefit the economics of nuclear relative to fossil fuels. In addition, nuclear power offers valuable cost stability in times of changing commodity prices, since the uranium cost represents only around 5% of the total generating cost, compared to gas-fired generation, where the raw gas cost accounts for around 60% of the total generating cost.

2. Nuclear power is essential in combating CO2 emissions

2.1 As the only **large-scale provider of low-carbon electricity** nuclear power already avoids the emission of around 35 million tonnes of CO2 each year in the UK alone (equivalent to over 6% of the UK's total emissions). As the focus moves to renewables as a key weapon in the fight against global warming, we should remember that – all else being unchanged - even if we hit the ambitious target to have 20% of our power from renewables by 2020, then we will simply stand still in CO2 terms – replacing 20% nuclear with 20% renewables. This is because, by then, most existing UK nuclear plants will have closed.

2.2 **Renewable energy** – primarily from wind turbines – is an important ally of nuclear in the fight against climate change. As the UK is falling behind its targets for reducing CO2 emissions, it is important that *all* forms of low carbon energy are deployed to the fullest extent possible to achieve the necessary reductions. Furthermore, wind power is inherently intermittent,

and so relies on the availability of backup plant when the wind is not blowing. This backup plant is always likely to be fossil-fired (probably coal and gas) in view of the flexibility needed.

2.3 Similarly, **energy efficiency** is an important element in the concerted national effort to reduce CO₂ emissions. Yet, substantial progress in demand reduction relies on action by large numbers of consumers in the domestic industrial and commercial sectors, and cannot be guaranteed. In several sectors, the timescale for achieving results through energy efficiency measures is long – driven much more strongly by the construction of new buildings than by fitting new equipment in existing ones

2.4 Looking to the longer term, the UK Government has highlighted the need for a **60% cut in overall CO₂ emissions by 2050**. This can only mean major cuts from sectors beyond electricity generation – in particular the transport side. It is difficult to see how this can be achieved other than by the emergence of a hydrogen economy and a transition to vehicles powered by hydrogen fuel cells. Hydrogen production itself requires a substantial input of primary energy, and the delivery of real emissions savings requires that the full cycle is essentially carbon-free. This implies a huge growth in demand for both nuclear and renewable sources.

3. Nuclear power offers substantial security of supply benefits

3.1 UK oil and gas production is depleting. The UK will be a net importer of gas within a year. Moreover, the resources are now more and more concentrated in a limited number of countries that are politically sensitive and potentially unstable. For instance, by 2020, liquified natural gas (LNG) will be imported mainly from OPEC countries, and piped gas mainly from Russia.

3.2 At the current rate of utilisation, **world coal resources could last another two hundred years**. While coal is likely to have a role to play in the future, generation of electricity from coal stations emits approximately three times more carbon dioxide than gas-fired stations. The technology to “capture” the carbon dioxide is expected to be part of the long-term solution, once R&D has brought costs down to affordable levels, and once the necessary infrastructure to transport and store the CO₂ is in place.

3.3 Yet over the next decade, planned **phasing out of nuclear units** (Magnox in the next few years to come, and AGR progressively from 2008) means that the production equivalent of the consumption of approximately 10 million households will disappear. Life extension has already been fully exploited for Magnox plant and there is limited potential for AGRs. On a similar timescale, environmental pressures on coal-fired stations will further widen the energy gap.

3.4 Nuclear power offers major benefits in terms of supply reliability. Firstly, nuclear provides baseload power – round the clock, irrespective of weather conditions. Fuel import requirements are so low that uranium can virtually be thought of as an indigenous fuel, and in any case source nations are politically stable (Canada, Australia, etc) unlike those where major gas reserves are found. Furthermore, it is perfectly feasible to stockpile a strategic resource of uranium or of fabricated fuel, if supply concerns were to emerge. In contrast, the UK has just two weeks worth of gas storage capacity.

4. Nuclear plants can be built to time and cost

4.1 Experience in countries such as South Korea shows that **series build of new nuclear station designs can be achieved to time and cost**, with successive improvements demonstrated between each unit. This has been achieved due largely to much simpler, lower cost designs, advances in the construction approach and substantial off-site fabrication.

4.2 In Europe, **Finland has committed to building a new plant** and has adopted an approach whereby risk is managed effectively. Finland has formed a consortium of government, constructor, operator and customers able to apportion risk appropriately, and willing and able to provide certainty on the sales of electricity. They have adopted an international design and have been very sophisticated in building public acceptance of the need for nuclear power. Finally they have made sure that there is a clear solution to the question of waste management. In the UK, where some past nuclear plant projects have suffered delays and cost overruns, there is scope to learn from this positive international experience.

5. Nuclear waste issues should not be a barrier to building new stations

5.1 The important fact in respect of nuclear waste management is that the **UK already has a waste inventory which is being managed safely and effectively**. For example, to date over 15,000 cubic metres of waste, including some retrieved legacy waste, has been encapsulated and packaged in stainless steel drums.

5.2 A fleet of replacement nuclear plants to replace the existing stations and maintain a 20-25% share for nuclear in the UK would add **only around 10% to the volume** of the existing more active wastes, over a 60 year operating lifetime. Furthermore, waste and spent fuel arisings from modern reactors are designed to be managed relatively easily and are well characterised. There are no new technical challenges. No decisions we make now about potential future nuclear power in the UK can affect the fact that we already have the legacy wastes to manage, nor will the scale or type of solution we need to put in place be significantly affected by the operation of further nuclear power stations.

5.3 Other countries including Finland, France and the US have already put in place the legal and regulatory framework to address this issue. In 2001 permission was granted in Finland for the construction of ONKALO, an underground rock characterisation facility, and if work in such a facility proves successful a repository construction phase would follow, with disposal commencing in 2020. France similarly has granted permission to commence work to develop an underground repository, and in the US the Yucca Mountain repository is due to open in 2010.

5.4 Although **wastes from new stations would be different** from legacy wastes, it is worth noting that substantial progress continues to be made in the treatment and management of the legacy. Further clarity on policy is expected shortly from CoRWM. This serves to build confidence that safe and effective management of future wastes will not be an issue

6. The track record of safety and security in the nuclear industry is excellent

6.1 The nuclear industry has an **excellent safety record** – in terms of both public and worker safety – when compared objectively with other sources of power generation. Furthermore, many new reactor designs incorporate passive safety features (i.e. they rely on natural forces such as gravity and thermal convection, rather than complex sensing and control systems) which make the possibility of any kind of accident ever more remote.

DRAFT – 9 DECEMBER 2004

- **Declaring Government policy** to be supportive of new nuclear power, in recognition of its climate change and security of supply benefits, and working to help build public recognition of these benefits
- **Licensing, regulatory and planning processes**, which need to be streamlined to avoid unnecessary delay and uncertainty, which currently act as major barriers to investment in high capital projects such as nuclear plants
- **Measures to incorporate the costs of carbon emissions** in the electricity market in a way which incentivises all low-carbon forms of generation
- **Mechanisms to encourage longer-term contracting** for electricity, so that potential investors can have some assurances on future revenue
- **Policy on the management of radioactive wastes**, again to remove uncertainty to potential investors.