5. THE CASE FOR NUCLEAR

5.1. According to a recent MORI poll[1] "*the public accepts that nuclear energy has a place in the overall energy balance (54% agree). A majority (55%) also agree that the best solution to the future "energy gap" would be to replace existing nuclear power stations with new ones at the same time as expanding renewable energy sources such as wind power*".

5.2. Nuclear power generates 20% of the UK's electricity but by 2020 that will have shrunk to 7% and by 2035[2] the last of the current generation of stations will have closed, leaving the UK highly dependant on imported gas.

5.3. Nuclear is a low carbon technology with an impressive safety record in the UK. It could generate large quantities of electricity, contribute to stabilising CO_2 emissions and add to the diversity of the UK's energy supply. According to British Energy about 40MtCO_2 of emissions each year are avoided by nuclear generation, which is almost twice the Phase 1 savings target brought about by the EU Emissions Trading Scheme.

5.4. **Amicus believes that it is vital for this Energy Review to recommend in the strongest possible terms, that the Government commit to ensuring that there will be replacement/new nuclear power stations built in the UK and the programme for same will commence within the next 12 months.** In our view it is vital for the future well being of the UK's economy and the quality of life of all people in the UK that this decision is taken.

5.5. In our view this means : building replacement/new nuclear power stations; life extensions for the existing nuclear power stations; a decision to deal with nuclear waste; incentives to encourage the UK supply chain to take full advantage of the opportunities for jobs; a review of the regulated system to deal with market related issues and a review of planning regulations in order to speed up the process for allowing new build to take place.

5.6. Building replacement / new nuclear power stations

5.6.1. There is an urgent need to commit to building replacement/new nuclear power stations on the existing sites where we already have a nuclear

[1] *7 November 2005*
[2] *DTI 5.11 Power Stations in the United Kingdom (May 2005)*

site licence approved by the NII and also Grid connections to UK's transmission systems. An urgent evaluation of the various nuclear reactors that have been developed throughout the world needs to be conducted and the NII need to be strengthened in order that they can approve those designs from a nuclear and industrial safety point of view in terms of being compliant with UK Nuclear Safety legislation.

5.6.2. There is a major concern, however, that the time-scale for any new or replacement build will be too long to synchronise with the decommissioning of the current nuclear fleet and this will provide a vital gap in generation. It is possible to construct 8GW of new nuclear capacity over a 12 -15 year period, preceded by a robust planning and licensing process, but this would require a very strict adherence to schedules.

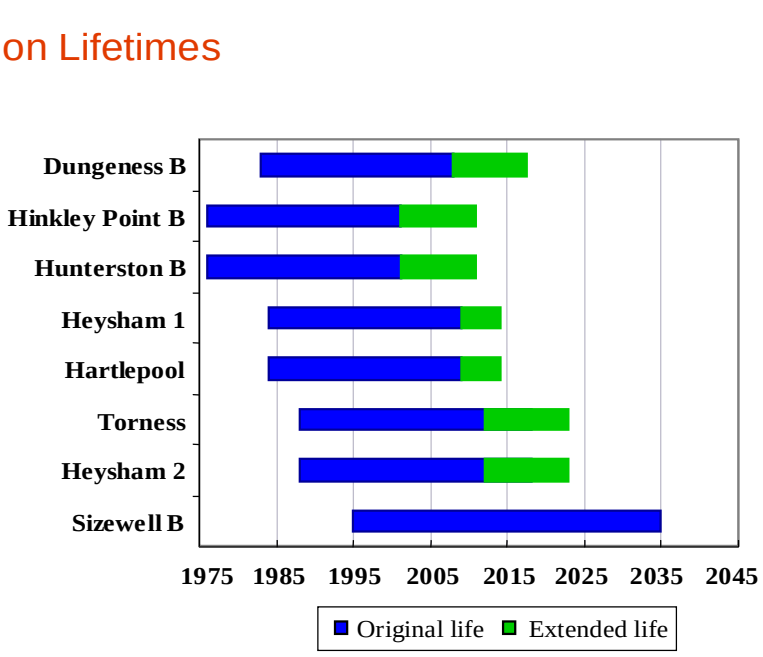
5.6.3. **The Government must also make a decision with regard to a standardised design**. **Amicus, based on anecdotal evidence, favours the Westinghouse AP1000 Reactor design as we must have a common reactor and ensure that we maximise the potential benefit to our manufacturing sectors by building much of the equipment in the UK.** Further, nuclear electricity generation should be brought to a level of 25% base load, the remaining 75% being taken up by other forms of electricity generation. In addition, there is a potential manufacturing opportunity i.e., the Springfields site currently makes the fuel elements for Westinghouse and could be developed as an international centre of excellence.

5.6.4. It is important for the country to control the scale and pace of new build to make sure it meets climate, security and economic objectives. At the same time, scarce skills in the nuclear industry must be used to good effect and not spread too thinly between new build, operating existing stations and decommissioning. To manage these risks, the Government must encourage British Energy to take a central role in any new build activity. This will create a positive future for their staff and will allow them to build staff numbers and manage transition as needed.

5.7. Life extension

There is a need to ensure that the maximum life extension is obtained from the existing British Energy fleet of power stations. At the moment, four of British Energy's stations are scheduled to close before the earliest date that new stations are expected to be commissioned. It is important that everything feasible is done to extend the safe operating lives of all the AGR stations and to line up their eventual closure with commissioning of new ones. This will reduce climate change and security of supply concerns for the UK and will give greatest chances for continuity of employment in the communities that are affected by these closures.

Graph showing current AGR/PWR Station lifetimes:



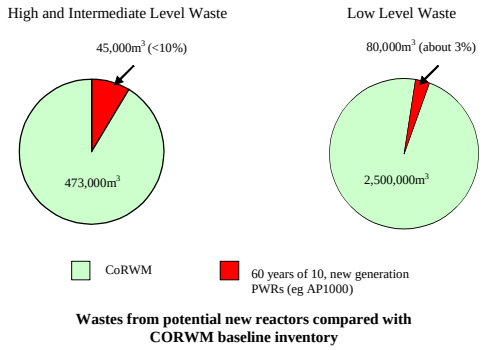
5.8. Dealing with nuclear waste

5.8.1. Successive Governments have failed in terms of taking a clear and unambiguous decision to build Deep Retrievable Nuclear waste repository. The legacy of this waste is mainly from the Ministry of Defence military programmes but also from hospitals and requires the nation to take this course of action.

5.8.2. The Committee on Radioactive Waste Management, (CoRWM), delivers its recommendations in July 2006 and Amicus has made it clear that we would like them to recommend a Deep Retrievable Nuclear Repository. Amicus believes that there should be one repository built, near Sellafield, (75% of waste is already at Sellafield), and that there are existing nuclear resources with the necessary skills and capabilities as well as having the geological characteristics that would give us confidence from a security and safety point of view.

5.8.3. The issue of spent fuel is not singular to the British nuclear industry but is pertinent to the Ministry of Defence, hospitals and industry in general. The 2001 United Kingdom Radioactive Waste Inventory, prepared by Nirex and DEFRA, reports that on 1 April 2001 there was estimated to be approximately 92,000^3 meters of radioactive waste in stock of which just 2% was classed as High Level Waste (HLW) and Spent Fuel (SF) from energy generation. The BNES suggest that if we replaced the capacity of our current fleet with new build the amount of extra waste caused would amount to less than 10% of the legacy of Intermediate and High Level Waste we are already carrying.

Chart showing the potential waste from building 10 PWRs compare ɔ CORWM baseline inventory.



Wastes from potential new reactors compared with CORWM baseline inventory

5.8.4. Amicus does not subscribe to the view that new nuclear stations should not be built until the treatment of radioactive waste is “solved.” This stricture is not applied to other energy sources. Most notably power stations using fossil fuels have continued to be built despite the fact that there is no “solution” in view for climate change.

5. 9. Decommissioning

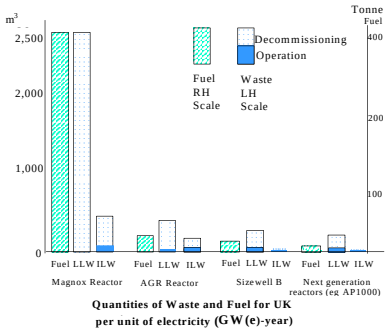
5.9.1. The Nuclear Decommissioning Authority was set up by the Government to take responsibility for decommissioning all civil nuclear sites. Amicus welcomed the creation of the NDA which aimed to ensure effective decommissioning within shorter time scales by opening up the process to competition. It is important that they continue to get a better understanding of the "baseline". Amicus also welcomes the contribution being made by the restructured British Energy to cover expected costs of decommissioning the AGR and PWR stations. On the latest estimates, the value of these contributions is more than the cost of "back end" liabilities that should be passed on to the NDA as the stations close.

5.9.2. An extremely important issue is the future of the Thorp Plant at Sellafield. It is essential this plant is re-opened and operated in a safe and competent manner and be allowed to fulfil the orders it has in terms of commercial contracts. Similarly the SMP plant needs to be

commissioned and operated. Once again every action should be taken to achieve that outcome.

5.9.3. For the future, the new designs take into account lessons learned about safe and economic decommissioning and will cost less to decommission.

Diagram showing – Quantities of Waste and Fuel for UK



Quantities of Waste and Fuel for UK per unit of electricity (GW(e)-year)

5.10. Supply Chain

5.10.1. IBM Business Consulting Services have carried out a research study to evaluate the capability and capacity of the UK and global supply chains to support a new nuclear build programme in the UK, to investigate the key issues and barriers that exist and to identify what actions could be taken to facilitate a UK programme. This research study assumes, inter alia, a replacement/new nuclear build programme in the UK would commence shortly after 2010 and concluded.

5.10.2. The UK supply chain has the capability to deliver many of the elements of a new nuclear build programme, particularly the non-nuclear systems and infrastructure, but would require investment in facilities and staff in some of these areas.

5.10.3. The global supply chain may itself be capacity limited in some areas as global demand increases and, therefore, if the UK wishes to proceed with a new nuclear build programme, action would need to be taken to ensure that the UK is an attractive market for global suppliers, operators and investors.

5.10.4. For a new nuclear build programme to be successful in the UK and to attract both the UK and global supply chains, there are a number of critical issues and enablers which the supply chain cannot control and

where strategic direction would be required. These include an energy policy with a clear position on nuclear power, a nuclear waste strategy, site selection, the public inquiry process and the impact of the regulatory environment along with the current planning requirements which include:

- Statement of need
- Justification - Justification of Practices Involving Ionising Radiation Regulations 2004
- Strategic Environment Assessment - Strategic Environment Assessment Regulations 2004
- Section 36 Application & Environmental Impact Assessment - Electricity Act 1989
- Discharge Application - Radioactive Substances Act 1993
- Article 37 Submission - Euratom Treaty
- Nuclear Site Licence - Nuclear Installations Act 1965
- Security & Safeguards Arrangements - Nuclear Industry Security Regulations 2003 & Euratom Treaty
- Also: Building Regulations, PPC Authorisations, Marine Construction Works Approval and CDM notification.

5.11. Costs

5.11.1. The current cost barrier to nuclear new build has to be overcome if we are to take advantage of the environmental benefits at stake. At present, economics and uncertainty act as disincentives to private investment. An indication from government about the future direction it intends to take towards nuclear would go some way to encourage investment in the industry.

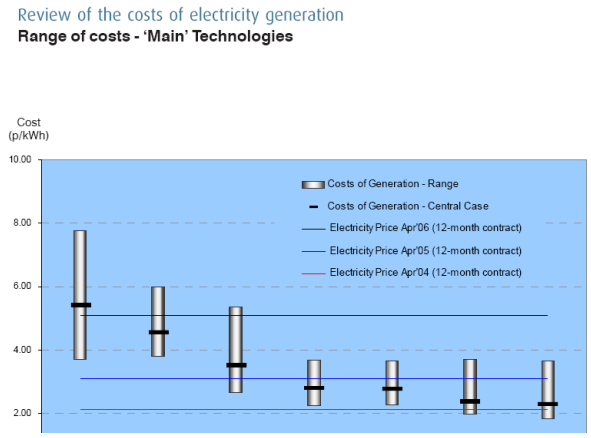
5.11.2. Nuclear is a base load energy, i.e. it is operated continuously. As such it can not compete in the present market where electricity prices are unpredictable and subject to hourly fluctuation. **The Government review of the market arrangements must ensure that base load energies can compete alongside peak load and other more "flexible" plants in order to attract more investors and meet the needs of customers and consumers.**

5.11.3. The capital cost of a new nuclear plant represents the majority of the total cost of generation, typically as much as 70% for a base load plant. However, operational and maintenance costs and fuel costs are relatively low. A recent study by the Royal Academy of Engineering took the actual costs of building, maintenance and running various types of power station in the UK and derived costs of producing electricity by using a common financing model with a nominal discount rate of 7.5%. The 2004 study showed that for base load operation, a nuclear fission plant was the second cheapest way of generating electricity and clearly competitive with high technology

clean coal.[3] This was, however, at a time when the then cheapest form of generation, via natural gas, was at a price far lower than those of today.

5.11.4. PB Power was commissioned by The Royal Academy of Engineering to undertake the underlying analytical work on technology costs, fuel prices and other costs associated with the production of electrical energy from a wide range of electricity generating technologies. As a contribution to the Energy Review, PB Power has re-examined the work it carried out for The Royal Academy of Engineering in 2004 and updated some of the assumptions it made at that time on capital costs of generating plant, fuel costs and discount rates.

Diagram showing range of costs – 'Main' Technologies
PB Power – Powering the Nation
A review of the costs of generating electricity, March 2006



5.11.5. It is our view that new and replacement build can be encouraged without placing a massive burden on the UK tax payer. We also believe that the incentives for low or zero carbon emission technologies should equally apply to nuclear as it clearly falls into this category.

5.12. Manufacturing

Given that nuclear generation takes place in some remote areas of the UK, decommissioning without new build will cause wide spread effects to the local economy. Anglesey Aluminium is a huge user of electricity and, as its output goes up, so does its power consumption. The direct impact for Anglesey Aluminium will be the increase in cost

[3] *The Cost of Generating Electricity" Royal Academy of Engineers. (2004)*

of electricity currently being supplied by Magnox to the smelter via Wylva Power Station (nuclear) situated on the Island. It has been estimated that from October 2005 until 2010 the cost to the Smelter will be an additional £7 million per annum. It is no surprise that the future of this Anglesey Aluminium smelter is therefore at risk from these cost pressures causing one of the largest employers in North Wales to be at risk of closure.

5.13. Regulatory regime

5.13.1. The existing regulatory system does not have the flexibility required in order to allow a balanced energy policy to operate in the UK. Amicus supports competition, but we believe there will have to be detailed discussions with the industry, the regulators, the DTI and other stakeholders regarding the construction of a regulatory model that would be flexible enough to allow all forms of generation, including nuclear, to operate within a framework that would have restrictions but still maintain competition.

5.13.2. There are a number of issues that need to be addressed apart from cost and these include security of supply, environmental impact, national competitiveness and social concerns. In the view of Amicus, the advantages that nuclear provides with regards to the first two issues are significant and if combined with the overall cost of generation, makes it a viable component of a diverse energy policy. The high safety standards set by the World Association of Nuclear Operators (WANO) and the Institution of Nuclear Power Operators (INPO) are intrinsic to the industry and must be exported to other developing countries alongside the technology and expertise.