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Visions of Nuclear in the 21st Century

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- Modern economies need baseload generation.
- There are only four fuel choices - oil, gas, coal, nuclear.
- No type of baseload plant has been built in a deregulated, competitive market.
- The deregulated electricity market gives price signals at best one or two years ahead. Baseload plants need 5-10 years to bring on line.
- Baseload plants are not being built in the UK today because:
 - Over capacity (c 40% supply margin).
 - Electricity prices for generation are below new entry level costs of any fuel type.
 - Long term supply contracts (15–30 years) which all fuel types need are not available.
- This leads to scenario that as supply margins tighten (Government forecast zero about 2015), prices will rise significantly as market two years out senses supply shortage.
- Under present policies gas is quickest to market and will dominate generation mix (80% + by 2020) resulting in significant rise in CO₂ emissions as nuclear is phased out. This supposes that a 15 year supply contract can be put in place.
- We recommend the energy review results in the following changes to policy so that nuclear baseload stations can be built in response to the market.
- Modification of current climate change mechanisms (Climate Change Levy) recognising that nuclear generation should benefit from the fact that it makes virtually no contribution to greenhouse gas emissions.
- Streamline planning and regulatory approval processes.

- Decide on overall policy for radioactive waste management which recognises:
 - Nuclear Waste currently managed safely
 - Prolonged safe storage is a viable approach to management of intermediate and high level wastes whether reprocessed or not.
 - Need to put management of legacy waste on commercial footing.
 - Need to clarify the obligation for spent fuel management costs of new build.
- There must be a review of how long term contracts can be put in place. This is important for any fuel type for baseload stations. The only mechanism being used today is the requirement on supply companies to have 10% of their output from renewables where they give 20 year contracts to 30/mwhr.
- BNFL believes that there is a powerful case for nuclear power to be supported. However, if current market mechanisms are maintained over the next two decades and nuclear reactors are decommissioned as planned, no replacement capacity will be built. The UK will be reliant on imported gas (up to 80% of supply) to meet the growing demand for electricity.
- Over-dependence on imported gas for electricity would result in serious long term consequences: i) supply will be far less secure as over 60% of proven gas reserves lie in the Middle East and Russia, ii) prices would be volatile, and potentially rising, reflecting the need for gas infrastructure enhancements, as UK reserves dwindle; iii) greenhouse gas emission reduction targets would almost certainly not be met.
- Nuclear electricity generation currently makes a major contribution to the Government's key energy policy goals. This capacity should be actively replaced so that nuclear power will continue to represent a significant proportion of the UK energy portfolio for the following reasons:
 - Safety: the nuclear industry's safety record is good and has steadily improved across the world because of firm regulation, improved designs and greater operational experience. The UK's nuclear reactors have operated safely for the length of their existence, over four decades.
 - Security of Supply: nuclear contributes significantly to security of supply: (i) nuclear adds to the diversity of energy sources; (ii) the uranium feedstock is plentiful and comes from stable countries such as Australia and Canada; (iii) nuclear provides reliable baseload generating capacity; and (iv) fuel availability can be assured through retention of strategic stocks either of finished fuel or of raw uranium feedstock.
 - Cost Effective: nuclear generation costs for a new reactor in the UK are expected to be in the range of 2.2p to 3.0p/kWh for an advanced passive (AP) design, i.e. competitive with any other source. Costs, however, would be substantially less volatile due to low exposure to fuel cost movements. To

ensure cost-effectiveness, it is vital to standardise on a world class reactor for the future, such as BNFL's AP design.

- Minimal Emissions: the presence of a significant component of nuclear power in the generation mix ensures that large quantities of high density base load electricity are provided with virtually no CO₂, SO₂ or nitrogen oxides (NO_x) emissions.
- A strong domestic nuclear generation programme would maintain the UK's global market position in the nuclear fuel cycle. By helping the UK keep at the leading edge of the science and technology base, it would contribute directly to regional employment, as well as contributing indirectly through overseas earnings.
- The current availability of private finance for large infrastructure projects in the UK (eg £650m for Birmingham northern relief road, £1.4bn for National Air Traffic Service) suggests that the market would consider the private financing of new nuclear plant positively, provided that the project is sufficiently attractive (in terms of its returns and risk profile) and that the key issues can be addressed. Furthermore, recent sales of existing nuclear plant in the USA demonstrate that the equity markets are not 'prejudiced' against nuclear plant.
- BNFL is a national UK resource. Its nuclear scientific, technical and engineering resources serve nuclear utilities worldwide.
- The only new generation USA Approved design AP600
- Nuclear fuel supplier
- Nuclear services supplier
- Spent fuel management
- Decommissioning expertise

It is well positioned to benefit from the nuclear resurgence.