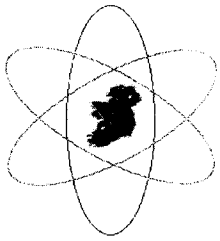
BENE

Better Environment with Nuclear Energy



24 November 2006

Response from **BENE*** to Statements in Energy Green Paper, Nuclear Section

Statement 1

"The government believes that for reasons of **security, safety and economic feasibility** (.....) nuclear generation would not be an appropriate choice for this country"

Response

Assuming that "**security**" means resistance to terrorist attack, or a reliable and adequate fuel supply, or both, we make the following response:

Modern NPPs (nuclear power plants) are enclosed in robust containment buildings with very thick reinforced concrete walls and roofs designed to withstand aircraft crashes. Robust structures containing the reactor coolant within this building, such as the reactor pressure vessel and connecting pipe-work, are designed to ensure the proper containment of the coolant which may be required to provide continued cooling of the shut-down reactor - the impact of an aircraft would trigger the automatic shutting down of the reactor. Moreover, all NPPs are subject to strict national and international security regulations and overall they are highly **secure against terrorist attack.**

With regard to the **security of fuel supply**, NPPs are in a far better position than fossil fuel plants. This is because the uranium ore used to make the fuel comes mostly from politically stable parts of the world within the OECD and its refinement into fuel rods is also carried out there. There is an ample supply of uranium to sustain growth of nuclear power according to Nuclear Energy Agency (NEA) of the OECD and the IAEA – see NEA/IAEA press release dated 1st June 2006. Also because the energy content of nuclear fuel is so much greater than that of fossil fuel it is easy to stock-pile a supply for many years of operation; a 1000 MW nuclear reactor uses some 20 tonnes of fuel rod bundles per year as opposed to a coal station of the same size that uses about 2,000,000 tonnes of coal. Generating plants driven by oil and gas have a similar problem in maintaining adequate fuel reserves, but not as severe as coal plants.

Regarding **safety**, over 400 reactors have been generating electricity safely around the world for the past 20 years. There have been no accidents causing serious health or environmental effects; this compares well, if not better, with competing technologies over the same period. Prior to this period there were three serious accidents, namely, at Chernobyl, USSR 1986, Three Mile Island (TMI), USA 1979, and Windscale, UK 1957. The Windscale accident, which caused no fatalities, was at a military reactor designed to produce plutonium for nuclear weapons and therefore is not really relevant when trying to judge the safety of today's commercial NPPs. The TMI accident caused a small release of radioactive gas but no fatalities and no serious or lasting environmental damage. The Chernobyl accident had very serious effects but should not be seen as a reference accident when judging the safety of today's reactors. Chernobyl and other RBMK reactors suffered from a basic design fault which allowed the reactors to be unstable at low powers and be susceptible to a power "runaway" which is what happened; they also do not have the type of containment building that TMI and other western reactors have. Additionally, design, construction, and operation of Chernobyl were not subject to a "western" type regulatory regime; the test which caused the accident did not have the necessary approval of the Soviet regulatory organisation. When considering the safety of modern reactors the TMI, rather than the Chernobyl, accident should be seen as the "reference". Improvements in later designs incorporating increased levels of

"passive" safety with less reliance on operators have provided even greater levels of safety. For a quick appreciation of the relative safety of nuclear power in the USA over the period 1966 to 1997 see Irish Academy of Engineering (IAE) "Future Energy Policy in Ireland" (2006) Part 2, page 83.

The **economic feasibility** of nuclear power has never been more evident than today. With the recent increases in oil and gas prices and taking into consideration the near zero greenhouse gas emissions associated with the nuclear fuel cycle, nuclear power is now the least expensive method of generating electricity - see Royal Academy of Engineering, "The Cost of Generating Electricity" (2004) and International Energy Agency/Nuclear Energy Agency's "Projected Costs of Generating Electricity" (2005).

Statement 2

"...the addition of a large base-load nuclear unit (typical size of c 1600 MW) into a small island market with limited interconnection would not be desirable from either a system reserve or running regime perspective"

Response

While this statement in itself is true, why were smaller base-load reactors not considered? In early 2005 there were 24 reactors under construction around the world. Of these 11 had maximum rated outputs of less than 900 MW. Among these was a well proven 655 MW Candu reactor which would fit well on our grid. We assume the reason for the choice of a 1600 MW reactor was the mistaken belief that only large reactors are economic. Even if this were so, bearing in mind the establishment of an all-island grid and its growth during the lead time for the construction of a reactor, a large reactor, for example a 1000 MW Westinghouse APR 1000, could be accommodated. This reactor, which is licensable in the USA, is currently under consideration by the UK and is certainly economically viable.

Statement 3

"...the problem of nuclear waste disposal in general remains unsolved around the world"

Response

The average sized reactor produces several hundreds of tonnes of waste per year. Most of this is categorised as low and intermediate level radioactive waste. This waste is being treated, packaged and safely disposed of in most countries employing nuclear power and also in many countries that do not employ nuclear power but which produce radioactive waste from industrial, medical and research activities. Technical solutions for the disposal of the remaining waste in the 20 tonnes or so of spent reactor fuel have been available for implementation for many years. The sole remaining problem of their political acceptance, however, has not been generally solved. A notable exception is to be found in Finland where approval at technical, political and community levels has been reached. Other countries such as Sweden and the USA are making good progress towards similar solutions. The quantity of high level waste produced to date is so small that storing it safely while awaiting the necessary approvals has not been a problem. In any case such storage allows the waste to cool down which is a necessary prerequisite for disposal. The disposal of all categories of radioactive waste in general is far safer than that of the products of combustion from the burning of fossil fuels which are causing countless deaths annually and a serious rate of climate change that is damaging the world's environment. See IAE report on "Future Energy Policy in Ireland" (2006) pages 81 and 82 and also the recently released Stern Report. Finally, it is likely in the near future that certain nuclear-weapons countries will supply complete reactor fuel services under an arrangement to be called the Global Nuclear Energy Partnership (or something similar): this is an idea proposed by the USA primarily to increase security of fissile materials but it will also have the effect of relieving recipient countries of the burden of waste disposal problems.

Conclusion

For the sake of the economy and environment there must be immediate and serious consideration, at all levels, of the use of nuclear power. To encourage commercial interest in the debate the present statutory prohibition on nuclear generation of electricity should

be revoked. In parallel, an expert group of engineers, scientists and economists should be established to gather the facts and advise the Government on the feasibility of the use of nuclear power in Ireland for the generation of electricity and heat for processing.

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