

The Future for Nuclear Power in Europe

by Professor Ian Fells, 4th February '05

Nuclear power provides 32 per cent of EU(25) electricity, more than any other fuel source; coal provides 30 per cent. It is secure, with an enviable safety record and does not put carbon dioxide into the atmosphere. Recent analyses by the Royal Academy of Engineering in the UK and the Paul Scherrer Institut in Switzerland, show the cost of generating electricity from the second generation of nuclear stations is on a par with gas-fired generation, around 2.3p (UK); however, the gas price has risen sharply recently since the reports were written, coal is 2.6p. This makes nuclear a good deal cheaper than onshore wind which comes in at 3.7p without back-up for windless days, and 5.4p with back-up and very much cheaper than other renewable electricity sources such as solar, wave and tidal power. The notion that nuclear power is uneconomic is out of date.

As the UK takes over the presidency of the G8 countries, protection of the environment has risen to the top of the agenda. Prime Minister Blair has called for a reduction in carbon dioxide emissions of 60 per cent by 2050, in order to stabilise the weather machine. This is an heroic challenge as the EU is unlikely even to meet its modest Kyoto reduction target of 8 per cent of greenhouse gases (of which carbon dioxide is the major component), by 2010.

So why are countries like Germany and the UK phasing out nuclear power, which is a vital component of their carbon dioxide-free power generation, and are decommissioning their nuclear stations as they come to the end of their useful lives, typically between 30 and 50 years? They will all disappear over the next 30 years, and in many cases considerably less, leaving a huge gap in electricity supply. In the UK, nuclear power provides 23 per cent of electricity and in Germany 28 per cent. In the EU overall, nuclear power reduces carbon dioxide emissions by 600m tonnes per annum, equivalent to 80 per cent of the emissions from all transport in the EU.

What non-polluting power source will replace these decommissioned power stations? The political answer is renewable electricity, but this is becoming more and more unlikely as renewable targets are missed. It requires 2,400 large 2 MW wind turbines to replace one typical nuclear station. Because of the intermittent nature of wind (there is no wind at all for as much as one sixth of the time in northern EU countries), reliable back up from coal, gas or nuclear stations has to be provided and paid for. The only reliable, non-polluting power source is large scale hydro power, but we are running out of new sites in Europe. The philosophy of replacing nuclear power with renewables is absurd. All it accomplishes is replacement of one non-polluting electricity source with another. This does nothing to reduce the carbon dioxide emissions from the increasing number of gas-fired stations, currently the preferred choice for meeting increasing demand for electricity and replacing old nuclear stations.

Attitudes are changing in some countries. Finland and France take a different view, as do some of the new entrants to the EU. Finland has ordered a new European Pressurised Water Reactor (EPWR), which they see as the cheapest, non-polluting electricity source and one which has the added advantage of being under their control, unlike imported natural gas from Russia. France has a steadily expanding nuclear programme, which goes back 40 years; there are now 56 nuclear stations which provide 78 per cent of French electricity. It is the only country in Europe where carbon dioxide emissions from electricity generation have steadily declined. Electricite de France (EDF) has ordered a new EPWR station for the Flamanville site and plans steady replacement of some 19 of its ageing nuclear stations.

France also sells cheap, nuclear electricity to a number of neighbouring EU countries some of whom are happy to buy it despite having an anti-nuclear policy in their own country. In Italy, Prime Minister Berlusconi, has indicated a possible move away from Italy's traditional anti-nuclear stance.

In the Far East, China has announced its intention of building between one and two nuclear stations every year, South Korea is 40 per cent nuclear, Japan is moving ahead with its nuclear programme, as is Taiwan.

The technology of nuclear power has moved a long way since 1956 when the first commercial nuclear power station was opened at Calder Hall in the UK. Inherently safe reactors are available from Siemens-Framatome, Westinghouse, General Electric, Canadian CANDU and others. These new designs produce only one tenth the radioactive waste of current designs and both Finland and Sweden are happy with deep, geological disposal of active waste. There is a safe way of dealing with radioactive waste despite the shrill, often repeated complaints by anti-nuclear groups that there is no solution.

In terms of risk management the possibility of a nuclear accident pales into insignificance beside the risks posed by global warming. If carbon dioxide emissions from burning fossil fuels are allowed to increase unhindered it will lead to destabilisation of the weather machine, rising sea levels and increased frequency of extreme weather events. A truly frightening prospect, admitted by most countries of the world with the exception of a few, unfortunately powerful countries, with vested interests in the oil industry. But recently, on January 12th 2005 in an interview in the Wall Street Journal, President George W Bush said "nuclear power certainly answers a lot of our issues.....the upcoming energy bill will include incentives for nuclear power".

There is no simple solution to this problem. A big increase in the use of renewable energy, despite its high cost, is an important part of the solution, but to neglect nuclear power for whatever green, emotional, un-technological reasons is like going into battle with one arm tied behind one's back. Dr James Lovelock, the distinguished scientist and environmentalist, said in an interview on the 28th August 2004 with the Independent Newspaper that "nuclear power is the only answer, there is no alternative". In December 2004, chief executives of over 20 electricity and nuclear service companies launched a joint declaration in Brussels calling for Europe to keep nuclear

power “at the heart” of its energy supply system. Only in this way can the twin challenges of global warming and energy security be faced, they insisted.

If we are to achieve the target of 60 per cent reduction in carbon dioxide emissions by 2050 we will have to institute a huge global programme of carbon dioxide reduction technologies. The G8 countries will lead the way but it will certainly not be achieved, with disastrous consequences, if we do not include nuclear power as part of the action plan.

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