

DOES THE NUCLEAR OPTION PROVIDE A SOLUTION TO GLOBAL WARMING? Alice Cutler 25.4.2005

Despite the promise to make 2005 the year that politicians would face up to the challenges of climate change the topic remains a low priority in the election campaign and plans continue for new roads, airport expansions and business as usual. I can only conclude that there is a deep-seated denial in our society about the seriousness of the situation we face. The G8 countries account for 12% of the world's population and 62% of the total greenhouse gas emissions. It is crucial that we cut our carbon emissions by 60%-90% to avert the catastrophic consequences of climate change, (IPCC). One sign that people are beginning to acknowledge something has to be done is the incredible resurgence of the nuclear power option, once again being hailed as the clean, safe, carbon-neutral way to produce electricity. James Lovelock, author of Gaia, famously came out in favour of nuclear power as an option to reduce the threat than global warming caused by the burning of fossil fuels. Nuclear has become a lesser evil in the minds of many and a Government white paper recommending that 10 new nuclear stations be built is apparently waiting in the wings for the election to pass.

Campaigns, such as CND, have traditionally focused on nuclear weapons and on the still unsolved issue of highly dangerous nuclear waste and the health risks from the radiation associated to it. This article is more concerned with nuclear power and with exposing the myths that the nuclear option could provide a solution to cutting greenhouse gases. With the concerns over impending climate change and in the desperate search to find non-fossil fuel energy sources, the facts about nuclear power have become blurred. Let's look at what the real science of the matter shows.

MYTH: Nuclear power does not create carbon dioxide (CO₂) emissions

REALITY: Although most reactors do not produce CO₂, the nuclear fuel cycle does. Uranium mining, milling, processing and enrichment, dealing with nuclear waste and transportation are all carbon intensive processes. The amount of CO₂ produced depends on the grade of uranium ore and the method of enrichment used to process the uranium. The fissile material (U-235) in natural uranium only constitutes around 0.7% which is too low for nuclear reactions to occur. This fissile material must be enriched approximately fourfold for it to be able to be used in a reactor. The enrichment process requires enormous processing plants and is hugely energy intensive.

Using favourable assumptions (i.e. high-grade, easy-to-process shale ore, diffusion enrichment and an easy method of waste disposal), the nuclear option is estimated to produce as much as one third the CO₂ produced by gas-fired power stations, per kilowatt hour (kWh) of electricity. Using more pessimistic assumptions, (low-grade ore, hard-to-process granite ore, centrifuge enrichment and difficult waste disposal) nuclear cycle carbon emissions could equal or even exceed those of gas-fired power stations. There is a deficit of research relating to these statistics with none of the governments using nuclear power researching the claims about carbon emissions made by industry funded scientists.

MYTH: There is a limitless supply of fissile material.

The U concentration of uranium ore is the most crucial factor in determining carbon emissions and so it is important to note that, as with oil, we have already "picked

the low-hanging fruit". Most easily obtainable U-rich seams have already been mined and the search for high-grade uranium ore is becoming more difficult. This means that the CO₂ needed to extract equivalent amounts of uranium will inevitably increase in future years. Although very large amounts of uranium exist in the earth's crust and in the sea, the concentrations are so low that they are not viable, i.e. the energy required for extraction would exceed the energy produced. Also, uranium mining is a destructive, energy-intensive process which has had disastrous effects on nearby communities, such as those near the former uranium mines in Germany, the Czech Republic, Australia and Canada.

MYTH: Producing UK electricity with nuclear is a good way to cut greenhouse gas emissions.

REALITY: Electricity generation is only responsible for around 25% of annual CO₂ production in the UK (the rest is from transportation and domestic/ industrial/ commercial heating). The electricity we require varies enormously during the day with high peaks in the morning and evening (see fig 1). However nuclear reactors cannot be switched on/off or cranked up to meet these varying electricity loads: for safety reasons they work at a fixed rate 24 hours a day. This means nuclear could only make a maximum contribution of ~25% to UK electricity generation. Therefore the actual potential for CO₂ reduction is only about a quarter of 25%, i.e. 5%.

And of course there are other greenhouse gases as well as carbon dioxide. The end result is that nuclear is a very poor way to reduce UK greenhouse gases.

Fig. 1- Electricity demand through an average 24 hr period in UK.

The shaded area represents the potential total output of nuclear power.
Insert shaded area

MYTH: Nuclear is a cost-effective way to reduce emissions.

REALITY: To build the new reactors being proposed by the nuclear industry (i.e. the so-called AP 1000MW reactor) would cost approximately £1.4- 2 billion per reactor, assuming that 10 were built to get economies of scale.* Therefore the total cost would be around £14 to 20 billion. This would only be possible with massive government subsidies, which would probably be illegal under EU competition rules. £ per £, a number of studies estimate that nuclear is 5 to 7 times less cost-effective than efficiency/renewable energies in reducing CO₂ emissions. The priority should be end-use efficiency, i.e. efficiency measures introduced at the point of electricity consumption.

FACT: the DTI has consistently invested 2 to 3 times more in nuclear energy than in renewable and novel sources of energy. In 2004, the figures were £57.8 million on nuclear technologies and only £19 million on renewable sources. (See www.dti.gov.uk/expenditureplan/report2004)

FACT: the estimated time needed to observe legal procedures, carry out public inquiries, training and construction etc for a nuclear reactor is 10-15 years from the time of the decision. We must act sooner than this. THERE IS NO TIME TO WAIT!

FACT: the Royal Commission on Environmental Pollution (Flowers Report, 1976) said that until a method to deal with nuclear waste has been found no programme of nuclear fission should be carried out. To this day, no method exists. We should not be embarking on a new nuclear programme without having solved the huge nuclear waste problems of the first nuclear programme.

CONCLUSION:

In conclusion, nuclear is not a cost-effective, viable or safe solution to global warming and it does not address the core problem of unsustainable energy use. The question remains then, why is the Government considering a vastly unpopular return to nuclear power construction? Already British Energy (which runs most of the UK's nuclear stations) is supported by the Government to the tune of £300 million a year.

Lord Falconer, head of the Government's legal administration and close colleague of Mr Blair, was previously chief legal executive for British Nuclear Fuels in the early 1990s. Then he was instrumental in bringing legal injunctions against Greenpeace anti-nuclear campaigners and seeking sequestrations of Greenpeace assets. BNFL is an important UK company which has major US Westinghouse holdings and the Government wants to see returns on its investments in the company. Nuclear technology is a major potential export for the UK; countries such as South Korea, China and Taiwan are all potential customers. Could this be "the tackling of climate change" that Blair meant when he announced his 3 point plan to the UK Business leaders back in September 2004? (He said then that tackling climate change did not have to be an unbearable burden to business, that the UK could benefit from its leading role in the technology and science, and that we had to deal with rising emissions from rapidly developing countries such as China.) If Blair and the G8 truly wanted to face up to climate change they would stop their perpetuation of the neo-liberal market system that puts profit above all else and would address the dramatically unsustainable energy consumption of the rich and powerful. A return to nuclear raises the false and dangerous prospect that people believe that "something is being done", that energy remains plentiful and that no radical changes in their lives and consumption patterns are necessary. Meanwhile power literally remains in the hands of massive energy corporations and undermines the development of truly sustainable, community owned, small scale, local, renewable alternatives. It is typical of the techno-utopian view point that seeks to use ever more technology rather than tackle the underlying causes. The nuclear option represents a further example of exploiting a technology for the short-term benefit of the few with complete disregard for future generations or the health of the planet. The anti-nuclear movement in the UK must rise from the ashes and we must expose the dangerous myths of nuclear as part of the solution to global warming and demand real climate justice.

With thanks for technical information to Dr Ian Fairlie, a member of SERA (the Socialist Environment and Resources Association).