Nuclear Energy

Giles Chichester MEP

It is abundantly clear to me that the case for nuclear energy does need to be made, repeatedly, both to inform the vast majority of people who don't really know much about it and to counter the negative propaganda so passionately promoted by opponents. So, I have made a list of pros and cons which helps me see the issues clearly.

My first advantage is the basic fact of this technology creating a new and additional source of energy. I am no physicist so it seems all the more remarkable that so much energy can be extracted from so small an amount of material in a way unimaginable a hundred years ago.

The next strength is that nuclear energy is a well-proven and mature technology. 441 reactors operating worldwide, some for over 50 years and some licensed for 60 years working life, make this point. This is not to denigrate other, newer technologies because we need all the energy we can get but things like hydrogen fuel cells have it all to prove while nuclear fission is well established.

The third advantage lies in the bulk, volume base load electricity generated by nuclear energy. Not everyone sees large capacity power plants as a plus in an age where the concepts of distributed, decentralised generation are on the verge of becoming fashionable but for me the fundamental truth is that we keep on using more electricity and there can be no substitute for a 1000MW plant belting out power 24/7.

The fourth strength is the predictability of nuclear power output particularly by comparison with some alternatives such as wind or tidal, never mind gas supplies subject to arbitrary interruption and dramatic volatility in price.

The fifth strength is the operating safety record for nuclear power. Even that disaster the opponents love to mention, Chernobyl, has actually had a positive effect in providing a stimulus for ever greater attention to safety in Western reactors through the efforts of WANO, the World Association of Nuclear Operators, and WENRA, the Western European Nuclear Regulators Association. The industry safety record stands well in comparison with those for oil, gas and coal.

Next, I come to security of supply derived from a proven technology giving a reliable, consistent, predictable volume of output power over a very long working life. Because the fuel component is a relatively small part of overall cost, nuclear is much less vulnerable to raw material price changes or interrupted supplies.

My seventh advantage for nuclear, is long-term price stability. Despite the capital cost of building a nuclear power plant being high, the cost per kilowatt hour is one of the lowest of all generating technologies over the full working life. Having a long working life means it is possible to amortize construction, de-commissioning, waste treatment and disposal costs over a longer period. Above all, it means prices will be stable and predictable over the full working life.

It follows that I also think it cannot be said too many times or emphasised too much that nuclear energy is cost competitive. Statistics regularly compiled by the NEA (OECD Nuclear Energy Agency) underline this fact. Study after study by reputable and independent bodies tell the same story. And new designs of the next generation of reactors promise greater efficiency, lower costs and even better safety with less waste product. The historic fact of some reactor types turning out very expensive, and I can think of the go-it-alone AGR technology we embraced in England for example, is against the trend, in a very small minority and should not be allowed to detract from the overall picture.

My ninth advantage is the excellent long term return on investment prospects offered by nuclear energy. Just look at the USA where PWR's licensed for 40 years operation are being re-licensed for a further 20

years and consider the financial return that implies even after the cost of updating improvements required as a licensing condition. Of course, a stable regulatory and market framework is essential, requiring politicians and officials to swear a self-denying ordinance to leave things alone. This is difficult to imagine, but not beyond the bounds of possibility!

My tenth advantage of nuclear energy has only become apparent since the emergence of climate change theory and concerns about the potentially dramatic impact on our environment of global warming. For some years now climatologists, or most of them, have identified CO_2 emissions from burning coal, oil and gas for energy as the principal culprit. Nuclear energy emits a negligible amount of carbon over its full life cycle and a study by the UK Government Energy Technology Support Unit highlights this advantage. The study calculates the amount of carbon per kilowatt hour of electricity produced. The numbers are striking. Coal 955 grams, oil 828, gas 430, hydro and wind both 8 grams and nuclear a mere 4 grams.

I now turn to the arguments against nuclear energy.

Originally opponents linked the peaceful use of nuclear energy with the military applications of fission and fusion, ie the bomb. This played easily on people's understandable fears about the mushroom clouds and the horrors of Hiroshima and Nagasaki. Gradually over time I think people have come to accept that the physics and engineering of using nuclear fission to generate electricity is fundamentally different and safe but I believe an educational challenge remains.

The next argument was also about exploiting people's fears of the unknown and unseen. Radiation, radioactivity can indeed be dangerous if not handled properly but so can that most innocuous commodity water if you drink too much of it or if you try walking on it, for example. Yet all animal life has lived on earth for hundreds of thousands and millions of years unaware of background radiation from the ground. In Britain the radiation the average person is exposed to is 75% from background sources, 34% from medical and chemical sources and 1% from man's uses in the nuclear industry, other industrial applications and fall-out from the testing and use of nuclear weapons. The challenge remains to inform people about this.

Chernobyl was like manna falling from heaven for the opponents of nuclear energy. Never mind the facts of how it happened, the extent of the damage and the number of deaths and casualties this was a powerful, emotive argument that nuclear energy is dangerous, unsafe, nasty and should never have been invented. There is no doubt in my mind that those scientists and technicians who monkeyed around with and over-rode all the safety mechanisms to the point of precipitating the event have much to answer for in terms of people's perceptions about safety. The only answer can be full explanation coupled with complete openness and availability of information from the whole industry. Those who know have a duty to inform those who don't.

Next, the complexity of the back end of the fuel cycle allowed the still widely held myth and perception that "nobody knows what to do with radioactive waste" to take hold. It clearly worries many people who only hear the line about nobody knows and do not go on to listen to answers giving the facts about decommissioning and the various options for engineered solutions. Yet again there is a crying need for information to be widely disseminated.

A related argument is that nuclear energy is expensive and uncompetitive partly because of the cost of construction, but mainly because of extravagant estimates of the costs of decommissioning, waste treatment and disposal. In my view, the accusation that nuclear is too expensive has been the most serious and effective argument used by opponents and doubters alike. The only thing to say in addition to my remarks above about competitiveness is that we know a lot more now about these costs than was the case twenty years ago.

A different point has been made about the security risks arising from the vulnerability of nuclear power stations and spent fuel repositories to some form of terrorist attack or theft of fissile material. I am not a security expert and would not wish to speculate on what form of attack and systems of defence might be involved, but if one considers the size and expense of plant required to re-process spent fuel or enrich uranium then it seems to me the only realistic threat would be from a rogue state in cahoots with a terrorist organisation. I think we should put our trust in modern methods of intelligence and surveillance to counter that risk.

The latest argument concerns the availability of uranium. It goes something like this. There is only 30-40 years supply of uranium at the present rate of utilisation so there is no point in building any more reactors. If a shortage appears likely the price will rise and make deposits with lower concentration viable for extraction. Other responses include: re-processing spent fuel; fast breeder reactor technology; mox fuel fabrication; and more efficient reactor designs. And by the time we have done all that we may be on the threshold of the fusion era.

I make that ten arguments for and seven against with plenty of potential for debate. I want to see more public debate and dissemination of information because I believe the case for safe, reliable, ultra low carbon emitting, secure and competitive energy from nuclear can only benefit. Scientists, politicians and industrialists must all contribute. We have a quality and standard of life to safeguard as well as global warming to cope with and time is short.