The need for a roadmap for nuclear policy

Posted on Thursday 8th March 2012

As the world marks the first anniversary of the meltdown at Japan's tsunami-hit Fukushima nuclear reactor, the UK is confronted by a familiar conundrum over its own energy policies. It is in some ways unhealthy to continue to filter all discussion through the prism of the events of March 11 and the days that followed, but it cannot be denied that they propelled the debate over nuclear energy back to the top of the socioeconomic and political agendas. Japan is extremely cautious about the future. The likes of Germany swiftly decided nuclear power represents a dead end, while the likes of France continue to see it as a path to sustainability. And Britain still loiters at the crossroads.

We perhaps forget too easily that the UK is a nuclear nation of some standing. The world's first commercial nuclear power station, Sellafield's Calder Hall, was opened by the Queen in 1956 and, using its original reactor for the duration, operated without incident until its closure in 2003. Calder Hall employed Magnox reactors. Many subsequent designs followed. It was frequently remarked that no two reactors in the UK were alike, such was the level of British development, invention and innovation. But time moves on. The necessary culture has been forgotten. The workforce trained to deliver Calder Hall and its ilk has either long since retired or is on the verge of doing so. We lack much of the skills base required for decommissioning, let alone construction.

One of the major challenges we face if we are properly to embrace the nuclear option as a key element of our energy portfolio is to restore this capacity to provide highly trained specialists and high-specification products. We will have to find a way of making it attractive for companies to build nuclear facilities here.

Before that, however, we must solve the enduring puzzle of whether we want to pursue the nuclear alternative in the first place. And to achieve that it is imperative that we move on from a long and undistinguished history of discourse that alarms rather than informs, prizes the further entrenchment of bias over balanced opinion and, above all, ill serves the layman and therefore the wider public.

As Fukushima predictably illustrated, the issue of safety in general, and radioactivity in particular, is at the heart of opposition to nuclear power. At the root of this view are several basic misperceptions. The fact is that the nuclear industry's safety record is second to none when compared to those of its rivals. This is because nuclear facilities are conceived and constructed to genuinely astonishing standards. Fukushima offers a case in point. The plant was subjected to an amazing natural disaster – one that devastated virtually everything else that felt its incredible force. Were it not for some design flaws that would not be repeated today, the reactor – built in the 1970s, based on 1960s technology and in many ways hugely removed from its modern successors – might have survived intact.

Sadly, we live in an age in which it is customary to attach a heightened risk to almost anything, usually notwithstanding a lack of any notable evidence. The difference between perceived risk and actual risk, however wide the gap, is seldom a factor in our deliberations. The mere spectacle of an event such as occurred a year ago is sufficient to obscure that the nuclear industry is now safer than ever and that Fukushima, for all the nerve-shredding drama surrounding the battle against meltdown, was actually a testament to that.

By way of context, consider the following. According to an analysis carried out for the Nuclear Energy Institute, a nuclear reactor could withstand the impact of a fully-laden Boeing 747. Now imagine a 747 did crash into a nuclear reactor and that, as per the NEI simulation, the former was blown to pieces and the latter maintained its structural integrity. Reactors and aeroplanes both satisfy the most demanding manufacturing and safety criteria. How many people would call for the outlawing of planes and how many would demand the immediate shutdown of every reactor on the face of the Earth? Again, it is all about perception.

Equally, our understanding of radiation is far from complete. We know the consequences of high levels of exposure but have a far lesser grasp of what happens at the other end of the scale. There is radioactivity all around us – in walls, in concrete, even in bananas – and our bodies have adapted accordingly. Some experts even say we may need radiation to stimulate our immune systems. We are not yet in a position to determine unequivocal rights and wrongs.

Of course, beyond these fundamental concerns – and the important issues of waste disposal and proliferation – lies the ultimate question of whether nuclear power will have a meaningful and lasting role in the UK's energy policy. We are geared towards reducing greenhouse gas emissions, which will entail a drastic change in how we generate power, but what part will nuclear play in our efforts? The likelihood is that if we pin ourselves to emission targets we will face a phenomenal challenge to achieve them using only renewables. Wind power suffers from variability problems and space constraints. The cost of offshore wind power appears to have been significantly underestimated. Solar power is challenging in a UK context. Wave power has potential but has yet to be properly demonstrated. So what do we do?

France has done a much better job of figuring out what its energy portfolio should look like and formulating a policy that will take the country through the next 50 years at minimum. Having successfully rolled out thermal pressurised water reactors (PWR), it now has prototypes of fast reactors and is mooting how best to introduce them circa 2050. France has proved itself forward-thinking and visionary. By contrast, we may find ourselves at the mercy of short-termism. We have no idea what we will be doing in five years, let alone 50.

Needless to say, the drive to de-carbonise is laudable. Morally, we owe it to the generations to come to behave responsibly, and the course favoured by China or the US might influence us in that regard. But an absence of willingness from other countries may yet see pragmatism overwhelm good intentions, as a result of which we should expect to see gas claim a larger stake in the energy mix.

The decision, whatever it may be, is not one to be taken lightly, which is why we at the very least have a duty to promote a much more inclusive and edifying public dialogue on nuclear power and, indeed, the energy sector as a whole. Whatever our extant views, we can surely agree that this much is long overdue. The time has come for all the choices to be judged in terms of their authentic merits, their legitimate pros and cons, rather than swiftly dismissed on the basis of little more than ignorance and intransigence.

Martin Freer
Professor of Nuclear Physics, Director of the Birmingham Centre for Nuclear Education and Research.

Martin Freer is a Professor of Nuclear Physics at the University of Birmingham, where he is Director of the Birmingham Centre for Nuclear Education and Research. He is a member of the University of Birmingham's policy commission on nuclear energy, Nuclear Power: What Does the Future Hold?, which is due to publish its recommendations later this year.