

Malcolm Keay looks at policy responses in the USA, Asia and Europe

Harold Macmillan is famously said to have remarked that the biggest problems for any politician were ‘events, dear boy, events’. It is an indication of the highly political nature of nuclear power that it has been events, as much as economic and technological fundamentals, which have affected its development over the past four decades. At first, this worked in favour of nuclear. The oil crises of the 1970s led to a massive expansion in nuclear programmes worldwide. But the US programme starting slowing down in the late 1970s and the core meltdown at Three Mile Island in 1979 proved fatal; over 50 reactors on order were cancelled over the next five years and no new orders have been constructed since then. In Europe, the expansion was sustained a little longer, but Sweden held a referendum in 1980 which led to a decision to phase out nuclear power; Spain decided on a moratorium in 1983. Some countries held out until the Chernobyl explosion in 1986 proved another turning point; Italy announced a closure programme following a referendum in 1987. In other countries, like the UK, the slowdown in demand and a surplus of capacity meant that the

issue could be put on the back burner in the hope that the impact of the disaster would be forgotten. Only a small number of countries with particular concerns about energy security – France, Finland and some parts of Eastern Europe – retained active programmes.

During the early 2000s, as memories of Chernobyl faded and concerns about climate change increased, nuclear crept slowly back on to the agenda. With the energy price rises of the second half of the decade nuclear seemed to be in favour again and there was confident talk of a ‘renaissance’ – though few orders, at least in the OECD. Has the Fukushima incident put an early end to this renaissance? The article in this *Forum* by Malcolm Grimston presents a relatively optimistic view of the implications for nuclear construction; Gordon MacKerron looks at the economics and paints a more pessimistic picture. This article looks at the policy impacts and in particular at the policy changes announced. In the OECD at any rate the implications are likely to be serious – directly for nuclear power, and in their effects on energy security and emissions. The effects outside the OECD are likely to be less severe, reinforcing a trend already under way during the first decade of this century – whereas during the twentieth century, nuclear plant construction was concentrated in OECD countries (particularly in the USA, Europe and East Asia) and in the former Soviet bloc, during this century the main focus of attention is likely to be the Middle East, South Asia, China and Russia.

The policy response to the Fukushima incident can be divided into a number of main regions. First, in North America, the response has been relatively muted, but this is because nuclear was in any event falling from favour. During the last decade, prompted primarily by concerns about energy security, the Bush administration gave strong policy support for new nuclear construction under the Energy Policy Act 2005 and a wave of new plants seemed to be on the horizon. However, interest has now declined – the arguments for

nuclear are less pressing in the USA than elsewhere. For instance, growth in electricity demand is much slower than in Asia; US climate change objectives are less ambitious than in Europe. Furthermore, the development of large deposits of shale gas has created the prospect of low gas prices for the foreseeable future and has avoided any need for significant imports (as had seemed to be the case a few years ago). Add to that a President who is at best lukewarm about nuclear, and a political impasse which makes any major developments on climate change and energy policy unlikely, and the nuclear issue can be expected to stay on the back burner for some time. While it is not possible to rule out some nuclear new build in the USA, even the nuclear industry itself does not expect to see more than four new units by 2020 (as compared with the 104 in operation today). Given that most existing capacity is thirty or forty years old, the expected retirements would lead to a decline in total nuclear capacity. But the implications of US inactivity for the rest of the world are comparatively minor. The US can achieve a significant degree of decarbonisation simply by shifting from coal to gas so the decline in nuclear is unlikely to push up carbon emissions; and the abundance of shale gas means that the increased gas use is unlikely to have much impact on world prices.

With Japan the global implications are more significant but the position is less clear. Japan has relied significantly on nuclear power, for security and environmental reasons, but in the light of the Fukushima incident is undertaking a rethink. This could mean withdrawal from nuclear – Prime Minister Kan reconfirmed in mid-July that Japan should aim for a society that does not depend on nuclear power and pledged to increase the emphasis on conservation and renewables. However, some of his Cabinet colleagues disagree and there is as yet no overall roadmap for a transition (which Mr Kan has said must happen ‘systematically and in stages’). The problem is that the many constraints which originally pushed Japan towards nuclear power are still there

and it will not be easy to find alternatives to nuclear. This is an immediate as well as a longer-term problem; Japan used to depend on nuclear for around 30 percent of its electricity but the programme was largely the brainchild of the central government. Local communities were often less happy with having a nuclear plant in the vicinity – for obvious reasons, nuclear power has had adverse connotations for many Japanese. Following the Fukushima accident many reactors were closed for inspection or routine maintenance; they are only being reopened after they pass a series of tests and the decision is generally in the hands of local officials. At the time of writing only 19 out of 54 reactors were in operation and power supply remains tight. South Korea is facing a similar period of soul-searching. It has a major commitment to nuclear power with five reactors under construction but is, unsurprisingly, having to rethink its approach. As with Japan, the constraints are powerful and the alternative strategies difficult to elaborate.

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The likely short- and medium-term impact is to put more pressure on traded gas supplies. In both countries any new energy strategy remains to be settled and conservation and renewables are in any event longer-term options, so this is likely to affect markets for some time – indeed it could be the case for most of the rest of this decade, after which markets were in any event expected to tighten again. Gas markets in the Pacific therefore seem destined to remain tighter than expected for some years to come.

It is in Europe that the policy response has to date been clearest:

- Germany has decided to phase out its nuclear plants (which currently supply about one quarter of its electricity) by 2022, and

not to reopen the eight old reactors that are currently off-line. This will have big implications for its environmental and energy policies. Despite its commitment to renewables, and especially wind, Germany is probably going to have to build about 20GW of coal and gas plant to replace its nuclear fleet. The coal market may not be greatly affected, given the decline in coal use elsewhere in Europe (and the dominance of the Pacific in world coal markets). However, there will be a lasting impact on gas prices, as in the Pacific, and the previous confident expectation of a well-supplied European market now looks less certain. In addition, while the new fossil plant is described as only transitional, it will still make the achievement of Germany's ambitious environmental targets difficult or impossible – Germany is aiming to reduce emissions by 40 percent by 2020 and 80 percent by 2050. While it is helped by the fact that the baseline year of 1990 includes the Eastern länder, where emissions declined rapidly after reunification, this will still be difficult or impossible. At the moment (and before the nuclear closures) Germany was only on track to achieve reductions of around 30 percent. The nuclear closures will add around 30 million tonnes of carbon dioxide emissions a year until new measures can be effected (or nearly 5 percent of emissions) leaving a huge gap against the target. It will probably also lead to significant levels of electricity imports into Germany, potentially putting pressure on other countries' emissions (or leading Germany to import nuclear while denying itself its own indigenous sources).

- In Switzerland the plan is to phase out nuclear power by 2034. The wider implications for fossil energy prices and the environment are probably not significant given the long time scale but for Switzerland the energy policy impacts will be major. Switzerland gets around 40 percent of its power from nuclear and will find it difficult for environmental reasons to expand its

other main source, hydro, so it will have to rely on renewables such as solar and conservation efforts, both of which might prove difficult.

- Developments in other European countries are likely to have less of an impact. Italy has voted in a referendum against restarting its nuclear programme (against the government's wishes) but that merely confirms the status quo. Spain remains lukewarm in general and opposed to new plant construction. In Sweden, which seemed to have been reconciling itself to a resurgence in nuclear power, opinion has now swung against the option again. The UK has not formally changed its position but, with the government's proposals for Electricity Market Reform starting a slow process of implementation, new construction is not likely soon and there has been speculation about whether RWE and EOn remain committed to nuclear development in the UK, given developments in Germany. France, of course, retains its commitment to nuclear as do a number of smaller countries, such as the Netherlands and Finland, along with much of central and eastern Europe. However, given the impact of the recession, the slowdown in electricity demand and EU energy efficiency programmes, only a small number of new plants are likely to come on stream in the next decade or so. As in the USA, there will probably be a net decline in nuclear capacity in Europe.

Even in non-OECD countries there have been some protests and a slowdown in some areas – China suspended approvals for new plants while it reviewed their safety. However, in general active interest in nuclear remains high in the regions mentioned above. As Malcolm Grimston's article points out, the underlying need for nuclear power has not been affected by Fukushima; many non-OECD countries see the primary role of the energy system as to support economic development and that remains the central priority of their governments.

Overall the current position is

that around 60 reactors are under construction worldwide; China, Russia and India alone account for about two-thirds of the total and all have strong reasons for continuing their programmes – energy security concerns in the case of the Asian superpowers and releasing gas for export in the case of Russia. However, the 60 under construction compares with around 440 currently in operation; it is also estimated that around 30 plants worldwide will be closed as a result of Fukushima and, as noted, many countries in the OECD are now scaling back or reconsidering their plans for the future. Even if the impact outside the OECD is less marked, so that we are not likely to see the widespread freeze on new plant which marked previous incidents, three broad conclusions seem to emerge:

- Climate change concerns are not themselves going to lead to a resurgence in nuclear; the countries with the greatest commitment to emissions reduction are also those most worried about nuclear safety issues.
- The centre of gravity of nuclear development will move from the OECD, to Asia and the Middle East in particular. This could well further discourage development in the OECD. Any nuclear investor is taking on the risk of an accident anywhere in the world as Gordon MacKerron's article underlines. While there is no specific reason to believe that safety standards will be lower outside the OECD, the scale of construction there will increase that risk, if only because, in many cases, transparency outside the OECD is lower.
- The implications of the nuclear slowdown are tighter gas markets in the Atlantic and Pacific; higher carbon emissions and, as a consequence, higher energy prices generally, especially in Europe.

In short, although Fukushima may not have the traumatic impact of Three Mile Island or Chernobyl, it is likely to be another turning point on the winding road of nuclear development – renaissance postponed, at least for the foreseeable future.