

Re-constructing the UK Nuclear Industry

Many observers have said that the real decisions on nuclear will not be taken until after the election. It is argued that because of the long term nature of nuclear projects, utilities require certainty. The election of new Government provides as much certainty as one can ever have in a democratic state. While in principle this may be true, a private company investing in nuclear has a longer horizon of risk. Their timescales are those of not just one but of many parliaments.

A typical nuclear power station will take 5 years to construct and at least 20 years of operation before the project pays back the initial investment. Therefore, the 2010 election is unlikely to remove uncertainty completely from the minds of EdF and the partners in Horizon: Eon and RWE, as they contemplate each building 3 or 4 new large nuclear power stations and each making investments of ~£15bn during the next fifteen years.

On surface we can see much evidence of progress:

- EdF have chosen their sites at Hinkley point, near Bristol and Sizewell in Suffolk.
- Horizon, as a JV, has been formed and the first site for their new reactors is announced to be Wylfa on the Isle of Anglesey.
- Both of the candidate reactors designs: EPR from AREVA and AP1000 from Westinghouse, in November cleared the latest stage of clearance by the Nuclear Division of the HSE. During this process both have received at least one serious reservation about their designs which will require design changes.

During the next year, there remains a huge amount of detailed safety work to be completed by the utilities - EdF and Horizon and by the reactor vendors AREVA and Westinghouse, to enable the Health & Safety Executive and the Environment Agency to complete Stage 4 of their assessments on schedule, in June 2011.

Reactor Safety Design Changes

- **EPR** related to the reactor control and protection systems, requiring AREVA to separate day to day control from automatic and ultimate protection functions;
- **AP1000** Westinghouse has to show how their more 'passive' reactor system operates in the case of an accident – operation of a novel feature 'Squib' valves which allow the cooling circuits to de-pressurise quickly, and the involvement of operators in protection during an accident. Also, Westinghouse's novel primary containment has been queried. It protects the reactor against major external events such as aircraft crash or explosion, and also enables reactor heat to escape if other methods of cooling are to be lost. Like the concept, the methods of construction are also novel.

Also, the utilities have to obtain separate planning agreement from the new Infrastructure Planning Commission (IPC) for their chosen sites. The IPC was established only last year. Though the Conservative Party have put some distance between themselves and the new IPC, their complaint is about the lack of democratic accountability and they intend to change the law such that the IPC still operates but only makes a recommendation which then either approved by the Secretary of State or is subject to a vote in Parliament.



The planning process has been laid out but it is untested. There is much to be learned about how the new process will work and there is always the threat of legal challenge either to the process or of the IPC decisions by those for whom, nuclear is still completely unacceptable. Until all these milestones are passed, no final decisions about investment will be made.

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- Construction consortia are being formed with UK companies teaming with overseas companies with more recent experience of nuclear new build;
- Manufacturing investment such as that by Sheffield Forgemaster and by Rolls-Royce to manufacture nuclear components;
- Supply chain preparations to meet the technical and quality standards of nuclear;
- Training and education of huge numbers of staff required with the setting up of the National Skills Academy for Nuclear and new university courses for nuclear engineers.

Also the industry is preparing to move from 15 lean years since the completion of Sizewell B in 1994, to perhaps 15 years of plenty starting in 2012. The planned programme of construction of power stations is challenging the nuclear industry to re-make itself from top to bottom (see box).

The question is: Will the companies involved really learn the lessons of the past? Will they ensure that the new nuclear power stations are delivered on time and on budget? Or will they, as in Finland and even more surprisingly in France, make the perennial mistakes of inexperienced project management and weak quality control as in the past?

acumen7 members have the experience and the know-how to help construction companies identify programme and supply chain risk at an early stage and to take steps to avoid these pitfalls during construction of these nuclear power stations.

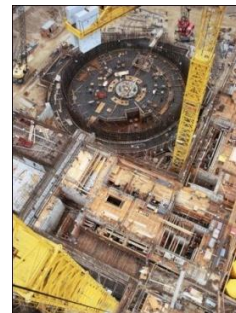


It is over 15 years since the last nuclear power station was completed in the UK. Now the UK **supply chain** for nuclear needs much development. Companies have either lost many of their experienced resources, through retirement or because of lack of work, or because the company decided to exit the sector. Now, with such a large programme starting in the UK and with the prospect of export nuclear new build markets opening up within the next decade, many companies want to re-enter the nuclear market and to re-skill their workforce.

Supply development divides into two parts: **manufacture** of nuclear components; site **fabrication and installations** skills. The Government has tasked the Nuclear Advanced Manufacturing Research Centre in Sheffield for the first, though planning for the work is at a very early stage. Civil contractors and M&E companies are beginning to be concerned about the second. There seems to be little inadequate concerted national action to re-skill the construction workforce. This issue is becoming action if we are to avoid the old error of fabrication and construction staff learning to work to nuclear standards by making mistakes on site.

The final and the most important issue is that of funding.

Both EdF and the Horizon partners recognise that given the uncertainties and timescales of nuclear there is no alternative (at least for the first batch of reactors) to funding these stations using their own balance sheets. Though the scale of their balance sheets is large, so are competing funding requirements of both other energy sources and other countries. But, there is one thing of which we can be sure. Neither whole of EdF's nor RWE's capital investment for the next 10-15 years will be channelled to the UK. However the funds are found, they will have to be supported by business cases that guarantee each project makes money from the sale of electricity generated together with any environmental credits or benefits that are available.



At present, the major uncertainties about both the level of future electricity prices and about the structure of other revenue sources, such as Carbon Credits and Levies/Obligations, are standing the way of making the business case for any large capital-intensive form of electricity generation including: offshore wind, carbon capture and nuclear. This problem seems to be similar to that faced by oil companies investing in new projects or new oil fields. However, both the diversity of subsidies for electricity generation and the involvement of the Government and its Regulator: *Ofgem* in the electricity market, are making the risks of the investing too high. *Ofgem* has recognised this problem and the huge gap in funding the UK's energy (gas & electricity) investment - estimated to be in the range £110-£194bn - over the next 10 years.

Key Energy Market decisions:

- Future of the EU ETS carbon market and hence carbon price;
- Enhanced Supply Obligations;
- Capacity tenders or allocation.

Ofgem is consulting on a complex range of possible changes to market regulation designed to deliver the Government's energy policy objectives of low carbon and security of supply. The answer to the nuclear funding conundrum will lie in the outcome of these consultations – which will not report until after the election. Then a new Government with a fresh mandate can consider the changes to the market.

This is the real reason why the election needs to be cleared out of the way before new Government with a fresh mandate for the far-reaching changes that are required in energy regulation affecting electricity funding. These changes will then allow the utilities to take their decisions about nuclear investment, which will signal the real starting gun for the UK's nuclear new build programme.

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Tony Roulstone

0775 362 7634

tony@acumen7.com

tony@bracchium.net

