

## Nuclear decay? Big challenges ahead for energy and waste

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Given recent events, one could be forgiven for thinking that the UK's policy on nuclear power and nuclear waste is unravelling — but does it matter? There is almost universal agreement that national energy security and the legislated commitment to reducing greenhouse gas emissions is the correct destination, but the journey may take many paths.



The re-sculpting of the electricity landscape is estimated to require over £100bn of investment. Deregulation of the electricity markets in the 1990s leaves the responsibility with the Energy Utilities and the vagaries of the market. It is widely anticipated that a key component will be nuclear energy — at least replacing the current nuclear power plant capacity.

The length of time for the Government to deliver the much vaunted Electricity Market Reform (EMR) and the setting of the strike price associated with the contracts-for-difference mechanism, which ultimately determines the price that companies can expect to get for electricity generation, is fuelling uncertainty.

It is no surprise that Centrica has finally lost patience and decided the future of the business lies outside New Nuclear — leaving EDF to seek international partners perhaps from China. Given that Centrica was the minor partner (20%) this may be judged to be low impact, but it is telling that the only British based utility — born of British Gas — has left all investment in nuclear coming from overseas sources.

This may be a masterstroke on the part of Government, or a source for major concern. Either way, deregulation has resulted in a certain lack of ability to centrally engineer the required revolution. There is a significant danger that without greater urgency more will unravel.

Although not directly coupled, the legacy waste from a generation of nuclear activity is a burning issue. First it should be recognised that a new generation of nuclear power plants would increase the volume of waste by only 10% over their lifespan — hence linking waste to new generation is a moot point. Nevertheless, there is a responsibility resting on the present generation to solve the waste problem.

The internationally recognised solution is to dispose rather than store. Dispose overcomes deep concerns over interference and bequeathed responsibility. The Nuclear Decommissioning Authority (NDA) propose the construction of a geological disposal facility (GDF) — ideally to open in 2040 at an estimated cost of £12bn. This would be constructed 500m underground, deep enough that it is out of reach of manmade and glacial activity. It would be opened, filled and then sealed.

Here the UK would be following in the footsteps of Finland and Sweden who are presently constructing facilities. In the case of the repositories in Scandinavia the host rock is granite. France is on course for the commissioning of its GDF in clay host rock around 2025, shortly after those in Sweden and Finland. Other national programmes are also investigating clay as a potential host rock, and Germany has extensively developed the salt disposal concept.

Up until recently, the proposed repository site was in Cumbria close to Sellafield, based on mainly volcanic rocks, and the disposal concept would be similar to the Scandinavian examples. However, the site is situated between three fault zones, underlining the difficulties in marrying ideal geological conditions with a willing host community.

The last point is key; finding an appropriate community willing to host the GDF. This is the model successfully employed in Sweden with an open competition between communities to host the site. Briefly the UK flirted with competition (with Shepway District Council's provisional interest), but quickly it reduced to one site in Cumbria and now with the latest Council vote, none. The waste disposal plan lies in tatters.

Volunteerism is clearly the right approach, but a key element is competition. There is a danger that the opportunity has been lost through the failure to maximally reward communities who offer to take on the responsibility of the nation, and convince them of the science. For rural communities there are great opportunities in terms of jobs and investment in local infrastructure, but there is a need by Government to be bold rather than conservative. Meanwhile elements of the waste storage facilities at Sellafield continue to deteriorate (with an estimated £67.5billion cost for clean-up) with surface storage being only a short term solution.

The challenges ahead on both fronts, energy and waste, are significant and mandate a more joined up approach between Government, industry, scientists and public. An important first step to such a solution could be a Nuclear Policy Council mirroring the function of the Committee on Climate Change.

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