SMALL BUT POWERFUL

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The year 2015 should see industry, investors and government finally committing to building the first new civil nuclear power plant in the UK for a generation, at Hinkley Point. But as attention continues to focus on the financial and technical complexity of these very large projects, is the UK overlooking an emerging global market for small nuclear reactors?

For decades, the public view of nuclear energy has been dominated by the image of large nuclear power stations, each one associated with a major construction project, long operational life and complex decommissioning. However, in December, the House of Commons Energy and Climate Change Committee published a little-remarked report entitled *Small nuclear power*. The report reflects the fact that the engineering of small modular reactors (SMRs), as discussed in Ingenia 52 in 2012, is at a stage where this alternative approach to generating nuclear electricity could become a commercial reality.

Small nuclear reactors are those classed as capable of generating up to 300 megawatts of electricity(MWe), a fraction of the size of the two 1,600 MWe reactors proposed for Hinkley Point.

The concept of an SMR is that its design should be amenable to mass production. SMRs would be shipped to a site as sealed units, installed on their own or in parallel with other modules and removed from the site for refuelling or for decommissioning, which could be up to 60 years later with large units. In some designs it may be possible to 'fuel for life'. Mass production needs to bring costs down to the level of other forms of distributed power generation but given that, safety concerns should be helped as the design basis of some SMRs can make them incapable of overheating. Although site level licensing will always be a requirement, regulatory approvals would be simplified due to the advantages of factory manufacture, leaving fewer issues to be addressed at installation.

Government interest in SMRs was stimulated by the recommendations of a House of Lords Science and Technology Select Committee paper in 2011. A workshop convened by Dame Sue Ion FREng led to a study being commissioned by a consortium led by the National Nuclear Laboratory (NNL). The resulting report, Small Modular Reactors (SMR) Feasibility Study, also published in December, describes the progress made in countries such as US, China, India and South Africa and the demonstrator plants already in operation or planned.

The NNL study explains that the size of the global market depends on whether SMR technology will become cost-competitive with large-scale nuclear plants or whether SMRs become an attractive solution for a wider range of locations, such as where the energy demand is limited or the distribution grid is unsuitable for conventional plants. The numbers are large, either way.

Can the UK exploit its long and successful nuclear experience to secure a slice of the action? The UK has an outstanding record in manufacturing, nuclear engineering and safety regulation, along with strong bilateral relations with potential international partners, as well as the commercial acumen to deliver a plug-and-play, service-based business model: selling electricity rather than reactors. But for the UK to become a partner of choice in a future SMR market, our industry needs to secure its place at the international table.

Developing a UK SMR capability will not happen through industry action alone: it requires the commitment of government and the regulators to play their part. The first step towards a global product is to bring industry and government together around an engineering research, development and demonstration programme, which should include a national SMR demonstrator project and be aimed at securing an international partnership for future market development. In parallel, finding ways to initiate early regulatory assessment and more generally to accelerate regulatory approval would build investor confidence in future international markets.

The window of opportunity is short and, with an election looming, it is likely that government attention will be diverted onto other issues. Industry has made its case and committees of both Houses of Parliament have expressed support. As the immediate task is to research the commercial viability of the technology in a public-private venture, should the government's Innovate UK now take the lead?

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