

The Hinkley Point C nuclear power plant project

Professor Steve Thomas
Emeritus Professor of Energy Policy
University of Greenwich

[My name is Stephen Thomas and I am Emeritus Professor of Energy Policy at the University of Greenwich. I have worked as an energy policy researcher, specialising in nuclear power economics and policy since 1979, until 2000 at the University of Sussex and since then till my retirement in 2015 at the University of Greenwich]

The Hinkley Point C project will be built and operated by a company 33.5% owned by China General Nuclear and 66.5% by **Électricité de France S.A**, EDF. The plant will have two European Pressurised Water Reactors (EPRs), 3.2GW, supplied by the French company, Framatome, previously Areva. EDF took a majority stake in Framatome in January 2018

In 2008, the UK government forecast that the cost of two EPRs would be £4bn and EDF claimed first power from Hinkley Point C would be in late 2017. However, by 2017:

- The estimated cost was £19.6-20.3bn, (5 times the original figure). Interest during construction is expected to cost an additional £10bn; and
- Completion was 2025-27, 10 years late.

A key plank to the 2008 nuclear policy was that new nuclear plants would receive no public subsidy, but as problems have mounted this promise has been repeatedly broken. For example, to allow EDF to finance its share of the project, the UK Government has offered to guarantee the loans EDF will require. In addition, EDF sought and has been given guarantees on lost profits if the project is halted before the end of its 35-year contract.

EPR problems

The EPR is an unproven design. No EPR is in service, completion of all four under construction globally is significantly delayed and costs have overrun. Olkiluoto in Finland is 10 years late and three times over budget, two reactors at Taishan in China are 5 years late. Flamanville on the north coast of France, a key reference point for the UK authorities, is 7 years late and more than three times over budget.

Regulatory issues

The UK safety regulator, ONR, carries out 'Generic Design Assessments' (GDA) for new designs intended to resolve all design issues before construction is allowed to start. An approved reactor design can be built at any site. This process was completed for the EPR in December 2012. However, the ONR final report makes it clear major design issues could not

be resolved then and the detailed design will only be completed and evaluated during the construction phase, contradicting the rationale for the GDA.¹

Quality control issues

In 2015, it emerged that parts of the safety-critical reactor vessel supplied by Framatome's Le Creusot Forge did not meet specification. These parts were already installed at Flamanville and Taishan. Those which had been advance ordered for Hinkley were subject to destructive testing to determine whether the sub-standard parts were strong enough. Given that the French nuclear safety regulator, ASN, had known in 2005 that Areva was using a forging process not approved by it and that the parts were installed by 2012, this issue should have been identified before the parts became hard to access and check. ASN has decided to allow the start-up of Flamanville, expected in 2019, but requires that the reactor pressure vessel lid be replaced in 2024. ASN has acknowledged that a key factor in choosing this date is that it is the earliest a replacement part can be available.

ASN ordered the company to review its quality control procedures and it has emerged that quality control documentation had been **falsified** at Creusot for up to 50 years. This has created major concerns about parts manufactured there for nuclear plants in France and elsewhere. The investigation is on-going. In March 2017, ASN ordered that production of parts at Creusot **for French reactors** be suspended because: "The tools at its disposal are not adequate to manufacture such huge components." "The inspection brought to light the fact that the safety culture in the plant is not sufficient to produce nuclear components."² The restriction was lifted in January 2018 even though there is no suggestion there had been any significant new production equipment installed. ASN has no role in supervising production of parts for Hinkley, which is the responsibility of ONR. Despite the ban by ASN, parts for Hinkley were being made at the Creusot Forge from July 2017 onwards.³ It is not clear whether ONR approved or was even aware that parts for Hinkley were being made.

Separately, in April 2018, EDF announced that up to 150 welds in key parts of Flamanville did not meet the required specification.⁴ It remains to be seen what remedial action will be needed and what further delays will be incurred. This places the completion of Flamanville by end 2020 in serious doubt. Completion by then was a condition imposed by the UK government on its offer of loan guarantees to ensure UK taxpayer money was not being risked on untested technology. Without loan guarantees it is hard to see how the project could be financed unless the UK government chooses to compromise again and withdraw the condition.

Conclusion

The Hinkley project is unpopular with a wide range of UK interests including many nuclear supporters because of the cost to consumers. EPR technology is suspect and the reputation of its supplier is in tatters. Yet as these problems have emerged the UK government has chosen to compromise and offer further subsidies rather than reconsider Hinkley. Mounting evidence

¹ See for example <http://www.onr.org.uk/new-reactors/reports/step-four/close-out/gi-ukepr-ci-01-close-out.pdf> (Accessed April 29, 2018)

² <https://uk.reuters.com/article/uk-areva-safety-creusot/areva-factory-ill-equipped-to-make-nuclear-parts-french-watchdog-idUKKBN16N1SL> (Accessed April 29, 2018)

³ Platts Nuclear News Flash, 26 January 2018.

⁴ <http://inpublic.globenewswire.com/releaseDetails.faces?rId=2182962> (Accessed April 29, 2018)

that options such as renewables and energy efficiency measures would be a much more cost-effective way of meeting the UK's climate change goals has been ignored imposing huge extra costs on future UK electricity consumers. The contract price agreed for Hinkley's output is £92.5 per MWh (in 2012 money), inflation indexed for 35 years. This is significantly above the September 2017 bids for off-shore wind projects of £57.5/MWh, and the current UK wholesale market price of £40/MWh. Formal construction will not start before 2019 and construction will provide large scope for further delays and cost increases.

There appears to be a worrying pattern with both ONR and ASN of inadequate supervision and an apparent willingness to make decisions that appear to favour the companies they supervise damaging confidence in the independence of these bodies in carrying out their crucial role.