



Role of the State in Nuclear Power Development

The Hinkley Point State Aid Case before the European Commission

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Earlier this year, the European Commission (EC) published its decision (notified by letter to the United Kingdom Government in December 2013) to launch an in-depth state aid investigation into the U.K.'s proposed financing scheme designed to attract necessary capital investment for the Hinkley Point C nuclear project. The most contentious measure in the financing package is a “contract for difference” (Cfd) mechanism, which provides a form of price protection to NNB Generation Company Limited (NNBG), a wholly owned subsidiary of EDF Energy, who will construct, own, and operate Hinkley Point. This is the first time the EC has considered whether the use of a Cfd measure in the context of a new build nuclear project will offend the European Union’s (EU’s) rules against state aid.

The decision, which is detailed in reasoning and apparently sophisticated in its analyses, has attracted little public comment from the nuclear industry. The lack of industry alarm may be driven by the oft repeated refrain that “EDF’s Hinkley Point deal is perhaps ‘too rich’” – a point the EC makes frequently and vigorously in its decision. Industry and policy makers alike should pay attention to this decision, key aspects of which hold potentially serious adverse implications not only for future new build projects in member countries but also beyond.

Aspects of the EC’s analysis, which has been described as “fiercely critical”, suggest a lack of understanding of the nuclear industry and the economics of new build nuclear projects, and display a naïve unscientific anti-nuclear ideology. The vigorous skepticism that the EC applies to the arguments made by the U.K. in support of its policy, gives way to extraordinarily shoddy work when it comes to the EC vigorously advancing its own assumptions. Most notably, three assumptions underlying key aspects of the EC’s decision fly in the face of evidence: (1) the implication that the construction of nuclear power plants is a commercially viable activity; (2) the express statement that new build nuclear power plants will eventually be built by private capital and will not require government support to remedy market failures specific to nuclear power; and (3)

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that the common policy objectives of the promotion of nuclear power by member states and the promotion of environmental protection are overridden by a vaguely stated (much less supported) belief that nuclear power is environmentally unsound and that the EU's express legislative policy in support of its promotion is secondary and subservient.

It is quite possible that the EC will be justified in its criticism on the narrow grounds that the evidence does not support the proposition that the market mechanism is both the correct remedy for a nuclear technology specific market failure and proportional. Nevertheless, the EC's final decision, to the extent that it follows the more sweeping and apparently anti-nuclear tenor and statements evident in its initial decision, could present serious challenges for the future of nuclear power projects in Europe and beyond. For this reason, it merits much closer scrutiny from the nuclear industry and policy makers, despite their geography or views on the specific Hinkley Point deal.

Background

Hinkley Point will be the first nuclear power plant built in the U.K. in almost two decades.² Beyond NNBG, investors into the project may include Areva and Chinese state-owned companies, China General Nuclear Corporation and China National Nuclear Corporation. The construction is expected to take 10 years, at a cost of approximately US\$26.2 billion, with an operational lifetime of 60 years.

The CfD measure proposed by the U.K. sets a strike price at twice the current price of electricity, and provides that when the market price of electricity is lower, the U.K. will pay to NNBG the difference between the market price and the strike price; conversely, where the market price rises above the strike price, NNBG will pay the difference to the U.K. The measure is included in a financing package that will also involve a state guarantee covering any debt NNBG will seek to obtain on financial markets to fund the construction of the plant.

The EC is investigating the proposed measure in connection with its obligation under the *Treaty on the Functioning of the European Union* (TFEU) and related legislation to ensure that government support for a proposed undertaking will not have a negative effect on the market. As noted by EC Vice-President Joaquín Almunia, the mechanism in question "is a complex measure of an unprecedented nature and scale. The EC therefore needs to investigate thoroughly its impact on the U.K. and the EU internal energy markets."

The EC's Analysis

State aid is defined as an advantage in any form whatsoever conferred by a government, on a selective basis, to undertakings. The EC considers five criteria in determining whether government support for an undertaking will constitute state aid. Specifically, the EC considers whether the proposed measure: involves money from public funds; confers a competitive advantage on the beneficiary; is selective, in that it affects the balance between the beneficiary and its competitors by not being a generally applicable measure; will distort competition; and will affect trade in the EU market.

Where all five criteria are met, the proposed measure is prohibited state aid, which must either be altered or eliminated, unless the measure is a service of general economic interest or otherwise falls within an

² Sizewell B first produced power in 1995. See e.g. World Nuclear Association: Nuclear Power in the U.K. <http://www.world-nuclear.org/info/Country-Profiles/Countries-T-Z/United-Kingdom/>

exemption. Thus, once a measure is found to be state aid, the key battleground becomes the applicability of a particular exemption, such as “aid to promote the execution of an important project of common European interest.”

Applying these criteria, the EC has indicated that the proposed measure involves state aid. The EC took the view that the measure “favours an undertaking selectively, thus threatening to distort competition and affect trade among the members.” Further the proposed measure does not “involve a genuine Service of General Economic Interest” and thus does not qualify for such exemption.

The EC expresses doubts about the claim that Hinkley Point is necessary to help achieve carbon emissions reduction targets because the U.K. could reduce emissions to the same extent in different ways, and subsidization of Hinkley Point could unfairly crowd out alternative energy technologies. Further, the EC does not view the nuclear power plant as necessary for ensuring security of supply and diversity, as the plant would not be complete prior to the U.K.’s predictions of a shortage of supply, and the U.K. underestimates the extent to which alternative technologies and continental interconnection could ensure such security and diversity. Finally, the EC does not appear to believe that nuclear technology requires state aid as it is a commercially viable endeavor and, furthermore, even where it could be shown to require state aid, the mechanism currently proposed is not proportional to the benefits. In brief, the EC is reticent to consider the financing package, as currently proposed, to be compatible with state aid.

Problems with the EC’s Assumptions

The Assumption of Commercial Viability

The EC’s discussion of the roles of government and private actors in the development and operation of new build nuclear power plants appears both to be internally inconsistent and to lack an understanding of the economics of the nuclear industry and the contribution of nuclear risk to market failure. On one hand, the EC expressly acknowledges that nuclear projects have “few, if any equivalents in commercial activities” and considerable levels of financing risks that “might well be considered unparalleled,” and that developers of nuclear projects are subject to certain risks. On the other hand, the EC’s analysis appears to be driven by the assumption that nuclear plants are (or could be) commercially viable and are equivalent to other forms of electricity generation, which operate in a competitive market. Thus, while the EC acknowledges the unique basket of risks applicable to nuclear power plants, its analysis fails to adequately address those risks in its assessment of the U.K.’s proposed financing package.

The EC rejects the notion that government must play an essential role to anchor project and financing risk at the early stages of a nuclear new build project. For example, the EC states that

... not only electricity generation is normally considered a commercial activity and a market in which competition takes place, but also and in particular nuclear technology has and can generally be considered a viable commercial activity. This appears to be confirmed by the fact NNBG will compete also against nuclear plants, which are operated commercially, seven of which are owned by EDF itself. It is therefore at the very last (sic) unclear why the market would

*not invest in the HPC plant, even if it uses a different technology than existing nuclear plants, under normal market dynamics.*³

This reasoning obliterates the distinction between the risks associated with developing and building a nuclear power project, which thus far have only allowed projects to proceed when anchored by public risk absorption, and those risks associated with the assumption of the long-term operation of existing nuclear power fleets, which is effectively market risk. It may well be that the EC is faced with a U.K. legislative policy that itself fails to make the requisite distinction by offering up a market risk hedge to entice technology vendors to assume nuclear construction risk. Nevertheless, the EC's decision blurs the distinction when convenient and, in so doing so, makes highly questionable statements, such as those quoted in the passage above.

What the EC fails to note is that the U.K.'s existing nuclear fleet, being Hinkley Point's competition, was built during a time of nationalization with the full support and financing of the state. The construction of these projects cannot be said to have occurred under "normal" market dynamics and most certainly did not occur on commercial terms. The fact that the U.K.'s existing fleet is now being operated by a private entity at a point where the risk profile is much more favourable does not support the claim that investment for the construction phase of the Hinkley Point project can be achieved on a commercial basis.

What the EC did observe, but failed to meaningfully consider, is the fact that nuclear power plants are characterized by extremely high fixed sunk costs, which must be amortized over very long periods of time. This unique characteristic of nuclear projects, combined with substantial technological, regulatory, and political risks, presents a risk profile during the early phases of a project that has proven to be unpalatable to private markets in the absence of substantial government participation and support.

Numerous studies have come to the directly contrary conclusion to that stated by the EC (see e.g. MIT's "The Future of Nuclear Power"⁴, the Congressional Budget Office study "*Nuclear Power's Role in Generating Electricity*"⁵, and the IAEA's "*Financing of New Nuclear Power Plants*"⁶). Those studies have shown that nuclear power projects, particularly in western democracies, are not commercially viable precisely because they are subject to considerable risks of cost overrun and schedule delay, in large measure due to technological and regulatory risks. The cost of money entailed in privately underwriting the risk of the development of nuclear power projects puts that prospect beyond the realm of commercial feasibility. One might learn from the recent experience of the host of the world's largest nuclear program, and a staunch defender of the market economy, the United States, which has enacted under the layers of incentives in the forms of DOE loan guarantees, Production Tax Credits, and regulatory delay insurance,

³ European EC: State aid S.A. 34947 (2013/C) (ex 2013/N) – U.K. Investment Contract (early Contract for Difference) for the Hinkley Point C New Nuclear Power Station at para. 107

⁴ *The Future of Nuclear Power: An Interdisciplinary MIT Study*, MIT (2003) available at <http://web.mit.edu/nuclearpower/pdf/nuclearpower-full.pdf>

⁵ *A CBO Study: Nuclear Power's Role in Generating Electricity*, Congressional Budget Office (2008) available at <http://cbo.gov/sites/default/files/cbofiles/ftpdocs/91xx/doc9133/05-02-nuclear.pdf>

⁶ *Financing of New Nuclear Power Plants*, IAEA Nuclear Energy Series NG-T-4.2 (2008) available at <http://www-pub.iaea.org/books/IAEABooks/7981/Financing-of-New-Nuclear-Power-Plants>

along with a streamlined Combined Construction and Operating Licensing process. In this context, the glaringly obvious fact is that, out of some 30 proposals to construct new nuclear power reactors, only the rate-based proposals are proceeding (such as Southern's Vogtle Units 3 and 4, which benefit from advanced rate hikes for Construction Work in Progress and ultimate cost absorption into the rate).

The world described by the EC does not exist. Nuclear power projects are being built where governments step up to anchor the construction and regulatory risk: e.g. China, Russia, Korea, India, or the UAE. They are not being built where the government cannot or will not play its essential role of anchoring those risks and expects the capital markets to step into its shoes: e.g. Canada, Bulgaria, Romania, and, thus far, Turkey.

The fallacy of the EC's proposition that new build nuclear facilities are commercially viable without state support is further underscored by the very examples the EC relies upon in support of its assessment of the market. The EC proposes that:

...the EPR technology power plants in Flamanville and Olkiluoto have been undertaken without any support. The Commission cannot at this stage explain why the HPC project should be fundamentally different from the two EPR plants currently being constructed.⁷

Ironically, both Flamanville and Olkiluoto are significantly over budget, with current cost estimates doubling and tripling original expectations. Further, both projects have incurred significant delays, with total project construction time now expected to double original estimates. Both projects have also received significant aid from government agencies. In fact, in the case of Olkiluoto, the Government of France provided a state guarantee to Areva, which was the subject of a three-year investigation before the EC determined the measure to be compatible with state aid rules. In the case of Flamanville, the owner is a utility company almost entirely owned by the French government.

The Assumption of Higher Imperatives

The EC's confounding of new build construction and operating economics might in some measure be attributable to the U.K. government's attempt to avoid the former risk by providing the prospective investor-vendor with a hedge for the latter. Much less understandable, and perhaps most perplexing, was the EC's obvious willingness to make unwarranted negative assumptions about nuclear technology and, in so doing, to press past express EU legislative policy.

The EC acknowledges and dismisses the argument that support is found for aid to nuclear power generation in the EU's Environmental Aid Guidelines, Article 191 of the TFEU, and Directive 2003/87/EC, which advance environmental protection, combating climate change, and the promotion of renewable energies as common policy objectives. In a series of statements that sound far more in advocacy than in adjudication, the EC suggests that nuclear power generation presents a higher environmental risk profile than other methods of power generation, such as would justify discounting its contribution to "decarbonisation". No evidence is offered or referenced in support of these extraordinary statements, which do not account for the Life Cycle Analyses studies comparing the relative environmental impacts of different methods of power

⁷ European EC: State aid S.A. 34947 (2013/C) (ex 2013/N) – U.K. Investment Contract (early Contract for Difference) for the Hinkley Point C New Nuclear Power Station at para. 337

generation. Those studies show that, even where additional provision is made for the longevity of nuclear waste (an issue raised by the EC), the environmental impacts of nuclear power generation rank on par with renewables, and well ahead of fossil fuels.⁸

In a similar and perhaps ironic vein, the EC also appears to challenge the selection of the EPR first-of-a-kind (“**FOAK**”) technology for the Hinkley Point project. For example the EC states that:

NNBG costs are towards the upper end of the benchmark cost range because the HPC plant is the first project of a kind in the UK. Indeed, NNBG has chosen a technology for HPC that is not yet operational anywhere in the world.

However, the EC does not acknowledge the reasons behind the development and use of FOAK technologies in the nuclear sector, and the increased risks associated with such technologies. The development and use of next generation FOAK technologies, such as EPR, is driven by a long-standing international trend towards the promulgation of higher safety and performance standards, such as those promoted through the IAEA’s Safety Fundamentals, and in the EC’s own draft legislation, “Draft proposal for a Council Directive amending Directive 2009/71/EURATOM establishing a Community framework for the Nuclear Safety of Nuclear Installations,” which will make mandatory the incorporation of those standards by reference into the domestic laws of member states.⁹ This legislative trend demands the development of new cutting-edge technologies that strive to meet those objectives at the cost of increased project and budget risk.

The EC also takes the position that the Hinkley Project will stave off investment in low carbon alternative baseload capacity. For example, the EC states that:

As in this case the notified measures will enable the development of a large level of capacity, which might otherwise have been the object of private investment by other market operators using alternative technologies, from either the UK or from other Member States, the notified measures can affect trade between Member States and distort competition.

The Commission notes in this regard that a support mechanism, which is specific to nuclear energy generation, might crowd out alternative investments in technologies or combinations of technologies, including renewable energy sources, which may have occurred in the absence of the notified measure.

Further, the EC appears to equate the baseload capacity available with nuclear technology with other forms of electricity:

... the notified measure might have substantial repercussion on trade and competition [...]. In particular, NNBG will be providing a service, which is difficult to distinguish from that provided by other generators of baseload electricity....

⁸ World Energy Council, “Comparison of Energy Systems Using Life Cycle Assessment”, July 2004

⁹ “Draft proposal for a Council Directive amending Directive 2009/71/EURATOM establishing a Community framework for the Nuclear Safety of Nuclear Installations” available at http://ec.europa.eu/energy/nuclear/safety/doc/com_2013_0343_en.pdf

... It is unclear that the market would not provide the service asked of NNBG under the potential SGEI – and in fact exactly the same product, i.e. baseload electricity at technical standards consistent with the TSO [Transmission System Operators] specifications, is normally provided by the market.

The concern that the Hinkley Point project will dissuade investment in alternative low carbon baseload options effectively places the project in competition with a theoretical energy source, which is directly at odds with the U.K.'s objective of obtaining security of supply. The reality is that the existing energy mix in the U.K. relies heavily on gas (at approximately 40%), coal (at approximately 32%) and nuclear (at approximately 18%) to provide necessary baseload. The only low-carbon baseload options presently available to the U.K. are bio-energy and hydroelectric, which contribute less than 6% of the total energy mix. The net result is that without new build nuclear the U.K. will need to turn to fossil fuel for baseload capacity. In the short time since its decision to abandon nuclear power, Germany's carbon emissions have been on the rise, with a 2% year-over-year rise in 2013. One can only assume a similar fate for those who follow suit, and wonder at the EC's rejection of the proposition that support for nuclear is an essential component of any sensible carbon emission reduction policy.

The prejudicial tenor of the EC's treatment of nuclear power generation can be seen in its summary dismissal of the clear policy objective of the TFEU to promote the establishment of nuclear undertakings as subordinate to competition impacts, and then proceeding to assume the latter impacts on the basis of layered assumptions.

Conclusion

It is clear is that the EC is highly reluctant to reach a finding that there is "no aid" in the proposed financing package for Hinkley Point. However, the EC's reasoning evidences not only a lack of understanding of the economics of nuclear power but also an unfavourable political disposition towards nuclear power. Whatever views one might take of either the Hinkley Point deal or the efficacy of the U.K.'s proposed legislative program, the EC's decision raises serious points that merit attention and response from the nuclear industry and policy makers alike. Should the trajectory of the EC's decision remain unchanged, a cloud of uncertainty must hang over future nuclear new build proposals in Europe.