The New Nuclear Industry

A briefing for the government from
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17 April 2012

"As we stand today, is (new nuclear) an investable option for Centrica, RWE? Simply put, no. The cost of capital based on those risks would be way too high to give you an electricity price which is affordable… We think it is uninvestable for public equity markets. EDF may be willing to take on the construction risks but none of the other (big utilities) are willing to do that."[1]

Peter Atherton, Citigroup's Head of European Utilities Research, July 2011

The Headlines

1. The History The UK Government has been erratic and inconsistent in its nuclear power policies. Its current burst of enthusiasm generated sufficient momentum to tempt some 'Big Players' in the utilities world into a bidding war in 2009 for the option to build a new generation of nuclear plants. Subsequently, however, there has been a pronounced cooling of interest by key players among these same utilities.

2. The Utilities Three Joint Ventures (JVs) have been formed by some of the largest global utilities, and construction sites have been optioned. But, as of April 2012, only one of the JVs – GenCo – has formally confirmed its intention to proceed, named its reactor type and initiated the planning process.

3. Institutional Cold Feet Since 2009, the enthusiasm has waned. The actual investment by the companies involved has been minimal, consisting mostly of options rather than hard purchases. E.ON and RWE npower have recently exited the scene, withdrawing from their own Joint Venture (Horizon Nuclear Power), following in the footsteps of Scottish and Southern Electricity, which withdrew from the the NuGen Joint Venture in September 2011.

A series of ongoing build, financing and operational shocks have struck the whole nuclear project: Fukushima, the global and eurozone credit crunches, the massive ongoing construction delays on present nuclear builds (particularly of the European Pressurised Reactor type most favoured for the UK), and doubts about the reliability of government 'sweeteners' over the nuclear timescale.

4. The Design Issue The only company that remains resolute in its commitment to nuclear power is EDF. But it is signed up to a reactor design (the European Pressurised Reactor - EPR) that it now widely believed to be a major problem. UK nuclear policy is caught on the horns of a dilemma: a programme without EDF is impossible, but no one except EDF will touch the EPR.

5. Are subsidised markets as safe as they look? In addition to the general risk that subsidies will be subject to the whim of government, nuclear operators must contend with the almost inevitable legal challenges relating to the creation of monopolies; and, must also confront a hardening attitude from the European Court, making companies liable to repay subsidies.

1. The History

The history of nuclear construction in the UK has proceeded in fits and starts, and is characterized by sporadic bouts of short-term enthusiasm followed by periods of indecision and inactivity as construction, financing and operational problems mount up. In one of those periods, during the 1990s, the UK effectively abandoned nuclear power when the Conservative administration of John Major made the decision not to replace any of the existing nuclear fleet. That decision was ratified by the new Labour government of 1997, whose first formal contribution to the debate was the 2003 Energy White Paper, according to which the 'current economics' of nuclear power 'make new nuclear build an unattractive option and there are important issues of nuclear waste to be resolved.' [2] The government therefore decided not to initiate any new nuclear plants.

However, by 2006, that policy had undergone a complete U-turn. The Government published an energy review announcing that, 'we have concluded that new nuclear power stations would make a significant contribution to meeting our energy policy goals'. [3] The subsequent White Paper (2008) stated that 'the electricity industry should, from now on, be allowed to build and operate new nuclear power stations'. This was a disingenuous statement, since nuclear builds had always been allowed, but they were too expensive and hence financially risky in the UK's liberalized energy market. However, to drive home the Government's new commitment to nuclear power, the paper added 'nuclear power can and will make a real contribution to meeting our commitments to limit damaging climate change'. [4]

The Government implemented a series of measures to facilitate prospective nuclear operators, including major reforms of the planning system (that more or less guaranteed rapid approval of pre-designated sites), the implementation of a Generic Design Approval process (the GDA) to speed approval of reactor types, and the underwriting of waste disposal and power prices for nuclear generators. It was made clear that, in effect, what prospective operators wanted, they would get. What the Government wanted was a major nuclear generation programme run by at least two, ideally more, nuclear operators.

Utilities were not slow to read the signals. In a flurry of activity, three major Joint Ventures (JVs) were formed, including some of the largest companies in the world. The so-called 'UK nuclear renaissance' reached its high point in 2009, when the Nuclear Decommissioning Authority began auctioning off designated sites leading to a frenzied bidding war for the prime spots. The Independent noted that one of the JVs bidding for the Wylfa, Oldbury and Bradwell sites, NuGen, 'pulled out [of the auction] after competition became so fierce it ran for six weeks rather than the expected one, and netted the Government a whopping £387million rather than the expected £100million'. [5]

[1] Citigroup: nuclear investment environment in UK "dire". Industrial Fuels and Power, July 7 2011. Accessed 26 March 2012 at: http://www.ifandp.com/article/0012075.html

[2] Energy white paper, Our energy future – creating a low carbon economy, Cm 5761, Department of Trade and Industry (February 2003).

[3] The Energy Challenge, Energy Review Report 2006, Cm 6887, Department of Trade and Industry (July 2006).

[4] Meeting the Energy Challenge – A White Paper on Nuclear Power, Cm 7296, Department for Business, Enterprise & Regulatory Reform (January 2008).

[5] Nuclear Firms Pay £70m for Sellafield Site, The Independent, 29 October 2009. Accessed on 26 March 2012 at: www.independent.co.uk/news/nuclear-firms-pay-16370m-for-sellafield-site-1811063.html

2. The Utilities

(1) Nuclear New Build Generation Ltd ('NNB GenCo.', or more commonly "GenCo")

a JV between EDF Energy and Centrica. EDF Energy is a wholly owned subsidiary of Electricite de France SA, one of the largest electricity producers in the world, with revenues of over €65 billion in 2011.[6] EDF SA, which is 85% owned by the French government, operates the entire French nuclear fleet of 58 reactors. Centrica (formerly British Gas) is the largest supplier of gas to the UK domestic market. The joint venture is split 80:20 between the two, with EDF the senior partner.

GenCo has bought land at Hinkley and Sizewell, at each of which they plan to build 2 European Pressurised Reactors (EPRs), which will have a total capacity between them of 6.6GW.

(2) Horizon Nuclear Power, a JV between E.ON and RWE, split 50/50.

To all extents and purposes, Horizon Nuclear is now defunct. Both E.ON and RWE npower have now withdrawn from their own Joint Venture, and will play no further part in any new nuclear programme in the UK. This is a massive blow to the nuclear industry as a whole.

Horizon bought land at Wylfa in Anglesey and Oldbury in Gloucestershire, and was planning approximately 6 GW of power at the two sites.

(3) NuGeneration Ltd (NuGen),

a JV of GDF Suez, Iberdrola and Scottish and Southern Electricity (SSE) – split 37.5%, 37.5%, 25%. NuGen dropped out of the Wylfa/Oldbury auction, and has settled for buying the Sellafield site, considered the least attractive site due to the fact that technical constraints will prevent a plant there connecting to the National Grid before 2023.

NuGen was the first of the JVs to have fractured; in September 2011, SSE announced that it was pulling out, 'after concluding that, for the time being, its resources are better deployed on business activities and technologies where it has the greatest knowledge and experience'.[7] Of the three JVs, NuGen is considered the least advanced in its plans. It is, 'currently assessing the financial case for the scheme and will decide whether to go ahead in 2015'.[8]

It is important to bear in mind that all the Utilities have brought forward their proposals via Joint Ventures. These JVs have no assets themselves, and will have to borrow the money to pay for the new reactors. Those loans will have to be guaranteed, and a number of analysts have questioned whether the parent companies could provide sufficiently convincing guarantees to help reduce the cost of capital. In effect, that means the utilities will need to acquire Government loan guarantees.

The likelihood of either the UK Government or the Spanish Government being prepared to offer such guarantees seems to us to be very low. As the owner of 85% of EDF, it's a different story for the French Government. But, right now, with the French economy facing such massive challenges, taking on such a large liability at this stage seems improbable.

[6] EDF 2011 Earnings Surge Mainly On Fall Away Of 2010 Charges, Dow Jones Deutschland 16 February 2012. Accessed on March 24 2012 at: www.dowjones.de/site/2012/02/edf-2011-earnings-surge-mainly-on-fall-away-of-2010-charges.html

[7] SSE sells nuclear stake for initial £5.75m, businessGreen, 17 February 2012. Accessed on 24 March 2012 at: www.businessgreen.com/bg/news/2153085/sse-sells-nuclear-stake-initial-gbp575m

[8] Cumberland News 1st Mar 2012 Accessed on 23 March 2012 at: www.cumberlandnews.co.uk/nuclear-reactor-firm-joins-industry-group-1.930172?referrerPath=business1.930172?referrerPath=business

3. Institutional Cold Feet

From the present perspective (April 2012), it looks as if the peak of the current bout of nuclear enthusiasm in the UK was the 2009 NDA land auction. At that time, utility CEOs gushed about the fantastic opportunity that nuclear power offered their businesses, expressing their delight at getting a slice of the action. The withdrawal from NuGen by SSE in September 2011 was the first concrete step away from the nuclear programme, but for industry observers, the writing has been on the wall for the past two years.

3.1 RWE/E.ON & HORIZON

The decision by E.ON UK and RWE npower to exit the scene was hardly surprising given what had happened in Germany after the Fukushima disaster. The immediate closure of all Germany's nuclear plants after Fukushima cost RWE, the main nuclear operator in Germany, over £1 billion in lost revenues. The decision to phase out all nuclear reactors on an accelerated timetable was also a hammer blow; retaining a nuclear division solely to deal with a handful of reactors in a foreign country simply didn't add up. In January 2012, RWE pulled out of a plan for the construction of a new nuclear plant at Borssele in the Netherlands, in a JV with EDF and the Dutch utility Delta. Delta blamed the pullout on the fact that'…[in the] last half-year the investment climate has worsened due to the financial crisis. In addition, overcapacity of electricity production has increased further due to the recession'. [9]

Further momentum against the German JV's nuclear ambitions had also come from the decision in September 2011 by Siemens AG (Germany's largest electricity generating plant suppliers) to abandon nuclear manufacturing. Siemens CEO Peter Loescher said, 'the [nuclear] chapter for us is closed', giving as his reason 'the clear positioning of German society and politics for a pullout from nuclear energy'. [10]

It was only a matter of time before Horizon was decommissioned.

3.2 Centrica

Centrica, 20% partners in the most advanced of the JVs, GenCo, has been prevaricating for some time. CEO Sam Laidlaw is refusing to activate Centrica's option until 'the end of next year [i.e. 2012] or in early 2013', adding:

"The reality is that post the news about Flamanville and Fukushima, we are clearly going to have some changes. People have been focusing a little more on the optionality since then. We'll give it our best shot, but if at the end of the day, if we add all that up and we just don't think the returns are there for the perceived risk, then we've always been very clear that this is an option, not an obligation for us… we will only do it if it makes good sense and good returns… it's no done deal". [11]

Nick Luff, Centrica's finance director, emphasised Centrica's 'wait and see' approach and said the decision hinged on securing licences, confidence EDF could deliver on appropriate cost estimates, and government assurance of a "sufficiently attractive electricity price". "There is an awful lot to do to be able to make an investment decision," he said, adding "Not all of those things may happen in time." [12]

Part of Centrica's reluctance to commit is the open hostility of much of the investment world and their shareholder base to the nuclear project. A senior energy investment consultant, formerly of Coopers & Lybrand and Arthur D. Little, now at Evolution Securities, wrote of Centrica's involvement in the GenCo project: 'Centrica is a minority holder in a technology in which it has no institutional understanding, and where, as emphasized by Flamanville, construction risk is notorious. Centrica should not progress new nuclear further'. [13]

[9] Dutch utility puts off plan for nuclear power plant. Reuters, 23 January 2012. Accessed on March 22 2012 at: http://af.reuters.com/article/commoditiesNews/idAFL5E8CN1XY20120123

[10] Siemens to quit nuclear industry. BBC News, 18 September 2011. Accessed on March 24 2012 at: http://www.bbc.co.uk/news/business-14963575

[11] Centrica says nuclear 'no done deal' as profits halve. The Daily Telegraph, 28 July 2011.

[12] UK power plant investment needed to keep lights on, warns Centrica chief Sam Laidlaw, The Daily Telegraph 23 February 2012. Accessed on 23 March 2012 at: www.telegraph.co.uk/finance/newsbysector/energy/oilandgas/9102378/UK-power-plant-investment-needed-to-keep-lights-on-warns-Centrica-chief-Sam-Laidlaw.html

[13] City presses Centrica to cancel plans for building nuclear power plants. The Guardian, 25 July 2011. Accessed 24 March 2012 at: http://www.guardian.co.uk/business/2011/jul/25/centrica-nuclear-power-stations

3.3 Iberdrola, GDF Suez, SSE & NuGen

As noted above, SSE has already pulled out of this JV, leaving a 25% hole in its future capital provision. Of the three JVs looking seriously at the UK nuclear market, NuGen was always the most cautious; they do not need to activate their option to buy until 2015, and will not have the infrastructure to feed into the National Grid until 2023, well behind the planned schedules of GenCo and Horizon.

There are few open signs of the intentions of GDF Suez and Iberdrola, but, in January 2011, they pulled out of a Romanian JV to build two new reactors at Cernavoda, a project that they had been involved in since 2008. In a joint statement, the three companies cited, 'economic and market-related uncertainties surrounding this project, related for the most part to the present financial crisis, which are not reconcilable now with the capital requirements of a new nuclear power project'. [14]

Just as Centrica's involvement has attracted scepticism from city investment analysts, so have both the Horizon and NuGen Joint Ventures. ICIS Heren reported that, at the European Nuclear Forum in Brussels in March 2012, 'senior analysts' were openly doubtful of both of the latter two ventures. They:

'questioned whether…two of the three consortia in the running to build up to 3GW of new nuclear capacity in the UK would go through with the job. [Analysts said] "One consortium is led by E.ON and RWE - is it likely they will invest as they're exiting nuclear in their country? The second involves GDF SUEZ, who are in Belgium, where there is strong anti-nuclear sentiment - so investment from them seems uncertain too." [15]

3.4 Impact on Share Price

Issues of investor confidence have been dealt with at greater length in a separate briefing (Briefing 2: Investing in Nuclear Power - Current Concerns 4.4.12), but obviously some of these overlap with factors that individual companies need to consider when approaching a project of the scale of nuclear new build. One of those factors must be the size of the debt that companies need to be ready to take on in order to participate. For investors, the major risk here is bankruptcy or similar debt default. For company CEOs and Boards of Directors, the problem of debt is also one of share price credibility.

Obviously, investors care about share prices too but massive debts depress share values and that can make companies vulnerable to takeover. For shareholders, that can be a profitable outcome; for company managers it usually means redundancy. Boards of all the private companies involved in the joint ventures attempting to build new nuclear in the UK (i.e. everyone except EDF) need to be alive to the impact that huge hikes in debt levels will have on share value. The consequence may be to depress share price, often via a ratings downgrade by the relevant rating agencies. ICIS Heren reported that investment analysts at the European Nuclear Forum felt that:

'while the views of ratings agencies alone would not be enough to dissuade a company from investing in nuclear, a potential ratings downgrade might give a utility considerable pause for thought. If it is already on the edge of a ratings band, a nuclear project could be the thing that pushes them over the edge - it's just another negative factor."

The sources went on to suggest that ratings agencies such as Moody's or Standard & Poor's who have a limited tolerance to debt hold nuclear as high-risk. [16]

The risk of ratings downgrades has been subjected to forensic analysis by the Texas Institute, who found that 'while the announcement of an intent to build a

[14] The cautious strategy of the third UK new-build consortium. Nuclear Engineering International, 4 March 2011. Accessed on 23 March 2012 at : www.meimagazine.com/story.asp?storyCode=2059056

[15] Nuclear energy investment could risk utility credit rating say analysts. ICIS Heren Reports, 20th Mar 2012. Accessed 24 March 2012 at: www.icis.com

[16] Nuclear energy investment could risk utility credit rating say analysts. ICIS Heren Reports, 20th Mar 2012. Accessed 24 March 2012 at: www.icis.com

new nuclear reactor had no measurable impact on a utility's credit rating, the actual construction of a new nuclear plant carried an almost 70 percent probability that the utility would experience a rating downgrade', before adding that, 'ratings downgrades often negatively impact a company's share price while increasing its cost of borrowing, so the impact on utility shareholders and its customers can be both immediate and long-lasting'. [17]

It will not have escaped the attention of key decision-makers in utilities that, in the year to March 2012, shares in SSE (who pulled out of nuclear in September 2011) have risen by 3% while those in Centrica (still in) have fallen by 13%.

4. The Design Issue

Of the three Joint Ventures still in the field, GenCo is the furthest ahead and the most likely to see this project through. The primary reason for that is the participation of EDF in the project. EDF is one of the largest nuclear operators in the world, and is backed by the French government, making them one of the few old-fashioned state-owned giants, and one of the few with genuine expertise in nuclear management.

But even a company the size of EDF has sought to spread the capital risk of this project, and their problems in keeping Centrica's commitment firm have been discussed above. If, as seems increasingly likely, Centrica drops out, EDF will need another partner. But finding another partner may become increasingly difficult as the idea gains traction that EDF's cherished choice of reactor, the French-designed and French-built EPR, has fundamental design flaws that make it unfeasibly expensive.

The two EPRs already under construction in Europe at Okiluoto (Finland) and Flamanville (France) have become notorious for their cost and time over-runs. So much so that the French Government commissioned a report by Francois Roussely, a former CEO of EDF, to examine the EPR's failure to win the bid for four new reactors in the UAE. Roussely's report refers to issues with 'complexity of the EPR…[which] without doubt hinders its construction and consequently impacts on its cost'. It also pointed to deep problems with 'the credibility of both the EPR model and the French nuclear industry's ability to build new reactors', which 'has been severely eroded by the difficulties encountered at the Finnish construction site of Olkiluoto and at the site of the third tranche of the Flamanville plant'.

Partly as a result of these problems, India, which had been due to order six EPRs, announced in September 2011 that it was postponing that decision pending further research. It was also reported in the Indian press that French Nuclear Safety Authority (ASN) president Andre-Claude Lacoste had said he "could not rule out" a moratorium on EPR construction, describing the design as "very compromised". [18]

It has been suggested that these difficulties can be written off as first-

[17] New Texas Institute study on nuclear power projects financing, Texas Institute press release, 13 September 2011. Accessed on March 25 2012 at: http://www.texasinstitute.org/news/newsletters/item/for-immediate-release-new-texas-institute-study-on-nuclear-power-projects-financing-2.html

[18] French Nuclear Safety Authority cannot rule out moratorium on 3rd generation EPR nuclear reactor, The Hindu 1 April 2011

of-a-kind engineering problems and that subsequent iterations will proceed more predictably – a belief expressed most recently by a leading advocate of nuclear power, Mark Lynas, writing in the Guardian. He claimed, in February 2012, that 'the two other EPRs under construction at Taishan, in China, are proceeding on budget and on time'. [19] This is not the case now, and it was not the case then. As long ago as October 2011, Finnish State Broadcaster, YLE, reported that the Taishan EPRs were being plagued by exactly the same problems that have afflicted Olkiluoto and Flamanville. It stated:

'YLE has obtained inspection reports from China's National Nuclear Safety Administration based on visits in 2009, as construction was beginning there. The results are familiar to observers of the Finnish and French ventures. When building work began on the new, third reactor at Olkiluoto, the Finnish Radiation and Nuclear Safety Authority (STUK) detected quality-control shortcomings in areas such as concrete pouring… Four years later, the list of problems at Taishan is very similar…'. [20]

Even in the UK, where the Generic Design Assessment (GDA) is supposed to smooth the design approval process there are ongoing problems with EPR assessment. On March 1 2012, the Office for Nuclear Regulation (ONR), responsible for overseeing the GDA, reported that some of the 'deliverables' on the resolution plan for design issues for the UK EPR 'have been late or do not provide the quality of information or depth of evidence that we expected'. '[I]t is unlikely that the GDA Issues will be closed-out on the timescales indicated in the resolution plans', the ONR said in its progress report for the quarter ending December 2011.

The ONR published a list of 31 GDA issues on the reactor design in the summer of 2011, along with an agreed resolution plan from co-applicants EDF and Areva. But, in its latest report, ONR said the delayed and poor quality replies from EDF and Areva 'will require a re-baselining of our assessment team resource allocation' - because ONR staff plans as well as those of ONR's technical support contractors were aligned to the currently published resolution plans. These delays could push the final Design Acceptance Confirmation back to 2013. [21]

While it remains to be seen whether the Taishan project will have the magnitude of trouble that Olkiluoto and Flamanville have, it is still the case that, despite having first been commissioned over a decade ago, there is not a single operating EPR anywhere in the world. Sufficient doubts exist about the EPR's ability to perform that in the – increasingly likely – event of a Centrica pullout, finding a new partner for EDF will be extremely hard.

[19] This nuclear deal is good for Britain and the battle against climate change. The Guardian, 17 February 2012. Accessed on March 25 2012 at: www.guardian.co.uk/commentisfree/2012/feb/17/nuclear-deal-britain-climate-change

[20] Problems seen in Olkiluoto-type project in China, YLE.fi, 7 October 2011. Accessed on 25 March 2012 at: www.yle.fi/uutiset/news/2011/10/problems_seen_in_olkiluoto_type_project_in_china_2930807.html

[21] UK EPR issues could push resolution into 2013, delay construction of Hinkley Point C, i-Nuclear Independent Nuclear News March 1, 2012. Accessed 26 March 2012 at: http://www.i-nuclear.com/2012/03/01/update-uk-epr-issues-could-push-resolution-into-2013-delay-construction-of-hinkley-point-c/

5. Are subsidised markets as safe as they look?

In the 'Political Risks' section of our briefing on investment, we asked the following question: can a national government, such as the UK, that has never fully embraced nuclear be trusted to see through multi-decade subsidy regimes, particularly when it has recently spectacularly reneged on other low-carbon subsidies? It also seems clear that many of the sweeteners offered by the UK government may breach EU subsidy regulations and leave companies in receipt of them open to legal challenge. This is a particularly worrying development for companies operating within subsidized and regulated markets. Recent developments appear to show that the European Court of Justice is moving to a position where not only will illegal subsidies be stopped by future court decisions, but that, in addition, recipient companies will have to repay any subsidies received. The case in question involves a potential repayment by EDF of over £1 billion. A final ruling is expected in the Spring of 2012. [22]

Conclusion

Although the nuclear industry manages to portray itself as standing on very solid ground, with robust balance sheets and positive prospects, nothing could be further from the truth. This is an industry in which the major players all find themselves in difficult circumstances, and whose investors are increasingly sceptical about (if not hostile to) their plans for new nuclear build. RWE npower and E.ON UK have already quit the field, as has SSE. Centrica looks very uncertain, and has many rather more pressing challenges that it must address urgently. In effect that just leaves EDF, whose total dependence on its nuclear portfolio is looking a lot less secure, given the political circumstances in France.

[22] EDF should repay state aid-EU court adviser. Reuters, Oct 20, 2011. Accessed 26 March 2012 at: http://uk.reuters.com/article/2011/10/20/court-edf-stateaid-idUKL5E7LK1FW20111020

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