



Supporters of Nuclear Energy

Newsletter

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NEW PLANTS FOR OLD

First, the good news. EDF is extending the lifetime of the reactors at four of its nuclear power stations in the UK. Now for the bad news. EDF has still not taken a final investment decision on the £18 billion Hinkley Point C project. Not to worry though - a decision on funding for Hinkley is “very close” according to EDF. Mind you, the company has been saying something similar for well over a year.

Keeping older reactors operating beyond their design lifetimes - twice as long in some cases - is generally a good thing and is happening world-wide. It does have its down side, however. The short term fix of reactor lifetime extension takes the pressure off. It allows operators, investors and politicians even more time to make up their minds about what they are trying to achieve and to firm up on new build programmes and to get the funds firmly in place.

The UK is one of the few countries in the West supporting a new build construction programme and any sign of hesitation is therefore unsettling. At least one of the companies behind the nuclear renaissance in Britain, Hitachi, sounded distinctly edgy about the future of its Wylfa nuclear power station project after the Hinkley announcement this month. The delay has also been seized upon by anti-nuclear activists to fuel speculation that EDF is poised to pull out of the Hinkley C project altogether and offer an alternative reactor at a later date in its place.

On the plus side refurbished reactors will produce electricity more cheaply than new reactors for the relatively short time they operate. It is also the case that the UK needs more electrical energy from somewhere as we approach the potential supply gap catastrophe forecast by the Institution of Mechanical Engineers last month.

Make no mistake. I want Hinkley Point C to go ahead and I want it to succeed but I am becoming somewhat disillusioned. I have been a supporter of nuclear energy for well over 50 years and have seen particular reactor types come and go. I fervently hope that is not the case with Hinkley and that what we are

seeing now is a hiatus, a blip if you like, and not the beginning of the end of a project which has taken far too long to get even this far.

It is possible that the Hinkley C project will proceed because of the involvement of three governments which want to make it happen and which have been very supportive publicly - so far. Their potential embarrassment is considerable but not sufficient reason in itself for hanging on to something which they, too, must have their doubts about.

The French own more than 80 per cent of EDF and confidence in that company has certainly been affected. The Chinese agreed to invest £6.2 billion in the project last year and regard it as a springboard into the UK market and a chance to display their own new build expertise. The UK Government regards nuclear and gas-fired electricity generation as the way forward for base load electricity generation. It would be a real setback if the Hinkley project, intended as the first of three new nuclear power stations, goes pear-shaped.

A NEW MODEL REACTOR

There are those who now think that is a possibility, however. According to a piece in the Independent newspaper an internal report to the EDF Board this month warned that for technical reasons it will be impossible to complete the two new generation EPR nuclear reactors at Hinkley Point within the nine-year timetable agreed by EDF.

The report also argued that the project would be financially disastrous for EDF. From other articles which have appeared this month it is apparent that the company's powerful trade unions and several senior executives want EDF to walk away from the project or at least persuade Britain to wait another three years until a more advanced generation of EPR reactors is available. That possibility was effectively trailed last autumn by EDF's chief executive, Jean-Bernard Levy. He stated that the design of a "New Model" EPR reactor was being worked on which would be easier and cheaper to build and which would be ready for orders from about 2020 which is, of course, only four years away.

The Reuters news agency tried to pin Mr. Levy down to a firm date for the signing of a final investment decision for the existing Hinkley project at a Brussels energy conference this month. His response was somewhat enigmatic.

"We are working with our Chinese partners to complete the discussion that we are having and announce a final investment decision very soon," Mr. Levy said. Asked whether "very soon" meant this year (which still has ten months to go) Mr. Levy said: "If in my thinking very soon did not mean this year I would be disingenuous."

That is not a word used very often so I looked it up in the dictionary. Disingenuous - not candid or sincere, typically by pretending that one knows less about something than one really does. Make of that what you will.

The latest delay in taking the final investment decision needed to get the Hinkley Point C project under way is due to difficulties which EDF is having finalising the investment terms which the company is negotiating with its partner, China General Nuclear Power Group, and in securing financing from the French government or anyone else prepared to help fund the scheme.

CALL FOR EU MARKET REFORM

It is obvious that EDF is struggling to find the money for its 66.5 percent stake and is putting pressure on the company's owner, the French Government, to come up with fresh funds. According to The Times newspaper EDF is also seeking permission to help pay for the construction of Hinkley Point C by selling off part of its stake in the French power grid, a suggestion which has been neither confirmed nor denied.

EDF is also calling for "rapid and radical reform" of Europe's electricity market structure to allow for future investments in new generating capacity. Mr. Levy said that through its energy mix and significant investment efforts, EDF actively supported the work undertaken by the European Commission in the energy sector.

In return, he called for a redefinition of the European electricity market model in order to reconcile consumer interests with the transition to a low carbon world.

EDF called for two "key actions" to be prioritised. Firstly, it wants to see a "significant" floor price for carbon dioxide established within the European Union (EU) to encourage investment in generation facilities using non-fossil fuels. This floor price, it says should be set at a minimum of €30 to €40 per tonne.

Secondly, EDF wanted to see the promotion of "effective capacity mechanisms so as to ensure that Europe has long-term security of energy supply, despite market turbulence and in the best interest of all customers." According to Mr. Levy the present EU carbon market - the Emissions Trading System - is "at a level which is not meaningful to the energy mix."

Mr. Levy said that EDF believed that there was an urgent need for the EU and for individual countries within Europe to look again at the way that deregulation and competition had been implemented. All investments in electricity were currently only delivered by regulation and not by the market.

The financial turbulence surrounding the Hinkley Point C project has shaken the chairman and chief executive of Hitachi, Hiroaki Nakanishi. This month he said that the problems surrounding EDF's attempts to raise finance had led to

“very serious concerns” about his own company’s investment in the UK. Hitachi’s subsidiary Horizon is planning a new nuclear plant at Wylfa Newydd, which is also expected to start generating power by the mid-2020s. Any delays to that project, on top of the Hinkley hiatus, would certainly put the cat amongst the pigeons.

WORRIES OVER WYLFA

Mr. Nakanishi voiced his concerns in an interview with The Telegraph in which he made it clear that Wylfa would only go ahead if the deal represented value for money for Hitachi as well as the UK government. What was happening in relation to the Hinkley Point C scheme raised questions about what the real solutions for setting up financial support arrangements were, he said.

“Nuclear power construction requires huge money,” Mr. Nakanishi said. “We need to arrange a financial plan for which the kind of money needed can be introduced. Some part is government endorsement, some is more preferable investment decisions on the part of the finance industry.”

Mr. Nakanishi said the challenges faced by Hinkley Point C could affect Horizon . “The UK Department of Energy and Climate Change’s worries about the scheduled construction of the Hinkley Point power plant, so some of the conditions, the credit requirements, those kind of things could affect us.”

Horizon is currently in negotiations with the DECC on the strike price for Wylfa, the amount the Government will guarantee per unit of electricity. This has been expected to be substantially lower than that agreed for Hinkley Point C and that expectation may have had something to do with the force of the warning shots fired across the Government’s bows by Mr. Nakashini.

A REACTOR WITH A TRACK RECORD

Alan Raymant , chief operating officer of Horizon, was more bullish than the head of the group which owns his company, while obviously supporting much of what Mr. Nakashini had to say. He said that talks with the DECC over the strike price for Wylfa were actually progressing rapidly and had the solid backing of Hitachi.

“We have always said we need further finance for the construction phase and we are confident we can achieve that,” he said. “Our reactor’s unique track record of delivery is very important. but we also need to put in place future revenue funding arrangements which are right for the project.

“We have begun positive discussions with the Government and we are very confident we can get a solution that works for all sides, including UK consumers.”

The Horizon project didn't get off to a particularly auspicious start, of course. Originally a joint venture between two German energy companies, RWE and E.ON, the two companies pulled out when Germany decided to abandon nuclear energy. The venture was then bought by Hitachi for £700 million.

Hitachi brought a different reactor technology to the project - twin Advanced Boiling Water Reactors (ABWRs) with a combined capacity of 2.7GW. The changes which had to be made led to some delay and Mr. Raymant has said that Horizon is now targeting first power from Wylfa in 2024 or 2025.

To achieve that the company needs to take a final investment decision on the plant in early 2019. In the intervening three years Horizon has to secure planning consent, safety approval for the ABWR design, a strike price deal with the Government, European Union state aid clearance and the support of investors. It is a tall order.

“We will learn from the experience at Hinkley Point, as will the Government,” Mr. Raymant said. Both sides hoped to be able to manage the various processes involved more effectively and efficiently so as to be able to be more precise about the timing.

EDF's LIFETIME EXTENSIONS IN THE UK

Back to the good news. EDF Energy announced that reactors at the Heysham A and Hartlepool stations will be extended by five years until 2024 and the closure dates of Heysham B and Torness will be delayed by seven years to 2030. Each station has two gas-cooled reactor units in commercial operation. This month's announcement follows life extensions at EDF's other Advanced Gas Reactor (AGR) power stations. In all, the programme is said to have the potential to avoid 80 million tons of carbon dioxide emissions, “equivalent to taking all the cars off the road in the UK for three and a half years.”

EDF's other operating UK nuclear power plants are the Hunterston B and Hinkley Point B AGRs, which both started up in 1976 and are now scheduled to close in 2023 and the Dungeness B AGR, commissioned in 1983 and now set to shut down in 2028. The company also operates Sizewell B, the UK's only pressurised water reactor (PWR) which began operating in 1995 and is currently scheduled to close in 2035.

Making its lifetime extension announcement EDF said it invests £600 million a year in its UK nuclear plants and that this investment is paying off. Last year, it said, their output was 60.6 TWh, the highest level for 10 years and 50 percent higher than in 2008 when EDF acquired the stations. Despite challenging market conditions the company's belief that two important

Government policies would be maintained and strengthened had given it the confidence to move the scheduled closure dates of the four stations.

The carbon price floor encouraged generation from low-carbon sources like nuclear while the capacity market ensured that the UK had the power it needed. Safety performance last year was the best ever with no reportable nuclear events, EDF said. The number of unplanned outages last year dropped by more than 50 percent compared with the year before.

Coincidentally, France's state audit office, the Cour des Comptes (Court of Audit) , in its annual report, re-examined the cost of EDF upgrading its fleet of 58 nuclear power stations in that country by 2030 and put the cost at €100 billion. The upgrades are needed to meet new safety requirements and to extend the lives of the units beyond 40 years .

LIFETIME EXTENSIONS IN FRANCE

Confusingly, the Court does not compare like with like. When it announced the life extension programme for its French fleet five years ago EDF said that it planned to spend around €55 billion on upgrading its plants to improve their performance and enable their continued operation. The programme also included upgrades in response to the Fukushima Daiichi accident in Japan.

Take the Court's annual report at face value and it appears that the cost has nearly doubled. However, the report explains that EDF's figure only covered planned investment whereas its own included operating costs. Hey presto : "both estimates are consistent."

The Court now estimates that investments totalling €74.73 billion are required between 2014 and 2030 and that operating costs during that period will come to about €25.16 billion. Despite uncertainties, estimated at perhaps €13.3 billion, "the effects of this programme on the production cost of nuclear electricity are limited," the Court says..

in its report the Court also noted that implementation of France's energy transition law will not be easy. The law calls for France's reliance on nuclear energy to be reduced to 50 percent from its present level of around 75 percent by 2025.

"This is likely to challenge the planned investments and force the company to close a third of its reactors," the Court said. "This will have important consequences in terms of jobs and could result in compensation, supported by the state.

"Only a very significant increase in electricity consumption or exports of power could limit the number of shutdowns, but experts are not forecasting

this to happen.” I am no expert but I suspect the UK will still be in the market for as much electricity generated in France as it can get the way things are going so EDF may get some help from that direction.

LIFETIME EXTENSIONS WORLD WIDE

Most nuclear plants originally had a nominal design lifetime of 25 to 40 years, but engineering assessments of many plants have established that they can operate much longer and it is not only EDF which has taken the view that lifetime extension is commercially viable and that safety can continue to be ensured. Upgrade programmes have taken place in France, the UK, the US and Russia (notably) in Spain, Finland and Sweden.

In the United States more than 75 reactors have been granted licence renewals which extend their operating lives from the original 40 years to 60 years and operators of most of the other reactors in the US can be expected to follow suit. Licence extensions at about the 30-year mark are seen to justify significant capital expenditure on the replacement of worn equipment and out-dated control systems.

The Russian government is extending the operating lives of most of the country’s reactors from their original 30 years for a further 15 years or for 25 years in the case of the newer units.

NEW BUILD PLANS

Lifetime reactor extensions rather than new build projects appear to be the name of the game in the West but that is certainly not the case in China. A minimum of 60 nuclear power reactors are expected to start up in China over the next decade, at a rate of six to eight a year. The strategy is outlined in the draft of China’s new Five Year Plan, covering 2016 to 2020.

According to the document, the Chinese Government will invest more than €89 billion to construct about seven new reactors annually between now and 2030. By 2050 it expects nuclear energy to exceed 350 Gigawatts (GWe) in China, with about 400 new nuclear reactors and total nuclear investment of more than a trillion dollars. China’s first nuclear power plant began operating in 1985 and by the end of October last year the Chinese mainland had 27 reactors in commercial operation with a combined generating capacity of 25.5 GWe and a further 25 units with a combined capacity of 27.5 GWe under construction.

China has been able to build nuclear reactors at a fraction of the cost of Western countries. For instance, six Chinese-designed reactors being built in southern China will cost around €10.4 billion, a third less than the cost of building comparable units in the West, while the two 610-megawatt

Chiangjiang units on Hainan Island, also in the south, are expected to cost just €3.15 billion.

Inevitably, there are concerns about the pace of China's nuclear expansion, particularly about the strength of the country's regulatory body, the National Nuclear Safety Administration (NNSA). It has been suggested that the NNSA needs four times as many staff members as it currently has if the extraordinary expansion programme which planned is to happen and succeed.

China's State Council recently issued its first White Paper on nuclear energy, detailing policies and measures to boost nuclear emergency preparedness and promoting nuclear security. The Council is adamant that nuclear safety has been strengthened in parallel with the development of the State's nuclear industry and that China's nuclear activities "remain in a safe and stable state." The White Paper notes that no incidents rated above Level 2 on the seven point International Nuclear Event Scale (INES) have occurred during the more than 30 years which China has operated civil nuclear reactors. Level 2 indicates a small incident of little significance. The problem I have with the statement is that INES itself is also of little significance in my opinion. Even high INES rates have been assigned by the operator of the plant where the incident occurred, by the formal national body responsible for safety, by scientific institutes, international authorities and other sometimes self-proclaimed experts. For that reason I am not reassured by the statement although I am prepared to accept that the Chinese have a very good safety record.

The rush to expand nuclear energy comes mainly from China's desperate need to reduce the horrendous air pollution the Chinese population have to put up with, largely the result of emissions from its coal-fired generating plants. It is also apparent that China is setting its sights on using successes domestically to reinforce its export ambitions. China wants to export its nuclear construction and, ultimately, its designs. Beijing hopes that its planned participation in the Hinkley C project and the chance to build its own Hualong One design at Bradwell will help convince the world that the Chinese nuclear industry is on a par with traditional technology leaders.

For that to happen, of course, HInkley Point C also has to happen.

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