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A nuclear crisis foreseen and predicted

The U.K.'s decline in nuclear power production is due to the growing obsolescence of the nation's aging power plants — and rectifying the situation is proving difficult.

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It is generally acknowledged, although in some quarters very reluctantly, that civilian nuclear power has a substantial part to play in reaching the global ambition of carbon neutrality, or net-zero emissions, by 2050.

The year 2050 is the point, so the forecasts tell us, beyond which climate disruption — already showing its ugly face in current heat waves, floods and fires around the world — turns into an all-out calamity as global temperatures rise to intolerable levels, unless greenhouse gas emissions are somehow curbed. The decarbonization of power supplies is central to this task and a strong nuclear contribution is vital to ensuring that end.

How some countries, such as Germany, which is phasing out all nuclear power, are ever going to get near to carbon net-zero remains a mystery.

Still, both the U.K. and Japan are among the nations that in the past have been able to generate a considerable proportion of their electric power from low-carbon nuclear sources. However, both countries have seen this proportion shrink in recent years, although for rather different reasons. In Japan's case, the high point 10 years ago was 30%, with plans for 41% by 2017. In the U.K.'s case, the peak was 25% of all electricity supplies, achieved in the late nineties.

But fate intervened, especially in Japan's case. And as a result of decisions to close down numerous nuclear plants following the 2011 Fukushima meltdown disaster, the nuclear electricity figure has drastically diminished, leading to a steep increase in Japan's fossil fuel imports.

As for the U.K., the decline in nuclear power production comes from the growing obsolescence of the nation's aging power plants, most of which are due to close in the next five years or sooner.

In both cases a large hole is being left in the low-carbon electric power sector. But when it comes to the next steps to be taken by each country, the responses have diverged. The Japanese policy has been to cautiously re-open a few of its existing nuclear plants — amid considerable public unease — and start building two more.

By contrast the U.K. has gone for wholesale fleet replacement. With the old fleet of nuclear stations wearing out, and despite one or two attempts — only partly successful — to prolong the life of some, the U.K. authorities decided on a bold course of action to build a new generation of giant stations to meet both the expected increase in power demand that will come with the impending all-electric age and to keep on the path of the net-zero target now enshrined in law.

This revived U.K. program includes at least five new major projects, which will also see heavy foreign participation — most notably from France and China, but also Japan — that will provide both technical and financial support.

What could possibly go wrong? The answer is just about everything.

First there has been the problem of choosing the best and latest reactor technology, with many errors having been made in the past.

The new plant at Hinkley Point in Somerset will employ a European Pressurized Reactor, a modern variant of the old Pressurized Water Reactor type that was a big favorite 40 years ago and of which France built dozens. Around 2012 a massive new plant, with two reactors, was duly ordered up and licensed from the French company EDF (Electricite de France), supported by a big chunk of Chinese finance.

Successfully constructing this new kind of model — up to now having only been built in Finland, China (Taishan) and in France itself — has been, to say the least, patchy, with massive delays and cost overruns. Taishan has now run into further safety issues.

Then there has been a financing issue. A big question is who would want to pay for such an enormous and risky investment, with its decades-long pay-back time frame? Certainly not your normal Western investors, nor the cash-strapped British government. But that problem seemed to dissolve when China General Nuclear, the Chinese state nuclear builder, stepped forward and with a few enticements was persuaded to put up the money.

Meanwhile, Japanese firms were being lined up to take the lead at two other sites where the plan was to build large reactors — Toshiba at Moorside in Lancashire and Hitachi at Wylfa in North Wales.

But from this point on things began to go downhill.

First, the Hinkley giant incurred new costs by the billion and started running behind time. Then, Toshiba pulled out of the Moorside project, partly due to problems back home. Hitachi also could not reach a financing agreement and dropped out.

Then another project on the Suffolk coast at Sizewell, to be built next to an older plant from the nineties, became bogged down in financing difficulties. A proposal asking consumers to pay in advance through higher electricity bills understandably proved to be unpopular.

But now has come the earthquake. A decade ago, when the Chinese were first invited to join in the U.K.'s nuclear program — together with numerous other investment projects in everything from railways, ports, 5G systems, property and football clubs, China was the flavor of the times, with every door held open.

Today the scene is utterly transformed. Ten years of Xi Jinping's aggressive "wolf warrior" diplomacy has alienated opinion that was so friendly to China a decade ago. The demand now is for China to be extracted from the U.K.'s floundering nuclear program, ensuring that it will falter even more unless new investors can be found — assuming that it is even possible to unravel China's deep involvement at this stage.

But even if the damage can be limited, there is a deeper problem. These mammoth nuclear plants are out of date and in the wrong century. They take too long to construct, are too complicated and nobody wants to risk their money on such long-term investments. New technologies are quickly coming along for smaller modular reactors that use different fuels and which can be fabricated on production lines and then quickly assembled on site.

So now, while the China "problem" is being tackled, the great U.K. nuclear replacement is on pause. A thirsty all-electric society, which lies ahead, may have to look elsewhere. Large scale, round-the-clock, low-carbon power is at risk, and the U.K. carbon net-zero goal is in jeopardy.

The forthcoming global climate conference in Glasgow, or COP26, in November will hear many hand-on-heart commitments for the future, but this is one fine mess which has to be sorted out here and now.
