UK Nuclear Power – The Questions that now have to be answered.

[Lord Howell opens the Lords Debate December 9th 2021]

My Lords, *I begin by declaring interests advising energy-related companies, as detailed in the Register, and as chair of Windsor Energy Group, as former president of the Energy Industries Association and the British Institute of Energy Economists, as former Foreign Office Minister for International Energy Security, and—rather a long time ago—as a former UK Energy Secretary, although I must say in very different times from those we now face.*

I am going to start with the civil nuclear future rather than the present, because I do think it is possible to strike a very positive note there. In fact, I do not disagree totally with those who say that the whole civil nuclear power industry could be on the verge of a spectacular new birth. I shall come later to the immediate state of nuclear power in the UK where, I am afraid, the situation is far from positive and some very serious issues demand extremely urgent government attention.

However, further ahead, we can see the outlines of two important advances. First, there is the prospect of building smaller modular reactors in place of or supplementing the giant plants that we know today. This has long been talked about but is now becoming genuinely within reach. Smaller modular reactors, as we all know, can be built far quicker, fabricated in the factory and, because of the speed of construction, are, importantly, far more attractive to private finance, which is one of the keys to progress. Rolls-Royce tells us that commercial models are now in sight, will deliver about 470 megawatts each and cost around £2 billion—starting higher than that but ending lower. This compares with the giant EPR nuclear station being built here in Britain at Hinkley Point C, with a capacity of 3,260 megawatts and at a cost—still climbing, I fear—of around £23 billion. The new, smaller machines would be located on present or older mothballed nuclear station sites.

Obviously, we are not the only people pursuing this avenue. China, America and France all have working models, and Japan is ahead on its new high-temperature gas-cooled advanced reactor, which is also smaller but not quite as small as the Rolls-Royce models. But, with

Toggle showing location ofColumn 2073

considerable renewed government support, Rolls-Royce now has a war chest of about £490 million with which to build its business case, and that is what it is doing with some vigour.

The second new prospect for nuclear power is fusion, or

“putting the sun in a bottle”,

as the late Walter Marshall described it to me when he was mentoring me in these areas. I know that this has always been a sort of holy grail, just out of reach tomorrow and never quite there, but things are changing there, too. Just outside Oxford at the Culham Centre for Fusion Energy, they are getting to that crucial point where the fusion process, which requires unimaginably large amounts of electricity to make it work at all, may nevertheless be producing more power than it drinks in, thus making it a net, completely clean and mercifully waste-free electricity source on a vast and cheap scale. It is a truly international operation called ITER, in which France, America and, indeed, Russia are playing a role, along with 32 other countries. In fact, the original design of the fusion machine—the so-called Tokamak fusion reactor—was Russian.

So all this is quite promising for the future of nuclear, and it is cleaner in every way. But when we scroll back to the present situation here in the UK, I am afraid that it is an entirely different story and the negatives really begin into appear. First, we need to face the fact that we are all going to need a lot more electricity in a cleaner, greener world ahead. The best estimate is that by 2050 the world will be needing about 12 times the present flow of clean electric power. Even by 2030 to 2035, the increase will be enormous.

Secondly, if we want to curb climate extremes and emissions growth as hoped and planned, there is not the slightest hope of doing so without a solid base of renewable, firm, low-carbon nuclear power serving as both a back-up and a baseload. However efficient we are at conserving power and insulating homes, our now entirely computerised world and our capacity to feed 7.5 billion or 8 billion people rests on secure electric power supply. Quite aside from that, nuclear power will be a major source of clean electricity for hydrogen.

Thirdly, if we want an orderly energy transition without wild instability in the system, a substantial nuclear section of reliable 24/7 electricity is vital. Strong renewable flows demand strong nuclear back-up if they are to deliver without vast disruption and hardship. It is not just that the wind sometimes drops for long periods; there are always events, sometimes quite unforeseen or related to faraway distant disorder or conflict, that can hit any energy system, where strong back-up and swing supply sources are absolutely essential to maintain the current.

Here in the UK, our old original fleet of nuclear power stations is wearing out. They will all be closed by the mid-2020s, except the one that I had the privilege of authorising, along with eight other pressurised water reactors, in October 1979, at Sizewell B. That finally began operating in 1995—quite a long time later. The only new replacement since then has been the 3,260 megawatt giant at Hinkley Point, built by the French and the Chinese, with

EDF and the China General Nuclear Power Group having the major shares

Toggle showing location ofColumn 2074

in it. The EPR design they are building now, which is a sort of great-grandchild of PWR, might well encounter faults. Indeed, it has encountered quite a few already, as has every other EPR built around the world, including the one in China, which has very recently gone wrong.
Of course, we should have planned a replacement fleet much earlier, but the mood turned against nuclear in the 1990s. My personal dream was to follow part of the amazing French example. They built 58 PWRs in the 1970s. To get on that track, my first task was to get the quarrelling nuclear scientific establishment to agree on a single design after years of CP Snow-like back-room bickering outside the corridors of power. Eventually, after some difficulty, we chose the PWR route as well. I sought advice from the formidable French Industry and Energy Minister, André Giraud, but it was too late. The eight more I hoped for were never built. Cheaper oil and gas undermined the economic case completely, and long-term national security was not considered worth the enormous cost.

We had to wait another 20 years until the Labour Government, having been totally against nuclear, gradually came round to it and started talks with the French and the Chinese, which led to the 2008 agreement for CGN to take a third interest in Hinkley C. But this is where geopolitics and technology collided. The original new plan was to build one large twin reactor at Hinkley, another at Wylfa in north Wales, another at Moorside in Lancashire, another still at Sizewell as a replica of Hinkley, and possibly one at Oldbury. To this end, Chinese participation—mainly financial—was invited at Hinkley and Sizewell, but with the enticement of a further all-Chinese project at Bradwell in Essex, which would be the springboard for world sales of the Chinese model.

That was the plan, but it is not how things worked out all. Toshiba withdrew from Moorside, Hitachi withdrew from Wylfa over difficulties on pricing, and of course the mood towards China changed through 180 degrees, from a love of everything Chinese 10 years ago to dislike and suspicion towards everything Chinese now. Having invited the Chinese in, the Government now seem determined to get them out, withdrawing the precious offer to the Chinese of their new station at Bradwell and keeping them out of Sizewell C as well.

The obvious danger is that CGN will get the message of being unwelcome and pull out of the one station that we are actually constructing at Hinkley. That would bring our great replacement programme to a sickening halt. We would like to know from the Minister this evening about the state of play on that delicate and difficult front. We would also like to know whether

anything can be revived at Wylfa—this time with Westinghouse, with perhaps a set of small reactors on the same site.

Meanwhile, our own nuclear supply has shrunk from a peak of 30% of our total electricity to 22%, and now 17%, and it is heading for 7%. Of course, gas has swollen to fill the gap, from 1% in the 1980s to 43% now—actually, last month, it was as much as 55% of all our electricity. This of course creates its own problems, as overdependence on any one fuel and power source always does, and as we have seen from the current astronomical rise in gas prices. When the cap is lifted in April, this will strike home with deadly force and

Toggle showing location ofColumn 2075

torpedo millions of household budgets. We simply cannot afford to conduct our energy policy in this way, as a great high-tech, modern nation.
We are not the only ones in trouble: the Germans are in a fix because Mrs Merkel—so wise in some areas—decided to drop nuclear power but forgot to fill the gap. It ended up being filled by coal and Russian gas—the two very worst solutions on climate and security grounds. This explains why, today, German carbon emissions are 8.4 tonnes per head, compared to 5.4 tonnes here and 5 tonnes in France. That is what you get if you reject nuclear power altogether. We must escape from this quagmire, and we can do if we act firmly and decisively now.

I end by putting two key questions to my noble friend the Minister. Who pays if the Chinese go? If CGN takes its support away not just from Sizewell C but perhaps even from Hinkley, who fills the hole of £20 billion or so in each case? Secondly, are we still committed to giant plants, or will we wait for the SMRs, which are cheaper and quicker and have lower waste? Will we still depend on public finance and enormously heavy and complex charge burdens on consumers, who are already paying some of the highest energy bills in Europe, or can we shift to smaller plants financed by private investors? Decisions on both these central questions cannot be escaped much longer.

Lessons from the current experience of chaos in the energy markets is that orderly energy transition to a low-carbon world must have back-up, and a large part of that—if it is to be low carbon and in line with climate goals—has to be nuclear. Without that, and with more delay—you cannot just demand a close-down overnight of investment in all fossil fuels at speed—we will end up with horrendous spikes, blackouts, outages, suffering and political revolt, which of course ends up undermining all popular support for the very climate policies that we are trying to achieve. That is the nuclear power dilemma of the age, and it must now be resolved.

3.39pm