

The nuclear new build renaissance: Challenges and opportunities

By Peter Rosher, Liam Hart and Vanessa Thieffry

Takeaways

- French and UK governments plan to build new nuclear power plants
- Post-Fukushima hiatus now over as nations must expand zero-carbon electricity
- Global nuclear supply chain has significant opportunities



France and the United Kingdom have renewed their focus on the completion of nuclear new build projects. In this article, we explore why this nuclear renaissance is happening and the obstacles and opportunities it faces. We also look at nuclear energy in Germany and the challenges faced by Russian-related projects in the wake of the war in Ukraine.

France and the UK: Different historical approaches to nuclear energy

Nuclear power has historically been a flagship of French industry, and today France operates 56 civil reactors. Approximately 70 percent of French electricity is produced using nuclear power, and France is also the world's largest net exporter of electricity, in large part thanks to its nuclear generation capacity. Despite this, the administration of President François Hollande passed a law after the Fukushima accident in 2011 to reduce nuclear-generated electricity to 50 percent of the whole in France by 2025, although industry was not compelled to carry out the reductions. In the early years of the Macron administration, after 2017, the government was also somewhat ambivalent about the future of nuclear energy because, among other concerns, many of France's nuclear plants were aging and it would take time to bring new reactors into operation.

Although the United Kingdom was the first country to harness nuclear energy for civil power generation, the UK allowed aspects of its nuclear new build construction capability to decline significantly during the 1990s. The UK now has 11 operating reactors, generating approximately 15 percent of the country's electricity, down from the late 1990s high point of approximately 25 percent.



Germany cuts nuclear in response to Fukushima

Germany has considerable recent expertise in nuclear engineering and new build construction relating to plants outside Germany. However, in 2011, in response to Fukushima, Germany decreed that it would abandon domestic nuclear energy completely by the end of 2022. At that time, Germany was generating nearly a quarter of its electricity from nuclear energy and had 17 reactors. Germany's policy shift led Vattenfall (a Swedish state-owned power company) to start an arbitration against Germany under the Energy Charter Treaty regarding Vattenfall's interest in two German plants earmarked for closure and to simultaneously challenge the policy in the German courts. It was announced in March 2022 that the German government would pay €1.4 billion to Vattenfall to settle those claims, with additional smaller payments to three German energy companies that were also affected by Germany's decision to phase out nuclear power.



Nuclear new build renaissance in France and the UK

After Fukushima, the future of nuclear energy looked relatively unpromising in much of Europe. But in the last two years, French and UK attitudes toward nuclear energy have changed dramatically, particularly in the last few months. There are three main reasons for this:

1. The climate crisis and the importance of reaching zero carbon as quickly as possible are reviving the fortunes of nuclear as a “green” – or at least, transitional – source of energy. This is reflected in the EU Commission's decision in February 2022 to classify certain nuclear activities as supporting the transition to a climate-neutral economy.
2. The war in Ukraine has resulted in sanctions against Russia and the broader political realization that European states are overly reliant on Russian gas.
3. The economic impact of COVID-19 has encouraged governments to look more favorably on major infrastructure investment as a way of promoting economic recovery.

In light of the above, France envisages the commissioning of up to 14 new EPR reactors by 2050, as well as prolonging the life of existing reactors where possible.

The UK government released its Energy Security Strategy on April 7, 2022, unveiling plans to increase nuclear power generation to 24GW by 2050 – three times more than now and once again representing up to a quarter of projected electricity demand. The government anticipates that could spur the nuclear sector into building up to eight more reactors across the next series of new build projects. This comes in addition to the new build plant currently under construction at Hinkley Point C.



Looking forward: Opportunities and challenges

The renewed focus on nuclear new build projects in the UK and France opens up several opportunities and challenges.

It goes without saying that the nuclear and construction industries will prosper in countries where nuclear mega-projects do receive the green light. However, considerable investment in upskilling and additional capacity will be required if multiple projects are to be completed simultaneously.

In the UK, the experience developed in the construction of Hinkley Point C will be invaluable, particularly for the Sizewell C project, which uses the same EPR design. The EPR design will also be used in the proposed new French reactors, applying lessons learned on previous projects. The global nuclear supply chain could potentially experience a boom in demand for materials and services, with the potential for associated bottlenecks and delays.

The UK government's ambitious plans depend in some part on the success of its recent decision to change the preferred financing model to a Regulated Asset Base (RAB) model. Under the RAB model, a company receives a license from an economic regulator to charge a regulated price to consumers in exchange for providing the nuclear plant. The RAB model differs from previously preferred Contract for Difference (CfD) approach, under which the developer agreed to pay the entire cost of constructing the nuclear plant in return for an agreed fixed price (the "strike price") for electricity output once the plant is online. Unlike the CfD model, where construction risk sits with the developer, the RAB model shares the risk between investors and consumers, while also maintaining the incentives for the private sector to minimize the risk of cost and schedule overruns. The fact that CfD placed the entire construction risk on developers has led to the cancellation, in recent years, of several potential nuclear projects in the UK.

In France, it remains to be seen whether the EU Commission's decision to classify nuclear energy as a transitional activity will survive potential legal challenges, and what effect that will have on the investment environment.

In contrast to projects in the UK and France, the Ukraine crisis has the potential to negatively impact Russian-related nuclear projects. Russia has been a key exporter and financier of nuclear projects, often backed by cheap Russian loans. Rosatom, a Russian state-owned corporation, is currently building or was planning to build plants in Turkey, Hungary, Belarus, Finland, Egypt, China, India and Bangladesh. However, following recent events, Rosatom's Finnish new build project has been suspended, and the planned expansion of the Paks II nuclear plant in Hungary may also be affected. It may be that the previous Russian nuclear export success story suffers more broadly in the face of current or future sanctions.

Despite these issues, these are exciting times to be involved in the nuclear industry, and the nuclear renaissance has the potential to transform electricity production on the way to a carbon-neutral future.





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