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This German Town Could Decide the Future of EU Reliance on Russian Nuclear Fuel

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Anti-nuclear protestors in Lingen in 2023. **Vladimir Slivyak/X**

Currently, 19 nuclear power units with Soviet-designed VVER reactors operate within the EU, all of which use Russian nuclear fuel. All operators of these plants' operators have already signed new contracts with alternative suppliers — the U.S. company Westinghouse or the French company Framatome.

However, Framatome intends to supply Russian fuel assembled under a Rosatom license in the coming years. These plans have sparked heated debates that have brewed for some time.

On Nov. 20-23, 2024, a public hearing was held in Lingen, Germany to discuss proposals for the licensed production of Russian nuclear fuel for VVER reactors in the EU. Framatome plans to expand production at the Lingen fuel fabrication plant, operated by its subsidiary Advanced

Nuclear Fuels (ANF) in collaboration with the Russian company TVEl, a subsidiary fully owned by state-owned Rosatom. After ANF's submitted license expansion application to the Lower Saxony Environment Ministry became publicly available in early 2024, approximately 11,000 objections were filed against the plans for expansion and cooperation with Russia.

To address these objections, the Lower Saxony Environment Ministry organized a meeting of 400 people between Nov. 20-23. However, it remains unclear what decision will be made on the fate of the license and when.

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After Russia's full-scale invasion of Ukraine in February 2022 and the imposition of extensive sanctions on various sectors of the country's economy, the issue of reducing Europe's dependence on Russia's nuclear industry became critical. Currently, 19 nuclear power units with Soviet and Russian-designed VVER reactors operating in Finland, the Czech Republic, Bulgaria, Slovakia, and Hungary use Russian nuclear fuel. The only alternative supplier for these reactors is currently Westinghouse, which has already assisted Ukraine's transition away from Russian fuel for half of its nuclear units before 2022 and now supplies fuel for all nine operational units under Ukraine's control.

The French nuclear fuel manufacturer Framatome does not yet possess its own technology for producing fuel for VVER reactors. However, it does have a long history of collaboration with Rosatom. Notably, in the early 1990s, the French nuclear fuel giant Areva (later Framatome) organized the licensed production of nuclear fuel for Western European nuclear power plants at the Russian MSZ plant in Elektrostal. Over several decades of cooperation, several thousand Russian-French fuel assemblies were produced for NPPs in Germany, Switzerland, Sweden, the Netherlands and Britain.

Furthermore, enriched uranium and fuel pellets (used to assemble fuel rods) are still being supplied from Russia to the plant in Lingen to produce fuel for Western nuclear power plants. Since there are currently no sanctions or restrictions on the import of these products from Russia to the EU, such deliveries continued even after 2022. For example, according to data from the German authorities, three shipments of fuel pellets were sent from the MSZ plant to Lingen throughout 2023 and 2024.

In January 2023, Framatome and Russia's TVEL jointly established European Hexagonal Fuel SAS, registered in France, to license Russian fuel technologies. Two months later, Framatome applied for permission to produce hexagonal fuel assemblies for VVER-1000 reactors in Lingen. This initiative eventually received over 11,000 objections and led to public hearings in November 2024, while the Ministry for the Environment has yet to respond.

Critics of the project cite security threats as one of their main objections since Russian specialists will be present at the plant to deliver and commission equipment, as they were in the spring of 2024. Critics worry that granting Russians access to a German nuclear fuel production facility could be exploited by Moscow for industrial espionage or even sabotage, as these people will be employees of the Rosatom state corporation which is actively involved in military operations in Ukraine and the occupation of the Zaporizhzhia NPP. According to several German anti-nuclear organizations, this could provide the Kremlin with intelligence

to carry out provocations or sabotage at European nuclear power plants.

Christian Meyer, the Lower Saxony environment minister who is responsible for deciding on the license application, has repeatedly said publicly that he shares protestors' concerns and takes the security threats associated with potential collaboration between the plant and Rosatom structures very seriously.

However, the question remains why after more than a year and a half of reviewing the application, the license still has not been denied. Perhaps the complexity of the legal justification and German thoroughness prevent making the simple, swift and obvious decision to deny the license, especially given the current political climate.

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Along with the specific security concerns raised, it is worth considering the role and prospects of this production within the broader context of the West's nuclear industry and energy sector's move to sever ties with Moscow. How necessary, really, is this joint project with Russia for Europe and the French company?

Russia and Rosatom's economic motives are understandable. The export of nuclear fuel for European VVER reactors brought Rosatom approximately €300–700 million ($310-731 million) annually. A licensing deal with Framatome could retain at least part of this revenue, as direct deliveries of Russian fuel are expected to cease in the near future.

Currently, the only alternative supplier of nuclear fuel for VVER-1000 and VVER-440 reactors is the North American company, Westinghouse. The company has its own licensed technology and many years of experience supplying fuel for VVER-1000 reactors in Ukraine. In 2024, this fuel began to be loaded into a power unit at the Kozloduy NPP in Bulgaria, with deliveries expected to a unit in the Czech Republic by the end of the year.

Fuel for the continent's 15 VVER-440 reactors was developed later. Still, Westinghouse began delivering fuel to two units at the Rivne Nuclear Power Plant in Ukraine in late 2023, and starting in mid-2024, ahead of schedule, to the Loviisa Nuclear Power Plant in Finland.

The French company Framatome, the world's second-largest supplier of nuclear fuel after Westinghouse, does not yet have its own independent technology for VVER reactor fuel despite working on its development since 2018. According to the company's plans presented at the PWR Prague 2024 conference, the development of its fuel for VVER-1000 reactors is scheduled to be completed in 2025, and for VVER-440 reactors in 2028.

At the same time, Framatome has already signed contracts to supply fuel for VVER-440 reactors in Slovakia and Hungary from 2027. Plans were also announced to supply fuel for the VVER-1000 reactors of the Temelín NPP in the Czech Republic from 2024 and for Unit 6 at the Kozloduy NPP in Bulgaria from the end of 2025.

Thus, for both types of VVER reactors, Framatome will not be able to complete its own fuel development on time, lagging behind by at least 1-2 years, and will only be able to fulfill its

contractual obligations on schedule by using licensed Russian fuel assemblies. The only exception may be the fuel supply to Bulgaria next year.

Without cooperation with Rosatom, Framatome risked losing these contracts, which could have either gone to Westinghouse or been extended with Rosatom. However, it remains uncertain whether Westinghouse could have expanded fuel production sufficiently within 2-3 years to meet the demand. Therefore, expanding the license for the Lingen plant is crucial for Framatome to fulfill its multi-million euro obligations under existing contracts, particularly in Slovakia and Hungary.

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It would undoubtedly benefit Europe's energy security to eliminate any critical dependence on fuel supplies from Russia as quickly as possible. To expedite the development of alternative supplies, Euratom has supported two projects aimed at developing and implementing alternative fuel for VVER reactors.

In January 2023, the Accelerated Program for Implementation of Secure VVER Fuel Supply (APIS) was launched, followed by the Safe and Alternative VVER European Project (SAVE) in June 2024. Both projects received €10 million in financial support from the EU, with participation from all VVER reactor operators in five EU countries. The main difference between the two projects is that the first is led by Westinghouse, while the second is led by Framatome.

Of course, competition and the presence of at least two alternative suppliers provide greater flexibility and choice for end customers, as well as ensuring the security of future supplies. However, the business interests of individual companies may conflict with the policy of cutting ties with Russia, leading to overt or covert cooperation with Rosatom, especially as there are no EU-level sanctions against this cooperation.

Theoretically, by compromising the principles of free market competition, the EU could issue a directive requiring operators of VVER reactors to stop purchasing nuclear fuel produced by or through cooperation with Russia at a similar timeframe to the delayed U.S. ban on buying enriched Russian Uranium, as part of the next EU sanctions package related to Russia's aggression in Ukraine.

It is true this would lead to signing contracts with the sole supplier, Westinghouse. However, combined with the requirement for shorter contracts (not immediately for 10 years, but perhaps for five years, for example), this would make it possible in future, when Framatome completes its fuel development (possibly even sooner than currently stated), to move to a competitive selection of Western suppliers and greater supply stability.

Framatome's constant emphasis that it is the only company that can develop truly sovereign European fuel, since Westinghouse is from North America (owned by Canadian companies, with its headquarters in the U.S.), is not entirely fair. After all, Westinghouse's fuel production facilities for VVER reactors are located entirely in the EU — at a plant in Sweden, with the involvement of the Spanish company Enusa. In the future, more production will take place in Ukraine.

The imbalance in Westinghouse's favor could have been mitigated by creating a unified project under the auspices of Euratom for the development, implementation, and licensing of fuel for VVER reactors, rather than two separate projects like APIS and SAFE. However, such flexible solutions were not found, and sanctions on Russian fuel at the EU level (which would advantage Westinghouse) would likely have been blocked by France and Hungary.

This is why Framatome is currently trying to secure a portion of the market, even at the cost of cooperation with Rosatom, with which European nuclear power plant operators want to sever ties. However, it is not surprising that Paris' Hungarian partners, who have ordered French-Russian fuel, see nothing wrong with this cooperation, as Hungary remains the only EU country where Rosatom is carrying out a construction project.

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It is unclear how much more time the German authorities will need to make a decision about the Lingnen plant's license. However, even if the license is denied, Framatome may still have the opportunity to try to set up a licensed assembly of Russian fuel at its plant in France or even under a different brand at Rosatom's plant in Russia.

All of these risks could have been avoided only with official EU sanctions on the supply of Russian fuel. However, the business interests of companies, the political decisions of certain countries and the unwillingness to seek more flexible and compromise-based approaches leave us with the situation as it is.

As a result, the issue of the security of future fuel supplies has moved from the high offices of EU leaders to the hearing room in Lingen, where local residents and activists voiced in no uncertain terms what diplomats have struggled to express in milder form over the past few years. Now the decision rests once more with diplomats, lawyers and officials from the Lower Saxony Environment Ministry

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