Nuclear Waste Situation in Bulgaria

INFORSE Europe webinar

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More information and proceedings: https://inforse.org/europe/nuclear.htm

INFORSE-EUROPE
International Network for Sustainable Energy

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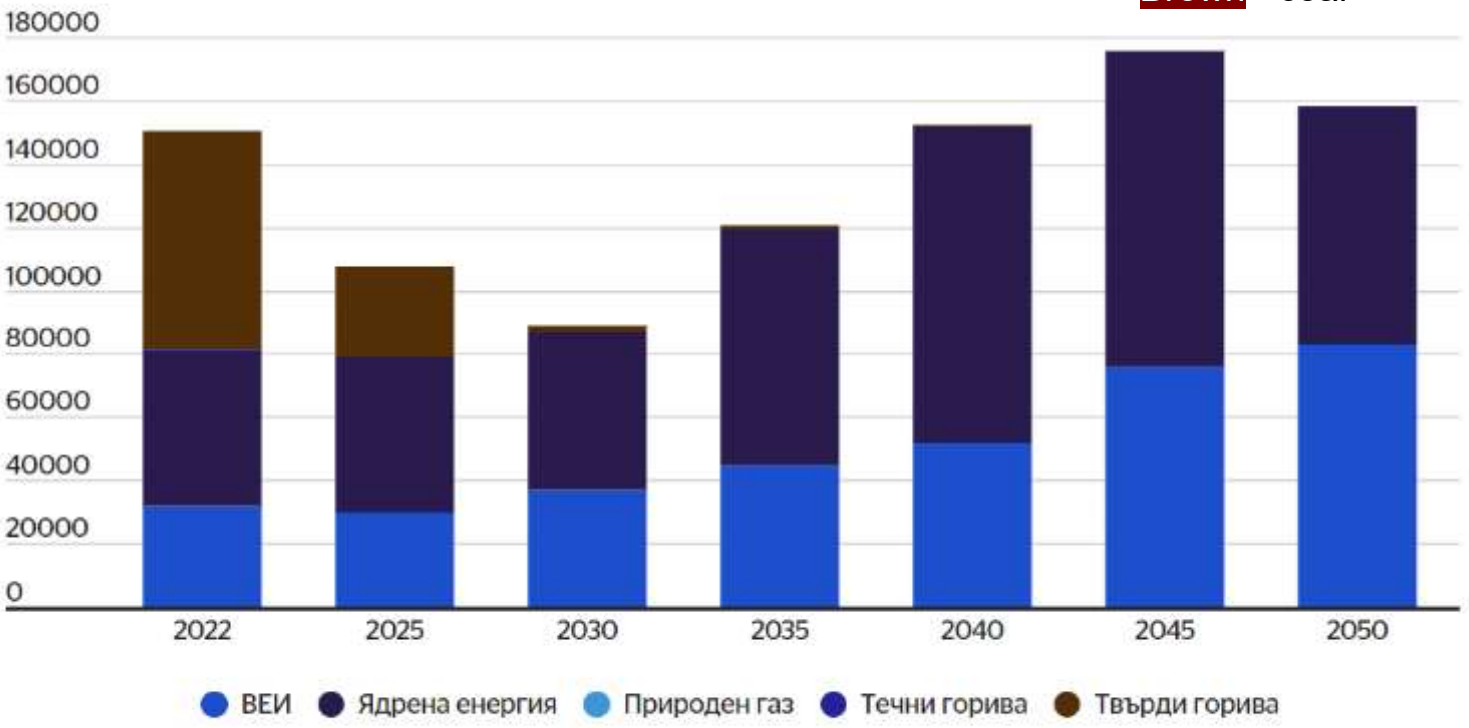
ПРОИЗВОДСТВО НА ПЪРВИЧНА ЕНЕРГИЯ

PRIMARY ENERGY PRODUCTION

- Light blue – RES
- Dark blue – nuclear
- Brown - coal



Източник: (B)EST model, E3-Modeling

NECP implementation – nuclear energy

The final Bulgarian NECP says that the planned increase in nuclear capacity between 2030 and 2040 is **in order to balance the system** due to the growth of RES ...

The government is proceeding on its and Parliament decision for the construction of two new units at the **Kozloduy NPP** with **Westinghouse's AP 1000 reactors**. The construction was entrusted to **Hyundai.**

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Kozloduy NPP and its nuclear waste

The project for the construction of the **first six units of the Kozloduy NPP** did not provide for **the processing, conditioning, storage, and disposal of low- and medium-level radioactive waste.**

Only after 1990, at the recommendation and insistence of the International Agency, set up an unit at the plant to deal with these issues.

A facility for separating waste, pressing it, and sealing it in 200-liter drums was built. Over time, a unique **facility was built for plasma incineration of such waste,** which turns everything into small glass balls and reduces the volume of waste dozens of times. It has been put into operation, but it **consumes 5 megawatts of power and is therefore used only from time to time** when large quantities of waste are collected.

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Low- and intermediate-level radioactive waste storage

Envisaged in 1999 in the first strategy
To be built in 2015
Construction started in 2017
Construction of building ends in 2025

Expecting licensing in 2027
Trial filing after 2027

No separate storage facilities built for low- and medium-level radioactive waste

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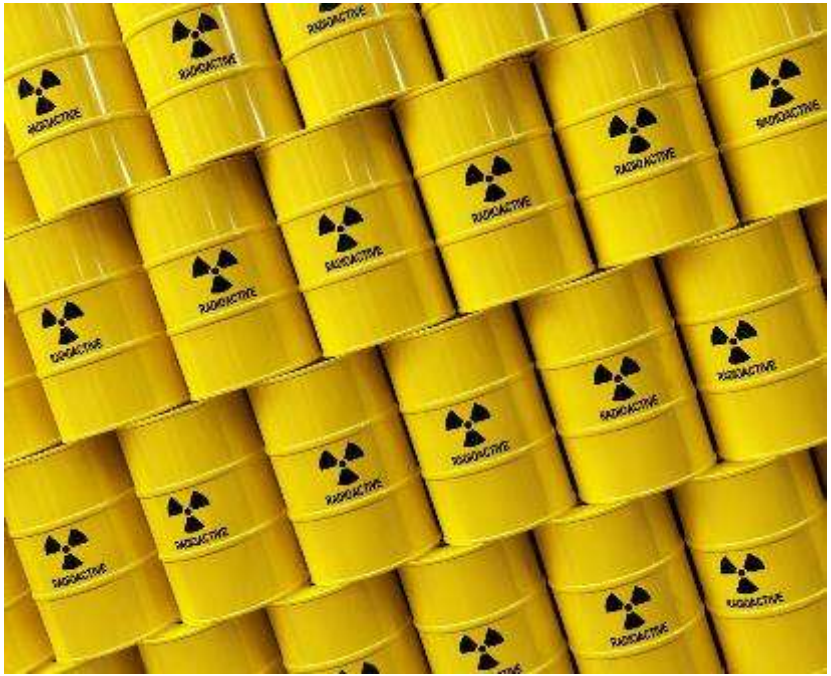
How much is the low & medium radioactive waste?

Around **1,000 concrete containers** reinforced with a metal frame with a useful volume of about 5 cubic meters are **stored in the temporary storage facility** at the Kozloduy NPP site

However, low - and medium-level waste accounts for only a few percent of all radioactive substances produced during the operation of the nuclear power plant.

The main risk comes from spent nuclear fuel.



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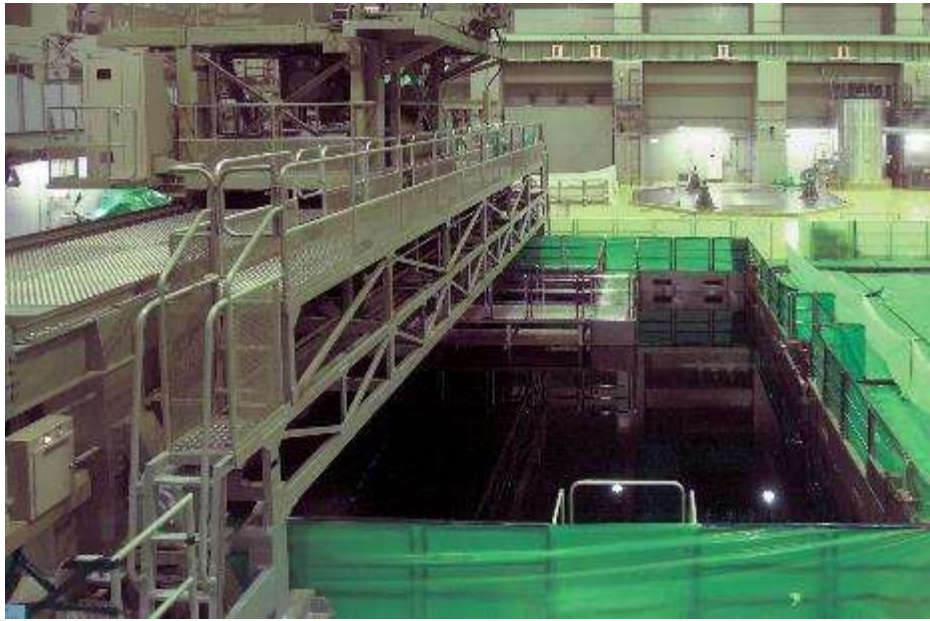
Spent Nuclear Fuel

The Bulgarian strategy says it would be **sent for reprocessing in russia,** but not possible **anymore!**

Bulgarian government is not taking steps to build a deep geological repository (located several hundred meters underground in stable earth layers such as clay formations or granite rocks) at the cost of at least BGN 5 billion / EUR 2.5 billion for a period over the next 25 years; no capacity and operating costs info)

It is also **not having talks with countries** that are building similar repositories (Finland, Sweden, France, and Switzerland).

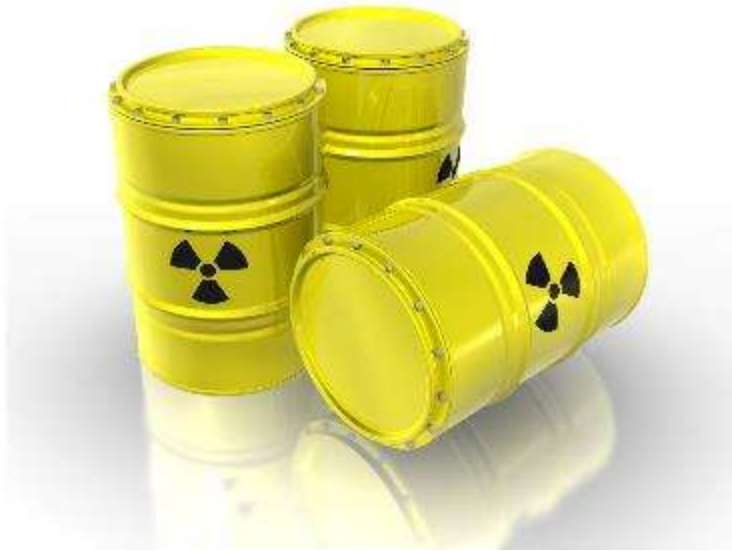


How much is the spent nuclear fuel?

Around **8,500 assemblies of spent nuclear fuel (SNF) were sent** for reprocessing and storage at the Mayak plant in russia, since the start of Kozloduy NPP in 1974.

The contract says the containers sent before Bulgaria's accession to the EU on January 1, 2007, **remain in russia**, while after that date the containers processed to vitrified high-level radioactive waste, **should be returned to Bulgaria for long-term disposal** (which is **about 1,006 tons of heavy metals**).

According to the updated, but not yet adopted strategy, Bulgaria has **significant stocks of fissile materials** (uranium and plutonium isotopes) obtained from the reprocessing of spent nuclear fuel in russia, that can be used to produce “innovative” fresh nuclear fuel in the future. They remain property of Bulgaria and are stored there until requested.
However, **it is not clear what these quantities are**, unlike the vitrified waste, which we must take back.



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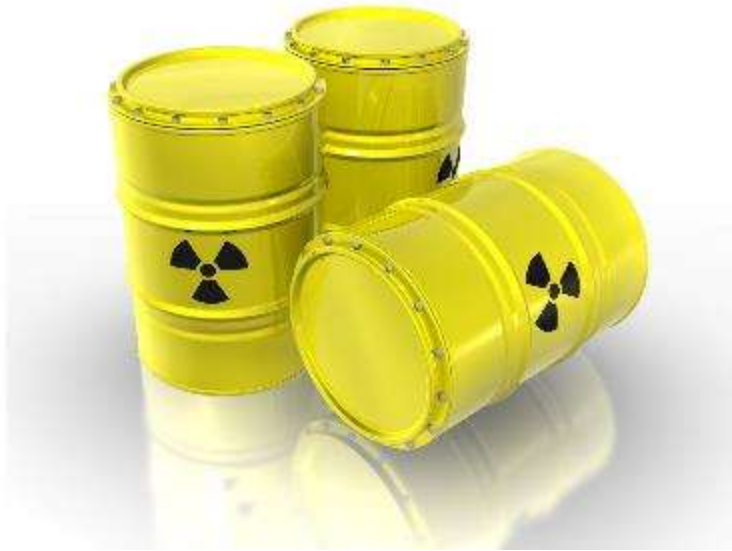
How much is the spent nuclear fuel?

Currently **Kozloduy NPP has 4,500 spent nuclear fuel (SNF) cassettes in storage** from the two operating VVER-1000 reactors.
They weren't transported to russia for reprocessing and vitrification into high-level radioactive waste, since 2022 and the start of the war in Ukraine.

Until 2047 and 2051, respectively, it is expected that **more than 2,400 cassettes will be added** to the above volume of waste, currently accumulated in the pools and storage facilities.



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Is there space for the spent nuclear fuel?

Wet storage capacity to be filled soon - The useful capacity of the wet storage facility for spent fuel at NPP Kozloduy site will be filled in 2032. This requires the dry storage facility to be expanded no later than 2030 to accommodate over 700 VVER-1000 cassettes. This would provide buffer capacity for the operation of the two operating units until 2040.

The operator of NPP Kozloduy claims that they had taken the necessary steps to expand the dry storage facility for spent nuclear fuel, but **did not explain what this meant** – whether plans had been drawn up, whether there were public tenders for the capacity increase, how much this would cost the nuclear operator.

More waste coming from the 2 new US reactors

The two planned new reactors at the Kozloduy NPP site, **based on the AP-1000 technology of Westinghouse**, are planned for 2034-2035, with an average annual production of **29 tons of heavy metal in spent nuclear fuel.**

With a **60-year operating life** for the two potential new nuclear facilities, this means about **2,600 tons of heavy metals in spent nuclear fuel**, according to the Ministry of Energy.

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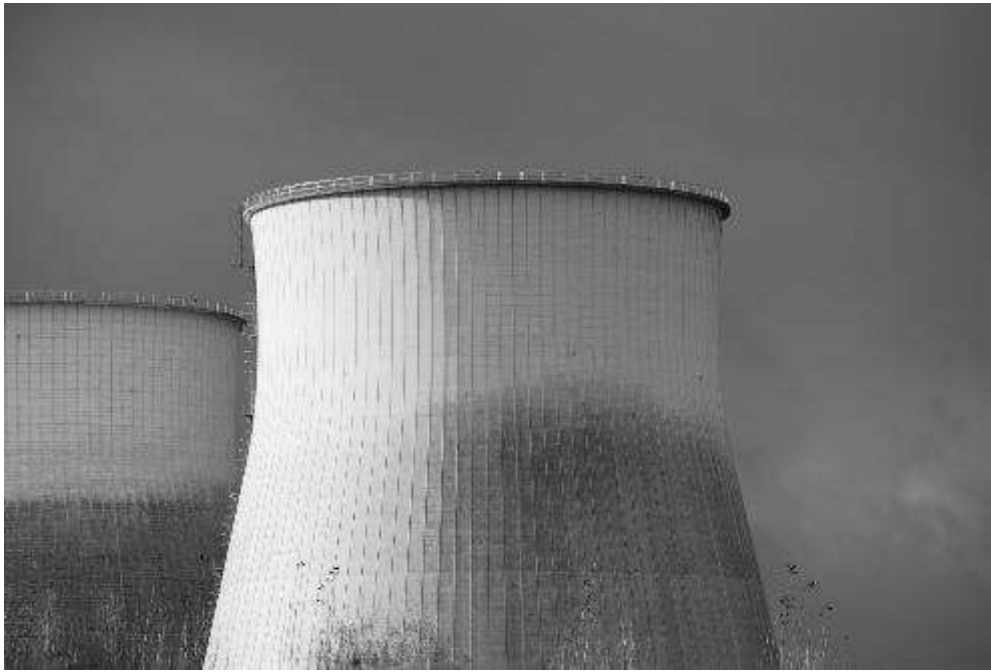
France reprocessing BG spent nuclear fuel?

Framatome, in the fall of 2026, **is to start supplying alternative fuel** to the current russian fuel for one of the two operating units at the Kozloduy NPP. **They have offered to recycle the accumulated russian casks,** but no decision has been made yet.

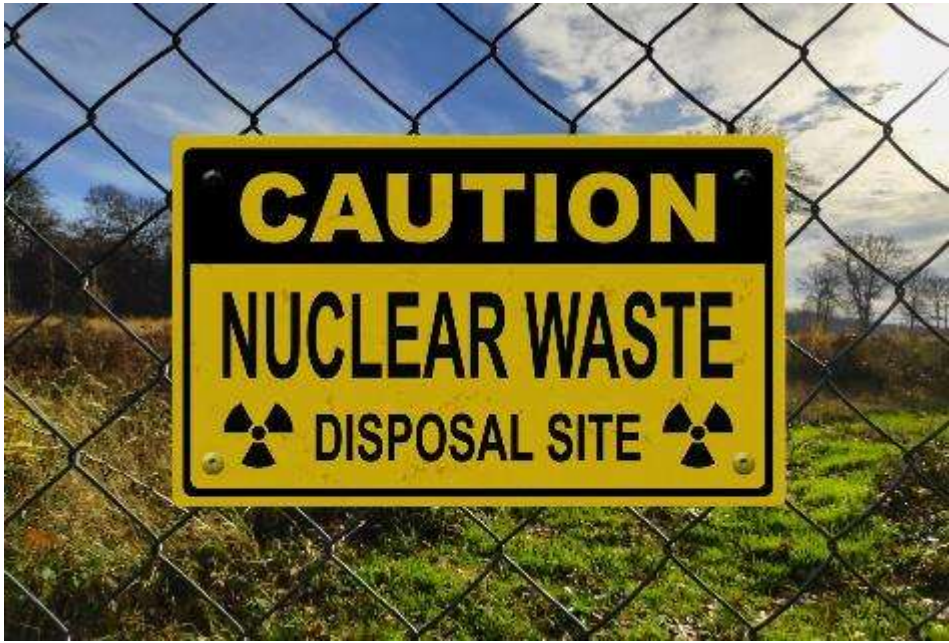
The draft strategy provides for the possibility of concluding a contract for the reprocessing of spent fuel in an EU member state. There is even a **direct provision in the text for the cassettes to be transported to France after 2030.**



Deep geological repository - no one wants it!

Studies of possible sites for the construction of underground storage facilities in the country are also **at a complete standstill.**

Several years ago, analyses of geological structures in northern Bulgaria were conducted, but politicians are afraid to raise the issue more seriously, because they fear civil unrest—no one wants even household waste in their "backyard," let alone nuclear waste.



Thank you for your attention!

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