

# **Nuclear sector's dependency on Russian companies and capital**

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**On March 10-11, EU heads of states and governments will try to devise and adopt an urgent plan for phase-out from the Member States' dependency on Russian fossil fuels, mainly gas and oil. However, Europe's nuclear power sector has a very similar problem, which might be even harder to tackle: the sector's dependency on various companies with Russia-derived capital is high. But, surprisingly for many, this does not concern Central and Eastern European (CEE) countries only.**

The world went through a shock when the Russian army shelled and took complete control over the Zaporizhzhia nuclear power plant (ZNPP), in terms of energy capacity, the biggest (6 units of 1000 MW each) in Ukraine and in Europe. The situation there is far from safe and clear, even a week later. This type of nuclear threat and danger suddenly materialized at the gates of the EU, while it has been denied as a realistic scenario in various impact assessments, for years and decades by the nuclear power complex, by planners, other plants' operators and even nuclear safety regulators in the EU and across the world. This was followed by another display of utter helplessness from the "nuclear watchdog" IAEA when its Director General R. Grossi started the appeals and offered to negotiate and to "speak to forces in charge [of the ZNPP]", with intention to enlighten the Russian military on IAEA's pillars of safety principles (!). This is, in fact no surprise at all to most knowledgeable experts in the nuclear field and to all of the critical NGOs warning of such dangers for years, as many have remembered pictures of tanks around the NPP Krško in Slovenia during the Balkan war in the early 1990s' and Azerbaijan government who was considering an attack on Armenia's Metsamor NPP during the war two years ago. Not to mention the luckily not fully successful attacks during the Gulf war when Iraq rocketed the secret 'Desdemona' reactor (Israel) and when the US struck Iraq's Nuclear Research Center.

Units at Zaporizhzhia were shut-down or their output reduced. Since electricity is a key service also for communication, nuclear dependency is an additional problem in a war situation.

## **Nuclear sector's dependency on Russia**

But even without acts of war, in many cases, the nuclear sector all over the world is exposed to high risks because the industry is heavily dependent on Russia-mined uranium, VVER-fuel supplies, servicing and maintenance of nuclear power plants and new-build plans.

The EU's latest sanctions on Russia do not (as of yet) include the nuclear sector, but first new-build projects, pushed for years and relatively advanced in planning or preparations, have already been cancelled or might be, while some of them could turn out, sooner or later, very problematic in one way or another.

De facto already cancelled has been the planned Hanhikivi-1 NPP: the Russian reactor VVER-1200 project's preparation has been withheld or actually stopped by the Finnish government for the time being, but most likely forever. The reactor was to be delivered by Rosatom; even the company set up to invest in and construct the plant, Fennovoima,

is 34% owned by Rosatom and would be the single largest owner of the NPP project. Now hundreds of millions of euros invested into the project will be sunk: While the site has been secured and fenced some 7 years ago, according to the Finnish owners, shifting the preparations to a non-Russian reactor technology at the Hanhikivi is practically unfeasible. The NPP's project is private (corporate), but it cannot proceed without a decision by the Finnish Government on the construction permit.

### **New NPP Paks II in Hungary**

Two planned VVER-1200s reactors were ordered for manufacturing in Russia by Rosatom. Even the financing (80% in loans, of the total worth under the still undisclosed contract) is secured by Russia. While officially the project is being still upheld, first rumors are claiming the contrary. The issue of financial transfers when Russia is not in the system SWIFT anymore and its banks banned from business, is definitely not helping.

### **Time up for Putin's Rosatom giant?**

Some countries' nuclear programme might encounter serious problems when trying to replace Russian services, since many more companies are connected to Rosatom or Gazprom than one might have expected. To start with the biggest one, Rosatom: Decreed by President Putin in 2007, it is a state-owned and -controlled corporation bringing together 350 enterprises, organizations and research institutions, among them the nuclear fuel manufacturer TVEL.

### **Nuclear fuel supply**

The following companies already cancelled business:

Germany's nuclear fuel manufacturer (Advanced Nuclear Fuels GmbH) based in Lingen: TVEL, the Russian nuclear fuel manufacturer planned a joint venture with French Framatome, this failed and a renewal of this plan is unlikely after Russian attack on Ukraine.

Urenco, European uranium enrichment company has cancelled its contract with TVEL's plant in Russia. Another well-known German centrifuge enricher's plant at Gronau after having been under criticism for many years.

### **TVEL, nuclear fuel manufacturer supplies fresh uranium fuel to most VVER reactors, in the EU specifically for units at the following NPPs:**

Loviisa 1&2 in Finland

Temelin 1&2 and Dukovany 1-4 in the Czech Republic

Bohunice 3&4 and Mochovce 1&2 in Slovakia

Paks 1&4 in Hungary

Kozloduy 5&6 in Bulgaria

As regards VVERs in Europe, only in Ukraine, its Zaporizhzhia and Southukraine NPP units have switched to Westinghouse-manufactured fuel assemblies. Still US Westinghouse's company (located in Västerås, Sweden) is the only alternative producer of VVER fuel. The past decades saw several attempts to completely replace the TVEL fuel

with that supplied by Westinghouse, but for reasons not always clear this has not achieved to date. Kozloduj is already in the process of switching to Westinghouse fuel, safety assessments however still pending. Temelin also is trying to avoid another fuel supply contract with TVEL.

**The formerly Czech company ŠKODA JS is actually a fully Russia-owned company.**

Rosatom is best known for constructing NPPs and for manufacturing fuel for its VVER reactors line. Less known are the many companies, which are active in nuclear services. Among them is e. g. ŠKODA JS, a former Czech nuclear company, which in 2004 was bought by OMZ, the Russian heavy machinery manufacturer, which is owned by Gazprombank, a private bank owned by Russian gas monopoly Gazprom. ŠKODA JS is currently responsible for maintenance of both NPPs (units at Bohunice, and Mochovce-1 and -2) and the construction of Mochovce-3 and -4, where it serves as the main contractor. Certainly, ŠKODA JS is also contracted for maintenance of both Czech NPPs, Dukovany and Temelin. Skoda JS is already responsible for Paks 1-4 (maintenance and modernization, including inspections of the reactor pressure vessel at units 2, 3 and 4) and signed contracts with MVM ERBE within a framework contract for the Paks 2 units for document evaluations, also for inspections of the primary circuits.

On top of this, through Škoda JS the Russian nuclear giant owns about 20% of the nuclear research institution UJV Rez, being also technical support organization (TSO), so they have an easy access to sensitive safety documentation for reactors in both countries.

**Russian hand in EPR (European Pressurized Reactor) - NPP Hinkley Point C / UK**

Since July 2018, Škoda JS has had a contract with France's Framatome to manufacture two sets of EPR reactor pressure vessel internals (core basket, heavy reflector and the upper internals) for the two units currently under construction at Hinkley Point C, but also the two other EPR reactors in the EU: recently completed in Olkiluoto (Finland) and for the still much delayed Flamanville-3 (France).

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