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Challenges of Nuclear Energy and Nuclear Waste  
in Slovenia and Croatia

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As the plans for the first Yugoslavian Nuclear power plant (NPP) Krško were drafted in the 1970s, there was no mention of nuclear waste.

Similarly, the purchase contract with Westinghouse made no mention of it. After the disintegration of Yugoslavia in 1990, the previous contract between the two states, Slovenia and Croatia, extended the primary 50:50 provision of ownership to nuclear waste.

This agreement is the origin of both cooperation and entanglements about nuclear waste. Slovenia and Croatia have decided to postpone the construction of a final depository for used nuclear fuel until the NPP Krško I, and the pending NPP Krško II, has been definitively put out of operation (approx.. around 2070).

The first strategy for spent fuel management was adopted in 1996. It was based on the agreement between the governments of Slovenia and Croatia.

However, cooperation has proven difficult as each side wants to make as much profit from the NPP as possible and to take over as little cost and responsibilities regarding used fuel as it can. Two separate final repositories for nuclear waste are probable.

The actual distribution of responsibilities through the end of the operation of the nuclear power facilities in Slovenia between the Agency for radioactive waste of Slovenia (ARAO) for low and medium active waste and to the NPP Krško for used fuel is unsatisfactory and creates risks.

The ARAO is a state public institution, and is responsible for handling all waste, preparing strategies, and developing technical capacity as well as operating facilities for storage or disposal. The NPP is primarily a profit-driven company that operates the nuclear power plant and whose purpose is generation of as much of electricity as possible. These two functions challenge one another.

The NPP Krško started operating in the autumn of 1981 and has been operating commercially since 1983. It is a Westinghouse two-loop Pressurized Water Reactor with a nominal output power of 727/696 MWe (gross electrical power/net electrical power).

The plant is owned by state-owned Slovenian and Croatian electrical power companies, GEN energija d.o.o. and Hrvatska Elektroprivreda - HEP d.d., respectively. Ownership is divided 50:50 between Slovenia and Croatia. The plant is operated by the public/private enterprise Krško NPP d.o.o. The NPP Krško is the major producer of radioactive waste in Slovenia and Croatia.

All operational radioactive waste and spent nuclear fuel produced through the NPP are stored on site. Solid radioactive waste is treated and then packed into steel drums, which are then stored in the solid radioactive waste storage facility.

Between 1993 and 2002, tensions surrounding the opposing interests of Croatia and Slovenia in relation to the NPP came to a head.

For the HEP and Croatia, the main disputes were supposedly reduced employment rights for Croatian workers in the NPP, participation of Croatian managers at the senior level, payment for the steam generators' replacement project imposed by the Slovenian PM Drnovšek, the application of different accounting standards for Croatian and Slovenian stakeholders, and Slovenian insistence on HEP's contribution into the Slovenian decommissioning fund.

For Slovenia, the main disputes were HEP's failure to pay for the electricity it received from the NPP Krško, HEP's refusal to contribute to the Slovenian decommissioning fund, HEP's refusal to approve all projects from the modernization program, which were seen as necessary to further secure operation of the NPP by the Slovenians, the amount of pooled depreciation, and the Croatian decision to cancel the construction of a second NPP on Croatian soil, as established in the original agreement.

Disputes culminated on 30 July 1998, as the government of Slovenia, the Slovenian transmission company ELES and the NPP Krško disconnected transmission lines to Croatia and terminated all deliveries of electricity from the NPP Krško to HEP.

The NPP was originally designed to operate until the end of 2023. Since the spring of 2015, however, the Slovenian government has sought to legally extend the operation lifetime for 20 years (until 2043), despite its unfulfilled promise to hold a national referendum on the nuclear projects.

In a joint commission on NPP issues that same year, representatives of the Croatian government agreed to the lifetime extension of 20 years. The construction of a second reactor at the same site is being proposed by the Slovenian government.

According to the ESPOO convention, any operation extension requires transboundary verification, that is approval or rejection from neighbouring countries; it is rather uncertain, however, whether Austria, as a neighbouring country, would support it.

In 2003, a new agreement between Croatia and Slovenia on the status of Croatian investments in the NPP and other legal relationships related to the NPP Krško, its use and decommissioning was adopted and ratified.

It represents the first legal regulation on nuclear waste between the two states after 22 years of operation.

Following the agreement, in 2004, the first program for NPP decommissioning was established. However, there were numerous challenges to renewing the program every five years as required.

These issues included differing opinions on general costs, payments to local communities around the NPP site, and each state's level of engagement in NPP reconstruction.

There are two entities in Slovenia in charge of nuclear waste:

Low and middle radioactive waste is managed by the Slovenian national agency for radioactive waste management, ARAO;

spent fuel and highly radioactive waste are to be managed by the Slovenian electrical power company GEN energija d.o.o. as long as the NPP is in operation.

This raises questions about possible conflicts of interests and responsibilities, as a provider of nuclear power is also a producer of spent fuel and responsible for spent fuel management.

Because of the two (state) owners of the NPP Krško, two separate funds for decommissioning and management of nuclear waste were established; the ARAO was established in Slovenia as a state-owned public institution for radioactive waste management in 1991 and the fund for decommissioning the NPP Krško was established in 1995.

There is no joint understanding of the use of the collected funds. For instance, Slovenia's government supports financing of the surrounding local communities to assure compliance by the neighbouring population, while the Croatian government does not see this support as necessary. Moreover, there are disparities in collected funds, which are generally seen as insufficient.

These disparities resulted from the lack of a united 'master plan' for managing all kinds of nuclear waste together. Additionally, the levy of 0.30 Euro cents per kWh, which is paid by the Slovenian electrical nuclear power company is not sufficient to finance the construction of a LILW depository.



Another open question is the “revolving door” between the nuclear industry and the government energy administrations.

For instance, the Director of the Energy Directorate of the Ministry of Infrastructure and Space /MzI/ in Slovenia is a former collaborator of the GEN Energija d.o.o., Mr. Danijel Levičar, which is the owner of the NPP Krško. Through such relationships, the nuclear energy sector has a decisive influence not only in the domain of nuclear energy, but also in relation to competing energy industries, particularly solar, wind, geothermal and bio energy sources.

The energy sector also has influence over overall energy pricing and subsidies.

Thus, it is no surprise that the nuclear industry presents itself as „the cheapest and sustainable“ energy, while subsidies for solar panels and wind turbines are blocked. In this way, nuclear industry collaborators are in a position to influence key political decisions in state energy politics.

There have been no further steps taken towards an agreement on the decommissioning program and nuclear waste management. The agreement adopted in 2004 is out of date, as it was planned to be updated every five years, but it is not. Among several unanswered questions is the involvement of the local population and its right to be informed and integrated in decision making, as defined in the Aarhus convention.

The local population had neither been consulted about the twenty-year extension of the operation life time of Krško 1, nor about the intended construction of a second reactor of the NPP, nor about the plans to construct an additional dry used nuclear fuel depository and a LILW depository at the NPP site, although these plans were distributed to the public by the press. It seems that the community Krško is a case of a community being dependent of its financing by nuclear power. Many speculate that the government is testing public reactions and may eventually change course if there are significant negative reactions.

But there have not been any such reactions and the press has shown lack of interest in the issue. Following the Chernobyl and Fukushima accidents, public opinion in Slovenia and Croatia has been against nuclear. However, given the intensive state suppression of nuclear opposition in the media and engaged antinuclear activists being forced out of their jobs, there has been only a weak public rejection of the nuclear industry's plans.

Similarly, numerous questions arise regarding the permitting and oversight of any planned waste disposal facilities. According to Mr. Andrej Stritar, the head of the Slovenian Nuclear Safety Administration (SNSA), construction of an additional new dry depository for spent fuel at the NPP site, which is needed for the life time extension of the NPP Krško from 40 to 60 years until 2043, can be permitted without an environmental impact assessment /EIA/ or approval from the local community Krško.

But such an official decision was rejected by a Slovenian court after several NGOs sued against it. Nevertheless the intention to extend the construction plans are still there and do not confront any important public opposition.

Thank You for Your attention!