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Historical Heritage and the Future of Serbia's Nuclear Energy: Dependence, Sovereignty, and Geopolitical Implications

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Abstract
This paper examines Serbia's recent decision to repeal the 1989 Law on the Prohibition of the Construction of Nuclear Power Plants, the so-called 'moratorium' on nuclear power plant (NPP) construction, amidst growing debates on the country's ability to manage such a project, its alternative green energy options, and ecological concerns about nuclear waste. The central issue, however, remains the strategic choice of a technological partner for NPP development, which encompasses geopolitical, security, and long-term economic factors. While recent French initiatives suggest that France could be a potential partner, Serbia's prior agreements with Russia's state-owned Rosatom raise concerns about increased Russian influence in Serbia and the Balkans. This analysis draws on historical examples of Yugoslavia's nuclear cooperation with the Soviet Union, offering insights into the present challenges Serbia faces. It argues that, given Serbia's technological and financial limitations, cooperation with Russia remains likely, potentially deepening Serbia's political and energy dependence on Russia and undermining its sovereignty. This dependence would have broader implications for regional and European security. By examining past and present dynamics, the paper highlights the need for Serbia to carefully consider its nuclear energy partnerships, balancing national interests with geopolitical realities.

Keywords: Nuclear energy, Serbia, Rosatom, Yugoslavia

Introduction

On 25 November 2024, during a rather turbulent session of the National Assembly of the Republic of Serbia that included some verbal and physical altercations between the representatives, the ruling coalition led by the Serbian Progressive Party (*Srpska napredna stranka,* SNS) successfully passed and adopted more than 60 laws and law amendments

without any debate.[1] Despite representing an unusual and dangerous precedent, even by the standards of Serbia's recent political tradition, among a bundle of legislative acts was the abolition of the Law on the Prohibition of the Construction of Nuclear Power Plants, the so-called 'moratorium' on the construction of nuclear power plants, in force in Yugoslavia and Serbia since 1989.[2]

These circumstances open a myriad of questions that have been publicly debated in Serbia in the last months, stretching from questioning Serbia's economic, scientific, and technological capacities to embark on such a project, to alternative options to produce green electric energy, to growing environmental concerns related to nuclear waste disposal. However, the question of a potential provider of adequate technologies does not seem prominent in these discussions, even though its importance encompasses important strategic aspects that involve a mix of geopolitical alignments, long-term energy sovereignty, economic ties, and technological dependencies. This raises the importance of making a strategic and long-term decision about a potential partner in the construction of a nuclear power plant (NPP) in Serbia that would balance these factors against national interests, national and energy security considerations, and global partnerships.

Although there are numerous alternatives to nuclear energy as a zero-carbon energy source, such as hydro, wind, solar, and geothermal, the recent abolition of long-standing legislation that specifically prohibited the construction of NPPs in Serbia suggests that nuclear energy is now being considered a key component of the country's future energy mix and a central pillar of its long-term energy security strategy.[3] Furthermore, the European Union (EU) Green Deal Agenda aims to reduce the net greenhouse gas emissions in the EU by at least 55% by 2030, compared to 1990 levels.[4] Despite initial reluctance within the European Union, on 11 July 2022, the European Parliament adopted the Complementary Climate Delegated Act, which classified nuclear energy and natural gas as viable alternatives to energy derived from "solid or liquid fossil fuels, including coal,"[5] Serbia's primary energy source. As a country that has held official EU candidate status since 1 March 2012,[6] Serbia's new energy strategy appears to align closely with existing EU legislation and regulatory frameworks. On the other hand, Serbia's negotiations seem stuck at the moment, partly due to the EU enlargement fatigue, but also to Serbia's questionable commitment to the cause.

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[1] BBC News na srpskom. 2024. Fizički sukob poslanika vladajuće koalicije i opozicije u Skupštini Srbije. *BBC News na srpskom*, 1 December 2024.

[2] Marić, Dunja. 2024. Ukinut moratorijum na gradnju nuklearki u Srbiji: U senci skupštinske tuče vlast usvojila izmene Zakona o energetici. *Nova ekonomija*, 28 November 2024. The use of the term *moratorium* may be somewhat misleading, as it implies the temporary nature of a given measure or piece of legislation. The original 1989 legislation submitted to the National Assembly included a moratorium on the construction of NPPs in Yugoslavia until 2000. However, when it was reintroduced in the Federal Republic of Yugoslavia in 1995, and extended by the Republic of Serbia in 2005, such a time limitation did not exist, effectively rendering it indefinite. Considering that *moratorium* continues to dominate public discourse in Serbia, I retain its use in this article for the sake of consistency with prevailing terminology. SRBATOM. Direktorat za radijacionu i nuklearnu bezbednost i sigurnost Srbije. 2019. Zakon o zabrani izgradnje nuklearnih elektrana u Saveznoj Republici Jugoslaviji. *SRBATOM. Direktorat za radijacionu i nuklearnu bezbednost i sigurnost Srbije,* 6 October 2005; Borba. 1988. Moratorijum sa zadrškom. *Borba*, 28 December 1988, 1.

[3] In 2023, Serbia produced up to 58.7 percent of its electric energy in the coal-fired thermal power plants. Statistical Office of the Republic of Serbia. 2025. *Energy Balances, 2023.* Belgrade: Statistical Office of the Republic of Serbia, 20; Miljković, Marko. 2024. 'Green' energy in 'red' Yugoslavia: The failure of hydroelectric power in Yugoslavia between the 1960s and 1980s. *Economic Analysis* 57(2), 17-35, 34.

[4] European Commission. *Delivering the European Green Deal* (accessed: 1 May 2024).

[5] European Parliament. *Nuclear Energy* (accessed: 23 March 2025); European Commission. *Implementing and delegated acts – Taxonomy Regulation* (accessed: 23 March 2025).

[6] European Commission. *Serbia* (accessed: 9 August 2024).

Considering that Serbia lacks the capacity to independently implement its nuclear energy strategy, the selection of a potential partner becomes a crucial challenge, one that could shape the country's long-term political alignments and partnerships. In this context, the International Atomic Energy Agency (IAEA) published, in 2023, a comprehensive document aimed at countries aspiring to develop a nuclear power program. Most likely designed as a response to the changed EU attitude toward nuclear energy, this document underscores that "[a] nuclear power plant represents a long-term national commitment — on the order of 100 years or more."[7] Although this comment refers to the development of necessary physical and safeguards infrastructure, human resources, and legislative framework, it is clear that Serbia would not be able to embark on such a long-term project without the comprehensive support of a foreign partner. In fact, the official estimates of the Serbian Government confirm that the country's nuclear program would have to start from scratch.[8]

Throughout 2024, French initiatives in the field have produced several comprehensive agreements with Serbia on the development of the country's civilian nuclear program, which seemingly indicates France as a potential partner. However, in public discussions, it is often neglected that in previous years, Serbia had already signed several and more elaborate agreements with the Russian state-owned nuclear energy company Rosatom. These agreements have a significant potential to expand Russia's already strong influence in Serbia and the region, predominantly based on Russia's earlier investments in Serbia's oil industry, in which Russia's Gazprom has the majority ownership.[9] Should such a scenario evolve in the near future, allowing for expansion of Russia's control over Serbia's entire energy sector, that would reflect in the expanded political influence, the risk of Serbia becoming a 'Balkan Belarus' would become considerable, while the prospects for its accession to the EU would diminish. In other words, the fact that "Belarus is 100 percent dependent on Russian energy imports" and that "Russia also takes advantage of this," might become Serbia's reality.[10] Stojanović agrees that Russia uses energy diplomacy "to achieve political goals through the levers of dependence of other countries on Russian energy sources," but somewhat contradictorily concludes that "Russia is emerging as the most favorable partner for the [Serbia's] future nuclear power plant."[11]

Considering the EU's fatigue with the protracted war in Ukraine and the increasing calls for negotiations, it is plausible that, soon after the resolution of the war in Ukraine, Russia could quickly reassert itself as a major global supplier of nuclear technology and exploit the already signed memorandums and protocols in Serbia with renewed vigor. The implications on Serbia's political independence, political alignments in the context of the ongoing EU accession negotiations, and even sovereignty would be difficult to fully assess at the moment. While precise projections remain speculative, it can be reasonably argued that any future cooperation between Serbia and Russia in the field of nuclear energy would carry significant

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[7] International Atomic Energy Agency. 2023. *Enhancing national safeguards infrastructure to support the introduction of nuclear power. IAEA Nuclear Energy Series NG-T-3.25*. Vienna: IAEA, 1.

[8] Republic of Serbia, Ministry of Mining and Energy. 2016. *Energy sector development strategy of the Republic of Serbia for the period by 2025 with projections by 2030*. Belgrade: Republic of Serbia, Ministry of Mining and Energy, 46. Nuclear safeguards are a set of technical measures and verification mechanisms implemented by the IAEA to ensure that civilian nuclear materials and technologies are not diverted for military or non-peaceful purposes.

[9] Prelec, Tena. 2020. The vicious circle of corrosive capital, authoritarian tendencies and state capture in the Western Balkans. *Journal of Regional Security* 15(2), 167-198; Stojanović, Bogdan. 2023. Nuclear energy sector and cooperation with Russia on the path to energy transition in Serbia. *Medjunarodni problemi* 75(2), 185-210, 200-202.

[10] Maness, Ryan C., and Brandon Valeriano. 2015. *Russia's coercive diplomacy: Energy, cyber, and maritime policy as new Sources of power*. Houndmills, Basingstoke, Hampshire & New York: Palgrave Macmillan, 11.

[11] Stojanović, *Nuclear energy sector*, 193, 196.

potential for deepening long-term Russian influence over Serbia, and such an outcome requires serious consideration both within Serbia and among EU policymakers.

This paper seeks to examine the historical cooperation between Yugoslavia and the Soviet Union on civilian nuclear energy projects, with the goal of identifying lessons relevant to Serbia's current challenges in developing its civilian nuclear program. It also explores potential strategies that Russia might employ to secure its influence over Serbia's emerging nuclear sector.

The limitations of employing historical analogies as a theoretical framework are evident, ranging from obscuring important changes in strategic priorities, institutional settings, or international norms to overly deterministic interpretations. Furthermore, as a historian, I fully agree with Gavin's comment that "[h]istorians emphasize complexity and uncertainty when looking at the past" and "dismiss the possibility of predicting future events."[12]

However, the fact remains that contemporary Russia's foreign policy thinking, strategic culture, and global alignments continue to exhibit significant continuities with the Soviet and even Tsarist era.[13] Regarding Russia's tradition of using energy politics for diplomatic gains, Maness and Valeriano also argue, "the contours of international interactions have shifted, but the outcome remains the same."[14] Therefore, in this case, historical parallels can provide meaningful insights into present-day trajectories, although caution is required. Inspired by Paul Kennedy's influential work on the historical dynamics of the rise and fall of superpowers,[15] this analysis refrains from deterministic forecasting or empirically unverifiable claims about the future cooperation between Serbia and Russia in the nuclear energy sector. Rather than seeking predictive certainty, the objective is to analytically construct a plausible, albeit adverse scenario in order to illuminate the strategic significance of Serbia's recent shift in energy policy. By doing so, the paper aims to underscore how this shift may shape the country's long-term political alignments and potentially affect regional and broader European political stability.

'Unclear' nuclear relations between the Soviet Union and Yugoslavia

Since the dawn of the Atomic Age in the late 1940s and early 1950s, nuclear energy, and particularly its civilian dimension, including the global proliferation of nuclear research and power reactors, has served as a strategic instrument through which superpowers have advanced their geopolitical interests at national, regional, and global levels. On 8 December 1953, U.S. President Eisenhower delivered the historic Atoms for Peace speech in the United Nations, thus sparking global nuclear cooperation in the field of civilian nuclear energy. Krige probably rightly comments that "[n]o single narrative can capture its many dimensions."[16] The speech and subsequent program based on it has been analyzed from

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[12] Gavin, Francis, J. 2012. *Nuclear statecraft: History and strategy in America's atomic age*. Ithaca & London: Cornell University Press, 2.

[13] See for example Robert Donaldson, Robert H., and Vidya Nadkarni. 2024. *The foreign policy of Russia: Changing systems, enduring interests*. New York & London: Routledge; Mankoff, Jeffrey. 2011. *Russian foreign policy: The return of great power politics.* Lanham: Rowman & Littlefield Publishers; Rieber, Alfred J. 2007. *How persistent are persistent factors?*, in *Russian foreign policy in the twenty-first century and the shadows of the past*, edited by Legvold, Robert. New York: Columbia University Press, 205-278; Rieber, Alfred J. 1993. *Persistent factors in Russian foreign policy: An interpretive essay*, in *Imperial Russian foreign policy*, edited by Ragsdale, Hugh. Cambridge: Woodrow Wilson Center and Cambridge University Press, 315–335.

[14] Maness and Valeriano, *Russia's Coercive Diplomacy*, 2.

[15] Kennedy, Paul. 1989. *The rise and fall of the great powers: Economic change and military conflict from 1500 to 2000*. New York: Vintage Books.

[16] Krige, John. 2010. *Techno-utopian dreams, techno-political realities: The education of desire for the peaceful atom*, in *Utopia/dystopia: Conditions of historical possibility*, edited by Gordi, Michael D. / Tilley, Helen, and Gyan Prakash. Princeton: Princeton University Press, 151-175, 152.

various of Cold War perspectives: "as a Marshall Plan for atomic energy, as an instrument of informal intelligence gathering, as an imperialist strategy to create export markets for American utility companies in the postcolonial world, as a major contribution to the controlled spread of nuclear science and technology, as a naive and misguided attempt to demilitarize a dual-use technology, and as a major factor in proliferation of nuclear weapons."[17] Regardless of potential dangers due to the rapid proliferation of nuclear technology, by mid-1955, the United States had signed more than a dozen agreements with countries across the globe.[18]

The Soviets quickly rose to the challenge. Holloway argues that "[i]n spite of its earlier misgivings, the Soviet Union was now committed to international collaboration," and signed similar agreements with the countries in its sphere of influence in the early months of 1955, promoting the modernity and technological prowess of the socialist system. In March 1956, they also established the Joint Institute of Nuclear Research at Dubna (JINR), designed as a counterpart to the European Organization for Nuclear Research (CERN).[19] Soviet propaganda was reinforced by the operational success of the world's first electricity-generating nuclear power plant in Obninsk, which, beginning in October 1954, supplied up to 5 MW of electricity to the Moscow electric grid. This achievement was presented as the material realization of Lenin's promise that "Communism equals Soviet power plus the electrification of the whole country," thereby linking nuclear advancement to the ideological and developmental goals of the Soviet state.[20]

The cooperation between Serbia and Russia in the nuclear field has a surprisingly long history. Already in 1946, the Soviets had pushed for the establishment of the so-called Physical Institute (*Fizički institut*) in Yugoslavia, which was part of their elaborate scheme to draw an important wartime ally closer to their orbit and exploit the existing connections a few nuclear scientists in Yugoslavia had with the West at the time.[21] The scheme was similar to the attested practice of the establishment of joint enterprises (joint-stock companies) that the Soviets somewhat enforced across their sphere of influence at the time, and with the same or similar purpose.[22]

The same scheme was visible in the establishment of joint uranium mining companies in Czechoslovakia, Bulgaria, and East Germany that eventually provided most of the natural uranium used in the Soviet atomic bomb program.[23] Similar attempts to find uranium were also made in Yugoslavia in 1947. The Soviet prospection team toured most of the country's mines in search of the elusive uranium, although they failed to discover any significant reserves. Despite the lack of results, the Soviet prospectors followed the practice established

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[17] Krige, *Techno-Utopian Dreams*, 152.

[18] Pilat, Joseph F. (ed.). 2007. *Atoms for peace: A future after fifty years?*. Washington: Woodrow Wilson Center, 1. See also, *Krige, Techno-Utopian Dreams*, 152, 154, 164; Krige, *Atoms for peace*, 161.

[19] Holloway, David. 1994. *Stalin and the bomb: The Soviet Union and atomic energy, 1939-1956*. New Haven & London: Yale University Press, 348-354.

[20] Holloway, *Stalin and the bomb*, 347-348; Josephson, Paul R. 2005. *Red atom: Russia's nuclear power program from Stalin to today*. Pittsburgh: University of Pittsburgh Press, 2-5.

[21] Miljković, Marko. *2025. Titova atomska bomba: Jugoslavenski nuklearni program 1948-1970. Zagreb: Srednja Europa*, 41-64.

[22] Ninković, Momir. 2015. Neuspešni pregovori o organizaciji jugoslovensko-sovjetskih mešovitih društava (1945-1947). *Tokovi istorije* 23(2), 129-153, 131-132, 135-138, 149-150; Unkovski-Korica, Vladimir. 2013. *The economic struggle for power in Tito's Yugoslavia: From World War II to Non-Alignment*. London & New York: I.B. Tauris, 30-31.

[23] Miljković, *Titova atomska bomba,* 84-86; Hristov, Ivaylo. 2014. *The Communist nuclear era: Bulgarian Atomic Community during the Cold War, 1944-1986*. PhD Thesis. Eindhoven: University of Technology Eindhoven, 33-38; Zeman, Zbynek, and Rainer Karlsch. 2008. *Uranium matters: Central European Uranium in international politics, 1900-1960*. Budapest & New York: Central European University Press, 9, 27, 75-76.

in other Eastern European countries and denied access to their findings to a Yugoslav scientist who accompanied them.[24]

The Tito-Stalin split of 1948 stopped that process in Yugoslavia. Instead of supporting the development of cutting-edge science in Yugoslavia, the Physical Institute was designed to become a small node in the network of Soviet nuclear institutes, fully managed and operated by their experts. In the late 1940s, Yugoslavia managed to 'read' the Soviet real intentions well. The Institute for Physics (*Institut za fiziku*) was independently established in January 1948, signaling even on a symbolic level the country's independence and a departure from the original Soviet plans. This institute later became known as the Boris Kidrič Institute of Nuclear Sciences (*Institut za nuklearne nauke Boris Kidrič,* IBK) in Vinča (near Belgrade, Serbia), a central nuclear institute of the budding Yugoslav nuclear program. The same response is visible in the field of uranium prospection and mining in Yugoslavia. Outraged by the behavior of the Soviet prospection team in 1947, the Yugoslavs embarked almost immediately on independent uranium prospection in the country, developing a couple of uranium mines by the early 1960s. In both cases, the Yugoslav experience was the complete opposite of the experiences of other Eastern European countries where uranium mining companies and similar scientific institutions "became the gate through which they entered Stalin's empire."[25]

Following a period of open hostilities, the cooperation between Yugoslavia and the Soviet Union was officially re-established in 1955 during Khrushchev's visit to Belgrade. An important part of this process was the deal for the purchase of the Soviet research nuclear reactor, which was formally signed in January 1956, after months of negotiations. Reflecting the dramatic change in the political position of Yugoslavia in the previous decade, the deal included the same type of nuclear reactor the Soviets sold to China roughly at the same time, which was a more advanced model than those provided to Warsaw Pact countries.[26] By the end of 1959, the installation of the so-called 'Chinese' or RA nuclear reactor at the IBK was finalized, and it became operational in a ceremony during which the Yugoslav president Tito pushed the necessary buttons.[27]

This was a significant political victory for Tito and Yugoslavia, holding a powerful symbolic value. At the time when the idea of a Non-Aligned Movement was in its infancy, Yugoslavia managed to confirm its desired position of a vanguard of global socialism, comparable to China and far ahead of other Eastern European countries that were under the strict Soviet rule. However, the honeymoon period ended soon after it started, revealing that the Soviet goodwill to provide the Yugoslavs all the support they requested obscured their elaborate plan to compromise Yugoslavia's position before its partners in the West and put under control the country's ambitious plans in the nuclear energy field.

The strategy proved highly effective. As early as 1955, the Soviets successfully outmaneuvered Westinghouse and its generous offer to supply Yugoslavia with a modern research reactor, largely because the Soviet counteroffer appeared more advantageous.[28] At the time when Yugoslavia simultaneously tried to negotiate similar deals with the United

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[24] Miljković, *Titova atomska bomba*, 87-95; Miljković, Marko. 2021. The Yugoslav 'Operation Paperclip': German geologists in the Yugoslav nuclear program in the late 1940s and early 1950s. *Godišnjak za društvenu istoriju* XXVIII(3), 7-32, 16-18.

[25] Miljković, *Titova atomska bomba*, 87-95; Miljković, *The Yugoslav 'Operation Paperclip'*, 18-26; Zeman and Karlsch, *Uranium Matters*, 75-76; Bondžić suggests the opposite, that this was an indigenous Yugoslav project designed to rely on the Soviet support, which was halted after the Tito-Stalin split of 1948, soon after the establishment of the first Yugoslav nuclear institute in Vinča. However, he does not offer strong arguments to support the claim, often mistaking the outcome as the proof of intent. Bondžić, Dragomir. 2016. *Između ambicija i iluzija. Nuklearna politika Jugoslavije 1945-1990.* Beograd: Institut za savremenu istoriju, Društvo istoričara Srbije "Stojan Novaković", 58-59.

[26] The 'Chinese'/RA nuclear reactor had a nominal power of 6.5 MW in normal and 10 MW in forced regime, which was significantly higher to the usual 2 MW reactors sold to other countries in the Soviet sphere of influence.

[27] Miljković, *Titova atomska bomba,* 258-60.

[28] Miljković, *Titova atomska bomba*, 252-257; 262-264.

States, Great Britain, and the Soviet Union, the Soviet side seized the initiative and proved to be "very generous."[29] By the end of September 1955, they had summarized their offer in a few words: "We can give you everything you need".[30] Unsurprisingly, these circumstances led one of the members of the Yugoslav delegation to comment that even though it was "completely clear that they [the Soviets] are going for purely political effect," it was "difficult to find arguments to reject."[31] Finally, during one of the meetings of the Yugoslav Federal Nuclear Energy Commission (*Savezna komisija za nuklearnu energiju,* SKNE), the conditions initially offered by Westinghouse were estimated as "hostile," after which the debate was finished, never to be reopened.[32]

Once the Soviets managed to secure the deal through the offer that was 'too good to be true', they employed a strategy that can be termed as 'delay and blackmail.' Negotiations between representatives of the SKNE and the Soviet Main Directorate for the Use of Atomic Energy (*Glavnoe upravlenie po ispol'zovaniyu atomnoy energii*, Glavatom) were held in Belgrade in May 1956. Already during initial meetings, the Glavatom representatives explained that previously agreed redesigning the 'Chinese' reactor to meet the Yugoslav requests would "extend the construction of reactor for 12 to 18 months, and would introduce a general uncertainty regarding deadlines," effectively forcing the Yugoslavs to accept a different technological choice that would extend the country's dependence on the Soviet nuclear industry for years.[33]

With equal authority and stressing safety concerns, the Soviet team discarded the Yugoslav project for the construction of other previously agreed specialized facilities that would enhance Yugoslavia's nuclear industry capabilities.[34] Even regarding the price of the heavy water used in the 'Chinese' reactor that was expected or indicated to be cheaper than elsewhere, the Soviets insisted on the price they claimed to be equal to the U.S. agreements, although it was actually higher. After some discussion, the Yugoslavs did not have much choice but to accept the price in order not to delay the negotiations.[35]

The implementation of the agreement proved far more difficult than anticipated, compelling the Yugoslav side to adopt a pragmatic 'take what you can, suffer what you must' approach. The Soviets admitted significantly fewer Yugoslav scientists than the previously agreed number, and even then, they frequently restricted access to sensitive areas of nuclear technology. Researchers were also often diverted to peripheral institutes and less significant topics. In some cases, even Yugoslav geologists and mining experts were barred from visiting active uranium mining sites. When access was granted to Soviet nuclear institutes, most Yugoslav scientists were subjected to strict control over what they could learn or take home, most notably illustrated by the confiscation and sealed return of geologists' notes, while enduring a generally hostile atmosphere echoed by similar complaints from their Polish and Czechoslovak peers. One of the simplest yet most disruptive strategies employed by the Soviets was to delay responses to urgent Yugoslav requests for specializations by several months, thereby forcing the Yugoslav side to keep scarce technical personnel in reserve, unable to contribute even to domestic projects. Ultimately, these obstacles resulted in

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[29] Arhiv Jugoslavije. *Stenografske beleške sa sednice Pretsedništva Savezne komisije za nuklearnu energiju, 30 September – 1 October 1955*. 177 Savezna komisija za nuklearnu energiju, folder 22-88 (in further reference 177, f. 22-88).

[30] Arhiv Jugoslavije. *Stenografske beleške sa sednice Pretsedništva Savezne komisije za nuklearnu energiju, 30 September – 1 October 1955*. 177, f. 22-88.

[31] Arhiv Jugoslavije. *Telegram from Franc Kos to the SKNE, 31 December 1955.* 177, f. 437.

[32] Arhiv Jugoslavije, *Stenografske beleške sa sednice Pretsedništva Savezne komisije za nuklearnu energiju*.

[33] Arhiv Jugoslavije. *Beleška sa III (trećeg) sastanaka jugoslovenske i sovjetske delegacije, 9 May 1956. The Yugoslavs insisted on a technologically simpler solution for the nuclear reactor fuel, that was expected to be domestically produced in a short period of time.* 177, f. 437.

[34] Arhiv Jugoslavije. *Beleška sa II (drugog) sastanka jugoslovenske i sovjetske delegacije, 5 May 1956*. 177, f. 437.

[35] Arhiv Jugoslavije. *Beleška sa V (petog) sastanka jugoslovenske i sovjetske delegacije, 21 May 1956.* 177, f. 437.

significant delays for Yugoslavia, with nearly continuous negotiations dragging on from 1956 to 1959.[36]

The technological aspect of cooperation with the Soviet Union was not working much better either. During the final stages of the assembly of the 'Chinese' 6.5/10 MW nuclear reactor, enough problems were identified and eventual changes made to the original project that the final version of the nuclear reactor could have been named 'Yugoslav', instead of 'Chinese', although the reasons for it would not be a point of pride. The overall estimate was that "almost no component of the equipment was functionally sound."[37] Some of the comments are rather instructive:

> *We do not know what to expect from the Russians, due to their attitude which one can never know in advance, nor would they reveal [to us] even those things they know are faulty. Shortening of draining tubes, change of technical channels, change of the position of the heavy water pumps, change of heavy water pipelines, redesign of heavy water pumps, etc. Significant changes [were made] in the [technical] documentation, so if compared, the current situation with the documentation would not even resemble the one which was ordered. Not a single change in the documentation was formally approved and signed by the Russians, even if it was made on their request. We urged them and made requests many times, yet with no response.*[38]

The official estimate of the IBK director, Vojislav Babić, was that this situation created "constant insecurity during work", which "psychologically can make operating personnel waver, since there is no confidence in the instruments."[39] This problem must have been particularly emphasized at the IBK after the accident with the smaller, independently developed 'zero-power' nuclear reactor on 15 October 1958.[40]

The final results of the Soviet 'delay and blackmail' strategy were astonishing. The potential acceleration of the Yugoslav nuclear program, combined with the sheer volume of technologies, machines, and materials, all of which cooperation with the Soviet Union formally offered, proved to be too tempting for the SKNE to refuse. However, instead of producing the shiny jewel in the crown of the Yugoslav nuclear program, the entire experience was extremely frustrating. Continuous negotiations and renegotiations with the Soviets led to a waste of time that Yugoslavia wanted to save, funds that they struggled to gather, and distrust in the management of the SKNE among scientists and technicians, which rose sharply and caused many departures of young and talented Yugoslav scientists. The construction of the 'Chinese' nuclear reactor, which needed a serious overhaul even before it became operational, clearly represents a monument to all of these failures. Official history somewhat euphemistically records that the "trial period […] ended with a general overhaul of the reactor's equipment in 1963."[41]

Past experiences in the cooperation between Yugoslavia and the Soviet Union in the nuclear energy field offer contradictory conclusions. In the case of the establishment of the first nuclear institute in Yugoslavia in the late 1940s, the country's political leadership

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[36] Arhiv Jugoslavije. *Saradnja sa Sovjetskim Savezom, 16 December 1959.* 177, f. 437*;* Arhiv Jugoslavije. *Informacija o saradnji sa SSSR-om, 25 April 1959.* 177, f. 437; Arhiv Jugoslavije. *Izveštaj Direkcije za nuklearne sirovine IV sektoru SKNE, 22 October 1958*. 177, f. 437; Arhiv Jugoslavije. *Godišnji izveštaj o saradnji sa SSSR-om u 1958, n.d., 1958*. 177, f. 437.

[37] Arhiv Jugoslavije. *Beleška o stanju radova na velikom reaktoru, 24 April 1959.* 177, f. 15.

[38] Arhiv Jugoslavije, *Beleška o stanju radova na velikom reaktoru.*

[39] Arhiv Jugoslavije, *Beleška o stanju radova na velikom reaktoru.*

[40] Miljković, Marko. 2020. *Nuclear Yutopia: The outcome of the first nuclear accident in Yugoslavia, 1958*, in *Labor in state-socialist Europe, 1945-1989: Contributions to a history of work*, edited by Siefert, Marsha. Budapest & New York: Central European University Press, 274-305.

[41] Perović-Nešković, Branislava (ed.). 2000. *Pola veka instituta "Vinča" (1948-1998).* Beograd: Instiut za nuklearne nauke "Vinča"& Zavod za udžbenike i nastavna sredstva, 265.

understood the Soviet real intentions and managed to undermine their plans of further integration of Yugoslavia into the Soviet sphere of influence. A decade later, basically the same Yugoslav leadership appeared to be charmed by the Soviet overtures and seemingly generous offers for the construction of a research nuclear reactor at IBK, and almost too eagerly succumbed to Soviet influence for almost a full decade.

While the explanations for such a decision are multiple and are analyzed in the existing scholarship,[42] for this analysis, it is more important to emphasize that, despite different global political circumstances and differences between Stalin's and Khrushchev's regimes, the Soviet strategy in the field seemed robust and unchanged. Its main agenda remained the political use of nuclear technology and cooperation for the extension of its influence and deeper incorporation of Yugoslavia into the Soviet scientific and economic system, with expected political consequences.

This does not mean that the U.S. administration was shying away from exploiting similar arrangements. President Eisenhower's Atoms for Peace program had a similar goal, although it was not as aggressive as the Soviet approach, aiming predominantly to reinforce already established political partnerships, control the proliferation of sensitive technologies, and secure lucrative deals for its nuclear industry. According to Krige, "it is more instructive" to think of it "as a Marshall Plan than as an imperialist adventure", a project that "was not imposed, nor was it maintained by force," although it did produce a "consensual hegemony."[43]

The Yugoslavs have learned their lesson, and never again repeated the same mistake of establishing an all-encompassing cooperation with the Soviet Union in the nuclear energy field. Contracts signed with them between 1955 and 1957 were not annulled, mostly because of the need to service and refuel the IBK's 'Chinese'/RA reactor, avoid any further deterioration of relations with the Soviet Union, but also to continue with the Yugoslav attested policy of playing one side against the other in order to negotiate a better deal.

During the late 1960s, when Yugoslavia became interested in the construction of a nuclear power plant (NPP), some negotiations took place between the SKNE and the Soviet representatives on a possible cooperation in the construction of a Soviet Novo Voronezh-type NPP, but did not progress much further. The actual open competition published in April 1971 saw only offers from the U.S, Italian, West German, and Swedish companies. Ultimately, in 1974 Yugoslavia accepted the predominantly commercial offer (turn-key facility) from the U.S.-based Westinghouse, resulting in the construction of the country's first and only nuclear power plant in Krško, Slovenia (632 MW electric), completed in the early 1980s.[44] The choice of Westinghouse was hardly a surprise, considering that "until the first half of the 1970s, American suppliers had more than 90% of the reactor export market."[45] At the time when the contract was signed, the Soviet Union had only three commercial NPPs of a similar model as Westinghouse's (pressurized water reactor – PWR), the biggest of which was producing 440 MW of electric power (VVER-440), and was put online only in 1971 at Novovoronezhkaia Atomic Electric Station near Voronezh. One of the problems for the Soviets was questionable

[42] Miljković, Marko. 2024. Yugoslavia: *The creation of a nuclear policy in the 1960s*, in *Neutral Europe and creation of the nonproliferation regime*, edited by Lotaz, Pascal, and Yoko Iwama. London & New York: Routledge, 185-204; Kostić Šulejić, Marina. 2024. *Vojna neutralnost i nuklearno oružje – između posedovanja i zabrane.* Beograd: Institut za međunarodnu politiku i privredu; Miljković, *Titova atomska bomba*; Bondžić, *Između ambicija i iluzija.*
[43] Krige, *Techno-utopian dreams*, 151.
[44] Bondžić, *Između ambicija i iluzija*, 201, 355, 397; Čopič, Milan / Martinčić, Rafael, and Jože Špiler. 1986. Emergency planning in Yugoslavia. Vienna: IAEA, 28-29.
[45] Krige, *Techno-utopian dreams*, 166.

safety and reliability. On the other hand, the Soviets were quick to export this model to their satellites, having installed the first VVER-440 by 1971/72 in Loviisa NPP in Finland. During the 1970s, the same type of nuclear reactors were installed in Czechoslovakia, Bulgaria, East Germany, and Hungary.[46]

Rosatom instead of Glavatom? Future Prospects of Nuclear Cooperation with Russia

Despite initial setbacks in establishing a global presence during the 1960s and 1970s, modern Russia has emerged as a major actor in the international nuclear energy sector. Established in 2007 as a state-owned corporation, Rosatom consolidated several former Soviet and Russian agencies and ministries previously responsible for the nuclear sector. Through its numerous subsidiaries, Rosatom now maintains a broad international portfolio encompassing reactor construction, fuel supply, and related services across 54 countries, with an estimated cumulative contract value exceeding $139 billion over the next decade. Between 2000 and 2015, Rosatom is estimated to have held nearly 50% of the global market share in nuclear technologies, covering areas such as nuclear power plant construction, fuel provision, decommissioning, and nuclear waste management, while other leading nuclear exporters, including China, France, Japan, South Korea, and the United States, collectively accounted for approximately 40%.[47]

Since the Russian annexation of Crimea in 2014, and particularly following the Russian invasion of Ukraine in 2022, Europe's dependence on Russian coal, oil, and gas has become a central issue of geopolitical debate, leading to the swift imposition of sanctions by both the United States and the European Union targeting these sectors. In contrast, Russia's nuclear energy sector has remained largely insulated from international sanctions. It was not until 13 May 2024 that the United States enacted the *Prohibiting Russian Uranium Imports Act* (H.R.1042), which specifically targets Russia's uranium fuel production and is set to remain in effect until 31 December 2040.[48] The belated imposition of these sanctions was due to the U.S. reliance on Russia to fuel its NPPs, supplying up to 35% of the U.S. needs.[49] This was followed by a new sweeping set of sanctions that the U.S. Department of the Treasury raised against Russia on 10 January 2025, targeting Russian energy sector companies and their subsidiaries. Some of the sanctions were imposed on Rosatom, although only on its board of directors and senior officials, not the company itself or its operations.[50]

Despite its stated commitment to halting Russian aggression in Ukraine, visible in a wide range of sanctions targeting the broader Russian energy sector as a key source of funding for

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[46] Josepshon, *Red atom*, 37; Rosatom. *The VVER today: Evolution, design, safety* (accessed: 29 March 2025). It is a frequently repeated misconception that the Westinghouse reactor installed at the Krško NPP was based on an outdated design. In reality, at the time of procurement, it belonged to the Generation II category of commercial nuclear reactors (like the Soviet VVER-440) which entered operation in the late 1960s and remained in production until the mid-1990s. More in: Goldberg, Stephen M., and Robert Rosner. 2011. *Nuclear reactors: Generation to generation*. Cambridge: American Academy of Arts and Sciences, 4-5.

[47] Szulecki, Kacper, and Indra Overland. 2023. Russian nuclear energy diplomacy and its implications for energy security in the context of the war in Ukraine. *Nature Energy* 8, 413–421, 413; Josephson, Paul R. 2025. Russia's global grip on nuclear energy. *Engelsberg Ideas*, 3 February 2025. More precisely, Rosatom controls 38% of uranium fuel supply and 46% of uranium enrichment capacities, while in the period between 2009 and 2018, 23 of 31 nuclear power plants in construction worldwide were supplied by Rosatom.

[48] United States Congress. 2024. H.R.1042 - Prohibiting Russian Uranium Imports Act. *United States Congress*, 13 May 2024..

[49] Josephson, *Russia's global grip on nuclear energy*.

[50] U.S. Department of Treasury. 2025. Treasury Intensifies Sanctions Against Russia by Targeting Russia's Oil Production and Exports. *U.S. Department of Treasury*, 10 January 2025; U.S. Department of State. 2025. Sanctions to degrade Russia's energy sector. *U.S. Department of State*, 10 January 2025.

the war effort, the European Union has so far refrained from imposing any restrictions on Russia's nuclear industry. This reluctance is partly explained by the EU's continued reliance on 19 Soviet-designed VVER nuclear reactors, which remain operational in member states such as the Czech Republic, Slovakia, Bulgaria, Hungary, and Finland. Contrary to the situation with the Russian oil and gas, the EU countries actually doubled their imports of the Russian nuclear fuel, from €280 million in 2022 to €686 million a year later.[51]

This situation can primarily be attributed to the complexity and prohibitive costs of transitioning to alternative nuclear fuel suppliers. Westinghouse's previous experience in replacing the Russian nuclear fuel in Ukraine suggests that this transition may last over a decade.[52] In 2006, similar problems were reported by the Temelin NPP in the Czech Republic, where the Westinghouse-supplied VVER-1000 fuel experienced "a series of technical problems including fuel deformation and incomplete rod insertion."[53] Finland's experience with the Westinghouse's VVER-440 fuel supplied to the Loviisa NPP between 2001 and 2007, also showed that it was "so uncompetitive […] that the Finnish operator awarded the next fuel contract to Rosatom."[54] Furthermore, the existing EU operators of the Soviet NPPs have active contracts with Rosatom; Slovakia until 2026, the Czech Republic until 2028, and Hungary until 2030, making any assumption of a rapid transition to a different nuclear fuel supplier overly optimistic.[55]

As a result, since 2022 the five EU member states operating these nuclear power plants have increased their purchases from Rosatom to build strategic reserves, anticipating potential future supply disruptions and the time needed for alternative providers to develop adequate replacements. Several such contracts with the U.S. Westinghouse and French Framatom had already been signed by all of the EU members operating Russian nuclear reactors, with notable initial reluctance of Hungary. The first batches of Westinghouse's fuel started to be delivered by mid-2024. However, it is expected the complete transition to the Westinghouse and Framatom as a nuclear fuel suppliers may not be finalized before 2030, partly due to different countries' active and still legal contracts with Rosatom, their existing reserves of Russian fuel, and partly to a seemingly slow progress of the Framatom.[56] In this context, the ongoing mayhem created by the U.S. recent imposition of restrictive tariffs against the EU, regardless of the eventual outcome, will most certainly complicate the process and raise the costs of transitioning to EU supplied fuel for the Soviet nuclear reactors.[57]

This relative immunity has provided Rosatom with continued access to global markets and desperately needed income, but also a strategic opportunity to pursue an assertive nuclear energy diplomacy on the international stage. Josephson emphasizes that "Rosatom remains, like its Soviet predecessor Minsredmash, a tool of state power […] pursuing [Russia's] military and foreign policy goals with ruthless ambition."[58] Other scholars agree that

[51] Bellona. 2024. Europe doubled its import of Russian nuclear fuel for 2023, data say. *Bellona*, 15 March 2024.
[52] Szulecki and Overland, *Russian nuclear energy diplomacy*, 416.
[53] Pan, Yanliang. 2023. Managing the atomic divorce: The challenges of East Central Europe's nuclear energy decoupling from Russia. *The Electricity Journal* 36, 1-10, 2-3.
[54] Pan, *Managing the atomic divorce*, 2-3.
[55] Pan, *Managing the atomic divorce*, 2-3.
[56] Pan, *Managing the atomic divorce*, 2-3.; World Nuclear News. 2024. Westinghouse fuel loaded into Loviisa reactor. *World Nuclear News*, 2 September 2024; Westinghouse Electric Company. 2024. Westinghouse delivers first VVER-1000 fuel reload to Bulgaria. *Westinghouse Electric Company*, 29 May 2024.
[57] Corlin, Peggy. 2025. EU member states agree first wave of retaliatory tariffs. *Euronews*, 9 April 2025.
[58] Josephson, Russia's global grip on nuclear energy. The Ministry of Medium Machine Building (Minsredmash) was responsible for the Soviet civilian and military nuclear program until 1989 when it was merged with the Ministry of Atomic Energy into short-lived Ministry of Atomic Energy and Industry. See also Josepshon, *Red Atom*, *passim.*

Rosatom's international activity should be understood in terms of a "continuum of energy statecraft tools, as its global presence creates different kinds of (inter)dependencies through varying intensity of collaboration."[59] The main tools in this process present a potent set of mutually supporting dependencies that include technological, infrastructural, economic, and personal reliance on Rosatom and the Russian political establishment.[60]

Russia's control over Serbia's energy sector started to expand in 1992, when Russian and Serbian state-owned companies, Gazprom and Progres, established Progresgas Trading, a joint-venture company that managed all Russian gas sales to Serbia. Despite certain resistance in the early 2000s, in 2008, Gazpromneft had solidified its control over the Serbia's gas and oil sector through purchasing 51% of NIS (*Naftna industrija Srbije*) for a grossly undervalued price of $500 million, a sum designated as a loan and fully repaid by the NIS in following years. Shady business arrangements and infrastructure investments led to Gazprom's share growing to 56.15%, while Serbia's share fell to 29.87%. The result is that Russia's state companies and their subsidiaries control the entire oil and gas sector in Serbia, encompassing exploration, extraction, refining, and logistics, including Serbia's not insignificant oil and gas reserves.[61]

More importantly, Russia's control over Serbia's oil and gas sector has afforded it considerable political influence both within Serbia and across the region, aligning with its 'traditional' approach to energy diplomacy. This dynamic was largely facilitated through shady intermediary structures such as Progresgas Trading in the 1990s and Yugorosgaz from 2006 onward. These companies primarily served to collect commissions and inflate gas prices, without any particular strategic projects in the development of Serbia's energy infrastructure. Their operations enabled access to illicit rents and non-transparent business arrangements, which fostered the emergence of a clientelist network within Serbia's political elite. The roots of this network can be traced back to the early 1990s and remain discernible in contemporary political and economic relations.[62]

Russia's considerable influence is reflected in Serbia's continued refusal to align with EU sanctions against Moscow, making it the only EU membership candidate that has not followed the Union's foreign policy on this issue, stubbornly defending this policy despite continuous pressure to change it. This position contrasts with Serbia's nominal support for the UN General Assembly Resolution condemning the Russian aggression against Ukraine, adopted on 2 March 2022.[63] This ambivalent stance has contributed to the construction of a seemingly distinctive foreign policy position for Serbia.

However, the more recent sanctions of the U.S. Department of the Treasury on Russian oil and gas companies, which include NIS as part of the package, underscore the extent of

[59] Szulecki and Overland, *Russian nuclear energy diplomacy*, 417.
[60] Szulecki and Overland, *Russian nuclear energy diplomacy*, 417.
[61] Prelec, *The vicious circle*, 176-179; Jirušek, Martin. 2016. *Activities of Russian state-owned Energy Enterprises in the natural gas Sector in South-Eastern Europe.* PhD Thesis. Brno: Masaryk University, Faculty of Social Studies, Department of International Relations and European Studies, 138-140; Orban, Anita. 2008. *Power, energy and the new Russian imperialism*. Westport: Praeger Security International, 143, 152-154. PJSC Gazpromneft owns 50 percent, PAO Gazprom 6.15 percent, while the rest is divided by smaller shareholders, mostly below 1 percent of share. Agencija za privredne registre Republike Srbije. Naftna industrija Srbije a.d. Novi Sad (accessed: 2 April 2025).
[62] Prelec, *The vicious circle*, 179-182.
[63] European Western Balkans. 2022. All Western Balkan countries vote in favour of the UN Resolution on aggression against Ukraine. *European Western Balkans*, 2 March 2022.

Russia's dominant influence in Serbia's energy sector.[64] Continuous negotiations between the Government of the Republic of Serbia and the U.S. Department of the Treasury have so far resulted in the postponement of the full implementation of sanctions against NIS until 28 April 2025.[65] This is an important achievement for Serbia, considering that NIS is one of the country's biggest companies and the greatest contributor to the budget. However, despite the potentially significant economic impact of U.S. sanctions on NIS, Russia's hold over the country's energy sector remains largely intact. The only visible change has been a cosmetic shift in ownership structure: Gazpromneft's share decreased from 56.15% to 44.85%, while PAO Gazprom, which is currently not subject to sanctions, increased its share from 6.15% to 11.30%.[66]

Based on existing agreements between Russia and Serbia in the nuclear energy sector in early 2023, Szulecki and Overland's analysis put Serbia in a range of countries with a low level of nuclear cooperation with Russia, indexed at 0.3.[67] They also argue that it is expected that "[f]or most Western-aligned states, it will be inconceivable to enter into any type of new dependence or even non-dependent cooperation with Russia in the nuclear energy sector," and that alternatives will have to be found.[68] Pan agrees that "the geopolitical situation is making further [European] dependence on Russian nuclear fuel and new construction using Russian technology untenable," and that such "decoupling is unlikely to be temporary."[69]

While these assessments suggest relatively limited risks for Serbia, it is important to note that they often overlook Russia's existing control over key segments of Serbia's energy sector, its broader political influence through its deeply rooted clientelist network, and the lack of progress in Serbia's EU accession negotiations. They also do not consider how potential future arrangements with Rosatom could significantly increase these risks, potentially leading to a situation of near-complete energy dependence on Russia, and placing Serbia in a position comparable to that of Belarus. While this assessment may be criticized as overly rigid or speculative, it nevertheless underscores a reality that, unlike socialist Yugoslavia, contemporary Serbia lacks the scientific and technological capacity in the field of nuclear science that would be necessary for the independent development of a nuclear energy program. Therefore, any potential partner in this field would establish a long-term partnership with Serbia. The official government estimates offer a grim picture:

> *[C]urrently there is no regulatory or administrative framework which would regulate the construction and operation of nuclear power plants. Also, there are no scientific or expert human resources that would monitor the construction and operation of these plants, and educating human resources needed for nuclear energy was terminated [after the 1989 Moratorium]. A similar situation is in administrative and regulatory and scientific and expert terms and with the treatment of highly radioactive waste and spent nuclear fuel.*[70]

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[64] U.S. Department of Treasury. 2025. Treasury intensifies sanctions against Russia by targeting Russia's oil production and exports. *U.S. Department of Treasury*, 10 January 2025.
[65] The Government of the Republic of Serbia. *US sanctions on oil company NIS postponed for additional 30 days* (accessed: 10 November 2025).
[66] NIS. *Informacije o kompaniji* (accessed: 5 April 2025).
[67] Szulecki and Overland, *Russian nuclear energy diplomacy*, 416. Among previously discussed examples, medium range countries include the Czech Republic (0.7), Finland (0.8), Slovakia and Bulgaria (1.0), while the high range countries include Hungary (1.4), Belarus (2.7) and the highest-ranking Iran (2.8).
[68] Szulecki and Overland, *Russian nuclear energy diplomacy*, 471.
[69] Pan, *Managing the atomic divorce*, 2.
[70] Republic of Serbia – Ministry of Mining and Energy. 2016. Energy sector development strategy of the Republic of Serbia for the period by 2025 with projections by 2030. *Republic of Serbia, Ministry of Mining and Energy*, 46.

In the last couple of years, Serbia signed several elaborate agreements with Rosatom that provide Russia with a broad legal framework to actively participate in the development of Serbia's nuclear energy program. During Vladimir Putin's visit to Serbia on 17 January 2019, the Serbian Government signed a "inter-governmental agreement on cooperation in the implementation of joint projects in the field of peaceful use of nuclear energy and a statement of strategic partnership between the two countries in the construction of a center for nuclear science, technology, and innovation in Serbia" (Agreement). According to the Rosatom's official statement, "the agreement establishes a broad spectrum of cooperation between the two countries, including, but not limited to, support in the creation and enhancement of nuclear energy infrastructure in Serbia, design, construction, and modernization of research nuclear reactors, development of nuclear medicine, conducting fundamental and applied research in the field of nuclear energy, innovation development, new technologies, and modern digital technologies, application of radiation technology in agriculture and industry; education, training, and additional training of experts in the nuclear industry."[71]

The Agreement between Serbia and Rosatom is seemingly very general but, at the same time, all-encompassing, targeting any possible avenue of cooperation in the field of nuclear technology while specifying that further agreements outside of these general provisions are possible. In that respect, it can be argued that its inherent logic and wide reach are not different from the agreement signed between Yugoslavia and the Soviet Union in the 1950s. Much like its predecessors, the Agreement is not binding, although it provides the necessary legal framework for any future initiative to be relatively quickly initiated and executed.

More importantly, the process behind the signing of the Agreement reveals activities of the Russian clientelist network in Serbia and its main proponents. The Agreement was signed by Alexey Likhachev, Chief Executive Officer of Rosatom, and Nenad Popović, at the time the Minister without Portfolio in the Government of the Republic of Serbia, in charge of innovation and technological development. He was also a member of the latest government, as a Minister without Portfolio in charge of international economic cooperation and the social position of the church in the country and abroad.[72] Popović's role becomes more obvious considering the fact that the Agreement was based on a previous statement on the principles of Russian-Serbian cooperation in innovation and technological development in the field of peaceful use of nuclear energy, which he signed with Rosatom on 15 May 2018 at the Atomexpo Congress in Sochi.[73]

Furthermore, Popović is under the sanctions of the U.S. Department of State and is identified as one of the agents of Russian influence in Serbia through his "Russia-based businesses," which he used "to enrich himself and gain close connections with Kremlin senior leaders."[74] Portfolios of his main holding companies, Asset Electro and Asset Automation, stretch into many fields. However, these companies mostly cooperate with the Russian nuclear industry,

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[71] Službeni glasnik Republike Srbije. 2019. Sporazum između Vlade Republike Srbije i Vlade Ruske Federacije o saradnji u oblasti upotrebe nuklearne energije u mirnodopske svrhe na osnovu potvrđenih i inovacionih tehnologija. *Sl. glasnik – Međunarodni ugovori*, br. 2/2019.
; Danas. 2019. Rusija i Srbija zajedno grade naučni nuklearni centar. *Danas*, 18 January 2019.

[72] The Government of the Republic of Serbia. *Members. 2024. Nenad Popović, Minister without portfolio in charge of international economic cooperation and the social position of the church in the country and abroad* (accessed: 18 August 2024); Danas. 2019. Rusija i Srbija zajedno grade naučni nuklearni centar. *Danas*, 18 January 2019.

[73] Stojanović, *Nuclear energy sector and cooperation with Russia*, 201; Petrušić, Sandra. 2019. Nuklearni reaktor drugi put među Srbima. *NIN*, 7 November 2019.

[74] The US Department of Treasury. 2023. The U.S. Government designates individuals and entities in the Western Balkans for corruption and malign activities. *The US Department of Treasury*, 16 November 2023.

the state-owned Rosenergoatom, and the Urals Electromechanical Plant (UEMZ), as suppliers of different electric components and automation systems for nuclear power plants. As a person with strong connections in the Russian political establishment and business circles, it is hardly a surprise that he was a vocal supporter of Gazprom's purchase of the NIS in 2008, when he, at least on one occasion, stressed that this was "the best economic agreement that Serbia has signed in the last 40 years."[75]

Even though Popović is only one cog in Russia's complex mechanism for spreading its influence in Serbia that has its roots in the early 1990s, it is noteworthy that his interest in securing a deal with Rosatom encompasses both his political and financial interests. Moreover, considering the fact that during the last decade he was a minister in most of the successive Serbian governments, indirectly indicates that, much like in the case of U.S. sanctions against NIS, the Serbian political leadership did not, or simply could not, close the door for cooperation with Russia in the nuclear energy sector. These circumstances further suggest that the initiative for signing the Agreement likely originated from Russia rather than Serbia, as it is improbable that Popović possesses sufficient influence within the Russian political elite to act independently in pursuit of narrow business interests, despite the personal benefits he stands to gain from this and potential future agreements with Rosatom.

In his extensive interview regarding the Agreement, Popović insisted that "the SFRY [Yugoslavia] made the biggest mistake when it halted all state processes related to the use of nuclear energy and the development of nuclear technologies in 1989," stressing that "Russia is a friend of Serbia."[76] Even though the 'moratorium' on the construction of NPPs had been questioned several times by the Serbian public since the early 2000s, this was the first such direct and vocal call for its cancellation, additionally supported by an official agreement with Rosatom.

During the visit of Russian Prime Minister Dmitry Medvedev in October 2019, it was also announced that Rosatom will construct a Center for Nuclear Science in Serbia, "the most modern in Europe," and the "first" 20 MW nuclear research reactor.[77] Once again, this approach closely mirrors Soviet strategies from the 1950s, which sought to expand and consolidate control over Eastern European countries through agreements to sell them nuclear research reactors. The fact that many of these countries are still struggling to disentangle themselves from Russia's nuclear industry highlights the significant risks Serbia faces should similar arrangements be made with Rosatom.

The text of the additional agreement that Nenad Popović signed again with the Rosatom director Alexey Likhachev was never published, and the details are unknown.[78] The COVID-19 pandemic obviously postponed any activities on the implementation of signed agreements, although in January 2022, it was announced that the necessary contracts with Rosatom would be signed by the end of March 2022.[79] More importantly, this additional agreement is still nominally active and may be the basis for future cooperation in the construction of the Russian NPP in Serbia. It would be difficult to make any strong claims, but considering that

[75] Komarčević, Dušan, and Jelena Janković. 2023. Od konsaltinga do nuklearnih elektrana: Ruski poslovi sankcionisanog političara Nenada Popovića. *Radio Slobodna Evropa*, 17 November 2023.
[76] Čebić, Radoslav. 2019. Rusija je prijatelj Srbije. *Vreme*, 30 January 2019.
[77] Petrušić, *Nuklearni reaktor drugi put među Srbima.*
[78] Petrušić, *Nuklearni reaktor drugi put među Srbima.*
[79] eKapija. Krajem marta ugovor sa Rusima o zajedničkoj gradnji Centra za nuklearnu nauku - Koliko je Srbija daleko od atomske elektrane?. *eKapija*, 19 January 2022.

these negotiations took place at the beginning of 2022, it may be argued that it was only the Russian invasion of Ukraine in February of that year that postponed any activities toward the construction of the announced Center for Nuclear Science in Serbia.

Despite these obstacles, in January 2024, the activities in this field were rekindled when the delegations of the Russian and Serbian ministers of health signed a Memorandum of cooperation between the Ministries of Health of the Republic of Serbia and the Russian Federation, with a particular emphasis on cooperation in the field of nuclear medicine. This was soon followed by the memorandum between the Serbian Ministry of Health and Rosatom Healthcare, signed on 25 March 2024, by the former Serbian Minister of Health, Dr. Danica Grujičić, unsurprisingly, during her visit to the Atomexpo Congress in Sochi.[80] This was one of the points included in the 2019 Agreement, and it seems that, while the purchase and construction of a nuclear research reactor appears unrealistic at this time for various reasons, Rosatom is pursuing other, less complex avenues to expand its influence in Serbia, following its established strategies and existing normative framework.

Serbia's potential purchase of a stake in Hungary's Paks II NPP, which is currently under construction by Rosatom, presents another option for less aggressive and less direct expansion of Russian control over Serbia's energy sector. Back in 2021, Serbian President Aleksandar Vučić presented this idea to Hungarian Prime Minister Viktor Orbán. It included the offer to purchase up to 10% of the stake in Paks II NPP, although by November 2024, Vučić's offer was lowered to 5 to 10%.[81] While the details remain undisclosed, it is noteworthy that these negotiations were conducted between two political leaders, echoing the model of the 2014 negotiations between Orbán and Putin over the Paks II project, which resulted in a direct agreement with Rosatom and "sealed without an open tender process."[82] While possible acceptance of Vučić's offer would not include any direct agreements with Rosatom, it would solidify both the relations between Belgrade, Budapest, and Moscow and establish a framework for potential expansion of Rosatom's projects into Serbia.

This scheme might also be an intermediate solution to the growing challenge for the Serbian government, increasingly pressured by EU legislation to reduce its reliance on fossil fuels, particularly through the Carbon Border Adjustment Mechanism (CBAM), a key instrument of the European Green Deal aimed at taxing carbon-intensive imports. With its transitional phase launched in October 2023 and full implementation expected by 2026, CBAM targets sectors such as electricity, cement, iron, and steel, core components of Serbia's exports, over 60% of which are directed to the EU. More than 500 Serbian companies are already under CBAM oversight, with the energy and steel sectors most affected.[83] In response, Serbia is aligning its legal framework with EU standards, notably through the Strategy of Low Carbon

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[80] Stevanović, Marija. 2024. Rusija je ušla već u 22. vek u nuklearnoj medicini: Potpisan Memorandum o saradnji između ministarstava zdravlja Srbije i Rusije. *Novosti*, 29 January 2024; Davidov-Kesar, Danijela. 2024. Za milione ljudi nuklearna medicina je jedini način očuvanja zdravlja. *Politika*, 21 April 2024; Davidov-Kesar, Danijela. 2024. Naša zemlja može brzo da ovlada nuklearnom tehnologijom. *Politika*, 26 March 2024.

[81] Manojlović, Mila, and Reid Standish. 2024. Serbia's nuclear energy quest opens geopolitical flash point for China, Russia, and the West. *Radio Free Europe*, 10 July 2024; Embassy of the Republic of Serbia, Budapest – Hungary. 2024. Second Session of the Serbian-Hungarian Strategic Cooperation Council. *Embassy of the Republic of Serbia, Budapest,* 14 November 2024.

[82] Jirušek, Martin / Vlček, Tomáš, and James Henderson. 2024. Same but different: Rosatom as the Kremlin's upcoming leverage? *Journal of Contemporary European Studies* 32(4), 1242-1258, 1251.

[83] European Commisssion. *Carbon border adjustment mechanism* (accessed: 1 May 2024); Republika Srbija – Ministarstvo za evropske integracije. 2023. Miščević: EU je najveći trgovinski partner Srbije. *Republika Srbija. Ministarstvo za evropske integracije*, 30 November 2023.

Development (2023–2030, with projections to 2050), which aims to cut greenhouse gas emissions by 33% by 2030 and up to 76% by 2050.[84]

While the credibility of Serbia's commitment to EU accession remains subject to debate, regulatory instruments such as the CBAM and prospective future EU legislation are expected to exert growing pressure on the country's economy and energy production. Within this framework, the construction of nuclear power plants or the potential acquisition of a 5–10% stake in Hungary's Paks II NPP has emerged as a key component of Serbia's strategic response. These initiatives are framed both as immediate measures to mitigate pressing regulatory exposure and as long-term solutions aimed at phasing out coal and achieving national decarbonization objectives.

An alternative reading of Serbia's cooperation with Rosatom and potential cooperation on the Paks II project points to a strategic balancing by President Aleksandar Vučić, aimed at leveraging competing international partnerships to secure more favorable terms for Serbia. During Vučić's meeting with French President Emmanuel Macron in Paris on 8 April 2024, nuclear cooperation emerged as a central topic. It included the signing of a Memorandum of Understanding with Électricité de France (EDF) on long-term collaboration in energy transition and low-carbon technologies.[85] This move was swiftly followed by a series of coordinated steps at the national level. The proposal to lift the decades-long 'moratorium' on nuclear power plants, the signing of a memorandum with domestic scientific institutions, and the launch of a public debate on nuclear policy. The formal lifting of the 'moratorium' was passed in November 2024 without parliamentary discussion, confirming the government's political will to pursue nuclear energy development.[86] Macron's return visit to Serbia in August 2024 reinforced this trajectory through the signing of strategic agreements, including both the purchase of 12 Rafale fighter jets and cooperation on civilian nuclear development. When viewed alongside Serbia's parallel Agreement on Strategic Cooperation in the Field of Energy between Serbia and the USA in September 2024, these developments suggest a carefully calibrated foreign policy that seeks to counterbalance Russian influence while positioning Serbia as a partner to both Western powers and global energy actors.[87]

On paper, Serbia's engagement with France in the nuclear energy sector appears to reflect a bold strategy. However, in reality, the agreements signed with French partners offer no more specificity than earlier documents signed with Rosatom and do not guarantee that French companies will ultimately be contracted for the construction of a nuclear power plant in Serbia. A significant challenge lies in the track record of France's nuclear industry. Framatome's recent involvement in the construction of Unit 3 at Finland's Olkiluoto NPP exemplifies these problems. The project was completed in 2022, but it took 17 years to finalize

[84] Republika Srbija – Ministarstvo zaštite životne sredine. 2023. Low Carbon Development of the Republic of Serbia for the 2023-2030 period with projections until 2050. *Republika Srbija. Ministarstvo zaštite životne sredine*, 7 June 2023.

[85] Energetski portal. 2024. Potpisan memorandum o strateškoj saradnji sa francuskom elektroprivredom. *Energetski portal*, 9 April 2024.; Republika Srbija – Ministarstvo ruda i energetike. 2024. Vlada usvojila Memorandum o razumevanju sa „Francuskom elektroprivredom" o uspostavljanju dugoročnog dijaloga i saradnje u energetskoj tranziciji i niskougljeničnim tehnologijama. *Republika Srbija. Ministarstvo ruda i energetike,* 5 April 2024.

[86] Narodna skupština Republike Srbije. 2024. Predlog Zakona o prestanku važenja Zakona o zabrani izgradnje nuklearnih elektrana u Saveznoj Republici Jugoslaviji. *Narodna skupština Republike Srbije. Zakoni i procedure*, 11 April 2024; Nova ekonomija. 2024. Potpisan Memorandum o razvoju nuklearne energije u Srbiji. *Nova ekonomija*, 10 July 2024; Petaković, Nevena. 2024. Na stolu temeljne izmene Zakona o energetici, dozvoljava se gradnja nuklearnih centrala. *Nova ekonomija*, 22 August 2024.

[87] Republika Srbija – Ministarstvo spoljnih poslova. 2024. Đurić: Važan korak ka unapređenju partnerstva sa SAD i osiguranju dugoročne energetske bezbednosti. *Republika Srbija. Ministarstvo spoljnih poslova*, 18 September 2024.

or, more precisely, it was "13 years behind schedule and around eight billion euros over its original three-billion-euro budget", facing persistent operational issues since it was connected to the grid.[88] Similarly, the U.S. Westinghouse filed for bankruptcy in 2017 following $13 billion in cost overruns on two nuclear projects in the United States.[89] These cases underscore the broader risks and uncertainties associated with relying on Western nuclear suppliers, despite their potential strategic appeal, geopolitical pressures and interests or elaborate strategies designed to navigate these challenges.

What remains clear is that Serbia is unlikely to be able to independently finance the construction of a nuclear power plant, regardless of its chosen partner. Even Hungary, with a more advanced economy and access to EU funding, has faced significant delays in its nuclear expansion plans originally conceived in 2009. The agreement with Rosatom for the Paks II project included provisions for the Russian government to finance up to €10 billion, or 80% of the estimated construction costs, through a state-backed loan. According to the terms, Hungary would begin repaying the loan only after the two new reactor units become operational. In a 'same but different' deal, in 2014, Rosatom (through its subsidiary RAOS Voima Oy) acquired a 34% ownership stake in Fennovoima Oy, the contractor for Finland's Hanhikivi 1 NPP project, thereby converting a portion of the construction costs into ownership.[90]

Although the Hanhikivi 1 NPP project was eventually canceled by Fennovoima Oy in 2022 as a response to the Russian invasion of Ukraine,[91] the entire deal reveals a significant component of Russian nuclear energy diplomacy. By contrast, the Paks II project, based on a similar scheme, is still underway and has recently reached a significant milestone, marking the formal beginning of construction scheduled for early 2025.[92] In both cases, it is important to stress that the Russian government and the state-owned Rosatom are not only using nuclear energy projects to secure and expand their influence in a given country or a sphere of interest but are also willing to suffer immediate financial losses for future political gains.

Conclusion

The recent signing of a Memorandum between Serbia and France can be interpreted in several ways - as a response to mounting EU pressure on Serbia to sever its political ties with Russia and align more closely with European partners; as Belgrade's own calculated effort to signal strategic distance from Moscow; or as a tactical maneuver to exploit geopolitical competition in order to extract political or financial concessions while preserving a degree of strategic autonomy in an increasingly polarized global order. Alternatively, it may simply reflect an attempt by Serbia's political establishment to deflect further political pressure from the EU without committing to substantive realignment. Framed within an established theoretical perspective, and in the absence of conclusive evidence to support any single interpretation, particularly considering that Serbia remains at the very beginning of a complex and resource-intensive process of developing a nuclear energy sector, the available

[88] Pan, *Managing the atomic divorce*, 3.
[89] Pan, *Managing the atomic divorce*, 3.
[90] Jirušek, Vlček, and Henderson, *Same but different*, 1252.
[91] World Nuclear News. 2022. Fennovoima cancels Hanhikivi 1 contract with Russia. *World Nuclear News*, 3 May 2022.
[92] World Nuclear News. 2024. Paks II gets key approval for pouring of first concrete. *World Nuclear News*, 2 December 2024.

evidence suggests that, based on the current state of affairs, a partnership with Rosatom remains the most likely outcome.

Should Serbia choose to deepen its cooperation with Rosatom, such a partnership would in all probability unfold along the lines of Russia's established model of nuclear diplomacy, blending Soviet-era 'delay and blackmail' practices with contemporary mechanisms such as bilateral intergovernmental agreements, state-backed loans covering the bulk of construction costs, and long-term contracts for fuel supply, maintenance, and waste management. The initial stage would probably involve the signing of an intergovernmental agreement enabling Russian financial support for the majority of project expenses, perhaps up to 80%, as evidenced by Hungary's agreement for the Pakś II project, where repayment is deferred until reactor commissioning. In Serbia's case, Rosatom may go even further by offering to fully finance the project, presenting terms that may appear highly favorable on paper. Drawing parallels with Russia's acquisition of a majority stake in Serbia's oil industry through Gazprom's takeover of NIS, and Rosatom's partial ownership structure in Finland's Hanhikivi 1 project, it is not implausible that repayment conditions could include securing partial or even controlling ownership in Serbia's state-owned electric utility, *Elektroprivreda Srbije* (EPS), the future NPP as a strategically central energy facility, or a combination of these two options.

The construction of an NPP in Serbia is likely to be fraught with delays, cost overruns, and contractual extensions, problems that could ultimately be offset either by increasing Rosatom's ownership stake in EPS or through the accumulation of significant Serbian debt to Russia that could be repaid through Rosatom's ownership of EPS. While recent experiences with Westinghouse and Framatome in Europe and the United States demonstrate that such complications are not unique to Russian partnerships, predominantly due to the inherent complexity of such projects, historical experiences raise concerns in the case of Rosatom. Unlike its Western counterparts, Rosatom has been known to exploit delays and financial vulnerabilities as levers for extracting political concessions or advancing broader geopolitical objectives. In this context, technical and financial challenges may not be mere byproducts of complexity but instruments of strategic influence.

The integration of a Russian-built nuclear power plant would reshape the country's energy mix, potentially accelerating the phasing out of coal and contributing to decarbonization goals. However, it would also introduce new risks by tethering Serbia's electricity generation capacity to a vertically integrated Russian supply chain. This could marginalize alternative investment opportunities, hinder diversification efforts, and reinforce political leverage held by Moscow through its existing control over Serbia's oil and gas energy sector. Moreover, given that Serbia's electric power industry remains largely state-controlled and historically undercapitalized, a nuclear partnership of this scale could concentrate decision-making power and lock the sector into a path dependency that limits long-term flexibility in energy governance, market liberalization, and alignment with EU standards.

Ultimately, the choice of partner will not only determine the technological trajectory of Serbia's future nuclear program but also signal its long-term geopolitical orientation, either reinforcing a model of illiberal dependency, turning Serbia into a 'Balkan Belarus,' or fostering integration into the EU energy, regulatory, and political architecture. One thing is certain. Russian nuclear strategy in Serbia has roots in the early 1990s; it has proven resilient to political change, it continues to operate within the logic of the Soviet legacy, and it is projected far into the future, an enduring reality that cannot be ignored.

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