

Briefing Paper:

House Foreign Affairs Committee - Europe Subcommittee

“Going Nuclear on Rosatom: Ending Global Dependence on Putin’s Nuclear Energy Sector”

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Honorable Committee Members:

I am an American nuclear physicist working in Europe for 12 years, resident in Berlin. My work on energy-market and geostrategic matters,⁴ has mainly focused on Germany, Poland and Ukraine (and

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Also: CV: <https://websites.umich.edu/~twod/cv/>, Bio: <https://websites.umich.edu/~twod/bio/>, Syllabi: <https://public.websites.umich.edu/~twod/>, Thesis/Dissertation: <https://public.websites.umich.edu/~twod/thesis/>.

⁴ For example, supporting Polish and Ukrainian opposition to the Russo-German Nord Stream 2 partnership, promoting LNG import-capacities for Central and Eastern European and Baltic states, assisting Ukraine’s fight against Russian-backed energy oligarchs and corruption, etc.

Brief for USA House Foreign Affairs Committee, Europe Subcommittee
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more generally, the Central and Eastern European [CEE] and Baltic States or “Three-Seas Region”) in light of USA, EU, OPEC and Russian policies.

I am also participating in a collaboration with colleagues at two Warsaw-based Polish think-tanks, initiated on my proposal, to establish a Polish nuclear experts’ policy network, and similarly for the larger 3 Seas region.⁵

Underlying assumptions: The appropriate energy security & transition model

This brief proceeds from my expert assessment that Europe’s “3 Seas Region” requires pragmatic energy-security and energy-transition policies to address the energy trilemma of security-of-energy-supplies, affordability-and-competitiveness, and decarbonization. This is made all the more urgent by the Russian Federation’s imposition, from late 2022, of a protracted war on Ukraine, with heavy economic and energy burdens implicit for Europe, but especially the neighboring 3 Seas Region, and notably Germany, which was woefully unprepared in its pre-war energy policies.

Specifically, these energy policy requirements, in my assessment, consist of:

- A massive expansion of nuclear power, accompanied by
- A reasonable level of weather-dependent renewables (i.e., a level that imposes minimal need to rebuild grids and install technology-limited grid-scale storage, to avoid the huge systemic costs from over-reliance on widely distributed, variable renewables), and
- A rather long-term dependence on natural gas, both as a backup to variable renewables and to assist in the early phase out of much-more-carbon-intensive coal, until such time as sufficient new-nuclear capacity is installed, capable of replacing most of this natural gas generation and a large part of the much-shorter-life-cycle wind and solar renewables (i.e., with life cycles typically one-third to one-fourth as long as a modern 80-to-100-year Generation 3+ nuclear plant),

In light of the protracted war Moscow is now imposing on Ukraine, such a pragmatic policy is of urgency for states of the 3 Seas region bordering the war zone.

Two threats to this pragmatic policy scenario

I see two sharp threats to this policy:

- A. European activities of the Russian Federation and its state nuclear monopoly, Rosatom, including
 1. Building new Russian nuclear projects in Europe (including in Turkey), (See Appendix A)

⁵ The two think tanks are Centre for Eastern Studies (OSW) <https://www.osw.waw.pl/en>, and Polish Economic Institute (PEI) <https://pie.net.pl/en/>.

2. Perpetuating existing dependence on Russian nuclear fuel for soviet-legacy reactors in the 3 Seas Region. ^{6,7,8,9,10} (See Appendix A)
3. Using Rosatom as a front or vehicle for Russia to attain tech items for the Russian war effort, which it is otherwise sanctioned from obtaining, and (See Appendix B)
4. Using its contacts within any given country in operates in to turn business, governmental and academic actors engaging with it into sympathizers or instruments of the Russian state. This is a process of “elite capture.”

Rosatom, like Gazprom, as an instrument for elite captures

On the fourth point, from work over several years up to the February 24, 2022, full-scale Russian invasion of Ukraine, including within Germany, Ukraine and the larger 3 Seas Region, the well-known machinations of Russian state monopoly, Gazprom, could be readily observed along similar lines. The dominant supplier of gas to Ukraine and throughout much of the 3 Seas region, as well as to Germany, Gazprom afforded significant opportunities and leverage within the business and political classes. The simple presence of Gazprom deep within the activities of these nations’ elites was used to bestow profitable advantages to “capture” the allegiances of certain local businesspersons, some of whom developed into pro-Russian oligarchs, while many of lesser stature were expertly cultivated to feel loyalty to Russia over any felt towards their own country.

In my and my colleagues’ experiences, the activities of Rosatom are similar in this regard to those of Gazprom’s before they were largely expelled from these societies. Similar needs to be done with Rosatom.

In particular, such corrupting ties are being furthered by the continuing Rosatom reactor project in Hungary, were likely also accomplished to a degree in Finland before a joint program was ditched in 2022,¹¹ and now due to continued fuel-fabrication collaboration (for the Hungarian project) by French firm Framatome conducted at a German facility (see Appendix B).

The 2nd threat to allied-based, pragmatic nuclear renaissance in 3 Seas Region

Before elaboration below on the other three points above, I feel I should bring to the Committee’s attention a closely related issue to that of Rosatom’s malign activity in the EU 3 Seas Region, as seen from the vantage point of my work, which others might not raise. That is:

⁶ France is EU’s first importer of ‘Russian nuclear products’: study – Euractiv
<https://www.euractiv.com/section/energy-environment/news/france-now-top-eu-importer-of-russian-nuclear-products-study/>

⁷ Russian nuclear energy diplomacy and its implications for energy security in the context of the war in Ukraine, Nature Energy <https://www.nature.com/articles/s41560-023-01228-5>

⁸ Rosatom State Atomic Energy Corporation ROSATOM global leader in nuclear technologies nuclear energy
<https://www.rosatom.ru/en/investors/projects/>

⁹ Russia’s nuclear project in Hungary: France’s growing role, OSW Centre for Eastern Studies, Warsaw, Poland.
<https://www.osw.waw.pl/en/publikacje/osw-commentary/2023-07-04/russias-nuclear-project-hungary-frances-growing-role>

¹⁰ Russia’s influence in EU nuclear power projects shown by Siemens Energy cooperation, Clean Energy Wire, Berlin, Germany
<https://www.cleanenergywire.org/news/russias-influence-eu-nuclear-power-projects-shown-siemens-energy-cooperation>

Nuclear Power in the European Union - World Nuclear Association

<https://world-nuclear.org/information-library/country-profiles/others/european-union.aspx>

¹¹ Finnish group ditches Russian-built nuclear plant plan, by Anne Kauranen, Reuters, May 2, 2022.

<https://www.reuters.com/world/europe/finnish-group-ditches-russian-built-nuclear-plant-plan-2022-05-02/>

- B. There are also several Member states of the EU itself, which actively oppose the continuation or expansion of nuclear power within Europe. This anti-nuclear rhetoric often relies on examples of problems with today's Russian or older Soviet-legacy reactors to unscientifically claim that these are inescapable problems inherent to nuclear energy generally.

A faction of seven EU Members are opposed to any nuclear energy projects, including Austria, Denmark, Germany, Ireland, Luxembourg, Portugal and Spain,¹² with Germany the central player, greatly handicapping development of a robust, allies-based nuclear sector, one free of dangerous Russian and Chinese participation. This internal-EU opposition greatly hinders Brussels from playing the sort of central organizational, governance, subsidizing-and-financing roles, which it logically should and must play in the EU nuclear sector. These states, and principally the “renewable fundamentalist”¹³ and deeply ideologically anti-nuclear German state, continue to block Brussels from establishing:

- A level playing field for nuclear energy alongside renewable wind and solar generation as concerns finance, subsidies and carbon credits, or
- A comprehensive EU-wide governance-and-policy system for its nuclear sector. A lack of this system greatly enables malicious actors, such as Russia and China from growing their nuclear-energy presence within this or that Member state.

The EU adoption of the so-called “Green Taxonomy” in 2022, finally facilitated, somewhat, the development of new nuclear capacity in Europe. However, quite insufficiently. As I wrote at the time:

“Indeed, the downsides of sticking to the “100% renewables and no nuclear” transition orthodoxy are worrisome.

“Consider the results last year, of Germany’s official Eighth Annual Independent Monitors’ Report on the Energiewende.^[4] Aside from reporting, that its renewables-only program will miss many targets, as usual, it made the rather stunning finding that it will not be possible to produce sufficient domestic renewable electricity in future to meet domestic demand. It goes on to propose German firms investment in renewables abroad, writing “ ... the establishment of transnational projects at the European level should be considered here.” The paper *Die Welt* explains this to mean that the EU should allow German firms to develop renewables abroad and take the [carbon] credit for these projects back home in order to satisfy Germany’s own national EU-mandated decarbonization responsibilities.^[5] Renewable colonialism?”¹⁴

¹² “Germany, Spain push to keep nuclear out of EU renewable energy goals,” By Kate Abnett, Reuters, March 16, 2023. <https://www.reuters.com/business/energy/germany-spain-push-keep-nuclear-out-eu-renewable-energy-goals-2023-03-16/>

¹³ A critical characterization, which I coined, to emphasize the maximalist and inflexible nature of the German energy transitions plan, the *Energiewende*, adopted in 2011, which mandates 100% renewables and no nuclear power.

¹⁴ “EU Commission openness to nuclear as green, betrays falling confidence in the German 100%-renewables model [English & Polish],” by Thomas O’Donnell, Posted 14Jan2022, website GlobalBarrel.com. <https://globalbarrel.com/2022/01/27/eu-commission-openness-to-nuclear-as-green-belays-falling-confidence-in-the-german-100-renewables-model-english-polish/#more-170192> The “renewables colonialism” characterization reflects that the massive “green hydrogen” import projects Germany now insists on from 3 Seas, African and Mideast states, are often described as “colonial” in these regions for ignoring local-states’ energy-security exigencies T.O’D 14Feb24].

Note that, the former-president of the European Investment Bank, in a public talk in Frankfurt on February 14, 2024, used the same characterization of these German projects, saying that, in Africa, they ignore the local needs, and are called “colonial”.¹⁵ Similar views, in my experiences, are held by some in Ukraine and 3 Seas.

Indeed, an identical sort of subversion was carried out by Russia to kill fracking for gas in Central and Eastern Europe in the 2010's and after.¹⁶ Even though Russia and its Gazprom export monopoly were major players in Europe, they sought to eliminate any competition, and found it [useful] to actively support (or initiate) pseudo-“green” and –“environmental” anti-gas-fracking protest groups in especially Central and Eastern Europe.

Germany's state-funded anti-nuclear institutes (Stiftungen) and NGO's active in the 3 Seas Region follows a strikingly similar pattern.

What to do about all this?

It is the traditional preference and practice of officials the USA and those EU states that embrace nuclear energy, to avoid ideological and political issues that might inflame relations with and between Members. However, this has left the public and elite discourse sparse, with insufficient informed critiques of both the dangers of continued Russian nuclear activities in Europe, and of the destructive, anti-scientific opposition by several Member states to nuclear power as a pragmatic and legitimate vehicle for energy-security and energy-transition success. As I advised in a study published in September 2021, commissioned by the leading Estonian security think tank, ICDS

“Government will need to actively back the efforts of its own officials, civil society groups, and the expert, academic, and think-tank communities to engage nuclear sceptics of the society in critical, facts-based polemic and thus provide some balance against the renewables-only populism.”

Recommendation:

Besides the obvious need for sanctioning further Rosatom business dealings within Europe and the USA (and if possible, Turkey), those EU Member governments – as well as the USA - having clear ideas on the risk from any continued cooperation or business with Rosatom, must speak up consistently and relentlessly against the continuance of these dependencies and relationships, using reasoned arguments, and supported by facts.

However, in my view, the equally or perhaps more damaging opposition to development of new nuclear power in Europe and especially within the 3 Seas region so in need of it, which, unfortunately, emanates not from the Russian aggressor, but from allied Member states and most especially from Germany, must also be opposed publicly and consistently as well by both Member-states' and USA government officials and competent civil society institutions. These are co-equal threats that, if allowed to continue, risk turning the difficult victory of Europe over Putin's energy war, the gas crisis of Winters 2021-22 and 2022-23, into Pyrrhic victories. The prolonged Russian war

¹⁵ Conference: “The Transatlantic Agenda in a Pivotal American Election Year,” Wednesday, February 14, 2024, Alliance Building, Frankfurt, organized by the American German Institute (AGI) of Washington, DC. Quoting Dr. Werner Hoyer, former-EIB President: January 2012-December 31, 2023.

<https://americangerman.institute/events/2024/02/the-transatlantic-agenda-in-a-pivotal-american-election-year/>

¹⁶ “Russia's Quiet War Against European Fracking: Environmentalists trying to block shale gas exploration across Europe are unknowingly helping Putin maintain his energy leverage over the continent,” Keith Johnson, Foreign Policy, June 20, 2014, <https://foreignpolicy.com/2014/06/20/russias-quiet-war-against-european-fracking/>

in Ukraine will put great stress on the economies of 3 Seas states (and on particularly ill-prepared Germany), overcoming which will require pragmatic energy-system restructurings, with nuclear energy at the core.

This is how the Nord Stream 2 pipeline partnership of Moscow and Berlin was treated by realistic, security-conscious Members, especially Poland and most others in the 3 Seas Region, and this opposition grew gradually to be ultimately highly impactful. Such public, civil-society-rallying clarity is sorely lacking on these new-nuclear issues from many Member governments.

Appendix A: Some facts and policy recommendations on Rosatom activities (based on PEI, Warsaw colleagues research)¹⁷

1. Turkey & Egypt. Rosatom remains important instrument of Russian long-term economic diplomacy, in particular in the area of Middle East (e.g.: Russian Council (PCMД) report: <https://russiancouncil.ru/papers/Rosatom-MiddleEast-Report61.pdf>), in particular projects in Turkey and Egypt.
2. BRICS, CIA, Asia, LatAm. Those project receive regular media coverage in Russian press (such as neftegaz.ru or vedomosti.ru). Russian nuclear power capacity is supposed to be one of its important contributions for BRICS economic development. The crucial projects and cooperations are taking place also in Commonwealth of Independent States countries, Asia and Latin America (p.55-57, https://www.report.rosatom.ru/go_eng/go_rosatom_eng_2022/rosatom_2022_eng.pdf).
3. India. Rosatom also expands in India – two further VVER 1200 units are planned in Kudankulam. India plans to expand its nuclear capacity from 7,5 to nearly 23 GW which could be further done with Russians (<https://world-nuclear-news.org/Articles/Rosatom-boss-optimistic-about-expanding-nuclear-co>) and Rosatom-coordinated nuclear cooperation becomes, alongside with crude oil, important aspect of Russian-India relations (<https://www.investindia.gov.in/country/russia-plus>).
4. Hungary. Despite Russian invasion of Ukraine the Hungarian government has declared it is fully determined to build the Paks II Nuclear Power Plant (VVER-1200) and got acceptance from European Commission (<https://www.reuters.com/world/europe/hungary-gets-eus-ok-amend-russian-nuclear-plant-contract-2023-05-25/>; <https://www.world-nuclear-news.org/Articles/Construction-schedule-agreed-for-Paks-II-in-Hungar>)
 - a. However, the delays in the Rosatom project might occur in 2024. The company, driven by necessity of achieving political goals of Russian Federation, could have overestimated its capacities as stated by Estonian Foreign Intelligence Service (page 34, <https://www.valisluureamet.ee/doc/raport/2024-en.pdf>).
5. Turkey. According to the source above, a one-year delay of the Turkish reactor in Akkuyu should be expected. The past and contemporary experiences with Rosatom nuclear project in Astravyets could be an example of challenges encountered by Rosatom. Another example, mentioned even by Rosatom itself, is the shortage of competent, challenging the schedule of nuclear projects in Armenia (<https://neftegaz.ru/news/nuclear/817528-armeniya-stolknulas-defitsitom-spetsialistov-dlya-stroitelstva-novoy-atomnoy-elektrostantsii/>).
6. Russian Fuel Exports: Presently, there are no EU sanctions on Russian nuclear industry ([https://www.sanctionsmap.eu/api/v1/pdf/regime?id\[\]=26&include\[\]=lists&lang=en](https://www.sanctionsmap.eu/api/v1/pdf/regime?id[]=26&include[]=lists&lang=en)).

¹⁷ My thanks to colleagues at Polish Economic Institute (PEI), Dr. Adam Juszcak, and Mr. Kamil Lipiński, for this research contribution, T.O'D.

However, the economic value of Russian nuclear fuel exports remains limited in comparison to EU still-existing imports of Russian fossil fuels (natural gas and LNG).

- a. However, Western economy still runs short on nuclear fuel enrichment – combined capabilities of uranium enrichment in 2021 in US, EU and UK combined were 26,1 SWU/yearly. Rosatom capabilities – 27 SWU/yearly. Increasing western capability in this matter should be a priority especially considering the number of planned new nuclear projects – both traditional nuclear power plants as well as SMRs (<https://world-nuclear.org/information-library/nuclear-fuel-cycle/conversion-enrichment-and-fabrication/uranium-enrichment.aspx> ; <https://rusi.org/explore-our-research/publications/commentary/catch-235-western-dependence-russian-nuclear-supplies-hard-shake>).

Appendix B. Rosatom may be assisting in circumventing sanctions. (based on DiXiE Group, Kiev, colleagues' research)¹⁸

1. Rosatom may be assisting in circumventing sanctions

Rosatom maintains access to international markets, a crucial strategy following the inclusion of Russian microelectronics and electronics developers, such as chipmakers Baikal Electronics, MCST, Module, and computer technology manufacturers (Aquarius group), in sanction lists. In early 2023, Russian media [reported](#) that Critical Information Systems (a company within Rosatom's structure) is preparing for investment deals in the Russian electronics market, establishing a separate mergers and acquisitions department for this purpose.

In early 2023, The Washington Post [published](#) information about a potential circumvention of sanctions through Rosatom's structure, citing a document obtained by Ukrainian intelligence. The document claims that Rosatom proposed supplying components to military units and arms factories subject to sanctions. Among the components listed are **aluminum oxide, lithium-ion batteries for tanks and air defense systems, used in rocket fuel**, and 3D printing technology.

Facts to prove Rosatom's activities in the sectors which are subject to sanctions:

- Critical Information Systems (a structure within Rosatom) [acquired](#) (Feb 2023) 100% shares in JSC "MCST" (Moscow Center for Spark Technologies) - a developer of processors based on the Elbrus architecture and the Elbrus Linux operating system. Russian media reported that the state corporation acts on the government's behalf, intending to preserve a vital electronics developer facing financial difficulties after the imposition of sanctions.
- Rosatom practically [acquired](#) South Korean lithium battery developer Enertech. In 2021, Rosatom bought 49% of Enertech's shares, and in 2022, it acquired another 49%, making it the effective owner of the business. The purchase of the company with a technology package is a logical step, as independent development of comparable battery technologies would take years.
- On December 22, Rosatom [closed a deal](#) to acquire 50% of the electronics manufacturer Kraftway. According to open sources, the company [imports](#) converters, microcontrollers, transistors, microchips, collaborating with companies from China, Taiwan, and South Korea.

¹⁸ My thanks to colleagues at DiXiE Group, Kyiv, Ukraine, especially Mr. Roman Nitsovych, Ms. Olena Pavlenko (Director) et al, for this research contribution, T.O'D.

- [Non-profile assets](#) of Rosatom: wind energy, additive technologies, geophysical equipment, energy storage, engineering, metallurgy, digital technologies, etc.

#	PRODUCT	IMPORTER	SUPPLIER	ARRIVAL DATE	COUNTRY OF ORIGIN	GROSS WE
1	МАШИНЫ ДЛЯ ПРИЕМА, ПРЕОБРАЗОВАНИЯ И ПЕРЕДАЧИ ИЛИ ВОССТАНОВЛЕНИЯ ГОЛОСА, ИЗОБРАЖЕНИЙ ИЛИ ДРУГИХ ДАННЫХ, ГРАЖДАНСКОГО НАЗНАЧЕНИЯ, ДЛЯ СОБСТВЕННЫХ НУЖД, НЕ ДЛЯ СЕРТИФИКАЦИИ, НЕ ДЛЯ РЕАЛИЗАЦИИ В РФ, ДЛЯ ИСПЫТАНИЙ НА СОБСТВЕННОМ ПРОИЗВОДСТВЕ:	АО ""КРАФТВЭЙ КОРПОРЕЙШН ПЛС""	LOTHAR TRADING PTE LTD	2023-07-12	CN - КИТАЙ	2 KGS
2	МИКРОКОНТРОЛЛЕРЫ ЭЛЕКТРОННЫЕ ИНТЕГРАЛЬНЫЕ ДЛЯ МОНТАЖА НА ПЛАТЫ БЛОКОВ ОБРАБОТКИ ДАННЫХ, НЕ ИСПОЛЗУЮТСЯ ДЛЯ СКРЫТОГО ПОЛУЧЕНИЯ ДАННЫХ. ТОВАР ВВОЗИТСЯ В КАЧЕСТВЕ КОМПЛЕКТУЮЩИХ И РАСХОДНЫХ МАТЕРИАЛОВ ДЛЯ СОБСТВЕННОГО ПРОИЗВОДСТВА НА ТЕРРИТОРИИ РФ:	АО ""КРАФТВЭЙ КОРПОРЕЙШН ПЛС""	ALLIANCE ELECTRO TECH CO.,LIMITED	2023-06-21	TW - ТАЙВАНЬ (КИТАЙ)	6 KGS
3	ПРЕОБРАЗОВАТЕЛИ СТАТИЧЕСКИЕ, ИСПОЛЗУЕМЫЕ С ТЕЛЕКОММУНИКАЦИОННОЙ АППАРАТУРОЙ, ВЫЧИСЛИТЕЛЬНЫМИ МАШИНАМИ И ИХ БЛОКАМИ, ДЛЯ ПРОМЫШЛЕННОЙ СБОРКИ ВЫЧИСЛИТЕЛЬНЫХ МАШИН. КОМПЛЕКТУЮЩИЕ ДЛЯ СОБСТВЕННОГО ПРОИЗВОДСТВА НА ТЕРРИТОРИИ РФ:	АО ""КРАФТВЭЙ КОРПОРЕЙШН ПЛС""	LOTHAR TRADING PTE LTD	2023-04-07	КИТАЙ	28 KGS
4	МИКРОКОНТРОЛЛЕРЫ ЭЛЕКТРОННЫЕ ИНТЕГРАЛЬНЫЕ ДЛЯ МОНТАЖА НА ПЛАТЫ БЛОКОВ ОБРАБОТКИ ДАННЫХ, НЕ ИСПОЛЗУЮТСЯ ДЛЯ СКРЫТОГО ПОЛУЧЕНИЯ ДАННЫХ. ТОВАР ВВОЗИТСЯ В КАЧЕСТВЕ КОМПЛЕКТУЮЩИХ И РАСХОДНЫХ МАТЕРИАЛОВ ДЛЯ СОБСТВЕННОГО ПРОИЗВОДСТВА НА ТЕРРИТОРИИ РФ:	АО ""КРАФТВЭЙ КОРПОРЕЙШН ПЛС""	ALLIANCE ELECTRO TECH CO.,LIMITED	2023-04-07	ТАЙВАНЬ (КИТАЙ)	4 KGS
5	ТРАНЗИСТОРЫ МОЩНОСТЬЮ МЕНЕЕ 1 ВТ. ДЛЯ МОНТАЖА НА ПЛАТЫ ОБОРУДОВАНИЯ НА НАПРЯЖЕНИЕ ДО 48В ПОСТОЯННОГО ТОКА. ТОВАР ВВОЗИТСЯ В КАЧЕСТВЕ КОМПЛЕКТУЮЩИХ И РАСХОДНЫХ МАТЕРИАЛОВ ДЛЯ ИЗГОТОВЛЕНИЯ МАТЕРИНСКИХ ПЛАТ НА СОБСТВЕННОМ ПРОИЗВОДСТВЕ:	АО ""КРАФТВЭЙ КОРПОРЕЙШН ПЛС""	LOTHAR TRADING PTE LTD	2023-02-11	RU	

Conclusions:

Rosatom plans to establish a holding for the development and supply of electronics to Russia's public sector. After being subjected to sanctions, enterprises in the electronics manufacturing sector are unable to meet the needs of the public sector, especially the military. The formation of relevant assets within the structure of Rosatom allows avoiding restrictions, acquiring ready technologies, and manufacturing to fulfill defense orders.

Proposition: Any new deals for the sale of assets or technologies by Rosatom should be prohibited in coalition countries. All new assets acquired by Rosatom after February 22, 2022, should be on the sanctions list.

2. Rosatom continues to have access to modern nuclear technologies

Rosatom continues to cooperate in international scientific projects, such as development of small modular reactors, production of a thermonuclear experimental reactor. But if the West considers these +technologies as solutions for the development of the global economy, the fight against climate change, Russia considers them from a military point of view and the possibility of expanding its influence on third countries to make them dependent on Russian technologies. Strategically, this

means actually putting high-tech weapons in the hands of the opponent, in order to fight with them later.

Facts:

- Russia is one of the countries actively involved in the development of small modular reactor (SMR) technologies. The IAEA [coordinates](#) the efforts of its member states in developing various types of SMRs, taking a systematic approach to defining and developing promising technologies. A [special platform](#) has been created to support the development and deployment of SMR systems. Thus, Russia has a robust channel for exchanging expertise and technologies to advance the field of small modular reactors.
- Russians continue to actively participate in the [ITER project](#) to create a thermonuclear experimental reactor. [According to Rosatom](#), the deliveries of equipment and key reactor systems by the Russian side constitute 9.09% of the total project cost.
- Other international initiatives where representatives of Rosatom are still present include the [INPRO](#) project of IAEA member states (dedicated to innovative nuclear reactors and fuel cycles), the [Generation IV International Forum](#), and the [SNETP](#) project (the Sustainable Nuclear Energy Technology Platform).

Conclusions:

The most illustrative case here is SMR technologies. The Nuclear Energy Agency [estimates](#) that the global SMR market could reach 21 GW by 2035. It is evident that Russia aims to capture a significant share of this emerging market. Therefore, it is crucial to prevent Russians from exchanging expertise and Western technologies in the nuclear development field. It would be easier and cheaper to do this now than to later seek ways to reduce dependence on the Kremlin. The Research and Design Bureau of Machine Building named after I.I. Afrikantov is responsible for the development of SMRs and is not under sanctions from any coalition country except Ukraine. There are dozens of such design bureaus and research institutes with access to technologies working towards the further expansion of the Russian atomic industry within the corporation's structure.

3. Rosatom continues its expansion and creates new dependencies.

Facts:

- Construction of the second phase of the Paks Nuclear Power Plant in Hungary [has commenced](#), with Russia previously [agreeing](#) to provide a state loan for the plant's construction.
- In March, during a state visit to Russia, Chinese President [signed](#) a decade-long cooperation program between Moscow and Beijing in the field of fast-neutron reactors and closing the nuclear fuel cycle.
- Framatome ANF [plans to produce](#) nuclear fuel for VVER reactors under a TVEL license in Germany.

- In mid-2023, Rosatom and one of the world's largest port operators, DP World (Dubai Port World), [signed a strategic](#) cooperation agreement in the global market. The goal of the collaboration is to create a global logistics operator.
- In 2023 alone, nearly 20 new agreements and memoranda of cooperation were signed, potentially evolving into new long-term dependencies. Rosatom [is discussing or has concluded](#) preliminary agreements on the construction of power units in countries such as Armenia, Brazil, Kyrgyzstan, Myanmar, Nigeria, Uzbekistan and Sri Lanka. The state corporation is participating in a competition for the construction of a nuclear power plant in Kazakhstan.
- In 2022, Rosatom [acquired](#) the Budenovskoye uranium deposit in Kazakhstan, becoming the owner of the second-largest uranium reserves in the world. Rosatom's expansion in uranium mining appears to be aimed at increasing the dependency of the U.S. and the EU on this segment of the nuclear fuel cycle. Considering Russia's share in the uranium enrichment services market ([46% of capacities](#) in 2022), the intentions to make the atomic industry, particularly Rosatom, 'sanction-resistant' are evident.

In 2022, there [were reports](#) of the acceleration of the construction of a new station, the Karun Nuclear Power Plant, with a capacity of 300 MW, expected to be operational in 8 years using Iranian technologies. That same year, [information surfaced](#) that Iran sought Russia's assistance in acquiring additional nuclear materials and nuclear fuel production. Given that Russia is the only country cooperating with Iran in the nuclear field, receiving significant amounts of military products, and [reports from the IAEA](#) since early 2023 indicate signs of undeclared nuclear developments, the Russian role in the Iranian nuclear program raises more questions, and the intentions of the Iranian regime become increasingly apparent.

Conclusions:

The Kremlin continues to place a bet on the nuclear industry. After losing the opportunity to continue gas blackmail against European countries, Russia intensifies its activity in the nuclear sector. Close cooperation with the French company Framatome creates risks of new dependencies and project disruptions in diversifying nuclear fuel supply. Accelerating the process of reducing dependence on Russia in the supply of enriched uranium and nuclear fuel, as well as imposing sanctions against research organizations and non-profile assets, is one of the most effective ways to counteract this expansion.

Additional information:

Rosatom enterprises already under sanctions by both the U.S. and the EU:

- Troitsk Institute of Innovative and Thermonuclear Research State Scientific Center of the Russian Federation JSC (under sanctions of the EU, the USA, Switzerland, the UK, Canada, Australia and Ukraine);
- M.L. Dukhov All-Russian Research Institute of Automatics Federal State Unitary Enterprise (under sanctions of the EU, the USA, Switzerland, Japan, the UK, New Zealand, Canada, Australia and Ukraine);
- A.P. Aleksandrov Research Technological Institute Federal State Unitary Enterprise (under sanctions of the EU, the USA, Switzerland, the UK, Canada, Japan, New Zealand and Ukraine);

- M.A. Dollezhal Research and Development Institute of Power Engineering JSC (under sanctions of the EU, the USA, Switzerland, the UK, Canada, Japan, Australia and Ukraine);
- A.I. Leipunsky Institute of Physics and Power Engineering State Scientific Center of the Russian Federation JSC (under sanctions of the EU, the USA, Switzerland, Japan and Ukraine).

Companies subject to US sanctions and no EU sanctions:

- Ye.I. Zababakhin All-Russian Research Institute of Industrial Physics Russian Federal Nuclear Center Federal State Unitary Enterprise (under sanctions of the USA, the UK and Ukraine);
- Russian Federal Nuclear Center All-Russian Research Institute of Experimental Physics Federal State Unitary Enterprise (under sanctions of the USA, the UK, Canada, Australia and Ukraine);
- NIGrafit Research Institute of Structural Materials Based on Graphite JSC (under sanctions of the USA, the UK and Ukraine);
- Atomstroy Research and Design Institute of Assembly Technology JSC (under sanctions of the USA, Canada and Ukraine);

Start Production Association named after M.V. Protsenko Federal Research and Production Center (under sanctions of the USA, Canada and Ukraine).

In 2023, Rosatom's revenue from foreign projects is expected to reach approximately \$14 billion. Since 2017, the foreign revenue of the state corporation has more than doubled - from 6.1 billion US dollars. In 2022, foreign projects brought Rosatom \$11.2 billion.

Appendix C. Why sanction Rosatom: Link between “peaceful” Rosatom energy & Russian nuclear weapons (based on research by Kyiv colleague MG et al)¹⁹

Two recent publications as recommended further reading:

1. Rosatom: Why should the Russian nuclear sector be sanctioned? (Part 1) “Rosatom” is perceived through a ‘peaceful atom’ lens by many. But, does the Russian nuclear death machine have “Rosatom’s” face? by EUToday Correspondents January 28, 2024.
2. Rosatom: why should the Russian nuclear sector be sanctioned? (Part 2), by EUToday Correspondents January 28, 2024. <https://eutoday.net/rosatom-russian-nuclear-sector/>

¹⁹ My thanks to colleagues at CGS Strategy XXI, Kyiv, Ukraine, in particular Mykhailo M. Gonchar*, Founder & President, for this research contribution, T.O'D.

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