



**OPINION – Joshua A. Schwartz**

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**The Nuclear Taboo is a Myth**

In recent years, countries have adopted increasingly risky nuclear behaviors. Vladimir Putin has issued nuclear threats in the context of the Russia-Ukraine War, violated the INF Treaty, leading to its collapse, and suspended Moscow’s participation in the New START Treaty that regulates strategic nuclear weapons. Donald Trump publicly threatened North Korea with nuclear use in his infamous “fire and fury” tweet and privately discussed crossing the nuclear threshold with his advisers.

Joe Biden is pursuing a diplomatic agreement with Saudi Arabia under which the US would help the kingdom build a civilian (for now) nuclear program with uranium enrichment. Iran continues to substantially increase its stockpile of near weapons-grade uranium following the disastrous U.S. withdrawal from the nuclear deal. And China is engaged in a large-scale nuclear buildup that will see the size of its arsenal double by 2030.

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historic danger.” U.N. Secretary-General António Guterres has similarly warned that nuclear risks are the highest they have been in decades and that the threat is casting a “suicidal shadow” over humanity. Are these assessments hyperbole, or is the threat real and urgent?

Optimists argue that the probability of nuclear use is quite low for two reasons. First, nuclear deterrence: Countries fear crossing the nuclear threshold against nuclear-armed adversaries due to the likelihood of

devastating retaliation. Second, the alleged nuclear “taboo”: Nuclear use is perceived as so morally abhorrent that it is not even considered by policymakers or members of the public.

Although nuclear deterrence is indeed a strong factor disincentivizing nuclear use in certain circumstances, my research indicates that optimists significantly overstate the strength of the norm against nuclear use. In particular, public support for nuclear weapons use—even by *foreign* countries—is shockingly high. Policymakers have also seriously considered nuclear use on many occasions. Regrettably, there appears to be no nuclear taboo. The guardrails against nuclear use are weaker than optimists expect. Consequently, policymakers should take additional, active precautions to reduce the chances of nuclear escalation.

***The Illusory Nuclear Taboo:***

The standard for a taboo is high. Something that is taboo, such as incest or cannibalism, is strictly prohibited in all circumstances and should not even be considered. As Nina Tannenwald, who first proposed the concept of the nuclear taboo, wrote, a taboo “connotes such qualities as absoluteness, unthinkingness, and taken-for-grantedness.” A taboo is therefore stronger than a regular norm or tradition. Recent research suggests there is no taboo. Public opinion survey experiments conducted in the US, China, the United Kingdom, France, and Israel reveal that a majority or near-majority of the public would support the use of nuclear weapons by their *own* government if doing so enhances military effectiveness or saves the lives of co-national soldiers.

However, this prior work leaves a key question unanswered. Members of the public might be willing to support nuclear use by their domestic government, but would they still strongly support nuclear attacks by *foreign* governments? In other words, does the nuclear taboo begin only at the water’s edge? Perhaps scholars have been

searching for the taboo in the wrong place.

This is a crucial question for two reasons. First, policymakers care what international audiences think. For example, U.S. leaders repeatedly worried during the Cold War about how foreigners would react to the use of nuclear weapons, and this was a major factor that constrained the US from crossing the nuclear threshold after 1945. Indian policymakers were also highly concerned with international reactions during the 1999 Kargil War against Pakistan, which was the first instance of a direct war between two nuclear-armed states.

Second, the assumption among policymakers is that the use of nuclear weapons would be met with opprobrium by foreign audiences. Secretary of State John Foster Dulles argued that using nuclear weapons in response to the Soviet blockade on Berlin in 1948 “would surely cost us our allies” and “we’d be finished as far as present-day world opinion was concerned.” Regarding the possibility of using nuclear weapons in Vietnam, Richard Nixon said that doing so would have resulted in “domestic and international uproar [that] would have damaged our foreign policy on all fronts.” Gen. Matthew Ridgway, who became supreme allied commander in Europe and U.S. Army chief of staff, anticipated that using nuclear weapons “would so revolt free world opinion as to leave us, quite possibly, friendless and isolated in a hostile world.”

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***When Foreign Countries Push the Button:*** In a recent article published in *International Security*, I argue that this conventional wisdom among policymakers is incorrect. Due to in-group bias, which is an individual’s penchant for favoring and more positively evaluating members of their own group (“us”) than members of out-groups (“them”), I expected that the public would not be more likely to disapprove of nuclear use by allied and partner governments than by their own

government. If allies and partners are viewed as part of the in-group, then the imperative for unity may outweigh ethical concerns about supporting nuclear weapons use.

I tested my argument in a series of public opinion survey experiments in the

US and India. In the surveys, I presented respondents with hypothetical scenarios in which a country might consider using nuclear weapons—for example, in a war with Iran or in the case of a terrorist group with a deeply buried atomic weapons lab. I then randomly varied the country using nuclear weapons while holding all other factors constant.

The results were striking. Public support for nuclear use was not less when allied or partner countries carried out a nuclear attack compared with when an individual's own government did so. Absolute levels of support for nuclear use were also quite high (between 37 and 54 percent), even when it was foreign countries pressing the nuclear button.

But it should be noted that none of the targets in the experimental scenarios had nuclear weapons themselves. If they did, then support for nuclear use may have been lower. Prior research also demonstrates that presenting the public with vivid information about the human costs of nuclear use or how purposefully targeting civilians with nuclear weapons violates international law can further lower support for using nuclear weapons.

Still, these findings are inconsistent with an absolute and unthinking nuclear taboo. Many members of the public are willing to do more than just consider nuclear use; they are willing to

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**Because there is no taboo that will constrain nuclear use, policymakers should take several steps to reduce the danger. First, the nuclear powers with the largest stockpiles—Russia, the US, and increasingly China—should recommit to nuclear arms control and abandon quests for nuclear superiority. A return to the huge numbers of nuclear weapons stockpiled during the Cold War—as many as 70,000 between the US and Soviet Union in the mid-1980s—is unnecessary for deterrence and unduly raises the danger of arms races and nuclear accidents.**

support it.

Although there may be no widespread nuclear taboo, there does appear to be a less powerful norm against nuclear use among at least some members of the public. The hypothetical scenarios I presented respondents with are hard

tests for finding evidence of a nuclear non-use norm because they highlighted the theoretical benefits of conducting nuclear strikes—benefits that included an increased chance of successfully destroying an underground terrorist atomic weapons lab or saving the lives of soldiers by ending a war with Iran more quickly. The fact that a significant proportion of respondents still opposed nuclear use under these conditions shows that there is real atomic aversion among a subset of the general public. Furthermore, respondents did judge nuclear use by *non*-allied and *non*-partner countries more harshly than nuclear use by their own government or allied or partner countries. The strength of the nuclear non-use norm among a given audience is therefore

conditional on the identity of the country pressing the nuclear button.

#### **How to Reduce Nuclear Risks:**

Because there is no taboo that will constrain nuclear use, policymakers should take several steps to reduce the danger. First, the nuclear powers with the largest stockpiles—Russia, the US, and increasingly China—should recommit to nuclear arms control and abandon quests for nuclear superiority. A return to the huge numbers of nuclear weapons

stockpiled during the Cold War—as many as 70,000 between the US and Soviet Union in the mid-1980s—is unnecessary for deterrence and unduly

raises the danger of arms races and nuclear accidents. While most of the blame for the collapse of nuclear arms control should be placed on Russia, there are growing calls in the US for a broad nuclear buildup to match the combined arsenals of Russia and China. That would be a mistake.

Second, policymakers should reprioritize preventing nuclear proliferation to countries like Iran—ideally via diplomacy, but no option should be taken off the table. If a country does not possess nuclear weapons, it cannot be tempted to employ them—taboo or not. Third, the U.S. president and other leaders should not have unilateral authority within their own political system to launch a nuclear first strike. If leaders want to take the grave step of launching a nuclear war of choice, then they should—

at the very least—be required to gain the support of other members of the government. In the U.S. context, requiring the vice president (who cannot be fired by the president) to also approve the use of nuclear weapons and the attorney general to certify that such an action is legal would be one sensible safeguard. In short, much greater caution is warranted in a world with no nuclear taboo.

Source: <https://www.lawfaremedia.org/article/the-nuclear-taboo-is-a-myth>, 07 July 2024.

**OPINION – Hamid Bahrami**

**What Does Iran’s Nuclear Policy Look Like with the New President?**

As Iran stands on the brink of electing a new president, the future of its nuclear policy hangs in the balance. The collapse of the JCPOA following the US’ abrupt withdrawal in 2018 has left a profound impact on Iran’s political landscape. The agreement, designed to limit Iran’s nuclear capabilities in exchange for the lifting of economic sanctions, has been mired in controversy and distrust. Both leading candidates in the

presidential run-off, reformist-backed Pezeshkian and ultra-hardliner, Saeed Jalili, offer starkly different visions for Iran’s nuclear policy and its engagement with the world. Understanding their perspectives and potential impacts on Iran’s nuclear trajectory is crucial as the nation navigates this critical juncture.

**The JCPOA: From Hope to Collapse:** The JCPOA, signed in 2015 between Iran and the P5+1 (the US, UK, France, Russia, China, and Germany), was hailed as a diplomatic triumph. It aimed to curb Iran’s nuclear program and prevent it from

developing nuclear weapons, in return for the lifting of crippling economic sanctions. Iran complied by reducing its uranium enrichment levels, dismantling a significant portion of its centrifuges, and allowing extensive monitoring by the IAEA.

However, the deal’s fragility was exposed when President Trump unilaterally withdrew the US from the agreement in 2018, re-imposing severe sanctions on Iran. The promised economic benefits did not materialise, leading to widespread disillusionment within Iran. This breach of trust has significantly shaped Iran’s political narrative and public opinion as they show the strategic shift in their opinion on nuclear weapons. Today, Iran justifies the breach of the JCPOA terms by arguing that the other signatories, particularly the US, failed to honour their commitments. This sentiment is not confined to the political elite; it resonates deeply with the Iranian public, which has endured economic hardship without seeing the anticipated relief.

**A Diplomatic Approach with a Western Outlook while under Strain:**

Mohammad Reza Pezeshkian, backed by reformists, presents a vision of re-engaging with the West and reviving the JCPOA. Pezeshkian’s campaign is heavily influenced by Javad Zarif, Iran’s former foreign minister and the primary negotiator of the original nuclear deal. Zarif, known for his constructivist approach to international relations, emphasises the importance of Iran’s revolutionary discourse and

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soft power over military might. However, Zarif's tenure was not without controversy. He was involved in a severe dispute with Qassem Soleimani and the "axis of resistance", highlighting internal divisions over Iran's foreign policy direction.

Pezeshkian's strategy hinges on the belief that lifting sanctions and re-entering the JCPOA will stabilise Iran's economy and enhance its international standing. If Pezeshkian wins the election, he will pursue reviving the JCPOA based on the approach of normalising ties with the West, which can be a window of opportunity for the West to slightly distance Iran from China and Russia by offering Iran a good deal. However, it is naive for the western powers if they think Iran will go back to 3/67 per cent uranium enrichment, which was agreed in the JCPOA.

Pezeshkian's approach faces substantial internal and external challenges. Domestically, the Iranian parliament is dominated by hardliners who view the JCPOA with suspicion and hostility. The Supreme Leader, Ayatollah Khamenei, who holds ultimate authority over foreign policy, remains sceptical about Western intentions and is wary of repeating "past mistakes". Externally, the geopolitical landscape has shifted since the JCPOA's inception. The US-Iran relationship is fraught with distrust, and the Biden administration, while expressing willingness to re-enter the deal, faces its own set of domestic and international pressures. Moreover, the recent advancements in Iran's nuclear capabilities have changed the dynamics, making a simple return to the original terms of the JCPOA unlikely. Pezeshkian's potential presidency would thus involve navigating a complex web of political resistance and strategic recalculations.

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**Jalili: A hard-line Stance with an Eastern Pivot:** In stark contrast, Saeed Jalili, an ultra-hardliner and former chief nuclear negotiator (2007-2013),

advocates for a more confrontational approach. Jalili perceives the JCPOA as a disarmament treaty that compromised Iran's sovereignty and security. He and his allies argue that the sanctions, rather than being purely detrimental, can be leveraged to foster internal resilience on condition of minimising corruption within the system. One of Jalili's closest allies, Abolfazl Zohrevand, an Iranian diplomat and current MP from Tehran, often states that "it was God who pushed Trump to withdraw from the JCPOA", reflecting a narrative of divine intervention and resistance.

Jalili's foreign policy is characterised by a pivot towards Eastern alliances, particularly with China and Russia. He believes that these relationships offer strategic counter-balances to Western pressure and hostility. Jalili's stance is influenced by his close ties with Qassem Soleimani and the "axis of resistance", underscoring a commitment to regionalism and a strong defensive posture.

Should Jalili win the presidency, Iran's nuclear policy is likely to take a more defiant turn. He supports maintaining Iran's nuclear threshold capability, arguing that this is essential for national security in the face of perceived Western aggression. Jalili views the ideological conflict with the US as a fundamental and intractable issue, necessitating a robust military and nuclear deterrent. His administration would likely continue to enrich uranium at higher levels, pushing the boundaries of the JCPOA and increasing the risk of a nuclear-armed Iran. If the EU3 activates the snapback mechanism, re-imposing Security Council sanctions, it could lead

Iran to consider changing its military doctrine. As Kamal Kharrazi, an adviser to the Supreme Leader, told *Al-Jazeera*, “We have no decision to build a nuclear bomb, but should Iran’s existence be threatened, there will be no choice but to change our military doctrine.”

As Iran elects its new president, the nation’s nuclear policy stands at a critical crossroads. The collapse of the JCPOA has left a legacy of mistrust and strategic recalibration. Pezeshkian offers a diplomatic route fraught with internal and external obstacles, while Jalili’s hardline stance promises a more confrontational and potentially perilous path. The outcome of this election will not only shape Iran’s future but also test the resilience of global non-proliferation efforts and the stability of the Middle East. The international community must navigate these developments with caution, balancing pressure with diplomacy to avoid escalating tensions and ensuring a path towards sustainable peace and security.

Source: <https://www.middleeastmonitor.com/20240702-what-does-irans-nuclear-policy-look-like-with-the-new-president/>, 02 July 2024.

**OPINION – Anthony Colangelo**

**The New Nuclear Threat: Belarus**

On Sunday, Belarus issued a statement that it would use nuclear weapons if its “sovereignty and independence” were threatened. But would such a use violate international law? The question

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**This precedent comes from the longstanding practice of the U.S. and NATO in what are referred to as nuclear “sharing arrangements,” whereby the U.S. stations nuclear warheads in allied countries. The U.S.-NATO argument that such arrangements are legal under the non-proliferation treaty is that the weapons remain at all times under the control of the U.S., thus not violating (or perhaps more accurately not triggering) the treaty. Russia’s stationing of the weapons in Belarus appears to be likewise legal under international law.**

breaks down into a few sub-questions, the first of which is how Belarus, Russia’s ally in the region, obtained nuclear weapons in the first place. The answer, of course, is that they came from Russia. From there, one must ask whether the stationing of nuclear weapons in Belarus and the training of Belarusian soldiers in the use and operation of such weapons is a violation of international law.

Here the relevant international law comes from the NPT, to which both Belarus and Russia are party. Article I of the treaty prohibits “the transfer to any recipient whatsoever [of] nuclear weapons or other nuclear explosive devices or control over such weapons,” and Article II prohibits “receiv[ing] the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons.” It would not be unreasonable at first glance to conclude that Russia’s stationing of the weapons violates the treaty. But there is strong precedent that it does not.

This precedent comes from the longstanding practice of the U.S. and NATO in what are referred to as nuclear “sharing arrangements,” whereby the U.S. stations nuclear warheads in allied countries. The U.S.-NATO argument that such arrangements are legal under the non-proliferation treaty is that the weapons remain at all times under the control of the U.S., thus not violating (or perhaps more accurately not triggering) the treaty. Russia’s stationing of the weapons in Belarus appears to be likewise legal

under international law. What is more questionable is whether use of the weapons by Belarus — not Russia — would violate the nuclear treaty. As soon as control of the weapons is transferred to Belarus, Article I and II of the treaty are triggered, thus constituting a violation of international law.

The other obvious question is whether the use of such weapons violates international law. Here Belarus is likely relying upon Article X of the treaty, which states: "Each Party shall in exercising its national sovereignty have the right to withdraw from the Treaty if it decides that extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country." It is no accident that Belarus' statement contains similar language to Article X, stressing state "sovereignty."

But a threat to sovereignty is highly subjective. Does international law provide a mechanism by which states may gauge the legitimacy of a purported threat? The answer is yes. Article X sets out that a state withdrawing from the non-proliferation treaty "shall give notice of such withdrawal to all other Parties to the Treaty and to the UN Security Council three months in advance. Such notice shall include a statement of the extraordinary events it regards as having jeopardized its supreme interests." Here, international law provides an objective constraint on the use of nuclear weapons and an opportunity for the international community to come together and define what does, and does not, constitute a valid threat to state sovereignty freeing states to use nuclear weapons. Belarus's statement is a warning. It is now up to the world to respond.

Source: <https://thehill.com/opinion/national-security/4754268-belarus-nuclear-weapons-treaty/mlite/>, 05 July 2024.

**OPINION – Tom Mehaffie**

**Pennsylvania's Energy Past could be its Energy Future**

Nuclear power, which has produced one-third of

the electricity generated within Pennsylvania for decades, helps keep the lights on for our homes and businesses with efficient, carbon-free production. Domestically produced nuclear electricity provides a diversified energy portfolio and stable grid without releasing harmful emissions into the air. Emerging technology allows for nuclear power to be produced in much smaller spaces with fewer construction costs.

I've joined other representatives and senators in relaunching the bipartisan, bicameral Pennsylvania Nuclear Energy Caucus this summer to ensure we keep this tried-and-true clean energy contributing to our baseload power for generations to come. The caucus stands ready to hear from stakeholders, including workers themselves, about how to maintain access to high-quality baseload power and provide grid reliability. We want to ensure Pennsylvania is properly positioned to capitalize on available federal resources.

In 2022, my House resolution directed the Joint State Government Commission to evaluate the benefits of nuclear energy and small modular reactors. SMRs are innovative technologies in which simple, fission-based units are constructed in factories and shipped to be assembled on-site, producing emission-free power 24 hours a day, regardless of whether the sun is shining or the wind is blowing.

Commercial SMRs are essentially all in design phases at the moment, with some planned as light-water reactors and some as non-light-water reactors. They're expected to be easier to build and assemble at a total cost more affordable than traditional reactors. It is estimated that SMRs will reach the market in the 2030s. 2030 is fast approaching, so now is the time for the Pennsylvania General Assembly to ensure that safeguards – not barriers – are in place for construction of SMRs. The Nuclear Energy Caucus is our all-hands approach to make that happen. We are in the early stages of listening and goal setting to ensure the caucus' work is effective, efficient and foundational for the future.

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When the Three Mile Island plant in Londonderry Township shut down in 2019, Pennsylvania-produced nuclear power dropped by 8%. It also decimated the regional workforce for those in IBEW Local 777 and other unions' ranks, causing families to uproot their lives and leave their community. The Legislature's response to the planned Three Mile Island closure was sluggish and ineffective. That is why we're positioning the Nuclear Energy Caucus to be more nimble, providing guidance for the four remaining nuclear plants within the state and foresight for SMRs.

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Pennsylvania has incredible economic potential tied to the energy industry. With nuclear, coal, solar, wind, natural gas, rare earth mineral mining and a potential \$1 billion lithium industry waiting to be unleashed – all within our borders – we are headed toward years of energy diversity and economic prosperity. The Commonwealth has the potential to continue leading in domestic energy production – and the Nuclear Energy Caucus will help to facilitate its nuclear future.

**Historically, there have been moments when public opinion has driven nuclear policy, and not simply through elected representatives in Congress voting on defense appropriations. Widespread concerns over radioactive fallout helped drive negotiations that banned atmospheric nuclear testing in the early 1960s. In the early 1980s, millions turned out in the US and Europe to protest the deployment of intermediate-range nuclear weapons, which put pressure on President Reagan and the U.S.S.R.'s Gorbachev to negotiate a ban on these systems.**

Source: <https://www.cityandstatepa.com/opinion/2024/07/opinion-pennsylvanias-energy-past-could-be-its-energy-future/397774/>, 01 July 2024.

**OPINION – Steve Andreasen**

**Will Everyday Americans have a Voice in Nuclear Arms Race Debate?**

In early June, the Biden administration announced a more “competitive” nuclear weapons strategy, after Moscow and

Beijing reportedly spurned U.S. efforts to discuss arms control. The new approach includes the possibility of increasing America's deployment of strategic nuclear weapons. The administration's more muscular stance may be only a small down payment on an even larger nuclear buildup foreshadowed in a recent report mandated by Congress. The public has a compelling interest in participating in this discussion now, before the bills and risks come due. “How much is enough” regarding America's nuclear forces is not a new question. It has been debated by political, military and scientific leaders since the first two nuclear weapons were used to end the Second World War almost 80 years ago.

Today, Washington and our two most likely nuclear adversaries, Russia and China, are all examining their nuclear ledgers to account for growing tensions in great-power relations, new technologies such as artificial intelligence and cyber warfare and emerging battlefields in space. Will the American people have a voice in this debate? Historically, there have been moments when public opinion has driven nuclear policy, and not simply through elected representatives in Congress voting on defense appropriations. Widespread concerns over radioactive fallout helped drive negotiations that banned atmospheric nuclear testing in the early 1960s. In the early 1980s, millions turned out in the US and Europe to protest the deployment of intermediate-range nuclear weapons, which put pressure on President Reagan and the U.S.S.R.'s Gorbachev to negotiate a ban on these systems. Yet it has been decades since the American public has weighed in *en masse* on nuclear policy, leaving the discussions to a small number of government, civilian and military bureaucrats and members of Congress.

The rest of us have practical and existential reasons to get engaged. To begin, the resources required



to maintain or expand our nuclear arsenal are substantial — hundreds of billions of dollars for new land-based nuclear missiles, bombers and submarines. This will come at a substantial cost to other defense capabilities and domestic priorities. Even more profoundly, a more aggressive nuclear policy and the mere existence of more weapons may increase the risk of nuclear use, which poses an existential threat to us all. As the former CIA deputy director for intelligence rightly said to then-national security adviser Henry Kissinger decades ago, “Once nuclear weapons start landing, the response is likely to be irrational.”

Based on research by independent experts published in the Bulletin of Atomic Scientists, the US today deploys more than 1,700 nuclear weapons. Roughly half of these warheads are on “day to day” alert, ready to be launched within minutes. Half of these are deployed at sea, immune from attack. Any rational nuclear adversary — say Russia or China, alone or together — must conclude that the use of even one nuclear weapon against the US or its allies in Europe or Asia would likely trigger a massive American nuclear response that could obliterate an aggressors’ leadership, military forces and industry. And the sobering reality is that a rational U.S. president must conclude the same with respect to Russia, which deploys roughly the same number of nuclear weapons as the U.S., and China, with a much smaller but growing nuclear inventory.

Adding more nuclear weapons, missile silos, bombers or submarines to the mix in China, Russia or the U.S. — or applying new technologies,

whether in speed or power — will not change the nuclear fundamentals: Use even one nuclear weapon and risk nuclear retaliation and a wider nuclear war that would destroy nations. The wise course for the U.S. is to ensure an adequate nuclear deterrent that places a premium on survivability, which means firepower and totals limited to the current arsenal, or even fewer.

Everyday Americans can and should campaign against this dangerous nuclear expansion. And beyond that, we can support what the US has slowly been doing, reducing the risks of a nuclear use by

reducing global nuclear arms through sound security policies and diplomacy. We can also support efforts to make the stockpile we have safer. In a rare but laudable bipartisan initiative, Congress directed the Biden administration to conduct an internal review of America’s nuclear command-and-control systems, including “fail-safe” steps to strengthen safeguards against cyber warfare threats and the unauthorized, inadvertent or accidental use of a nuclear weapon.

The review is due out in the fall, and it will almost certainly call for new investments to securely maintain a nuclear deterrent for as long as one is needed. That would be money well spent by Washington — and something that should be encouraged in every nuclear-armed state. No question, the U.S. is now in an across-the-board

competition with China and Russia. In Europe, it is centered on the war in Ukraine and deterring any further attacks by Russia on our NATO allies. The competition with China is much broader: There is an increasing military component in the South

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China Sea and Taiwan, but the economic and technology race is as consequential.

“Winning” this competition will require a number of increased investments and initiatives, such as shoring up our conventional military capabilities, leading the artificial intelligence revolution, developing defenses against cyber attacks and expanding clean energy alternatives. Making expensive investments in nuclear capabilities beyond what is adequate for deterrence would mean running this race carrying a heavy sandbag on our shoulders. When it comes to nuclear weapons, less is more.

Source: <https://www.seattletimes.com/opinion/who-will-stop-the-great-powers-itching-for-another-nuclear-arms-race/>, 01 July 2024.

## **BALLISTIC MISSILE DEFENCE**

### **NORTH KOREA**

#### **N Korea Test-launches 2 Ballistic Missiles**

The Joint Chiefs of Staff said in a statement the missiles were launched 10 minutes apart in a northeasterly direction from the town of Jangyon in southeastern North Korea, AP reported. It said the first missile flew 600 kms (370 miles) and the second missile 120 kms (75 miles), but didn't say where they landed. North Korea typically test-fires missiles toward its eastern waters, but the second missile's flight distance was too short to reach those waters.

Joint Chiefs of Staff spokesperson Lee Sung Joon later told a briefing the second missile suffered a possible abnormal flight during the initial stage of its flight. He said if the missile exploded, its debris would likely have scattered on the ground though no damages were immediately reported. Lee said an additional

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analysis of the second missile launch was underway. South Korean media, citing unidentified South Korean military sources, reported that it was highly likely the second missile crashed in an inland area of the North. The reports said the first missile landed in the waters off the North's eastern city of Chongjin.

The launches came two days after South Korea, the US, and Japan ended their new multidomain trilateral drills in the region. On Sunday, North Korea's Foreign Ministry issued a

lengthy statement strongly denouncing the “Freedom Edge” drill, calling the US-South Korea-Japan partnership an Asian version of NATO. It said the drill openly destroyed the security environment on the Korean Peninsula and contained a US intention to lay siege to China and exert pressure on Russia. The statement said North Korea will “firmly defend the sovereignty, security, and interests of the state and peace in the region through offensive and overwhelming countermeasures.”

Source: <https://en.mehrnews.com/news/217110/N-Korea-test-launches-2-ballistic-missiles>, 01 July 2024.

**The MoD has announced a comprehensive framework for missile defence research and development, titled Science and Technology Oriented Research and Development in Missile Defence (STORM). The contract will manage the delivery of research covering all activities to counter ballistic missiles and advanced threats, including but not limited to simple non-separating threats, complex separating threats, MaRVs, MIRVs, Hypersonic Glide Vehicles (HGVs), Hypersonic Cruise Missiles (HCM), and hybrid threats.**

### **UK**

#### **UK Launches ‘STORM’ to Defend Country from Missiles**

The MoD has announced a comprehensive framework for missile defence research and development, titled Science and Technology Oriented Research and Development in Missile Defence (STORM). The contract will manage the delivery of research covering all

activities to counter ballistic missiles and advanced threats, including but not limited to simple non-separating threats, complex separating threats, MaRVs, MIRVs, Hypersonic Glide Vehicles (HGVs), Hypersonic Cruise Missiles (HCM), and hybrid threats.

The research required will cover analysis, experimentation, trials, and technology/system development across all pillars of missile defence: Counter-proliferation: Measures to minimise the spread of missile technology. Deterrence: Measures to discourage the use of missile threats. Counterforce: Actions to reduce the quantity of missiles and supporting equipment available to an aggressor during a conflict. Active defence: Strategies to detect, track, intercept, and disable or destroy missiles in flight. Passive defence: Measures to mitigate and recover from the effects of missile impacts.

The STORM framework, with an estimated budget of £110 million to £251 million, addresses a broad spectrum of missile defence activities. ...The MoD outlines the historical and ongoing challenges posed by ballistic missiles: "Since the first V2 attack on London in 1944, ballistic missiles have posed a near constant threat to the UK, its overseas interests, and forces. Adversaries continue to invest in and proliferate increasingly advanced ballistic and manoeuvrable threat systems to challenge our freedom of action."

The MoD specifies the pillars of missile defence research under the STORM framework as follows: "Counter-Proliferation: Measures to minimise the spread of missile technology." "Deterrence: Measures to discourage the use of missile threats." "Counterforce: Actions to reduce the quantity of missiles and supporting equipment available to an aggressor during a conflict." "Active Defence: Strategies to detect, track, intercept, and disable or destroy missiles in flight." "Passive Defence: Measures to mitigate and recover from the effects of missile impacts."

The UK Missile Defence Centre (MDC), a unique government-industry partnership within the MoD Head Office, will spearhead the STORM framework. ... The MoD highlights the strategic importance of the STORM framework: "The Missile Defence R&D Category Strategy, approved in May

2023, recommended creation of a new route to market bringing together core research and technology maturation projects into a single contract, enhancing research outcomes and supply chain efficiency."

The selected contractor will work closely with the MDC to "design and manage a contract pipeline to deliver the Missile Defence R&D category's research requirements." This includes large, multi-year research technology maturation projects,

multinational and multi-supplier trials, and short-term rapid analysis. The coordination function is envisaged to be co-located with the Missile Defence Centre in Farnborough. The notice further details that "the research required will cover analysis, experimentation, trials and technology/system development across all pillars of missile defence."

The STORM framework is part of the 2020 MOD Science & Technology (S&T) Strategy, which aims to "sustain, exploit, and develop UK industrial and

academic expertise to continue to develop next-generation and generation-after-next technologies applicable to Integrated Air and Missile Defence."

Source: <https://ukdefencejournal.org.uk/uk-launches-storm-to-defend-country-from-missiles/>, 05 July 2024.

**The project team led by Zheng Xiaoping, a professor with Tsinghua University's department of electronic engineering, said it had built a radar capable of tracking 10 incoming hypersonic missiles at Mach 20 with unprecedented precision, and it could also identify false targets. During ground-based simulations, the new radar showed an error of 28cm (11 inches) in estimating the distance of a missile travelling at nearly 7 km (4.3 miles) per second, and it was up to 99.7 per cent accurate when estimating the missile's speed, the team said of a feat previously thought to be impossible.**

## **EMERGING TECHNOLOGIES AND DETERRENCE**

### **CHINA**

#### **China's New Interception Radar 'Can Track 10 Hypersonic Missiles at Mach 20'**

Chinese scientists say they have achieved an advance in radar technology that may turn up the heat in the race for hypersonic weapons. The project team led by Zheng Xiaoping, a professor with Tsinghua University's department of electronic engineering, said it had built a radar capable of tracking 10 incoming hypersonic

missiles at Mach 20 with unprecedented precision, and it could also identify false targets. During ground-based simulations, the new radar showed an error of 28cm (11 inches) in estimating the distance of a missile travelling at nearly 7 km (4.3 miles) per second, and it was up to 99.7 per cent accurate when estimating the missile's speed, the team said of a feat previously thought to be impossible.

Generating and analysing radar signals with precision for measurement requires electrons to move at extremely high speeds, which can potentially burn out the circuit boards. However, Zheng's team innovated by incorporating lasers into the radar, enabling information transmission between key nodes to reach the speed of light. As a result, the radar system could generate and process microwave signals much more complex than before, precisely measuring ultra-high-speed objects for the first time. This new microwave photonic radar boasts a detection range of over 600km, Zheng and his collaborators from Guangxi University said in a peer-reviewed paper. It was published on May 24 in the Chinese-language journal, *Optical Communication Technology*. The microwave photonic radar is small and light, making it suitable for loading on to air-defence missiles or planes. It is considered by some military experts to be key technology for the next generation of fire-control radars.

The US, which strives to narrow the gap with China in hypersonic weapons, tested an air-launched hypersonic missile on Guam in the Western Pacific in March. This test was perceived by some Western military observers as a targeted response to China, showing the US military's ability to attack Chinese coastal cities with its high-penetration weapon. Hypersonic weapons pose a greater challenge for interception than traditional ballistic missiles. They are not only faster, but can make unpredictable manoeuvres, enabling them to penetrate air-defence networks. While new

interceptor missiles and laser weapons have the potential to destroy incoming hypersonic weapons, they require precise target position and velocity parameters to succeed.

According to a report released last year by the CSIS, a Washington-based think tank, one of the most vexing issues for the Pentagon is the challenge to obtain a fire-control radar that can track hypersonic targets with high precision for interceptor missile systems. "If you have more precise data, you could use an interceptor that

maybe wouldn't need to manoeuvre as much, and could be cheaper," said Masao Dahlgren, the report's author with the CSIS Missile Defence Project, in an interview with spacenews.com in December. Another challenge posed by high-speed moving targets is the emergence of phantom images on radar screens, with "false targets" often outnumbering real targets.

Using laser technology, Zheng's team enabled the radar to send three different bands of

microwaves simultaneously, improving detection accuracy. They also developed an algorithm that eliminates false target interference entirely by comparing signals of different frequencies. Zheng and his team have built a complete radar system, including chips and transmitters, verifying the performance in a laboratory with instruments that simulate the movement of hypersonic targets in the atmosphere.

Source: <https://www.scmp.com/news/china/science/article/3269347/chinas-new-interception-radar-can-track-10-hypersonic-missiles-mach-20>, 07 July 2024.

## UK

### McLaren to Partner with British Defence Ministry in its Hypersonic Missile Development Program

What does a car manufacturer whose models race past the tracks in a Formula One race and the manufacturer of a hypersonic missile have in

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common? To a layman this may be like comparing oranges to apples. It has now emerged in various news reports that the Formula One team McLaren will be collaborating with the British MoD on its hypersonic missile program. The car maker will be amongst other things advising the MoD on matters pertaining to optimizing supply chain relationships. The details of the cooperation remain vague and this comes in the midst of an arms race in the manufacturing and innovation in the field of hypersonic missiles.

**Details of the Cooperation:**

The Accelerator team of McLaren and the defence ministry's hypersonic department will be collaborating. The car manufacturer confirmed that they are not in the business of production of hypersonic missiles. This project will see the car brand share their knowledge of high-performance environments among others. The car maker will be teaching the ministry on harnessing innovation, digital decision making and improving team capabilities from their experiences. It is to achieve a high performance culture and promote operational efficiency in the team which is manufacturing the hypersonic missiles. ...

Source: <https://www.msn.com/en-in/news/other/mclaren-to-partner-with-british-defence-ministry-in-its-hypersonic-missile-development-program/ar-BB1pwK33>, 07 July 2024.

**YEMEN**

**Houthis Claim to have Developed Long-Range Hypersonic Missile**

Adding to the growing panic for seafarers transiting the Middle East, the Houthis have claimed this week to have launched a homemade long-range hypersonic missile called the Hadim-2. This solid-fuel missile was reportedly used to

target a Liberian-flagged ship, the MSC Sarah V, in the Arabian Sea. The authenticity remains unverified, and questions persist about whether it truly qualifies as homemade. The Houthis have been known to receive weapons from Iran. The missile's design appears similar to Iranian-made munitions like the Fattah-1, which can travel at speeds of up to Mach 3.

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The Houthis have upped their campaign against merchant shipping over the past fortnight, both in terms of the number of attacks as well as in their sophistication – targeting vessels by air and sea simultaneously with a ship sinking, others badly damaged and another seafarer dying. Reports of another ship strike 84 nautical miles west of Hodeidah are emerging

today with Splash estimates suggesting nearly 120 merchant vessels have been targeted by the Houthis in their seven-month campaign, which they say is in solidarity with Hamas's ongoing war with Israel.

The International Transport Workers' Federation (ITF) and seafarers' unions globally earlier this week called on governments to step up and coordinate their efforts to protect seafarers sailing in or through the area. The ITF also demanded shipping companies demonstrate their commitment to their seafarers by diverting their ships and flag states were

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asked to instruct companies to divert their ships. Many shipping analysts in recent weeks – including from Jefferies, Cleaves and Bank of America – have predicted the ongoing Red Sea shipping crisis will continue into the first half of next year.

Source: <https://splash247.com/houthis-claim-to-have-developed-long-range-hypersonic-missile/>, 27 June 2024.

NUCLEAR ENERGY

KAZAKHSTAN

**Kazakhstan to Hold Referendum on Building Nuclear Power Plant**

Kazakhstan's power sector is at a crossroads, a point where the government wants to diversify and reduce CO2 emissions. Nuclear power is viewed as at least a partial solution to existing challenges, and officials have taken the first step toward building a reactor by scheduling a nationwide referendum. President Tokayev announced the referendum in late June without scheduling a specific date for it. The country has abundant oil and natural gas reserves, but the president stressed a need to develop other energy sources to power economic growth. He went on to reassure his audience that the government was committed to developing its nuclear energy potential in a well-considered manner.

"The country has great opportunities for the development of nuclear energy; it is important to use them correctly and effectively. The final decision on this issue will be made by the people," the presidential press service quoted Tokayev as saying in an address to journalists.

The immediate question on most people's minds is who will help Kazakhstan build a reactor? There are four entities from Russia, France, China and South Korea under consideration for the job. Officials say the choice will be made after the referendum, provided the issue receives a popular endorsement. Given that Kazakhstan has a tightly controlled political environment, a "yes" vote seems likely. But many fear that geopolitics will prompt Kazakh authorities to award the construction contract to Rosatom, the Russian state-controlled firm. Some even believe it's

already a done deal, just waiting for the right time to announce it. That likelihood is fueling unease about safety and sovereignty risks.

Aset Nauryzbaev, an economist and a former top official at KEGOC, the company operating Kazakhstan's electricity grid, believes a Russian-built reactor will undermine Kazakhstan's long-practiced foreign policy of multi-vectorism, in which Kazakhstan balances relations among global and regional powers so that none exerts controlling influence on Astana's policy choices. "By building its own nuclear power plant here, Russia will be able to keep Kazakhstan in its field of influence – we will depend on their production technologies, fuel, specialists, and they will certainly use this leverage when necessary,"

Nauryzbaev told Eurasianet.

Vadim Nee, director of the Social and Environmental Fund, an environmental non-profit, is also concerned about the prospect that Astana, by deepening its nuclear partnership with Moscow, could face geopolitical risks. ...Timur Zhantikin, general director of the Kazakhstan Nuclear Power Plant

company, said that the uranium needed to fuel a nuclear plant would be domestically sourced, thereby limiting Russia's ability to exert pressure on Kazakhstan once the reactor starts operations.

Social media chatter among Kazakhstan's commentariat appears firmly against Rosatom's involvement in any nuclear power plant project. The legacy of the 1986 Chernobyl nuclear disaster, as well as the close calls at the Zaporizhzhya nuclear plant during the Russia-Ukraine war, have imprinted on many the impression that Russia is lax when it comes to nuclear safety. Kazakhstan has its own complicated nuclear "history," with nuclear power, linked to the legacy of Semipalatinsk, one of the Soviet Union's main nuclear test sites.

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Presently, about 80 percent of electricity in Kazakhstan is produced by burning coal, another 15 percent is generated via hydropower, and the rest comes from renewable energy sources. Meanwhile, Soviet-era energy infrastructure is prone to frequent breakdowns that cause extended power outages across the country. Adding nuclear power to the current mix is seen by officials as a quick fix to existing problems. At the same time, nuclear energy should not be seen as a “green” energy source capable of replacing coal-fired plants without entailing risks, said Nee. “We must not forget that nuclear power plants produce hazardous waste,” Nee said. “And if an accident occurs, we risk losing one of our strategic water bodies – Lake Balkhash.”

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Since late last year, Kazakhstan’s Ministry of Energy has been conducting a promotional campaign that has shown signs of swaying public opinion in favor of nuclear energy. A poll conducted by Demoscope, an independent research firm, found that 47 percent of those polled favored construction of a nuclear plant, and 38 percent were against. Skeptics believe the referendum’s outcome is already settled, but authorities want to hold it to provide political cover, in case of a future mishap.

**Energy and electricity minister Kgosientsho Ramokgopa says work is at an advanced stage to procure 2,500 MW of nuclear energy. Speaking with the Sunday Times, Ramokgopa said that the nuclear plan aims to secure approval from the Treasury to build a 2,500MW power plant next month, with the team working on the deal finalising the procurement structure.**

*Source: <https://eurasianet.org/kazakhstan-to-hold-referendum-on-building-nuclear-power-plant>, 02 July 2024.*

## **SOUTH AFRICA**

### **South Africa Doubles Down on Nuclear Power**

Energy and electricity minister Kgosientsho Ramokgopa says work is at an advanced stage to procure 2,500 MW of nuclear energy. Speaking with

the Sunday Times, Ramokgopa said that the nuclear plan aims to secure approval from the Treasury to build a 2,500MW power plant next month, with the team working on the deal finalising the procurement structure.

Ramokgopa said that internal conversations related to what type of nuclear technology should be considered, with the late technology seen as very rapid to deploy, relatively cheap and more efficient. There are also

considerations over who will operate the plant, but Ramokgopa said that Eskom will likely run the plan given its experience with Koeberg near Cape Town. The minister said the department will have more information on the proposal by the end of August.

Ramokgopa initially revealed the intention to launch the procurement process in December 2023. The determination was first signed off by the now unbundled Department of Mineral Resources and Energy and concurred with by Nersa in 2021. However, after Ramokgopa received new powers following an exchange between the relevant ministries, another layer of approvals was required.

South Africa has not experienced load shedding for the last 100 days, a feat last achieved in 2021. This is good news as building a new nuclear power plant will not go online in the near term. The process of building a new nuclear power station takes roughly eight to ten years to build. Koeberg is the only nuclear power station in South Africa and produces 1,860MW when fully operational. However, the station is undergoing life-extension maintenance, with unit 2 offline

until later this year. The maintenance has been anything but smooth sailing for Eskom, with several delays at both units.

Once complete, Koeberg should be able to run for 20 more years. In the highly-contended draft IRP, the DRME did not list any additional nuclear energy contributions through the end of its first 'horizon' of 2030. A mix of new generation sources is listed in the 2030-2050 horizon, including nuclear. The future build pathway that welcomes nuclear includes a 2,500MW build in 2031-2035, additional nuclear procurement of 1,925MW to the end of 2040, and a giant 10,075MW by the end of 2050. Although nuclear power concerns many in the country over potential safety risks, especially following the Chernobyl disaster in Ukraine, nuclear energy has resulted in substantially fewer deaths than coal-powered energy.

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**Starting from 2050, all ships operating at sea will be required to use only carbon-free fuels, according to the International Maritime Organization (IMO) convention under the UN. "With such strong marine environmental regulations, ships that use carbon-free fuels and utilise advanced new technologies are in demand, and in particular, small modular reactor (SMR) ship technology is attracting attention as a core technology for the future marine industry," the university noted.**

...  
*Source: <https://businesstech.co.za/news/energy/781267/south-africa-doubles-down-on-nuclear-power/>, 07 July 2024.*

## **SMALL MODULAR REACTORS**

### **SOUTH KOREA**

#### **Research Institute for SMR-Powered Ships Launched**

Mokpo National University held the opening ceremony of its affiliated research institute, the SMR Ship Research Institute, on 2 July. The ceremony was attended by more than 100 people, including representatives from Korea Hydro & Nuclear Power (KHNP), Korea Research Institute of Ships & Ocean Engineering Director, Korea

Energy University, global shipyards such as Samsung Heavy Industries, HD Hyundai Samho, and HD Hyundai Mipo, international classification societies such as the American Bureau of Shipping, Det Norske Veritas, Lloyd's Register, and Korean Register of

Shipping, local governments, and representatives and related parties from shipbuilding and marine industry companies and organisations.

Starting from 2050, all ships operating at sea will be required to use only carbon-free fuels, according to the International Maritime Organization (IMO) convention under the UN. "With such strong marine environmental regulations, ships that use carbon-free fuels and utilise advanced new technologies are in demand, and in particular, small modular reactor (SMR) ship technology is attracting attention as a core technology for the future marine industry," the university noted. "In order to proactively respond to these demands, Mokpo

National University established the SMR Ship Research Institute to build a cooperative network with domestic and international organisations and companies, including universities, research institutes, large shipbuilders, and international classification societies, and to conduct full-scale research," it continued.

The new research institute will focus on developing and commercialising SMR ship technology and also developing and operating world-class educational programmes to train specialised personnel. "The establishment of the SMR Ship Research Institute marks an important milestone in the innovative convergence of Korea's world-class shipbuilding and nuclear industries, propelling Korea to become a global



leader in accelerating carbon neutrality," KHNP President Joo-ho said in a keynote speech. "KHNP will actively cooperate with the SMR Ship Research Institute to participate actively in the development and commercialisation of SMR-powered ships."

Regulatory hurdles: Nuclear power could transform the maritime industry with emissions-free shipping, whilst extending the life cycle of vessels and removing the uncertainty of fuel and refuelling infrastructure development, Lloyd's Register said in a new report. However, it said regulation and safety considerations must be addressed for its widespread commercial adoption.

The report - titled *Fuel for Thought: Nuclear* - assesses the opportunity presented by nuclear for commercial maritime given its proven track record in naval applications, with the study pointing to the role of new SMRs in bringing to market suitable low-maintenance reactors to meet the propulsion and energy requirements of commercial ships. According to the report, the commercial relationships between shipowners and energy producers will be altered as power is likely to be leased from reactor owners, separating the shipowner from the complexities of licensing and operating nuclear technology. "SMRs represent a leap forward in reactor design, emphasising safety, efficiency, and modularity for streamlined production," Lloyd's Register said. "As SMR technology matures and regulatory clarity increases, ship designs optimised for nuclear propulsion will emerge, ushering in a new era of

efficient and environmentally friendly vessels."

Mark Tipping, director Power to X at Lloyd's Register, said the report "represents one of the first easily accessible overviews on the use of nuclear power in shipping, combining information from a wide range of sources into one report tailored for commercial shipping and the wider maritime value chain. ...

Source: <https://world-nuclear-news.org/Articles/Research-institute-for-SMR-powered-ships-launched>, 05 July 2024.

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### **Korean City to Study Feasibility of i-SMR Deployment**

The MoU was signed on 17 June at Daegu City Hall by Daegu Mayor Hong Joon-pyo and KHNP CEO Whang Joo-ho. The MoU includes a feasibility study covering site suitability, economic viability, and enhancing resident acceptance, in a bid to build and commercialise a 680 MWe SMR power plant equivalent to the capacity of four 170 MW-per-unit modules.

Daegu City, in North Gyeongsang Province, said it plans to conduct a preliminary feasibility study with KHNP and private construction companies by 2026, obtain standard design approval from the government in 2028, and begin commercial development in 2033. To this end, a newly-created SMR construction special purpose corporation (SPC) will purchase about 160,000 square metres of land out in the Gunwi Advanced Industrial Complex and proceed with construction. The total project cost of KRW4 trillion (USD2.9 billion) will be entirely financed by the SPC. On 31 May, the Ministry of Trade, Industry

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and Energy allocated 0.7 GWe for SMRs by 2035 through the 11th Basic Plan for Electricity Supply and Demand. It announced a specific scheme to introduce one unit consisting of four 170 MWe modules.

"This agreement is the first case since the introduction of the first SMR in the 11th basic power plan was announced in May, and this is the first time that a metropolitan government has directly started SMR construction," Daegu City noted. The city said it has been discussing with MOTIE, the Korea Atomic Energy Research Institute and i-SMR Technology Development Agency for the past two years to build the first SMR in South Korea at the Gunwi New Airport Advanced Industrial Complex.

Daegu Metropolitan City said it plans to build an "SMR industrial ecosystem" by attracting power-intensive industries such as AI semiconductors and data centres to the new airport high-tech industrial complex, and will also prepare various support measures such as supplying district heating to parts of Daegu, increasing local income, resident welfare, and subsidising electricity rates. The Korean-designed i-SMR is an integrated pressurised water reactor type nuclear power plant with an electrical output of 170 MWe. It is being developed according to a development roadmap, with the goal of completing the standard design by the end of 2025 and obtaining standard design approval in 2028. According to KHNP, it requires just one-third of the investment, and can be constructed in half the time compared with large reactors.

KHNP has already signed a memorandum of understanding with Nusantara Power - a power generation subsidiary of Indonesian Electric Power

**Russia had already placed elements of their latest S-500 air defense missile system in Crimea and around the Kerch bridge that links the peninsula to the mainland. "This will, in principle, be an experimental application.... Kerch Bridge is always used, and as long as it's there, it will be used.**

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Corporation - on mutual cooperation for the introduction and construction of the i-SMR in Indonesia. Through this MoU, the two companies will cooperate in various fields, including: joint basic research on the economic feasibility and technology for deployment

of the i-SMR in Indonesia; development of local specialised technology through R&D cooperation; and collaboration through human/technology exchanges in the nuclear field through the formation of a working group.

KHNP has also signed an MoU on mutual cooperation with the Jordan Atomic Energy Commission for the deployment of the i-SMR in Jordan. The two organisations agreed to cooperate in comprehensive technology and information exchange on the i-SMR and to jointly conduct a feasibility study. Jordan is currently

considering the introduction of SMRs after 2030 in preparation of expected increased electricity demand.

Source: <https://world-nuclear-news.org/Articles/Korean-city-to-study-feasibility-of-i-SMR-deployme>, 03 July 2024.

## NUCLEAR COOPERATION

### ARMENIA-USA

#### Armenia and US in Talks to Build New Nuclear Power Plant

The head of Armenia's Security Council has said that Yerevan and Washington are in 'substantive' negotiations to build a new nuclear power plant in Armenia. On 03 July, Security Council Secretary Armen Grigoryan said the two countries were now discussing a legal framework for the proposed

power plant's construction. 'Without a legal framework, we cannot move forward. At this moment, I can say that the ball is in the US' court', he said, adding that work on the power plant would begin after the US carries out its 'internal processes', without elaborating further.

Prime Minister Pashinyan stated in October 2021 that Yerevan was in talks with Russia to construct a new facility to replace the ageing Metsamor Nuclear Power Plant — the only nuclear power plant in the Caucasus. In December 2023, Armenia contracted the Russian state nuclear agency, Rosatom, to extend the life of the Metsamor until 2036, with talks 'ongoing' about building a new reactor at the ageing facility.

However, a few months later, a joint statement of an Armenia–US–EU summit revealed that Washington intended to support Armenia with diversifying its energy production and sources and to 'explore the feasibility of new civil nuclear power options'. The US and Armenia had previously signed a memorandum of understanding on Civil Nuclear Cooperation 'to deepen' strategic cooperation in 2022.

Despite continuously deteriorating relations with Russia, Armenia's Ministry of Territorial Administration and Infrastructure told *RFE/RL* earlier this year that they were negotiating with the US, Russia, and South Korea on building a new power plant. Metsamor, whose current only operational reactor came online in 1980, produced 26% of Armenia's electricity in 2021. Environmental campaigners, Turkey, and the EU have all expressed concerns about the safety of the plant, urging the government to shut it down.

Source: <https://oc-media.org/armenia-and-us-in-talks-to-build-new-nuclear-power-plant/>, 04 July 2024.

## **INDIA–RUSSIA**

### **Russia Offers Cooperation in Building Small Tropical NPPs to India Coinciding with PM Modi's Visit**

India on Tuesday said cooperation in peaceful uses of nuclear technology is an important pillar of the multifaceted cooperation with Russia, which offered help in building small tropical nuclear power stations. "Russia offers cooperation in building small tropical nuclear power stations to India with the possibility of their deep localisation, including transfer of the construction part to New

Delhi," Chief Executive Officer of the state-run corporation Rosatom Alexey Likhachev said as he conducted a tour for Prime Minister Narendra Modi and Russian President Vladimir Putin in the Atom Pavilion.

"We offer cooperation possibilities for construction of tropical stations ... with very deep localisation. We can transfer the whole

construction part to you," the CEO told Modi as he visited the Rosatom Pavilion at the All Russian Exhibition Centre, VDNKh here.

Inaugurated in November 2023, VDNKh is one of the largest exhibitions in the history of scientific and technological developments. Modi also witnessed a photo exhibition dedicated to India-Russia cooperation in the field of civil nuclear energy. "Visited the Atom Pavilion with President Putin. Energy is an important pillar of cooperation between India and Russia and we are eager to further cement ties in this sector," Modi posted on his official X platform along with the photographs from the visit. "Prime Minister Modi was also shown the 'Atomic Symphony' – a permanent working model of the VVER-1000 reactor, which is the heart of the Kudankulam Nuclear Power Plant (KKNPP) in India," a statement from the Ministry of External Affairs (MEA) said.

**Russia offers cooperation in building small tropical nuclear power stations to India with the possibility of their deep localisation, including transfer of the construction part to New Delhi," Chief Executive Officer of the state-run corporation Rosatom Alexey Likhachev said as he conducted a tour for Prime Minister Narendra Modi and Russian President Vladimir Putin in the Atom Pavilion.**

“Cooperation in peaceful uses of nuclear technology is an important pillar of the multifaceted cooperation between India & Russia,” the MEA posted on X soon after the visit. Likhachev also said that Rosatom wants to develop 4G nuclear technologies in India. “We are currently developing the agenda of further cooperation. As we have tested each other and constructed very efficient relations in the present generation, the so-called 3+, we would like to move toward the fourth generation together,” he said.

TASS said quoting him from an interview with the Rossiya-24 TV news channel that those (the fourth generation) are fast reactors, fast-neutron reactors, there is further modification and development of our VVER technologies, water-water reactors, there is fuel cycle closure, as well as such groundwork areas as thermo-nuke and quantum technology.” ...

Source: <https://timesofindia.indiatimes.com/india/russia-offers-cooperation-in-building-small-tropical-npps-to-india-coinciding-with-pm-modis-visit/articleshowprint/111613169.cms>, 09 July 2024.

## RUSSIA-MALI

### Russia and Sahel State Boosting Nuclear Cooperation

Russian energy giant Rosatom has signed memorandums with Mali on developing cooperation on nuclear energy and other key areas, the company announced. A Rosatom delegation headed by Nikolay Spassky, deputy director general for international relations, and including Grigory Nazarov, head of JSC NovaWind, Rosatom’s subsidiary specializing in wind power,

**Cooperation in peaceful uses of nuclear technology is an important pillar of the multifaceted cooperation between India & Russia,” the MEA posted on X soon after the visit. Likhachev also said that Rosatom wants to develop 4G nuclear technologies in India.**

**In March, on the sidelines of the 13th international ATOMEXPO exhibition and forum in Sochi, Rosatom signed several agreements for developing cooperation in nuclear energy with Mali, as well as with Burkina Faso, and Algeria. During the event, Ryan Collier, acting CEO of Rosatom Central and South Africa, stated that African nations have shown a keen interest in nuclear energy from Rosatom, recognizing it as a dependable global supplier and “a reliable partner.**

traveled to the West African country this week, where they met with transitional president Goita.

Spassky provided Goita with a comprehensive update on the progress of

major cooperation projects spearheaded by Rosatom within the country. The trip concluded with the signing of three memorandums. Bintou Camara, Mali’s minister of energy and water resources, signed an agreement on developing nuclear infrastructure, while Bourema Kansaye,

minister of higher education, signed a memorandum on collaboration in personnel training.

According to a press release, discussions were also held with a Malian delegation headed by minister of economy and finance, Alousseni Sanou. The talks focused on solar energy projects and geological exploration. A significant portion of the

discussions centered on the potential launch of a strategic project to construct a Russian-designed, low-power nuclear power plant in Mali....

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Source: <https://www.rt.com/africa/600424-russia-mali-boost-nuclear-cooperation/>. 04 July, 2024.

**NUCLEAR SAFETY**

**UKRAINE**

**IAEA Concern at Damage to Zaporizhzhia Radiation Monitoring Station**

The Zaporizhzhia nuclear power plant (ZNPP) has six units and is Europe's largest. It has been under Russian military control since early March 2022 and is located on the frontline of Russian and Ukrainian forces. In an effort to try to reduce the risks to nuclear safety of the situation there have been IAEA experts stationed at the site since September 2022. The current rotation of agency experts were told by the operators of the plant that it lost connection to the monitoring station, which is about 16 kilometres away, on 24 June afternoon. The agency says that during the conflict several radiation monitoring stations within 30 kilometres of the plant have been out of service for varying periods of time.

Last week there was a 16-hour loss of power in the associated city of Enerгодar, where many of the nuclear power plant staff and their families live, which the IAEA said "caused a temporary halt in the operation of some of the environmental radiological monitoring stations after they ran out of back-up battery". Grossi said: "The loss of one radiation monitoring station does not have a direct impact on safety at the ZNPP, but it forms part of a continuous erosion of a range of safety measures during the war that remains a deep source of concern."

"The functioning of off-site radiation monitoring equipment is an essential part of nuclear safety around the world. These systems are important for continuously monitoring radiation levels and, in the case of an emergency, for quickly assessing

the ongoing and potential radiological impact and what protective actions may need to be taken." Ukraine is among 51 countries which participate in the IAEA's International Radiation Monitoring System which collects monitoring data from more than 6000 monitoring stations operating across the world.

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In the IAEA's latest update on the safety and security situation for Ukraine's nuclear power plants, it said that staff at Zaporizhzhia continued to hear regular explosions some distance from the plant. Among their activities this week they had witnessed the testing of an emergency diesel generator, to check it started up within 11 seconds of the loss of off-site power, and had also visited the site's temporary on-site emergency centre.

There are also IAEA teams at Ukraine's other nuclear power plants, with those at the South Ukraine nuclear power plant reporting there had been military action in their region, although they were told that neither their hotel nor the plant itself had

been targeted. The IAEA also reported that it had arranged two more deliveries of equipment to Ukraine in the past week - taking the total since February 2022 to 51 - to support the country in maintaining nuclear safety and security.

Source: <https://world-nuclear-news.org/Articles/IAEA-concern-at-damage-to-Zaporizhzhia-radiation-m>, 28 June 2024.

**Ukraine to Submit Draft Resolution on Nuclear Safety to UN General Assembly**

Kyiv is planning to submit to the U.N. General Assembly a draft resolution on nuclear safety and the security of Ukraine's nuclear facilities, President Zelensky said on X on July 3. The document will be mainly focused on

the Zaporizhzhia nuclear power plant, the largest nuclear power station in Europe which has been under Russian occupation since March 2022, Zelensky said.

Russia's occupation of the plant has led to heightened nuclear safety risks and Ukraine has repeatedly accused Moscow of using the plant as a launching site for drone attacks, presenting a serious security hazard. Monitoring teams from the IAEA have been based at the facility on rotation since September 2022, but Russian authorities still deny IAEA inspectors full access to the plant.

Zelensky met Dennis Francis, the President of the 78th session of the U.N. General Assembly. The visit in Kyiv marked the first visit to Ukraine by the head of the General Assembly in nearly 30 years. "I thanked him for supporting the first peace summit and its final communique. One of the practical outcomes of the summit could be a new resolution on nuclear safety and the security of Ukraine's nuclear facilities, particularly the Zaporizhzhia Nuclear Power Plant," Zelensky said. Throughout its occupation, the plant has been repeatedly disconnected from the Ukrainian power grid due to Russian attacks on the country's energy infrastructure. Energoatom said that the plant has experienced eight complete blackouts and one partial shutdown since the beginning of the full-scale war.

Source: <https://kyivindependent.com/ukraine-to-submit-draft-resolution-on-nuclear-safety-to-u-n-general-assembly/>, 03 July 2024.

**NUCLEAR NON-PROLIFERATION**

**GENERAL**

**SCO Members Stand for Strengthening Nuclear Non-Proliferation Regime**

The member countries of the SCO are in favor of strengthening the global nuclear non-proliferation regime, reads the Astana Declaration adopted following the SCO summit, Report informs referring to TASS. "The member states that are parties to the NPT of July 1, 1968 stand for strict compliance with the provisions of the treaty, the comprehensive balanced promotion of all the goals and principles set forth in it, the strengthening of the global regime for the non-proliferation of nuclear weapons, the continuation of the process of nuclear disarmament, as well as promoting equal, mutually beneficial cooperation in the field of using nuclear energy for peaceful purposes" says the document published on the Kremlin website. The SCO countries also emphasized the importance of implementing the JCPOA on the Iranian nuclear program.

According to the declaration, SCO members advocated strict compliance with the convention banning the development and production of biological and toxin weapons, confirmed their commitment to the peaceful resolution of differences between countries, consider the creation by individual countries of missile defense systems a threat to international security and stability, and also consider countering transnational crime is one

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of the key areas of cooperation. In addition, they agreed to declare 2025 the Year of Sustainable Development, etc.

Source: <https://report.az/en/region/sco-members-stand-for-strengthening-nuclear-non-proliferation-regime/>, 04 July 2024.

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fare better than with nuclear weapons. And Kazakhstan, for example, is a case in point." Kazakhstan voluntarily relinquished its nuclear arsenals inherited from the Soviet Union, prioritizing regime security and economic compensation.

## **NUCLEAR DISARMAMENT**

### **KAZAKHSTAN-NORTH KOREA**

#### **Kazakhstan Willing to Share Nuclear Disarmament Expertise with N. Korea**

Kazakhstan is willing to share its nuclear disarmament expertise with North Korea, emphasizing its own journey of voluntarily relinquishing nuclear weapons inherited from the Soviet Union and subsequently achieving substantial economic growth, Kazakhstan's Deputy Foreign Minister Roman Vassilenko said. "We want to help in whichever way we can, in a modest way, I should say, to help ease these tensions and provide our expertise," Vassilenko said when asked by The Korea Herald during a press briefing about the roles Kazakhstan might consider to contribute to the complete denuclearization of the Korean Peninsula.

**After the collapse of the Soviet Union in 1991, Kazakhstan inherited more than 1,400 nuclear warheads, more than 100 intercontinental ballistic missiles, nuclear test sites, and reprocessing facilities, becoming the world's fourth-largest nuclear power.**

After the collapse of the Soviet Union in 1991, Kazakhstan inherited more than 1,400 nuclear warheads, more than 100 intercontinental ballistic missiles, nuclear test sites, and reprocessing facilities, becoming the world's fourth-largest nuclear power. In June, South Korean President Yoon Suk Yeol, ahead of his trip to Kazakhstan, hailed the country as a "global model for denuclearization" during an interview with local media. Vassilenko also reiterated that Kazakhstan remains firmly opposed to any nuclear proliferation activities. "We, of course, have a special perspective on nuclear weapons and nuclear disarmament, or the lack thereof, in the world," Vassilenko said. "Therefore, we are very concerned generally with the deterioration in relations between the major

recognized nuclear weapon states, but also deeply concerned about the development of nuclear weapons by non-recognized nuclear weapon states, including the Democratic People's Republic of Korea (North Korea)." ...

Vassilenko emphasized that Kazakhstan remains a valuable model for North Korea, illustrating how denuclearization can pave the way for a more prosperous future. However, he also acknowledged the limitations of Kazakhstan's capacity to contribute to a nuclear-free Korean Peninsula, citing geographical distance and other factors. ... The Six-Party Talks aimed at achieving verifiable denuclearization of the Korean Peninsula through negotiations involving the US, South Korea, Japan, China, Russia and North Korea. Vassilenko went on to say, "For now, we can only share our experience and say, actually, that without nuclear weapons, you actually can

Source: <https://www.koreaherald.com/view.php?ud=20240704050440>, 04 July 2024.

## **URANIUM PRODUCTION**

### **UGANDA**

#### **IAEA Conducts First Uranium Production Cycle Review in Uganda**

An IAEA Integrated Uranium Production Cycle Review (IUPCR) team has completed an inaugural review of a uranium production cycle at the request of the Ugandan government. The mission assessed Uganda's capabilities to develop their uranium exploration programme and eventually

mine uranium for a domestic nuclear power programme. Uganda is looking to use nuclear power as part of its plan to meet its clean energy goals and increase access to electricity for its population of nearly 50m. Currently only around half of Ugandans have access to electricity, but the government has targeted an electricity access rate of more than 99% by 2030. Uganda is aiming for nuclear power generation by 2031 using domestically sourced uranium.

**Uganda is looking to use nuclear power as part of its plan to meet its clean energy goals and increase access to electricity for its population of nearly 50m. Currently only around half of Ugandans have access to electricity, but the government has targeted an electricity access rate of more than 99% by 2030. Uganda is aiming for nuclear power generation by 2031 using domestically sourced uranium.**

This first ever IUPCR mission, conducted with the support of the IAEA's technical cooperation programme, evaluated the status of the infrastructure Uganda will need to support uranium exploration, the first phase of a uranium production cycle programme. The mission involved 82 participants, primarily from Uganda's Ministry of Energy & Mineral Development and included a field visit to a site where exploration activities have been taking place.

The mission team, including experts from Argentina, Australia, France, Namibia and the IAEA, reviewed the status of 16 key aspects, including human resource capacity and the regulatory framework, and recommended steps that can be taken to bring the country closer to realising its nuclear energy goals, which include a domestic supply of uranium. ...

Several areas in Uganda have been identified as potentially uranium-rich, though no proven resources have been identified as yet. Exploration practices to make a final determination involve activities such as radiometric surveys and taking geochemical samples. ...The IUPCR team made several recommendations to facilitate the

**The IUPCR team made several recommendations to facilitate the success of the exploration programme. These included that Uganda should ensure the development of skilled personnel for uranium exploration and that the discovery, assessment and development of potential uranium resources are accelerated by establishing a robust and well-funded exploration programme. The mission was implemented as part of a four-year IAEA Technical Cooperation Project on supporting uranium exploration and evaluation, which began in 2022.**

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*Source: <https://www.neimagazine.com/news/iaea-conducts-first-uranium-production-cycle-review-in-uganda/?cf-view>, 05 July 2024.*

## **NUCLEAR WASTE MANAGEMENT**

### **BRAZIL**

#### **Brazil to have Definitive Repository for Nuclear Waste by 2029**

Brazil is expected to establish a permanent repository for nuclear waste by early 2029. This facility will centralize the storage of materials resulting from operations that produce radioactive waste, including nuclear power plants, medical facilities, and the food industry, for centuries to come. The repository is expected to be completed by the National Nuclear Energy Commission (CNEN), the regulatory body overseeing nuclear activities in Brazil, under the

Ministry of Science, Technology, and Innovation. The repository is a key component of the Nuclear and Environmental Technology Center (Centena) project. This initiative aims to design, construct,



and commission a technology center that not only provides permanent storage for radioactive waste but also includes support buildings for operational activities and facilities for research and technological development. The center will also serve as a hub for disseminating nuclear sector activities and offering specialized training.

Currently, radioactive waste generated by Brazil's two nuclear power plants, Angra 1 and Angra 2, located on the coast of Rio de Janeiro, is stored in warehouses near the plants. Stringent safety procedures and strict monitoring ensure there is no environmental pollution or risk to people both inside and outside the nuclear power plants. This material, which includes contaminated tools and uniforms, is isolated in steel barrels and small containers before being transported to the Tailings Management Center (CGR), a complex comprising three warehouses. Currently, around 7,900 volumes are stored in this facility, which has the capacity to receive additional material until 2030.

**Centena Project:** According to the Centena project description, the new facility will operate

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for 60 years and undergo monitoring for an additional 300 years after its closure. Clédola Cássia Oliveira de Tello, the technical coordinator of the Centena Project, explained that the facility will undergo several licensing phases before becoming operational. "The first phase relates to the site, the second to construction, and the final phase to operation," she stated.

The exact location of the Centena facility has not yet been announced. "Currently, the projected start of operations is late 2028 to early 2029," said the technical coordinator. While nuclear activity is most commonly associated with energy generation through power plants, it is also widely used in other industries. In medicine, nuclear technology is applied in diagnostics, examinations, and treatments for various diseases. In the food industry, ionizing radiation is used to eliminate harmful microorganisms and delay ripening, thereby extending shelf life.

*Source: <https://agenciabrasil.ebc.com.br/en/geral/noticia/2024-07/brazil-have-definitive-repository-nuclear-waste-2029>, 06 July 2024.*



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