



**OPINION – Melissa Parke**

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**It's Time the World Understands a Nuclear War Cannot be Won**

When United States President Ronald Reagan and his Soviet counterpart Mikhail Gorbachev met in Geneva in 1985 they agreed “A nuclear war cannot be won and must never be fought.” It was the prelude to the beginning of the end of the Cold War nuclear arms race and subsequent deep cuts in American and Soviet – later Russian – arsenals. Since then, the original five nuclear weapons states have reaffirmed this statement, most recently in 2022.

But some disagree and hark back to the military strategies of the 1950s that envisaged the use of nuclear weapons by troops on the battlefield to win wars. A recent example is former Trump administration official, David Lasseter, who argued “the DoD is not doing nearly enough to ensure the American warfighter is able to fight, survive, and win on a nuclear battlefield”.

The timing of such comments could not be more inopportune: as the Nobel Peace Prize is about to be awarded to Nihon Hidankyo – an organisation of hibakusha, the survivors of the US bombings of Hiroshima and Nagasaki – for their lifelong campaigning for the elimination of nuclear weapons.

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The 1945 atomic bombs that killed more than 200,000 people in Japan would today be called “tactical” nuclear weapons. The survivors of those “tactical” nuclear weapons are the real experts on what nuclear war means. They crawled through the rubble of the world’s first, and thankfully only, nuclear war. It is cynical indeed for armchair warriors, particularly those with ties to the companies building nuclear weapons, to advocate strategies based on unproven theories, not real-life experience.

The hibakusha alive today were children when their cities were devastated by American atomic bombs 80 years ago. Their average age is now 86. Sumiteru Taniguchi, who died in 2017, was 16 years old when Nagasaki was attacked. At the time of the explosion, he was riding his bicycle. "In the flash of the explosion," he recounted, "I was blown off the bicycle from behind and slapped down against the ground." When he lifted his head, he saw that the children who had been playing all around him just moments before were dead.

He suffered severe burns and his wounds quickly became infected. He spent almost four years in hospital recovering from his injuries, including 21 months lying on his stomach. He had to have 10 surgeries later in life to remove growths from the scarred areas of his body. The pain and discomfort from the injuries never went away.

It is estimated that 38,000 children were killed in the attacks on Hiroshima and Nagasaki. The fact that so many children were killed, maimed and harmed in other lingering ways in the attacks motivated the survivors, like Taniguchi, who served as chair of the Nagasaki Council of A-Bomb Sufferers for many years, to devote their lives to working to ensure no one ever again has to suffer as they did.

The testimony of the survivors graphically shows that the idea that nuclear war can be fought and won on the battlefield is dangerous, grotesque nonsense that makes nuclear war more likely. As Annie Jacobsen's recent book *Nuclear War: A Scenario* made clear, the use of a nuclear weapon would quickly escalate and result in a major exchange that would not just kill tens or hundreds of thousands near the explosions, but would end

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In response to nuclear threats that Russia has made during the Ukraine conflict, the co-chair of Nihon Hidankyo, Terumi Tanaka, who was 13 when Nagasaki was bombed, says the use of nuclear weapons would spell "the end of the human race" and that leaders like President Putin "don't realise the extent of the damage that can be done".

The leaders of all the nuclear-armed countries need to ignore the siren voices that tell them nuclear war can be fought and won and instead listen to the hibakusha who are urging them to eliminate their arsenals before it is too late. After Nihon Hidankyo was told it had won the Peace Prize, another of its co-chairs, Toshiyuki Mimaki, from Hiroshima, said the award would help bring the end of nuclear weapons closer, saying, "It would be a great force to appeal to the world that the abolition of nuclear weapons can be achieved ... Nuclear weapons should absolutely be abolished."

The hibakusha achieved a major step towards this goal when they played a leading role in the creation of the United Nations Treaty on the Prohibition of Nuclear Weapons, the TPNW. The treaty bans nuclear weapons and all activities associated with them outright. It came into force in 2021 and half of all countries have already signed or ratified it.

The TPNW provides the pathway under international law for all nuclear-armed states to

get rid of their weapons. This year's Nobel Peace Prize underlines that the governments of these countries have no more excuses – they should listen to Nihon Hidankyo and the hibakusha, join the treaty and eliminate their arsenals.

*Source: Melissa Parke is the Executive Director of ICAN, <https://www.aljazeera.com/opinions/2024/12/12/its-time-the-world-understands-a-nuclear-war-cannot-be-won>, 12 December 2024.*

**OPINION – Scott Henuset**

**Alberta's Can-Do Spirit Could Develop Nuclear Energy**

Many of you will have grown up having your parents read you the children's story of The Little Engine that Could. It is the story of a small train that took on a job that other larger, more powerful engines refused to do. All the way up the steep slope, the little engine kept chanting to itself, "I think I can, I think I can," as it did the impossible. As a province, Alberta has a long and proud history of doing what others think cannot be done. Thirty years ago, who would have believed that Canada would be producing more than four million barrels per day of oil, the vast majority from the oilsands? The reason that happened was because a group of engineers and business people said, "I think I can," and found ways to create an economy-building industry, for Alberta and Canada.

We are faced with the same opportunity today, with a different energy source-nuclear. The big difference is that nuclear technology is not new, it is not unknown, and it has long, deep Canadian roots. Ontario has relied on clean, safe and reliable Canadian CANDU technology for decades to power its economy. That

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province continues to look to nuclear power as the main path to decarbonization and electrification. Alberta now has the opportunity to diversify our energy mix, complementing the amazing achievement that has been developed in our province in the oilsands to create a viable path to decarbonization. Achieving that requires vision, but more than anything, it requires a can-do, entrepreneurial spirit to tackle the challenges and lean into the hard work. The development of nuclear power within the province requires the creation of an entire ecosystem that supports future operations and a vision to see nuclear power as

bigger than any individual project, and a larger economic generator for our province.

In Alberta, we know how to build big and we have the proven engineering and construction talent to do megaprojects, but we need the desire and the will to take the necessary first steps into a new industry.

But the road is well worth the effort. There are enormous economic benefits to the development of a large-scale nuclear power plant in the province. In a report published by the Conference Board of Canada, a 4,000 MW plant would bring more than \$90 billion to the Canadian GDP and \$29 billion in tax revenue over the life of the

project, and create 33,500 full-time equivalent jobs over nine years of construction along with 3,500 long-term jobs during its 70-plus years of operation. But building just one such plant is not the real path to success, the creation of an ecosystem of expertise, skilled trades, supply chains and

manufacturing capability across Western Canada is the future. Our nuclear industry is showing that we can do big things, as evidenced by the refurbishment projects in Ontario, which are a

shining star of what can be achieved by learning from the past and simply doing better each time.

Energy Alberta is a homegrown business, and we understand the culture and the way of thinking and doing things in this province. We are taking that first entrepreneurial step and, every day, just like the little engine that could, we say, “We think we can, we think we can,” as we work to bring clean, reliable, made-in-Canada nuclear energy technology to Alberta.

*Source: <https://calgaryherald.com/opinion/columnists/opinion-albertas-can-do-spirit-could-develop-nuclear-energy>, 30 November 2024.*

**OPINION – Farhad Rezaei**

**Iran’s Nuclear Threat: Key Steps the US and Israel Must Take to Prevent War**

Iran’s nuclear weapons program has reached a critical stage. The regime is now only a few days away from having sufficient weapons-grade uranium (90%) to build several nuclear warheads, and leaders of the Islamic Republic have begun openly hinting at a shift in Iran’s nuclear doctrine. The pressing question is: What immediate measures can the US, the EU, and Israel take to prevent the regime from achieving nuclear weapons, especially given the limited time and the urgency of the task? Although the situation is perilous, there are viable strategies to prevent the most severe outcomes.

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as of October 26, 2024, Iran’s stockpile of uranium enriched up to 60% purity has reached 182.3 kilograms. If further enriched to 90% purity, this amount could produce up to five nuclear warheads. Iran has also restricted the UN watchdog’s ability to monitor key facilities, both via technology and in physical inspections. As a result, the IAEA has lost the capability to detect whether Iran is diverting nuclear material, equipment, or other resources to undeclared sites, further complicating

verification efforts. This is extremely concerning because the regime has previously demonstrated its ability to secretly relocate manufacturing equipment to undisclosed locations. Intelligence reports indicate that Iranian scientists at civilian research institutes have been conducting nuclear “weaponization” work, including limited computer modeling and metallurgy experiments, which could expedite Iran’s production of nuclear weapons.

Imminent nuclear breakout: A report issued by the Office of the Director of National Intelligence (ODNI) to the US Congress concludes that the Islamic Republic has “undertaken activities that better position it to produce a nuclear device.” More concerning is the notable increase in public statements by regime officials regarding changes to Iran’s nuclear doctrine and its potential withdrawal from the NPT. Kamal Kharrazi, a political adviser to Ayatollah Khamenei, recently announced that Iran may change its nuclear doctrine and develop long-range ballistic missiles capable of carrying nuclear warheads.

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During a meeting with a group of students, Khamenei was asked whether he would consider changing the nuclear doctrine and issuing a secondary fatwa on nuclear weapons. He responded, “Everyone should know that in this struggle, every necessary military armament and political action for the readiness of the Iranian nation will be undertaken, and the authorities are already engaged in such efforts.”

In the absence of cooperation, the IAEA Board of Governors passed a resolution demanding that the Islamic Republic urgently improve its cooperation with the agency and requested a “comprehensive” report to pressure the regime into renewed nuclear negotiations. However, the regime reacted defiantly, announcing that it would install more advanced centrifuges and expand nuclear infrastructure. The situation is critical. With the regime perceiving a loss of deterrence in the region, particularly through Hezbollah and its other regional proxies – and now finding itself in a significantly weaker position compared to Israel and the US – it may choose to pursue the nuclear option. Countering this requires urgent action and a coordinated response.

Given these developments, the limited time available, and the urgency of the situation, there are several immediate measures that the US, the EU, and Israel can take to prevent the regime from reaching a nuclear breakout point. Before anything else, Western powers must understand that time is of the utmost importance. The regime is dangerously close to producing its first nuclear warhead, and the West must not waste time on

negotiating. The “talk-for-talk’s-sake” approach is part of the regime’s deliberate strategy to stall and drag out the process until it achieves nuclear breakout.

**Then, the US must trigger the snapback mechanism of UNSC Resolution 2231, designed to reimpose sanctions on the regime if it violates its commitments under the nuclear agreement. October 18, 2025, will be the last opportunity for world powers to initiate the snapback mechanism, but the US and European countries should not wait until the last moment; they must act now.**

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Next, President-elect Trump must put the regime on notice that if it further escalates, it will face severe consequences. Washington should present the Islamic regime with a credible threat of military action and, to ensure that it perceives the threat as credible, a shift in the US defense posture in the

last opportunity for world powers to initiate the snapback mechanism, but the US and European countries should not wait until the last moment; they must act now. President Trump should restore his maximum pressure campaign as soon as he re-enters the White House, and he must pressure China to

stop buying oil from Iran. Invoking the snapback mechanism would not only cripple the Islamic regime’s economy, it would also automatically restore restrictions on the sale or transfer of conventional arms to and from Iran, regardless of whether the original sunset clause for the embargo had already expired. This would prevent the regime from purchasing advanced arms from Russia and China.

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improve Iran's air capabilities, making the Islamic Republic a more potent hybrid military actor in the region. Invoking the snapback mechanism would also prevent the regime from selling locally produced weapons to neighboring countries, which currently brings in much-needed revenue. Moreover, The US, European countries, and Israel must actively support regime change in Iran.

The regime is facing a serious legitimacy crisis, and the environment is ripe for change in the country. There is widespread frustration over social restrictions, outrage over corruption and mismanagement, economic collapse, and growing anger toward Khamenei and his regime, which have shown little regard for the needs of the people. On several occasions, notably in late 2022 and early 2023, Iranians from various sectors of society took to the streets, calling for a regime change. The government was able to brutally crackdown on protesters, but they remain a fire smoldering beneath the ashes and waiting for the right opportunity – and for support from the West to rise again.

The West should proactively coordinate efforts to strengthen political opposition in the Islamic Republic, enhance direct assistance for human rights activists, and speak out more forcefully in support of a free Iran. The regime has blocked Iranians' access to free Internet and the US must help Iranians circumvent Internet censorship. There are more measures that the US and Israel can adopt, such as targeting the Islamic Revolutionary Guard Corps (IRGC), the regime's lifeline for exporting terrorism. Targeting the IRGC's top leadership, using cyber warfare to disrupt its command-and-control systems, and sabotaging its military bases should be high on the list. European countries must designate the IRGC as a foreign terrorist organization, not least because of its role in arming Russia against Ukraine, a European nation. Time is of the essence.

The regime in Tehran is dangerously close to producing its first nuclear warhead, and the West must avoid falling into its "talk-for-talk's-sake" trap. Decisive and meaningful action is needed to prevent Iran from acquiring nuclear weapons. Allowing the regime to acquire these weapons would enable it to intensify its destructive actions and expand its campaign of terrorism in the region and beyond. This must be prevented at all costs.

Source: <https://www.jpost.com/opinion/article-832044>, 05 December 2024.

**OPINION – Devin McCormick, Caden Rosenbaum**

### **Utah's Operation Gigawatt Should be a Blueprint for the Country**

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In the race to power the future of artificial intelligence, America's tech industry is turning toward nuclear energy – a solution that, until recently, was shelved by cost and controversy. Federal regulators may have rejected a bid to allow an Amazon data center to source power for its Pennsylvania data centers from a nearby nuclear

plant, but with Google and Microsoft investing in off-grid nuclear projects, the shift in tech's approach is undeniable. These companies are recognizing the unmatched, 24/7 energy reliability that only nuclear can deliver. Microsoft has taken a more immediate path by partnering with Constellation Energy to revive the dormant Three Mile Island plant. In contrast, Google has agreed to invest in SMRs, the latest generation of nuclear power plants promising greater safety, more flexibility and lower costs, pending approval from regulators. As data centers and AI demands drive up energy use, states like Utah are exploring a transformative strategy. Operation Gigawatt, as Utah Gov. Spencer Cox coined it, would convert the state's aging coal power plants into nuclear power facilities. The Hunter Coal Power Plant and

four others in Utah are prime candidates for conversion, using existing infrastructure to cut capital costs by 35%.

For Utah, this opportunity couldn't be more timely. Operation Gigawatt, an ambitious plan to double the state's power capacity over the next decade, would not only meet Utah's increasing energy needs but also position the state as a leader in energy production. However, the path to a nuclear-powered future is littered with significant regulatory obstacles, with the National Environmental Policy Act being one of the biggest.

NEPA was designed with the laudable goal of ensuring environmental impacts are considered. But it has morphed into a bureaucratic roadblock, often derailing crucial green energy projects like nuclear energy. The Environmental Impact Statement process, for example, can take years — bogged down by vague language in 102(C) and endless litigation, as seen in the Utah Blue Castle Project. Luckily, Americans are warming to the idea of nuclear energy. And if that wasn't enough to convince policymakers to hop on board, maybe competition will, as foreign adversaries are actively building next-generation nuclear power plants.

The ADVANCE Act, passed by Congress this summer, directs the Nuclear Regulatory Commission to report on ways to streamline reviews. A promising step, to be sure, but this is only a small step toward closing a growing gap between us and other parts of the world. What will surely be needed after the NRC submits its report to Congress is another piece of legislation, meaning Congress will need to move at breakneck speed — in relative federal policymaking terms, that is. As we await that progress, our available workforce of engineers and scientists capable of building nuclear energy are mostly greenhorns — untested and inefficient.

That is why, as Congress drags its feet, state-based efforts like Utah's Operation Gigawatt are so crucial. By investing in converting coal-power plants to nuclear power plants, the state could create thousands of well-paying jobs across various sectors — cultivating a workforce of experienced builders. The failed Blue Castle Project was projected to generate 4,000 construction jobs and 1,000 permanent positions, but Operation Gigawatt could bring even more opportunities as the state meets rising energy demands. According to Dusty Monks, the interim

director for the Utah Office of Energy Development, nuclear energy would not only supply clean power to Utah but also provide high-paying jobs for both blue- and white-collar workers. If the U.S. gets serious about investing in nuclear energy, we stand to gain

more than just energy. It's the key to unlocking the full potential of AI, an abundance of clean and reliable power and a wave of economic growth. It's really no surprise that Utah is at the forefront of such an effort.

*Source: <https://www.deseret.com/opinion/2024/12/01/utah-operation-gigawatt-energy-example-for-country/>, 01 December 2024.*

**OPINION – Kelvin Kemm**

**Nuclear is Part of Solution for SA's Energy Needs**

There has been a lot of talk about the "Just Energy Transition". To be clear about it, it is definitely not "just", and second, we don't need an urgent panic-stations transition, particularly not the one being forced on us by foreign countries telling us to do what they say. They also use the devious stunt of offering financial incentives, via newspapers, which look like gifts of cash, but are not. Their money is mostly in the form of loans that need to be repaid, and also, they come with strong strings attached. Not so much "strings" but huge pieces of thick rope. Frequently we have to use the loan to buy goods from them and then repay the money, as well as pay for the purchase. So effectively we pay twice.

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Behind all of this, they use a moral justification that we have to help “save the planet” from a mainly imaginary threat. So, we are told to stop using coal and to “transition” to wind and solar power...and we must do it fast because the chief of the UN says so. On this topic, the chief of the UN has shown himself to be usually wrong. A rapid shift to wind and solar is undoubtedly not “just”. The communities around the coal plants lose their jobs, and community life in the nearby towns and villages largely collapses. It is plain nonsense to claim that all these people will find different jobs in renewable energy projects.

The renewable systems are essentially entirely imported. There are no local manufacturing jobs created in fabrication, they are all created in places like Germany and China. I am not at all opposed to wind and solar, and I have never said or written one word against them, as energy sources. What I have done is to point out that you cannot run an electric train from Johannesburg to Cape Town, on solar and wind. Solar and wind are not solutions for industrial systems.

What is now necessary is to search for sensible uses for modern solar and wind in unique applications in Africa. There must be many. Trying to plug them all into the national grid is not the way to go. Even worse is to talk of building an extra 14,000km of hugely expensive long-distance transmission lines to carry solar power all the way from the Northern Cape to Gauteng and then saying that the enormous cost is not part of the cost of solar. We must stop kidding the public.

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There are also other technical problems such as a grid system needing a “spinning reserve” and wind and solar do not provide that. Coal and nuclear do. We need to take all the false “save the planet” emotion out of the supposed “just” solution and instead build an electricity system that serves the people of our beautiful country.

The answer is to keep running the coal plants and to rapidly start building substantial new nuclear. Nuclear will satisfy the political requirement to not produce carbon dioxide, though the wind and solar protagonists try their level

best to cover that up. As the planet advances, with the natural passage of time, I do not doubt that coal will fade away due to natural economic forces and be replaced by nuclear power. But we must not stop mining the coal. What we need is to build more Sasol-type operations. Coal is very valuable as a source of valuable chemicals. Sasol

knows this, since they produce petrol, lipstick, and ladies’ face cream from coal. Sasol is a very strategic operation and produces about a third of all of SA’s petrol. They should be using Small Nuclear Reactors to produce the heat to convert the coal.

SA needs a new large nuclear plant, a new Koeberg which has been spectacularly successful for 40 years. But we also need to develop several SMR

around the country. The SA-developed SMR, the HTMR-100 can be placed anywhere, from Free State gold mines to Limpopo agricultural developments. This SMR does not need to be built near a large body of water. We need to think and plan African solutions for Africa, developed by the people who live here.

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There must be no confrontation between nuclear, wind and solar. All nuclear people are happy with wind and solar, when used correctly. Sadly, in contrast, wind and solar protagonists seem hell-bent on destroying nuclear, come what may. One has to ask why. Where is the so-called “just transition” money going? But most important is proper planning at the initial stages of decision-making. If you start on a hike through the bush and you choose the wrong path to start with, no amount of refining your decision will get you onto the path that you should have taken at the start.

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Source: <https://www.sowetanlive.co.za/opinion/2024-12-02-opinion-nuclear-is-part-of-solution-for-sas-energy-needs/>, 02 December 2024.

**OPINION – Gordon G. Chang**

### **Why China is Probably on Board with Putin's Nuclear Threats**

“Under the current situation, all relevant parties need to remain calm and restrained and jointly seek de-escalation and lower strategic risks through dialogue and consultation,” said Chinese foreign ministry spokesperson Lin Jian on Nov 20. China's comments came a day after Putin approved a decree lowering the threshold for nuclear strikes. At first glance, it looks as if Beijing is worried that the war in Ukraine will escalate. It's sometimes hard to know for sure what the Chinese leadership actually thinks but leader Xi Jinping is almost surely comfortable with Putin's threats to use his most destructive weapons against Ukraine. Why? There are two principal reasons.

First, events over the past couple of years suggest that Beijing is fully behind Putin's war effort. As an initial matter, China greenlighted the invasion, evident from its joint statement with Russia declaring the “no limits” partnership, issued on Feb. 4, 2022, while the Russian leader was visiting the Chinese capital. The statement was released just 20 days before the Russian attack. The attack might have been earlier but Putin evidently acceded

to Chinese wishes and waited until the end of the Beijing Winter Olympics to hit the former Soviet republic.

From the very beginning of the war, Xi Jinping's regime has kept Putin in the fight by providing Russia with diplomatic, propaganda, banking, economic and lethal assistance. Moreover, China has been providing military personnel as “technical advisers” on the ground for about a year. “These advisers were charged with maintaining the Chinese-provided drones that Wagner mercenaries were deploying,” military analyst Brandon Weichert told me. “There are numerous reports of the advisers deploying into combat with those mercenaries.”

Putin is bold. I think Xi sees Putin as an essential partner because he is willing to do what Xi would like to do himself: disrupt the international system. Xi has adopted a page out of Mao Zedong's “peasant movement” playbook of promoting “chaos” to achieve worldwide Chinese rule, and Putin is Xi's chaos maker. What better way to cause chaos than to threaten nuclear war?

China and Russia have effectively formed an alliance because Xi and Putin see the world in the same terms, they articulate interests in the same way, and they have identified the same enemy: the US. China's and Russia's ultimate ambitions are different — Putin seeks to reassemble the Russian empire to its greatest extent and Xi wants to rule the world and the near parts of the solar system — but their conflicting goals do not prevent them in the here and now from coordinating policies. Their militaries continually practice for war together, on land and at sea. Putin is so important to China that the Chinese leader, I think, believes Russia must prevail in Ukraine and use every weapon at its disposal if that is what it takes.

Second, the Chinese regime has for decades been

making Putin-like threats of its own. Beijing has pledged to not use nuclear weapons first, but it has throughout this century made threats to do exactly that. For instance, in July and September 2021, China threatened to nuke Japan for supporting Taiwan and Australia for joining AUKUS, the submarine-building coalition of Australia, the UK and the U.S. In March 2022, the Chinese Ministry of Defense promised the “worst consequences” for countries helping Taiwan defend itself.

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Moreover, China throughout this century has made out-of-the-blue threats to incinerate America, most notably in October 2013. Then, the main outlets of Communist Party and state media — People’s Daily, China Central Television, and PLA Daily, among others — ran identical articles about how Chinese submarines launching ballistic missiles tipped with nuclear warheads could kill tens of millions of Americans, even listing the 11 cities they were targeting. These articles were not the work of rogue journalists: They appeared across Chinese media at the same time, a clear indication they were directed from the top of the Chinese political system. Tellingly, the articles were run less than a year after Xi Jinping became the country’s ruler.

Putin had the opportunity to observe China’s nuclear threats. Would he actually pull the trigger himself? By now, he has made so many threats to do so that most observers believe he has just been bluffing. Putin’s most recent threat came in response to the Biden administration allowing Ukraine to fire U.S.-made ATACMS missiles into

**As the security environment evolves, adjustments to the 2022 Nuclear Posture Review may be required to sustain the ability to achieve nuclear deterrence, in light of enhanced nuclear capabilities of China and Russia and possible lack of nuclear arms control agreements after February, said Johnson, who spoke on a panel at the Center for Strategic and International Studies’ Project on Nuclear Issues.**

Russian territory. Ukraine actually did so on Nov. 19, hitting an arms depot in the Bryansk region, about 70 miles inside Russia. Moscow

immediately called the United States a combatant in the war, and Putin, as noted, signed a decree lowering the threshold for the use of atomic weapons. ...Would China’s leadership be upset if Vladimir Putin carried through and detonated a nuclear device? And what is China’s position on the use of these weapons? ...

*Source: <https://thehill.com/opinion/international/5012484-china-putin-nuclear-threats/>, 29 November 2024.*

## NUCLEAR STRATEGY

### USA

#### **DOD Adjusts Nuclear Deterrence Strategy as Nuclear Peer Adversaries Escalate**

Multiple nuclear peer adversaries challenge the U.S. and its allies’ and partners’ security, according to the Department of Defense. “We are now in a world where we’re facing multiple nuclear competitors, multiple states that are growing, diversifying and modernizing their nuclear arsenals and also, unfortunately, prioritizing the role that nuclear weapons play in their national security strategies,” said Richard C. Johnson, deputy assistant secretary of defense for nuclear and countering weapons of mass destruction policy.

As the security environment evolves, adjustments to the 2022 Nuclear Posture Review may be required to sustain the ability to achieve nuclear deterrence, in light of enhanced nuclear capabilities of China and Russia and possible lack of nuclear arms control agreements after February,

said Johnson, who spoke on a panel at the Center for Strategic and International Studies’ Project on Nuclear Issues event Nov. 20 in Washington, D.C.

The underlying logic of nuclear deterrence remains sound. Also, the U.S. remains committed to a safe, secure and reliable nuclear deterrent, he said. However, the nuclear modernization program of record, while necessary, may be insufficient moving forward, he added.

DOD, in partnership with the National Nuclear Security Administration, has already taken steps to field capabilities to enhance nuclear deterrence and flexibility and to reduce risk to the department's nuclear modernization program, Johnson said. These include the B61-13 gravity bomb, delivered by aircraft, as well as the enhanced

readiness of nuclear armed and powered Ohio-class submarines, he said. The Department of Energy's National Nuclear Security Administration would produce the B61-13, which is a modern variant of the B61. On Nov. 15, the department submitted the 491 Report to Congress describing the nuclear employment strategy of the U.S. It's called the 491 because it was submitted in accordance with U.S. Code, Title 10, Section 491.

The 491 report describes changes that have been made from previous guidance and accounts for the new deterrence challenges that are posed by the growth, modernization and increasing diversity of potential adversaries' nuclear arsenals, Johnson said. The report directs that the U.S.:

- Plans to deter multiple nuclear-armed adversaries simultaneously.
- Requires the integration of non-nuclear capabilities, where feasible, to support the nuclear deterrence mission.
- Stresses the importance of escalation management in U.S. planning for responding to limited nuclear attack or high-consequence, non-nuclear strategic attack.
- Enables deeper consultation, coordination and combined planning with allies and partners in order to strengthen U.S. extended deterrence commitments.

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The report also recognizes that deterrence alone will not address strategic dangers. It recognizes arms control and risk reduction and nuclear nonproliferation play indispensable roles as well,

Johnson said. Grant Schneider, vice deputy director for strategic stability at the Joint Staff, who also spoke, said another part of the report is the significant intellectual and analytical work required to identify the range of scenarios and strategic circumstances the U.S. might face alongside its allies going into the 2030s. ...

Source: [https://cavazosentinel.com/news/dod-adjusts-nuclear-](https://cavazosentinel.com/news/dod-adjusts-nuclear-deterrence-strategy-as-nuclear-peer-adversaries-escalate/article_57baf5b8-ac47-11ef-93ea-e70785c03953.html)

[deterrence-strategy-as-nuclear-peer-adversaries-escalate/article\\_57baf5b8-ac47-11ef-93ea-e70785c03953.html](https://cavazosentinel.com/news/dod-adjusts-nuclear-deterrence-strategy-as-nuclear-peer-adversaries-escalate/article_57baf5b8-ac47-11ef-93ea-e70785c03953.html), 27 November 2024.

## **BALLISTIC MISSILE DEFENCE**

### **INDIA**

#### **India Tests Nuclear-Capable K-4 Missile from INS Arighaat**

India has conducted a successful test of its nuclear-capable K-4 SLBM from the recently commissioned INS Arighaat, a nuclear-powered submarine. In preparation of this test, a public area warning and NOTAM was issued for an intermediate-range missile test over a 3,490km flight corridor in the Bay of Bengal, reported The Times of India. Developed by the Defence Research and Development Organisation, the K-4 missile is capable of carrying a 1-tonne (t) payload up to a range of 3,500km, reported Defence News. This marks the first test of the K-4 missile from a submarine, following a previous unsuccessful trial in December 2019 due to technical problems. The missile, which is 10m long and weighs 20t, has been tested at least five times in recent years from submersible platforms, demonstrating its capabilities over nearly its full

range, people familiar with the matter told the Press Trust of India. INS Arighaat, the second Arihant-class submarine, was commissioned into the Indian Navy in August 2024 at Visakhapatnam, with Raksha Mantri Shri Rajnath Singh in attendance.

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It is capable of carrying K-4 missiles, in contrast to its predecessors. The construction of INS Arighaat involved advanced design and manufacturing technology, detailed research and development, and the use of special materials and complex engineering. The submarine features indigenous systems and equipment, conceptualised, designed, manufactured, and integrated by Indian scientists, industry, and naval personnel. Earlier in November 2024, India and Japan signed a memorandum of implementation for the co-development of the Unified Complex Radio Antenna (UNICORN) mast. This mast, featuring integrated communication systems, is designed for installation on Indian Navy ships, enhancing the stealth characteristics of naval platforms.

Source: <https://www.naval-technology.com/news/k-4-missile-from-ins-arighaat/?cf-view>, 29 November 2024.

**POLAND**

**Poland Procures Missiles for Its “Current and Future Fighters”**

The agreement, signed by the head of the Armament Agency, Brigadier General Artur Kuptel, with the U.S. government, includes the delivery of 232 missiles. The first missiles will be handed

over to the Polish Armed Forces between 2028 and 2030. The contract is valued at \$175 million. The U.S. State Department approved Poland’s purchase of these missiles in March 2024, with the maximum transaction value notified at \$219 million.

The AIM-9X Sidewinder Block II is a short-range air-to-air missile produced by Raytheon, equipped with an infrared-guided seeker. It can engage targets locked before launch (LOBL – Lock-On-Before-Launch) or after launch (LOAL – Lock-On-After-Launch). The missile is compatible with helmet-mounted targeting systems. ...Fifth-generation fighters carry these missiles under their wings, while medium-range AMRAAM missiles are carried in internal bays, potentially supplemented by Meteor missiles in the future. Poland already possesses AIM-9X Block II missiles, having purchased them in 2016. Earlier, during the acquisition of F-16C/D aircraft in the first decade of the 21st century, Poland bought the older

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Source: <https://defence24.com/armed-forces/poland-procures-missiles-for-its-current-and-future-fighters>, 02 December 2024.

**EMERGING TECHNOLOGIES AND DETERRENCE  
RUSSIA**

**Putin Hints at Deployment of Hypersonic Missiles from Belarus**

President Putin said that Russia could deploy its new Oreshnik intermediate-range hypersonic missile on the territory of its ally Belarus in the

second half of next year. Putin was responding to a request from Belarusian President Lukashenko at a summit in Minsk, where the two leaders signed a mutual defense pact, Reuters reported.

“... Since we have today signed an agreement on security guarantees using all available forces and means, I consider the deployment of such systems as the Oreshnik on the territory of the Republic of Belarus to be feasible,” Putin said. “I think this will become possible in the second half of next year, as serial production of these systems in Russia increases and as these missile systems enter service with the Russian strategic forces,” he added in televised comments. Russia first fired the Oreshnik at the Ukrainian city of Dnipro on November 21, in what Putin cast as a response to Ukraine’s first use of U.S. ATACMs ballistic missiles and British Storm Shadows to strike Russian territory with Western permission.

Putin has said Russia may use the Oreshnik again, including to hit “decision-making centers” in Kyiv, if Ukraine keeps attacking Russia with long-range Western weapons. Russian Foreign Minister Sergei Lavrov told U.S. journalist Tucker Carlson in an interview released late on Thursday that Moscow’s firing of the Oreshnik was a signal that the West must take it seriously. Putin has boasted that the Oreshnik (hazel tree) is impossible to intercept and that it has destructive power comparable to that of a nuclear weapon, even when fitted with a conventional warhead. Some Western experts have cast doubt on Putin’s claims about the missile, which they say is based on a system that Russia had at one point tested as an intercontinental weapon before putting its development on ice.

The experts said the novel feature of the Oreshnik was that it carried multiple warheads capable of simultaneously striking different targets - something usually associated with longer-range

intercontinental ballistic missiles. Putin told Lukashenko that Belarus - which shares borders with NATO members Poland, Latvia and Lithuania - would determine the targets for Oreshniks based on its territory. Putin said the new mutual defense treaty “will make it possible to reliably protect the security of Russia and Belarus,” the TASS state news agency reported.

Last month Putin approved changes which lowered the threshold for a nuclear strike in response to a broader range of conventional attacks and extended Moscow’s nuclear umbrella to cover Belarus. Nuclear weapons were withdrawn from Belarus after the fall of the Soviet Union in 1991, but Putin announced last year that Russia was placing tactical nuclear missiles there as a deterrent to the West. Lukashenko said in October that any use of Russian nuclear weapons deployed in Belarus would require his personal consent.

*Source: <https://tvpworld.com/83863450/putin-hints-at-deployment-of-hypersonic-missiles-from-belarus>, 06 December 2024.*

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## NUCLEAR ENERGY

### GENERAL

#### **Nuclear Power in Commercial Shipping Gains Momentum**

Nuclear power is seen both as a source of energy itself for ships and as a power provider for zero-carbon fuel production. Webinar moderator David Appleyard, Editor of Nuclear Engineering International, introduced LR’s Power-to-X Director, Mark Tipping, who set the scene. Nuclear power, he said, has a wide range of potential applications in shipping, both as a direct source of energy on board ships, but also as a source of offshore floating power for energy-intensive industries including the production of new marine fuels of the future and the decarbonisation of conventional fuels.

More than 700 nuclear reactors have already been

deployed in the marine environment, he said, and contrary to popular belief, nuclear-powered assets are now under development in both short- and longer-term timeframes. He highlighted the creation of the Nuclear Energy Maritime Organization (NEMO) earlier this year and its rapidly growing membership. And emphasised the new generation of nuclear

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reactors which are simpler, smaller, safer, and can be tailored to meet the requirements of ships and other floating assets. Kirsty Gogan, Managing Partner of LucidCatalyst, a clean energy consultancy, pointed to the many benefits of nuclear energy in a maritime context. It would enable substantial time savings: refuelling, if required at all, would be infrequent. More energy would enable larger assets to sail faster, raising supply chain efficiency and creating a very attractive business case.

**De Groot said that she can envisage a nuclear power barge built in a shipyard by around 2030. This could be deployed to power a city, an industrial plant, or provide the energy necessary to develop zero-carbon fuels for shipping, she said. Meanwhile, depending on the level of demand, nuclear-powered commercial ships could be coming off the blocks between 2030 and 2035. The early 2030s, she said, is a feasible target.**

She emphasised, however, that 'generation 4 reactors' would be just one part of a completely new ecosystem, initially with highly trained crews but ultimately designed to operate with minimal human intervention. Assets and their reactors, she said, would be designed as 'walk-away safe' in the event of a malfunction. Sytske de Groot, Allseas Department Head Naval Architecture, revealed that the company which operates some of the largest marine assets in the world, is actively considering nuclear power. She explained that reactors will be designed so that no fissile material can escape in the event of an accident – they will not melt or explode under extreme heat.

And there will be a requirement that in the event of an incident, nothing will be left that could

cause a risk in the future. De Groot said that she can envisage a nuclear power barge built in a shipyard by around 2030. This could be deployed to power a city, an industrial plant, or provide the energy necessary to develop zero-carbon fuels for shipping, she said. Meanwhile, depending on the level of demand, nuclear-powered commercial ships could be coming off the blocks between 2030 and 2035.

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The participants agreed, however, that there is uncertainty around the timeline because regulations are now the bottleneck. LR's Tipping emphasised again the importance of NEMO and also referred to the International Energy Agency's move to set up a new body for the safe and secure deployment of peaceful civil nuclear applications at sea. The Atomic Technology Licensed for Applications at Sea, ATLAS, will commence operations in 2025.

Source: [https://](https://www.seatrade-maritime.com/alternative-fuels/nuclear-power-in-commercial-shipping-gains-momentum)

[www.seatrade-maritime.com/alternative-fuels/nuclear-power-in-commercial-shipping-gains-momentum](https://www.seatrade-maritime.com/alternative-fuels/nuclear-power-in-commercial-shipping-gains-momentum), 27 November 2024.

## **INDONESIA**

### **Indonesia to Accelerate Nuclear Energy Adoption**

Indonesia has decided to accelerate the adoption of nuclear energy to enhance the country's energy security, with plans for future expansion, according to Minister of Energy and Mineral Resources Bahlil Lahadalia. In a statement issued by the ministry, Bahlil, who also serves as the chairperson of Indonesian National Energy Council, said that

nuclear energy is a breakthrough that Indonesia must pursue. The target is to benefit from nuclear energy starting in 2032. Bahlil emphasised that the adoption of nuclear energy will diversify Indonesia's energy mix and lower the basic cost of electricity, addressing future energy supply challenges. He said the council had thoroughly discussed the initiative. According to him, the initiative will enhance the use of renewable energy. As

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an initial step, Indonesia will start with a small-scale nuclear power plant, with a capacity of 250 MW to 500 MW. In the future, the development will be expanded to a larger scale. Previously, Indonesian President Subianto expressed his commitment to incorporating nuclear energy as part of Indonesia's energy diversification strategy to address global warming and national energy demands. The Indonesian government has set a target to achieve a 23% renewable energy mix by 2025 and is committed to supporting net zero emissions by 2060.

*Source: <https://en.vietnamplus.vn/indonesia-to-accelerate-nuclear-energy-adoption-post306242.vnp>, 06 December 2024.*

## **SERBIA**

### **Serbia Ends 35-year Ban on Nuclear Power**

Amendments to the law on energy were adopted by Serbia's National Assembly, which ended the 35-year disallowance of the construction of nuclear power plants in the country. Minister of Mining and Energy Dubravka Đedović Handanović said that the amendments to the Energy Law are revolutionary and historic. She emphasised that they opened the door to the development of nuclear energy in Serbia. "The first step was the lifting of

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the moratorium that was introduced 35 years ago," said the minister. "Nuclear energy is a basic stable source of clean energy and, above all, it is important that educational and scientific institutions take an active part in creating the next steps, which means recognising the three phases of the development of the nuclear program prescribed by the IAEA. There are clear guidelines and steps that every country needs to fulfil, and we will be guided by those guidelines because we absolutely have to adhere to all standards."

This Law was adopted in the former Socialist Federal Republic of Yugoslavia in 1989, recalled the Serbian Radiation and Nuclear Safety and Security Directorate. The authority added that the issue of nuclear energy use was brought into focus after the

first Nuclear Energy Summit in Brussels held in March this year. In the Declaration on Nuclear Energy, which was signed during the summit, nuclear energy is marked as a key component in the global strategy for the reduction of the greenhouse effect.

The amendments were approved by the parliament, soon after Minister Handanović and Hua Liu, Deputy Director General of the IAEA discussed cooperation in developing national infrastructure for the peaceful use of nuclear energy at the beginning of November. The minister also brought the attention to the French company EDF, which is conducting a preliminary study on the possibility of using nuclear energy in Serbia. ...Serbia's president Vučić also discussed the option of Serbia

acquiring 5 to 10 per cent of Hungary's Paks nuclear power plant.

Source: <https://ceenergynews.com/nuclear/serbia-ends-35-year-ban-on-nuclear-power/>, 09 December 2024.

## USA

### Meta Seeks Nuclear Power Developers for Early 2030s Reactor Projects

Meta is actively seeking proposals from nuclear power developers to support its AI and environmental objectives. The company aims to add 1GW to 4GW of new nuclear generation capacity in the US, with delivery expected to begin in the early 2030s. Meta believes that "nuclear energy will play a pivotal role in the transition to a cleaner, more reliable, and diversified electric grid". The company's focus is on creating sufficient scale to achieve cost reductions by deploying multiple units. This approach aims to meet Meta's future energy needs while advancing broader industry decarbonisation. Nuclear energy projects are capital-intensive and require extended development timelines, rigorous regulatory compliance, and longer operational lifespans compared to renewable sources such as solar and wind. The technology major stated that solar and wind projects "remain a priority for investment".

Early engagement in the lifecycle of nuclear projects is crucial due to their operational demands and the need for strategic partnerships. Meta commented: "We believe working with partners who will ultimately permit, design, engineer, finance, construct, and operate these power plants will ensure the long-term thinking necessary to accelerate nuclear technology." Citing Goldman Sachs, Reuters reported that US data centre power use is projected to triple

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**Amazon is collaborating with US nuclear developer X-energy to provide low-carbon electricity for its data centres, aiming to bring more than 5GW of SMR-generated power online by 2039. "Meta seeks nuclear power developers for early 2030s reactor projects" was originally created and published by Energy Monitor, a GlobalData owned brand.**

between 2023 and 2030, requiring 47GW of new generation capacity. However, swiftly meeting this demand with nuclear reactors poses challenges, including an overburdened US Nuclear Regulatory

Commission, potential uranium fuel supply issues, and local opposition. The growing power demand from Big Tech data centres, driven by AI, is boosting the nuclear industry.

In October 2024, Google ordered six to seven SMR from Kairos Power, supported by a \$300m

investment from the US Department of Energy. Microsoft announced in September its commitment to a 20-year electricity purchase from

the Three Mile Island nuclear plant, leading to its reopening by Constellation Energy. Additionally, Amazon is collaborating with US nuclear developer X-energy to provide low-carbon electricity for its data centres, aiming to bring more than 5GW of SMR-generated power online by 2039. "Meta seeks nuclear

power developers for early 2030s reactor projects" was originally created and published by Energy Monitor, a GlobalData owned brand.

Source: <https://finance.yahoo.com/news/meta-seeks-nuclear-power-developers-143622222.html>, 10 December 2024.

## SM ALL MODULAR REACTORS

### FINLAND

#### Tractebel to Help Develop Steady Energy's Heating SMR

Steady Energy was spun out of Finland's state-owned VTT Technical Research Centre in 2023 and is developing the LDR-50 small modular reactor with a thermal output of 50 MW, designed to



operate at around 150°C. Unlike most small modular reactors being developed around the world, it is not designed to generate electricity - or electricity and heat. Instead, it is designed to only produce heat and is focused on district heating, as well as industrial steam production and desalination projects.

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The company says it has already signed agreements for 15 reactors in Finland, with its reactor design currently being assessed by the Finnish Radiation and Nuclear Safety Authority (STUK). The aim is for construction of the first plant - to be the clean energy source for a district heating scheme - to begin in 2029. Tractebel will provide engineering support for the reactor design, review the probabilistic safety assessment and, the two companies say, work to establish a "severe accident management programme, which is required by national and international legislation despite the technology itself being inherently simple and safe".

Tommi Nyman, CEO of Steady Energy, said: "We are eager to start working with Tractebel and their internationally recognised nuclear engineers. Combined with our decades of Finnish expertise, we have one of the world's most capable SMR teams. Heating water to 150 degrees accounts for 10 per cent of global emissions. Our reactor focuses solely on this task, making it possibly the world's simplest commercial nuclear reactor. This design ensures that SMR-produced heat is cost-competitive compared with other alternatives." Denis Dumont, Tractebel's Chief Nuclear Officer, said: "Our engineers are frontrunners in nuclear

technology but also energy storage, combined heat and power, and hydrogen production. We are proud to support the development of this groundbreaking technology that unlocks the supply of clean heat to cities and industries."

*Source: <https://www.world-nuclear-news.org/articles/tractebel-to-help-develop-steady-energy-heating-smr>, 05 December 2024.*

## GENERAL

### GE Vernova Eyes Nuclear Power Expansion with Smarter Reactor Technology

GE Vernova, the General Electric offshoot focusing on energy solutions, is setting the stage for significant growth through its SMR known as the BWRX-300. With ambitious plans to generate upwards of \$2 billion annually by the mid-2030s,

**GE Vernova, the General Electric offshoot focusing on energy solutions, is setting the stage for significant growth through its SMR known as the BWRX-300. With ambitious plans to generate upwards of \$2 billion annually by the mid-2030s, the company is eyeing the deployment of as many as 57 of these reactors across the U.S., Canada, the UK, and Europe by 2035. This move aligns with the burgeoning opportunity for nuclear power to play a pivotal role not only in stabilizing the electric grid but also in meeting the increasing electricity demands driven by various sectors, including technology and industry.**

the company is eyeing the deployment of as many as 57 of these reactors across the U.S., Canada, the UK, and Europe by 2035. This move aligns with the burgeoning opportunity for nuclear power to play a pivotal role not only in stabilizing the electric grid but also in meeting the increasing electricity demands driven by various sectors, including technology and industry.

Vernova's BWRX-300 is crafted to alleviate some of the historical challenges associated with traditional

nuclear plants, namely high costs and extended construction times. By adopting a simplified design with fewer components, the reactor could cost significantly less to build—between \$2 billion and \$4 billion, compared to the \$10 billion to \$15 billion typically required for larger installations.

This novel approach not only lowers the financial barriers to entry but enhances flexibility, allowing multiple BWRX-300 reactors to be installed at one location to achieve equivalent output as seen with one large reactor.

Nicole Holmes, GE Vernova's Chief Commercial Officer for the nuclear unit, emphasized the potential attractiveness of this configuration, stating, "You could put four of these on a site and get the same output as you would from a single large reactor. You can have one started, deploying energy, making money, all the meanwhile building out others. It gives you a lot of optionality." With the average reactor producing 1,000 megawatts of energy, the BWRX-300 can deliver around 300 megawatts—enough to provide power to over 200,000 households—thus making it appealing for both new installations and the expansion of existing plants.

Two key factors fueling GE Vernova's SMR plans are the drive for cleaner energy sources and the rising energy demands from the tech sector, particularly related to AI data centers. The company's foray has piqued the interest of several utility companies and major technology firms who are considering how nuclear energy might help them meet future energy requirements. Notably, recent conversations between Vernova and tech giants reflect this burgeoning appetite for nuclear energy, particularly as companies like Alphabet and Amazon are diversifying their energy portfolios to include nuclear solutions.

Investors have responded positively, with GE Vernova's stock price soaring since its NYSE listing, demonstrating market confidence in the company's direction. Holmes noted, "We're building a strong order book, and many of the buyers will be utilities

interested in the long-term benefits of nuclear energy efficiencies." The excitement around the BWRX-300 also derives from its capacity to reduce the overall risks associated with nuclear

construction projects. For example, the Tennessee Valley Authority (TVA) is considering deploying the reactor at its Clinch River site due to the managed financial risks SMRs present compared to larger reactors.

The collaboration agreement established with Ontario Power Generation, Tennessee

Valley Authority, and Synthos Green Energy marks another milestone, signaling significant investment and progress toward getting the BWRX-300 operational. The joint effort aims to standardize reactor designs conducive to deployment across diverse markets and

regulatory environments, effectively streamlining the potential rollout across multiple regions.

GE Vernova's initial contract for deploying the BWRX-300 is set for Ontario Power, with plans to bring it online by 2029 at the Darlington facility, located about 60 miles from Toronto. The

provincial utility plans to expand its SMR offerings by potentially deploying three additional reactors there. This first commercial contract not only highlights the market's readiness for SMRs but also positions GE Vernova at the forefront of the nuclear renaissance anticipated over the next decade.

Meanwhile, amid these developments, the tech industry's involvement could revolutionize how energy needs are met. With firms like Microsoft engaging in 20-year agreements to revive existing nuclear assets, and investments from Amazon and Alphabet to develop new nuclear technologies,

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the influence of the tech sector on nuclear energy revival cannot be overstated. Holmes suggests this growing intersection of needs may forge new pathways for SMRs, as these large tech companies could act as buyers of the generated power, thereby ensuring economic feasibility for nuclear projects. She noted, “These large tech companies could be off takers and agree to power purchase prices supporting deployment of these early units and early technologies.”

The federal push to triple the contribution of nuclear power by 2050 reflects the urgent need to address the rising electricity consumption expected from both traditional and modern energy use cases. GE Vernova’s proactive approach, focusing on small modular reactors, positions it well against the backdrop of historical challenges—cost overruns, prolonged construction schedules, and occasional cancellations facing large nuclear facilities. The company aims not just to meet regulations but also to support energy transition goals through innovations leading to safer, more economical nuclear energy solutions. GE Vernova’s progress and the anticipated growth of SMRs serve as indicators of the revitalization of the nuclear sector, combining new technology with strong demand for clean energy solutions. With strategic partnerships, strong market positioning, and increasing engagement from diverse sectors, the future looks promising for GE Vernova and its BWRX-300 small modular reactor initiative.

*Source: <https://evrimagaci.org/tpg/ge-vernova-eyes-nuclear-power-expansion-with-smarter-reactor-technology-73177>, 01 December 2024.*

**SLOVENIA**

**Slovenia’s GEN to Intensify Study of SMR Options**

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Speaking at the Slovenian Association for Energy Economics conference at the University of Ljubljana, Paravan said that the company was continuing to prepare everything necessary for a final investment decision on the JEK2 project to be taken in 2028. JEK2 is a plan for a new one or two-unit nuclear power plant, with up to 2400 MW capacity, next to Slovenia’s existing nuclear power plant, Krško, a 696 MWe pressurised water reactor which generates about one-third of the country’s electricity and which is co-owned by neighbouring Croatia. Prime Minister Golob has committed to hold a referendum on the project before it goes ahead, and it had been due to be held on 24 November, before it was cancelled amid political differences. Golob’s Freedom Movement said that there would still be a referendum, but it would now be later in the process, by 2028 at the latest.

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At the conference, Paravan said that GEN remained committed to the project but “we cannot ignore what happened in the past months. For this reason, in addition to ongoing activities on the project, we will additionally intensify activities related to studying the possibility of using small modular reactors and ask key suppliers for detailed information”. He added: “The events of the past months have also shown the necessity of a professional and open discussion regarding the energy future of Slovenia, which is not based on emotions and takes into account the reality of possible alternatives, including the necessary interventions in space that these technologies require.”

As part of the public information process ahead of the planned referendum, the option of SMRs at the JEK2 site had been considered, but it had been concluded that, given the timelines proposed for the project, SMRs were not considered suitable, compared with larger units. However, the assessment said that GEN would continue to monitor the development of SMR technology, noting that “the development of this technology is very dynamic, the promises of the providers are great” although the “technical and economic assumptions of SMR technology have not yet been proven in practice”.

*Source: <https://www.world-nuclear-news.org/articles/slovenias-gen-to-intensify-study-of-smr-options>, 28 November 2024.*

**UK**

**Newcleo Submits SMR Design for UK Assessment**

Generic Design Assessment (GDA) is a process carried out by the Office for Nuclear Regulation (ONR) and the Environment Agency (EA) - and where applicable Natural Resources Wales - to assess the safety, security, and environmental protection aspects of a nuclear power plant design that is intended to be deployed in Great Britain. Successful completion of the GDA culminates in the issue of a Design Acceptance Confirmation from the ONR and a Statement of Design Acceptability from the EA. In May 2021, BEIS opened the GDA process to advanced nuclear technologies, including small modular reactors (SMRs).

Newcleo has now applied for a GDA of its commercial-scale 200 MWe lead-cooled fast reactor (LFR). It said it aims to complete a two-step GDA with the ONR and EA, including a fundamental assessment of its technology by the regulators. Subject to acceptance by the UK Department of Energy Security and Net Zero (DESNZ), the GDA would take around two years,

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starting in early 2025. “This application reflects the immense progress that Newcleo Group has made both in the growth of their global capability as well as the advancement of their research, development, and design activities,” the company said. It noted that it becomes the only advanced modular reactor developer to submit applications for both GDA and Regulatory Justification Decision in the UK.

In April this year, the Nuclear Industry Association applied to the UK government for a justification decision for Newcleo’s LFR-AS-200. Such a decision is required for the operation of a new nuclear technology in the country. The first step of Paris-headquartered Newcleo’s delivery roadmap will be the design and construction of the first-of-a-kind 30 MWe lead-cooled fast reactor to be deployed in France by 2030, followed by a 200 MWe commercial unit in the UK by 2033.

At the same time, Newcleo will directly invest in a mixed uranium/plutonium oxide (MOX) plant to fuel its reactors. In June 2022, Newcleo announced it had contracted France’s Orano for feasibility studies on the establishment of a MOX production plant. In October, the European Commission selected nine small modular reactor projects - including Newcleo’s LFR – in the initial round of applications to form Project Working Groups under the European Industrial Alliance on SMRs.

...Generic Design Assessments have previously been completed for the EDF/Areva UK EPR, the Westinghouse AP1000, the Hitachi-GE UK ABWR and the CGN/EDF/GNI UK

HPR1000 designs. A GDA assessment is currently ongoing for Rolls-Royce SMR Limited’s small modular reactor design, GE Hitachi Nuclear Energy’s BWRX-300 and Holtec International’s SMR-300. In August, Westinghouse’s AP300 was accepted for a GDA review.

*Source: <https://www.world-nuclear-news.org/articles/newcleo-submits-smr-design-for-uk-assessment>, 02 December 2024.*

**NUCLEAR SAFETY**

**BULGARIA**

**IAEA Mission Says Bulgaria is Committed to a High Level of Nuclear and Radiation Safety; Sees Areas for Further Enhancement**

An IAEA team of experts said Bulgaria has a comprehensive and robust regulatory framework for nuclear and radiation safety covering all facilities and activities. The mission found that the overall performance of Bulgaria's regulatory system would be enhanced with the adoption of a national safety policy and strategy in line with IAEA safety standards. The Integrated Regulatory Review Service (IRRS) mission was conducted at the request of the Government of Bulgaria and hosted by the Bulgarian Nuclear Regulatory Agency (BNRA), the regulatory body for nuclear and radiation safety in Bulgaria, and the Ministry of Health (MoH). Taking place from 17 to 29 November, the IRRS reviewed Bulgaria's national regulatory framework for nuclear, radiation, radioactive waste and transport safety.

Using IAEA safety standards and international good practices, IRRS missions are designed to strengthen the effectiveness of the national legal and regulatory infrastructures, while recognizing the responsibility of each country to ensure nuclear and radiation safety. This is the second IRRS mission that Bulgaria has hosted since the IAEA's IRRS programme began in 2006. The IRRS team consisted of 16 senior regulatory experts from 15 IAEA Member States, two observers and three IAEA staff members.

In Bulgaria, nuclear energy provides roughly 40 per cent of the country's electricity through the Kozloduy Nuclear Power Plant (NPP), which has two pressurized-water reactor units each providing an installed power of approximately 1000 MWe. The Bulgarian nuclear programme plans to construct two new nuclear power units utilizing

AP1000 technology at the Kozloduy NPP site. The country also uses nuclear and radiation technologies in medicine, industry and research.

During the 12-day mission, the team met with officials from the BNRA and MoH and made site visits to observe regulatory inspections at the Kozloduy NPP; Kozloduy State Enterprise Radioactive Waste Management (SE RAW); Controltest Ltd., a company working in destructive and non-destructive testing; Theta Consult Ltd., working in radiation control and radiation protection; and Acibadem City Clinic....

*Source: <https://www.iaea.org/newscenter/pressreleases/iaea-mission-says-bulgaria-is-committed-to-a-high-level-of-nuclear-and-radiation-safety-sees-areas-for-further-enhancement>, 29 November 2024.*

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**NETHERLANDS**

**IAEA Concludes a Long-Term Operation Safety Review at the Kingdom of the Netherlands' Borssele Nuclear Power Plant**

An IAEA team of experts today completed a review of long term operational safety of the Borssele Nuclear Power Plant (NPP) in the Kingdom of the Netherlands. The Pre-Safety Aspects of Long Term Operation (Pre-SALTO) review mission was requested by the country's Authority for Nuclear Safety and Radiation Protection (ANVS). During the ten-day mission, held from 19 to 28 November, the team reviewed the plant's preparedness, organization and programmes for safe long-term operation (LTO).

Borssele NPP, operated by Elektriciteits-Produktie maatschappij Zuid-Nederland (EPZ), is situated on the country's coast, roughly 165 kilometres south of Amsterdam. The plant's single unit is a pressurized water reactor with a net electrical output of 485 MW(e), contributing 3.2% of the total electricity generation in the country. It was put into commercial operation in 1973 with a design life of 40 years. The plant had previously received approval to extend the operational period

to 2033, and the plant's intention – as requested by the Dutch government – is to extend the operation for a subsequent period until 2054. ...

The team identified two good practices that will be shared with the nuclear industry globally, including: Use of a 360 degree imaging system for enhanced planning of ageing management activities to reduce radiation dose to plant personnel. Use of a portable tablet for field inspectors to conduct ageing

management inspections of civil structures and record findings. The team also provided 15 recommendations and suggestions to further improve safe subsequent LTO, including that: the plant should complete the development and implementation of the ageing management programmes for mechanical and electrical components; the plant should enhance the ageing management of civil structures; the plant should effectively update and implement the human resources strategy to support LTO.

The plant management expressed a determination to implement the mission findings. "We appreciate the IAEA's support to our plant in ageing management and preparation for safe subsequent LTO," said

Carlo Wolters, CEO of EPZ. "It is very important for us to get an external view of our preparations in an early phase. The competencies and experience of the IAEA team enabled an effective identification of our areas for improvements. The results of this mission will help us to improve our activities for safe subsequent LTO and to further align them with IAEA safety standards." The team provided a draft report to the plant management and to the ANVS. The plant management and ANVS will have an opportunity to make factual comments on the draft. A final report will be submitted to the plant management, ANVS and the Dutch Government within three months. ...

Source: <https://www.iaea.org/newscenter/pressreleases/iaea-concludes-a-long-term-operation-safety-review-at-the-kingdom-of-the-netherlands-borssele-nuclear-power-plant>, 28 November 2024.

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**Grossi said: "Ukraine's energy infrastructure is extremely fragile and vulnerable, putting nuclear safety at great risk. Once again, I call for maximum military restraint in areas with major nuclear energy facilities and other sites on which they depend."**

## UKRAINE

### IAEA Warns of Impact on Nuclear Safety of Attacks on Ukraine's Energy Infrastructure

In the agency's latest update it said that the nuclear power plants-Khmelnytsky, Rivne and South Ukraine-had to lower

their power levels on Thursday for the second time in two weeks as a precautionary safety step. The three plants have a total of nine reactors between them. One reactor at Rivne was disconnected from the grid and all three plants continued to receive off-site power, although Khmelnytsky lost connection to two of its power lines. Grossi said: "Ukraine's energy infrastructure is extremely fragile and vulnerable, putting nuclear safety at great risk. Once again, I call for maximum military restraint in areas with major nuclear energy facilities and other sites on which they depend."

IAEA teams visited seven substations located outside the nuclear power plants in Ukraine in September and October to assess the situation after

strikes on the energy infrastructure in August. Grossi reported to the IAEA board of governors earlier this month that there had been "extensive damage" and concluded that the reliability of off-site supply to nuclear power plants had been "significantly reduced". In his statement issued, he said: "The IAEA will continue to assess the extent of damage to facilities and power lines that are essential for nuclear safety and security. The IAEA will continue to do everything in its power to reduce the risk of a nuclear incident during this tragic war."

The IAEA has had teams stationed at each of Ukraine's nuclear power plants, and it said there

had been no reports of direct damage to nuclear power plants. Nuclear power plants need to have an electricity supply to ensure necessary safety functions can take place as well as reactor cooling, and they also need reliable connections to the grid to be able to distribute the electricity they produce. In addition to Ukraine's three operating nuclear power plants, Zaporizhzhia nuclear power plant has been under Russian military control since early March 2022. Its reactors are all shut down and it has had to rely on emergency diesel generators on occasions when it has lost all access to off-site power. The IAEA has set out its seven rules for nuclear safety and security during the Russian-Ukraine conflict, which have been adopted by the UNSC. They include the core principles that no-one should fire at, or from a nuclear power plant, or use a nuclear power plant as a military base.

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Source: <https://www.world-nuclear-news.org/articles/iaea-warns-of-impact-on-nuclear-safety-of-attacks-on-ukraines-energy-infrastructure>, 29 November 2024.

### NUCLEAR COOPERATION

#### BRAZIL–RUSSIA

##### **Brazil Expects to Reach Agreement with Russia's Rosatom on Nuclear Cooperation in 2025 - Brazilian Energy Ministry**

Brazil expects to reach an agreement with Rosatom state corporation on cooperation in the nuclear sector by the end of 2025, the Brazilian Mines and Energy Ministry said following a meeting between the ministry's head Alexandre Silveira and a Rosatom delegation. The parties have begun negotiations on developing a partnership, utilizing Russian experience and seeking investment for exploring Brazil's mineral potential. The country expects to leverage Rosatom's experience. Its nuclear generation capacity by 2035 is estimated

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at 1.1 GW, with 0.6 GW on land and 0.5 GW from floating capacities, the ministry said.

The country is working on strengthening the nuclear energy chain and advancing development of uranium mining policies and small nuclear reactors, the ministry said. Brazil has the potential to become the third-largest country in the world by uranium reserves. Currently, it ranks seventh in uranium reserves, while only 26% of its subsoil has been explored. Rosatom has been one of the largest suppliers of isotopic products for Brazil's nuclear medicine needs for several years. In

recent years, cooperation in the nuclear fuel cycle has also been developing. At the end of 2022, Rosatom said a contract had been signed between its Techsnabexport structure, which exports nuclear materials, and Brazil's INB for supplying enriched uranium products

that would be used for the operation of the Angra Nuclear Power Plant from 2023 to 2027.

Brazil is among the countries interested in floating nuclear power units, Rosatom CEO Alexei Likhachev previously said. "There are many countries with long coastlines, such as Brazil or Argentina. There are many countries with island infrastructure - Indonesia, Malaysia. These are countries in both southern and northern latitudes," Likhachev said in the spring of 2023.

Source: <https://www.interfax.com/newsroom/top-stories/108339/>, 05 December 2024.

#### UZBEKISTAN–IAEA

##### **Uzbekistan Signs Agreements on Nuclear Cooperation**

IAEA Director General Rafael Mariano Grossi and Mirziyoyev met ahead of the one-day *Prospects for the Use of Nuclear Energy for Peaceful*

*Purposes in Sustainable Development of the Organization of Islamic Cooperation (OIC) Member States* conference on 5 December in Samarkand.

Uzbekistan has been a member of the IAEA for 30 years and has implemented more than 40 joint projects with the agency's technical assistance.

Five such projects are currently under way, according to a statement from the Uzbek presidency. Priorities for cooperation noted during the meeting included improving competence and potential of national agencies, preparing high-skilled personnel, and prospective projects in nuclear energy,

agriculture, water use, healthcare, and ecology in the framework of IAEA programmes, culminating in an agreement on adopting a joint roadmap on "expanding multidimensional cooperation in peaceful atom development", the presidency said.

According to World Nuclear Association information, Uzbekistan - which has considerable mineral deposits - is the world's fifth-ranking uranium supplier. The country's generation is dominated by natural gas, which accounted for some 88% of its generation mix in 2021, and it also imports electricity from Tajikistan and Kyrgyzstan. Demand is expected to double by 2030.

..In an address to the conference, Mirziyoyev said ensuring reliable, safe, cost-effective and ecologically friendly energy sources was one of the top priorities in the large-scale reforms carried out in "New Uzbekistan". "We have established a National Agency to strengthen the regulatory and legal framework in this sector, adopted a Law on the Peaceful Use of Atomic Energy, a long-term Concept of Nuclear Power Development, and a strategy aimed at strengthening human resources in the field. We have introduced a system of training highly skilled specialists for the industry," he said. "There is no doubt that the introduction of advanced nuclear power technologies will give a powerful impetus to the development of our country, create opportunities for new scientific and technical developments, and transitioning to an

innovative economy."

**Bilateral Cooperation:** *The MoU between Uzatom and World Nuclear Association signed during the conference sets out a range of activities in which cooperation may be pursued, including exchanging nuclear-related information,*

*collaborating to bring together key decision-makers of countries developing nuclear energy, and raising awareness of each other's activities and objectives, among other things. Uzatom's mission is to develop and implement state policies for the peaceful use of nuclear energy in Uzbekistan,*

*including constructing and operating nuclear power facilities, advancing atomic science, ensuring safety, and promoting non-proliferation.*

...

Source: <https://www.world-nuclear-news.org/articles/Uzbekistan-signs-agreements-on-nuclear-cooperation>, 05 December 2024.

## URANIUM PRODUCTION

### USA

#### Uranium Mining Revival Portends Nuclear Renaissance in Texas and Beyond

In the old ranchlands of South Texas, dormant uranium mines are coming back online. A collection of new ones hope to start production soon, extracting radioactive fuel from the region's shallow aquifers. Many more may follow. These mines are the leading edge of what government and industry leaders in Texas hope will be a nuclear renaissance, as America's latent nuclear sector begins to stir again. Texas is currently developing a host of high-tech industries that require enormous amounts of electricity, from crypto-currency mines and artificial intelligence to hydrogen production and seawater desalination.

Now, powerful interests in the state are pushing to power it with next-generation nuclear reactors. "We can make Texas the nuclear capital of the world," said Reed Clay, president of the Texas Nuclear Alliance, former chief operating officer



for Texas Gov. Greg Abbott's office and former senior counsel to the Texas Office of Attorney General. "There's a huge opportunity." ...

Source: <https://www.texasstandard.org/stories/texas-uranium-mining-nuclear-reactors/>. 05 December, 2024.

**NUCLEAR WASTE MANAGEMENT**

**CANADA**

**The Nuclear Waste Management Organization Selects Site for Canada's Deep Geological Repository**

Today, the Nuclear Waste Management Organization (NWMO) announced it has selected Wabigoon Lake Ojibway Nation (WLO) and the Township of Ignace as the host communities for the future site for Canada's deep geological repository for used nuclear fuel. Canadians and Indigenous peoples have been clear that it is essential to take responsibility now, in this generation, to safely manage Canada's used nuclear fuel for the long term. This announcement is an important milestone in delivering on that promise to not leave it as a burden for future generations to manage. ...There is international scientific consensus that a deep geological repository is the safest way to manage used nuclear fuel over the long term, and Canada is among the leading countries on this solution.

The NWMO launched its community-driven, consent-based site selection process in 2010. It included clear commitments that Canada's plan for used nuclear fuel could only move forward in an area with a site that meets rigorous safety standards and that has informed and willing hosts. The project also needs to be implemented in a way that advances community well-being as defined by the host communities. The people of both host communities have demonstrated their willingness to move forward in this process. Earlier this month, WLO confirmed its willingness, following a decision-making process

that was open to all its members. The Township of Ignace completed a decision-making process with its residents in July, which also confirmed willingness.

This important decision for Canada was possible because of the communities' leadership and active engagement over a decade of learning, as well as considering the future of their communities. The safety of the site was also established through rigorous site assessment and technical studies. "We have learned so much from all the communities that took part in this process over the years," said Lise Morton, NWMO Vice-President of Site Selection. "By challenging us,

they helped the NWMO grow and become a better organization, and they directly shaped this project."

The project will drive a wide range of benefits for both host communities, the region and Canada as a whole over the 175-year timeline of the project. These include new jobs and investments in community well-being driven by the priorities communities themselves defined. As the project now advances into the regulatory decision-

making process, Canada will take another step forward on this long-term management solution for its used nuclear fuel, which will protect people and the environment, including water, while supporting its goals around energy security and climate change...

Source: <https://www.newswire.ca/news-releases/the-nuclear-waste-management-organization-selects-site-for-canada-s-deep-geological-repository-820449071.html>, 28 November 2024.

**DENMARK**

**Solving the Waste Challenge of New Nuclear Technologies**

This is the first agreement between a multinational repository developer and an advanced reactor designer in the global nuclear sector. It's a concrete step towards the long-term sustainability of nuclear energy.

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Copenhagen Atomics is leading the global race of delivering the first commercial thorium reactor. The company expects to demonstrate the viability of its process sooner than its competitors as it is on a rapid path to the first ultra efficient thorium reactor.

Copenhagen Atomics has invented an innovative thorium molten salt nuclear reactor with the size of a 40-foot shipping container and the company aims to mass manufacture these thorium reactors on assembly lines. When the rules are in place for spent nuclear fuel recycling, then these thorium reactors are able to consume all transuranics in the world. DeepGEO is developing multinational repositories for the disposal of spent nuclear fuel. It aims to assist both advanced reactor and small modular reactor developers in commercialising their technologies. The establishment of multinational interim storage facilities and repositories that can host a variety of waste forms would provide vital flexibility in support of novel nuclear technologies, applications, and business models.

**Thomas Jam Pedersen, CEO and co-founder of Copenhagen Atomics, says:**

*“Copenhagen Atomics reactors are able to burn spent nuclear fuel and get ten times more energy out of it, than when that same fuel is used in a traditional nuclear reactor. Together with DeepGEO, Copenhagen Atomics will explore how we can make international handling of spent nuclear fuel radically more efficient and at the same time handle all waste streams responsibly.” ...*

Source: <https://www.globenewswire.com/news-release/2024/11/26/2987597/0/en/Solving-the-waste-challenge-of-new-nuclear-technologies.html>, 26 November 2024.

## **ZIMBABWE**

### **IAEA Reviews Waste Management in Zimbabwe**

An IAEA International Physical Protection Advisory Service (IPPAS) team of experts has concluded a mission in Zimbabwe, conducted at the request of the government. Zimbabwe uses nuclear science and technology for peaceful purposes in various sectors, including health, industry, mining, agriculture, education and research.

The seven-person IPPAS mission, hosted by the Radiation Protection Authority of Zimbabwe (RPAZ), was led by Kouame Remi Adjoumani from Côte d'Ivoire, and included experts from Canada, Egypt, Türkiye, the US and Zambia, as well as one IAEA staff member. The team held discussions with officials from the RPAZ, the Office of the President and Cabinet, the Ministries of Health and Childcare, Defence, Transport and Infrastructure Development, as well as the Zimbabwe Defence Forces, the Zimbabwe Republic Police, the Zimbabwe Revenue Authority,

the National Nuclear Security Committee, the Airports Company of Zimbabwe, among others.

The mission reviewed Zimbabwe's nuclear security regime for radioactive material, associated facilities and activities, and the implementation of the Amendment to CPPNM.

Zimbabwe accepted the 2005 Amendment to the CPPNM in 2023. This amendment significantly enhances the original CPPNM by broadening its scope and establishing obligations for parties to ensure the physical protection of all nuclear facilities and nuclear material used for peaceful purposes, whether in domestic use, storage or transport.

The scope also reviewed the legislative and regulatory framework for the security of

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radioactive material; regulatory practices in licensing, inspection and enforcement; and coordination between stakeholders involved in nuclear security. The IPPAS team visited the Radiotherapy Centre of the Parirenyatwa Group of Hospitals in Harare, the radioactive waste management facility of the RPAZ in Harare, the Bindura Nickel Corporation in Bindura, and the Mpilo Central Hospital in Bulawayo. The team observed

**The IPPAS team visited the Radiotherapy Centre of the Parirenyatwa Group of Hospitals in Harare, the radioactive waste management facility of the RPAZ in Harare, the Bindura Nickel Corporation in Bindura, and the Mpilo Central Hospital in Bulawayo. The team observed that the nuclear security regime in Zimbabwe is being established and provided recommendations and suggestions to support Zimbabwe in enhancing and sustaining nuclear security.**

that the nuclear security regime in Zimbabwe is being established and provided recommendations and suggestions to support Zimbabwe in enhancing and sustaining nuclear security. Good practices were identified that can serve as examples to other IAEA member states to help strengthen their nuclear security activities.

Source: <https://www.neimagazine.com/news/iaea-reviews-waste-management-in-zimbabwe/?cf-view>, 03 December 2024.



Centre for Air Power Studies

The Centre for Air Power Studies (CAPS) is an independent, non-profit think tank that undertakes and promotes policy-related research, study and discussion on defence and military issues, trends and developments in air power and space for civil and military purposes, as also related issues of national security. The Centre is headed by Air Vice Marshal Anil Golani (Retd).

Centre for Air Power Studies

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