



**OPINION – Manpreet Sethi**

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**Emerging Missile Trends to Watch Out For**

Traditionally, much of the focus on missiles has been on those capable of delivery of WMD. But new missile trends are emerging. While missile technology is nearly 80 years old, modern missiles have registered huge advances in speed, range, navigation, use of advanced materials, and endurance. Earlier, when accuracy was not easy to achieve, missiles were seen to have a strategic effect only when carrying a nuclear warhead. Not anymore. As missile accuracy has improved with better internal and satellite-guided systems, precision targeting even with conventional missiles has become capable of causing strategic effects. In the ongoing Russia-Ukraine conflict, we can see large-scale use of conventional missiles for strategic gains on both sides. The sinking of the Moskva was one such incident, with the Ukrainian anti-ship cruise missile Neptune causing a strategic effect. Similarly, Russia, too, has used a large number of short-range missiles, including its hypersonic Kinzhal, to hit strategic targets such as ammunition storage sites and bridges.

With repeated large-scale use of missiles in various conflicts, more missile proliferation as well as their more uninhibited use in future conflicts can be anticipated. It may, therefore, be useful to

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examine some of the trends in the development and employment of missiles that are likely to become prominent in future. This article briefly discusses two trends: dual-capable missiles and hypersonic missiles.

**Dual-Capable Missiles:** Dual-capable missiles can carry both conventional and nuclear payloads. During the Cold War, the superpowers maintained a distinction between missiles on the basis of nuclear and non-nuclear ordnance delivery. This

trend was disrupted in the early 2000s, when the US introduced the concept of Conventional Global Prompt Strike. Since the most pertinent threat

perception for the US after 9/11 was the possibility of a terrorist strike, it felt the need for a capability that could hit time-sensitive targets hiding in hardened shelters or buried deep in caves. In order to hit them quickly, the US concluded that it should use existing ICBMs with conventional warheads.

This option, however, caused concern in Russia and China. Both feared that conventionally-armed, highly accurate ICBMs could also be used to attack their nuclear forces, with adverse impacts for their deterrence. One of the many steps they have since taken to restore deterrence has been to move towards developing and deploying dual-use capable missiles. The objective of dual-use capability is to signal ambiguity and deter the possibility of an American attack on their nuclear assets.

China has not only claimed dual-capability roles for some of its missiles, but also co-mingled them. So, for instance, both the nuclear and conventional versions of China's DF-26 missiles are available within the same brigade. They are also under the PLARF's common command and control. China finds this policy of intertwining conventional and nuclear forces useful to deter the US threat of long-range precision-strike missiles. US fears the nuclear entanglement. But Beijing believes that the US can be better deterred if it has to think twice about using its missiles since this may result, even if inadvertently, in targeting sites where nuclear and conventional assets are co-located, or hitting missiles that are dual-capable. So, while the US may have planned to hit conventional Chinese missiles, China may perceive it as an attack on its nuclear missiles, and choose to escalate. Pakistan follows the same logic to deter a conventional conflict with India.

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**Hypersonic Missiles:** The second trend is the development and deployment of hypersonic missiles, including hypersonic boost-glide vehicles (HGV) and hypersonic cruise missiles (HCMs). Both travel through the upper atmosphere at speeds faster than Mach 5. While existing ICBMs, too, attain and sustain hyper-sonic speeds, it is only during their boost and terminal phase. Most of a hypersonic delivery system's flight is at high speeds and with high levels of maneuverability. This creates challenges for their interception by missile defence systems. When equipped with suitable guidance systems, they can be used for precision

strikes against fixed, high-value targets, such as command-and-control installations or hardened bunkers, and potentially time-sensitive mobile targets, such as maritime vessels. China has an advanced and well-funded hypersonic-missile research programme. Its DF-17 HGV was unveiled in October 2019 and is believed to be dual-capable. The US has declared a conventional role for its hypersonic systems.

**If a state's early warning system detects an inbound HGV or HCM, but is uncertain about its payload and is unable to determine its exact target due to its maneuverability, would military-planners prefer more reactive postures, such as launch-on-warning or 'launch-under-attack'? Doing so might enhance deterrence, but it would also raise risks of inadvertent escalation and mis-calculation.**

Russia has used the Kinzhal, a dual-capable hypersonic missile, in conventional mode against Ukraine. Since it was employed in a conflict between a nuclear and non-nuclear state, the nature of the missile caused less consternation. However, what would be the impact of the use of such

missiles between two nuclear-armed states? If a state's early warning system detects an inbound HGV or HCM, but is uncertain about its payload and is unable to determine its exact target due to its maneuverability, would military-planners prefer more reactive postures, such as launch-on-warning or 'launch-under-attack'? Doing so might enhance deterrence, but it would also raise risks of inadvertent escalation and mis-calculation.

Conscious of this risk, India has maintained a distinction between its conventional and nuclear missiles as well as their command-and-control systems. This drastically reduces risks of misperception, especially when the fog of war engulfs a crisis.

The two missile trends discussed above are really the tip of the iceberg. An offence-defence spiral looks inevitable as states hedge and technologies gallop. Existing regimes meant to stem the proliferation of missile technologies, such as the MTCR or the Hague Code of Conduct, appear grossly insufficient. Not only is their membership devoid of any ways of enforcing compliance, but they are also ill-equipped to handle new technological realities. Meanwhile, any chance to reform them also looks difficult. None of the big powers are keen to take ownership of the challenge. As a result of high inter-state tensions and trust deficit, states are devoting attention to building missile capabilities instead of arresting their development. Unless inter-state relationships improve through dialogue, missiles and the possibilities of their use will only proliferate.

Source: [http://ipcs.org/comm\\_select.php?articleNo=5838](http://ipcs.org/comm_select.php?articleNo=5838), 25 November 2022.

**OPINION – Sitakanta Mishra**

**The Atomic Panacea: Non-Power Applications of Nuclear Technology**

Nuclear power is increasingly viewed as a clean energy source and a viable alternative to hydrocarbons which is depleting and also the major cause of climate change. It may take a few more decades to harness the full potential of nuclear power which is capable of meeting the

energy requirement of entire humanity; but very few are aware of the enormous 'non-power application' of nuclear technology, especially in the field of health, agriculture, water resources, environment, industry, etc. primarily enriching human life in numerous ways across the globe.

**It may take a few more decades to harness the full potential of nuclear power which is capable of meeting the energy requirement of entire humanity; but very few are aware of the enormous 'non-power application' of nuclear technology, especially in the field of health, agriculture, water resources, environment, industry, etc. primarily enriching human life in numerous ways across the globe.**

Medical industry is the largest beneficiary of nuclear technology, particularly in the field of radiopharmaceutical sector.

This includes diagnostic as well as therapeutic formulations using highly pure radioactive pharmaceutical preparations, safe enough for human administration to cure various ailments, especially cancer and cardiovascular disorders.

**Nuclear technology is capable of enhancing the efficiency of the agriculture sector in various ways. By the use of irradiation technology, the shelf-life extension of perishable food crops can be achieved, thereby supply to long distance is possible. Also, through the Gamma irradiation process high-yielding seed varieties are prepared by inducing mutations and cross-breeding for commercial exploitation.**

'Nuclear medicine' is one of the advanced frontiers in the medical industry with the controlled use of radionuclide for diagnostic imaging which helps treat diseases otherwise impossible to address through traditional methods. Besides, radiation technology and material are also used in the sterilization of medical equipment, and in the

production of biologically advanced supplements. The incredible scope of this industry has led several countries to establish specialized departments to cater to global medical industry needs. For example, the nuclear energy giant Rosatom (Russia) has established a specialized nuclear medicine department. Similarly, India also has established a Radiation Medicine Centre in Mumbai.

Secondly, nuclear technology is capable of enhancing the efficiency of the agriculture sector in various ways. By the use of irradiation technology, the shelf-life extension of perishable food crops can be achieved, thereby supply to long distance is possible. Also, through the Gamma

irradiation process high-yielding seed varieties are prepared by inducing mutations and cross-breeding for commercial exploitation. Evidence suggests that employment of irradiation technology can improve yield by 10-40 per cent for potatoes and leafy vegetables, 10-12 per cent for rice, 10-15 per cent for corn and wheat, and 7-15 per cent for Barley. Radiation technology is also used to address pest control. Through Sterile Insect Technique, environment-friendly safe options for pest control can significantly minimize crop losses. Furthermore, nuclear technology is also being used to determine soil quality to enable more efficient soil management. Soil moisture neutron probe, a technique to measure the moisture, has proven to be much more effective than conventional sensors, enabling farmers to optimize irrigation as per the soil's needs.

Thirdly, to address the shortage, wastage and contamination of water, the nuclear industry can play a big role. As water level is depleting, judicious use and conservation of water is the need of the hour, and nuclear technology can provide the option for scientific purification of polluted water, effluent treatment, as well as desalinization of seawater. With the application of advanced techniques for the removal of microorganisms, turbidity and toxic contaminants, the nuclear industry helps in addressing water conservation. To treat sea water, the nuclear desalination process uses the excess heat from a nuclear power plant to evaporate sea water and to condense the pure water.

**Most importantly, nuclear technology is helping urban development authorities for management of municipal sewage sludge by using radiolytic hygienisation techniques which produce pathogen-free sludge to be used as bio solids for providing micronutrients to the soil. India has established Asia's first radiation treatment plant to hygienize municipal sewage sludge, the Sludge Hygienisation Research Irradiator, in Vadodara, Gujarat.**

**The heavy water which is a component highly demanded in the nuclear industry finds its non-power application in areas like metabolism studies, NMR solvents, deuterated drugs, optical fiber, semi-conductors, medicinal chemistry, etc. Nuclear technology also finds its use in archeology where it helps archeologists to know the timelines or lifecycles of unearthed relics and documents.**

Moreover, with the help of nuclear techniques, scientists can determine the quantity and quality of water supplies by "using naturally occurring isotopes as tracers to find out where groundwater comes from, if it is recent or old, if it is being recharged or polluted and how it travels" which is called isotope hydrology. Most importantly, nuclear technology is helping urban development authorities for management of municipal sewage sludge by using radiolytic hygienisation techniques which produce pathogen-free sludge to be used as bio solids for providing micronutrients to the soil. India has established Asia's first radiation treatment plant to hygienize municipal sewage sludge, the Sludge Hygienisation Research Irradiator, in Vadodara, Gujarat.

Fourthly, nuclear technology is used in varieties of applications in industry such as gamma radiometry, scanning of industrial process columns, control systems using nucleonic gauges for level, thickness, moisture and density measurements, voidage determination, analysis of mixers, well logging and elemental nucleonic methods. The nucleonic gauges based on ionizing radiation are extensively used these days for quality control and online monitoring of production processes in the industrial sector. Known as 'industrial radiography' nuclear technology and material is used in welding, casting parts or composite pieces inspection, in food inspection and luggage control, in sorting and recycling, in EOD and IED analysis, aircraft maintenance, ballistics, turbine inspection, in surface characterisation, coating thickness

measurement, in counterfeit drug control, so on and so forth. Moreover, nuclear technology can help in the preservation of historic monuments through specific preservatory processes.

Besides, in many other sectors nuclear technology or material are increasingly used largely for betterment of human life. For example, nuclear energy is also getting increasingly applied in the beauty and skincare sector. The heavy water which is a component highly demanded in the nuclear industry finds its non-power application in areas like metabolism studies, NMR solvents, deuterated drugs, optical fiber, semi-conductors, medicinal chemistry, etc. Nuclear technology also finds its use in archeology where it helps archeologists to know the timelines or lifecycles of unearthed relics and documents.

The list of non-power applications of nuclear technology and material is huge and fast increasing. Interestingly, there is less awareness among the public of the wide application of this technology other than power generation.

Therefore, many times, nuclear technology is demonized and public perception on anything nuclear is largely negative. It is high time that the authorities and scientists extensively reach out to the public and spread the utility of nuclear industry which is catering to the larger society in numerous ways.

Source: <https://health.economictimes.indiatimes.com/news/industry/the-atomic-panacea-non-power-applications-of-nuclear-technology/95784895>, 26 November 2022.

**OPINION – Patty-Jane Geller**

**The Gaping Logic Hole in the Administration's Nuclear Posture Review**

The Biden administration's decision to cancel the nuclear sea-launched cruise missile (SLCM-N) has

been hotly debated since it was announced in April. The recently released Nuclear Posture Review only casts further doubt on the decision. Initially proposed in 2018, the missile was one of two new capabilities intended to address the growing disparity in tactical nuclear weapons between the United States and its adversaries. The other new capability, a low-yield submarine-launched ballistic missile called the W76-2, has already been deployed. Since these supplemental capabilities were proposed, the threats they were meant to deter have only worsened, making their need even more acute. Russia is openly threatening to use its nuclear

weapons to coerce the West in its war of aggression in Ukraine, and China has embarked on a nuclear buildup that rivals the biggest expansions in history. So, what drove the administration to cancel the SLCM-N program? Recent testimony of several top U.S. military leaders (including the Chairman and Vice-Chairman of the Joint Chiefs of Staff, along with the Commander of U.S.

Strategic Command) in support of the SLCM-N calls into question whether the SLCM-N was cancelled for national security reasons.

The administration's newly released Nuclear Posture Review correctly recognizes the growing nuclear threat and rightly predicts that adjustments to strategy and force structure may be necessary to ensure deterrence remains effective. Yet, despite this realistic assessment, the review proceeds to dismiss the SLCM-N as "no longer required to meet our deterrence needs." You'd think that, given Russia's explicit nuclear threats and China's nuclear breakout, those deterrence requirements would be increasing, not decreasing. So, what gives?

Unfortunately, the review fails to connect the dots between the worsening threat environment and the administration's decision. Its central argument

**Unfortunately, the review fails to connect the dots between the worsening threat environment and the administration's decision. Its central argument for canceling the SLCM-N is a surprising one: the SLCM-N is no longer necessary because the W76-2 has been deployed. This implies that the W76-2, by itself, is sufficient to deter the advancing Russian and Chinese nuclear threats now and in the foreseeable future. Such logic is fatally flawed.**

for canceling the SLCM-N is a surprising one: the SLCM-N is no longer necessary because the W76-2 has been deployed. This implies that the W76-2, by itself, is sufficient to deter the advancing Russian and Chinese nuclear threats now and in the foreseeable future. Such logic is fatally flawed. The two systems were explicitly proposed as a pair of capabilities that would complement each other. Military leaders made clear that the evolving nuclear threat required *both* systems; it never was an “either/or” deal. Earlier this year, Commander of U.S. Strategic Command, Admiral Richard, warned Congress that “a deterrence and assurance gap exists.” This assessment was made despite the deployment of the W76-2.

Indeed, while both systems were intended to increase our ability to deter battlefield nuclear use by providing proportional responses, they satisfy this need in different ways. The W76-2 was developed as a stopgap measure intended to provide a limited capability to help deter the use of battlefield nukes in the near-term. The SLCM-N was under development as a longer-term response. The W76-2 is deployed on strategic nuclear submarines. The SLCM-N, however, can be deployed on attack submarines or surface ships within both the European and Indo-Pacific theaters. This would increase the credibility of our nuclear response options to potential Russian or Chinese limited nuclear use and strengthen allied confidence in our extended deterrence commitments.

Moreover, the W76-2 alone is unable to address the numeric growth in Chinese and Russian nuclear arsenals. Since the W76-2 is deployed on a strategic system, it is limited by the treaty caps in New START. Despite being a “new” capability, it cannot be used to increase the overall size of the U.S. nuclear arsenal. Effectively, its deployment only meant that a small number of already-deployed warheads were replaced with modified low-yield versions.

The argument that just a handful of low-yield warheads could pace the growth in Russian and Chinese nuclear arsenals is simply not credible. As a new program, the SLCM-N could be deployed in sufficient numbers to help meet increasing deterrence requirements. Failing to adjust the size of the U.S. arsenal will only allow the existing imbalance in non-strategic nuclear forces to continue to grow—which is profoundly destabilizing. Fortunately, Congress seems to understand these points. It has already signaled its intent to overturn the Administration’s decision, as leaders in both chambers and parties have included funding for the SLCM-N in their defense policy bills for the upcoming fiscal year. Hopefully, the Administration will realize the error of its logic and move to reverse its ill-considered decision regarding the SLCM-N.

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Source: <https://www.heritage.org/defense/commentary/the-gaping-logic-hole-the-administrations-nuclear-posture-review>, 21 November 2022.

**OPINION – Kristie Pladson, Neil King**

**Why can’t Germany Break Up with Nuclear Energy?**

The pillar of vapor can be seen billowing into the sky from miles away, but finding the nuclear reactor isn’t that easy. The Emsland Nuclear Power Station is tucked away between a patch of trees and a chemical factory, quietly generating nuclear power for Germany just 10 kilometers (6.21 miles) south of downtown Lingen, a small city in the regional German state of Lower Saxony.... The Emsland reactor is one of the last three nuclear power stations in Germany. All three were meant to be shut down for good on New Year’s Eve this year, bringing a complete end to nuclear energy production in Germany. Then Russia started waging war in Ukraine....

**Major Policy Change:** Until recently, Russia had been a major energy partner to Germany, providing the country with the majority of its oil and natural gas. But tensions over the war in Ukraine upended that partnership. It has left Germany scrambling for alternative supplies as the winter months take hold in Europe, and sent energy prices through the roof. Now the country is rethinking its nuclear phaseout strategy. Today Germany's three existing nuclear reactors produce around 6% of the country's electricity supply. But it wasn't always this way: back in the 1990s, 19 nuclear power plants were producing about a third of Germany's power supply. Then, in 1998, a new center-left government consisting of the Social Democrats and the Greens party moved to get away from nuclear energy, a long-held objective of the Greens. Their prominence had started taking off in the 1980s as they railed against the dangers of nuclear weapons and nuclear energy against the backdrop of the Cold War. The construction of new nuclear plants in Germany ended in 2002 and plans were made to phase out all existing facilities over the next few decades.

**'Fascinating' Technology:** But Germany's dramatic affair with nuclear energy wasn't even close to being over. In 2010, a coalition of the conservative Christian Democrats and the liberal Free Democratic Party came into power and extended the use of nuclear energy by up to 14 years. But just one year later, meltdowns and explosions at the Fukushima nuclear power plant in Japan prompted Germany to do an about-face on this policy. The government returned to the plan for a nuclear phaseout by the end of 2022. Until October this year, when German Chancellor Olaf Scholz ordered the country's three remaining nuclear

power stations to keep operating until mid-April of 2023, less than three months before their planned retirement....

**Growing Energy Needs:** It's foolish to discount the significance of the electricity produced by Germany's nuclear power plants as the country tries to pull off a transition to green energy... "We will need more electric power in the future. That's a fact," he said, thinking of things like electric cars and heat pumps. "And 6% can be a lot to miss when there is nothing new [to replace it]. We'd be losing 6% when we really will need more." Many Germans seem to agree. While the majority of the public was in favor of the nuclear phaseout following the Fukushima disaster, as of August this year over 80% were in favor of extending the lifespan of Germany's existing nuclear reactors....

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**Disaster Fears:** But fears of a nuclear disaster and the unresolved question of what to do with radioactive nuclear waste still have many convinced the extension is the wrong move....

**Nuclear plants produce 117 grams of CO2 emissions per kilowatt-hour, according Dutch-based anti-nuclear group WISE, whereas burning lignite, a type of coal, produces over 1,000 grams of CO2 emissions per kilowatt-hour. Despite the changing circumstances...(no) temporary extension turning into a full-blown nuclear renaissance in Germany...**

**Small Carbon Footprint:** Still, many are now seeing nuclear energy as preferable to a fall back to burning coal, another strategy Germany has reached for amid this energy crisis. Nuclear plants produce 117 grams of CO2 emissions per kilowatt-hour, according Dutch-based anti-nuclear group WISE, whereas burning lignite, a type of coal, produces over 1,000 grams of CO2 emissions per kilowatt-hour. Despite the changing circumstances...(no) temporary extension turning into a full-blown nuclear renaissance in Germany....

Source: <https://www.dw.com/en/why-is-germany-struggling-to-break-up-with-nuclear-energy/a-63807428>, 21 November 2022.

OPINION – Harlan Ulman

**Lessons from the Cuban Missile Crisis: Putin is No Khrushchev**

Whether history rhymes or not, with war raging in Ukraine and Russian pundits threatening direct nuclear attacks against the US, perhaps some knowledge of the past may be helpful in assessing where this conflict is headed. One could argue that we are now at a comparable moment to 1915, when World War I ground to a bloody stalemate.

Alternatively, is this 1940 after Hitler overran Western Europe? Or have we now reached the modern equivalent of Midway and Stalingrad in 1942, when the course of World War II profoundly shifted in favor of the allies? There is a better analogy. Sixty years ago, the US and Soviet Union faced off in the most dangerous superpower confrontation of the Cold War. But if the Cuban Missile Crisis is to be used as a comparison for the Ukraine war, it is crucial to dispel the myth that Soviet Leader Nikita Khrushchev provoked the crisis. In reality, US President John Kennedy did so by promising to close a so-called missile gap that was actually in America's favor.

For decades, the myth has held that a courageous young US President forced a dangerous adversary to remove Soviet missiles from Cuba. But that rendition is tragically incomplete. Premier Khrushchev was greatly reducing Soviet military spending well before President Kennedy took office in 1961. In January 1960, Soviet reserve forces were cut by one million men. In January 1961, newly elected President Kennedy embarked on a massive nuclear and conventional military buildup.

In April, the disastrous Bay of Pigs invasion of Cuba was launched. Each development disrupted Premier Khrushchev's plans. Facing angry and alarmed generals, Premier Khrushchev would attempt to outflank US strategic superiority at minimal cost by secretly installing short-range nuclear missiles in Cuba, targeting America's east coast. But Premier Khrushchev's ploy failed on all counts. A naval "quarantine" was imposed on Cuba. Premier Khrushchev relented and the Soviet Union began its massive rearmament. Any comparisons with the current situation are not

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exact. Ukraine is not Cuba. Cuba was a Soviet ward, ninety miles off the Florida coast. Ukraine borders both Russia, its enemy, and NATO. NATO was not involved in the Cuban crisis but is engaged in Ukraine. Nor is Russia the USSR. Russia is a nuclear superpower. In 1962, the USSR was not. Similarly, President Putin is not Premier Khrushchev. Khrushchev had a Presidium that two years after Cuba would remove him, whereas President Putin is not so constrained. To Premier Khrushchev, Cuba was not existential. President Putin may view Ukraine differently, especially after announcing the annexation of four partially occupied Ukrainian provinces.

**Putin is not Premier Khrushchev. Khrushchev had a Presidium that two years after Cuba would remove him, whereas President Putin is not so constrained. To Premier Khrushchev, Cuba was not existential. President Putin may view Ukraine differently, especially after announcing the annexation of four partially occupied Ukrainian provinces.**

President Biden is not Kennedy. President Kennedy's response to Soviet missiles in Cuba reflected his failure to understand the real cause of the crisis. After forming a secret Executive Committee (EXCOM) of experts for advice, President Kennedy disregarded Moscow's first threatening hot line message. These were perhaps the two most important decisions of the crisis. He also made all the intelligence public at the UN. Biden did not form an EXCOM. Instead, his staff has conferred with outside experts on an ad hoc basis. Biden has been cautious and even self-detering in rearming Ukraine to prevent



escalation. He released intelligence exposing Russia's invasion plans, which might have had the opposite effect of taunting Putin into attack. What could this mean for Ukraine?

First, the US, NATO, and Russia are currently deadlocked over how to end the crisis. The US refuses negotiations or a ceasefire without a complete Russian withdrawal from Ukraine and a commitment for reparations. President Putin's September 21 speech was regarded by Washington as an ultimatum implying nuclear weapons could be used. President Biden could ignore that warning as President Kennedy did.

However, the annexation of four Ukrainian regions is a further indication of the gravity of the situation. Second, President Kennedy left Premier Khrushchev a way out of the crisis, privately agreeing not to invade Cuba and to withdraw missiles from Turkey. Despite intense political pressure to condemn, punish, and hold

President Putin solely responsible for the invasion, especially from Ukraine that understandably wants all its territory back, some flexibility may be prudent if the war is to be ended.

Third, President Kennedy tightly controlled all negotiations within the EXCOM. President Biden has ceded to Ukrainian President Zelenskyy the right to decide where, when, and how negotiations will take place. Do NATO and the US want to allow a decision or error on Zelenskyy's part to precipitate a wider war? One hopes not. Fourth, are Biden and Putin repeating Kennedy's and Khrushchev's mutual misjudgments and misunderstandings? If yes, is that resolvable? Fifth, the Soviet ambassador in Washington during the

Cuban Missile Crisis, Anatoly Dobrynin, served as a critical, trusted intermediary. Who can be today's Dobrynin, given that Biden has labeled Putin a "war criminal?" This is a good question with no answer.

Source: <https://www.atlanticcouncil.org/blogs/ukrainealert/lessons-from-the-cuban-missile-crisis-putin-is-no-khrushchev/>, 23 November 2022.

**OPINION – Ramzy Baroud**

**World Must Force Israel to Dismantle its Nuclear Arsenal**

**Kennedy left Premier Khrushchev a way out of the crisis, privately agreeing not to invade Cuba and to withdraw missiles from Turkey. Despite intense political pressure to condemn, punish, and hold President Putin solely responsible for the invasion, especially from Ukraine that understandably wants all its territory back, some flexibility may be prudent if the war is to be ended.**

As Western countries float the theory that Russia could escalate its conflict with Ukraine to a nuclear war, many of these governments continue to turn a blind eye to Israel's nuclear weapons capabilities. Luckily, many countries around the world do not subscribe to this endemic Western hypocrisy.

**The debate regarding nuclear weapons in the Middle East could not be any more pertinent or urgent. International observers rightly note that the period following the Russia-Ukraine war is likely to accelerate the quest for nuclear weapons throughout the world. Considering the seemingly perpetual state of conflict in the Middle East, the region is likely to witness nuclear rivalry as well.**

The UN's Conference on the Establishment of a Middle East Zone Free of Nuclear Weapons and Other Weapons of Mass Destruction was held between Nov. 14 and Nov. 18. It had the sole purpose of creating new standards of accountability that, as should have always been the case, apply equally to all Middle Eastern countries.

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witness nuclear rivalry as well.

For years, Arab and other countries attempted to raise the issue that accountability regarding the development and acquisition of nuclear weapons cannot be confined to states that are perceived to be enemies of Israel and the West.

The latest of these efforts was a UN resolution that called on Israel to dispose of its nuclear weapons and to place its nuclear facilities under the monitoring of the International Atomic Energy Agency. The resolution, which was drafted by Egypt with the support of other Arab countries, passed with an initial vote of 152-5. Unsurprisingly, among the five countries that voted against the draft were the US, Canada and, of course, Israel itself.

Blind American and Canadian support of Tel Aviv notwithstanding, what compels Washington and Ottawa to vote against a draft entitled, "The risk of nuclear proliferation in the Middle East?" Keeping in mind the successive right-wing extremist governments that have ruled over Israel for many years, the US must understand that it is a real possibility its ally will use nuclear weapons under the guise of fending off an "existential threat."

Since its inception, Israel has resorted to and utilized the phrase "existential threat" countless times. Various Arab governments, later Iran and even individual Palestinian resistance movements were accused of endangering Israel's very existence. Even the nonviolent Palestinian civil society-led Boycott, Divestment and Sanctions movement was in 2015 accused by then-Prime Minister Benjamin Netanyahu of being an existential threat to Israel. Netanyahu claimed that the boycott movement was "not connected to our actions; it is connected to our very existence."

This should worry everyone, not just in the Middle

East, but the whole world. A country with such hyped sensitivity about imagined existential threats should not be allowed to acquire the kind of weapons that could destroy the entire region several times over. Some may argue that Israel's nuclear arsenal is intrinsically linked to real fears resulting from its historical conflict with the Arabs. However, this is not the case. As soon as Israel finalized its ethnic cleansing of Palestinians from their historic homeland — and long before any serious Arab or Palestinian resistance was carried

out in response — Israel was already on the lookout for nuclear weapons.

As early as 1949, the Israeli army found uranium deposits in the Negev desert, leading to the establishment, in 1952, of the very secretive Israel Atomic Energy Commission. In 1955, the US government sold Israel a nuclear research reactor. But that was not enough.

Eager to become a full nuclear power, Tel Aviv resorted to France in 1957. Paris became a major partner in Israel's sinister nuclear activities when it helped the Israeli government construct a clandestine nuclear reactor near Dimona in the Negev.

The father of the Israeli nuclear program at the time was none other than Shimon Peres, who, ironically, was awarded the Nobel Peace Prize in 1994. The Dimona Nuclear Reactor is now named the Shimon Peres Negev Nuclear Research Center. With no international monitoring whatsoever, and thus with zero legal accountability, Israel's nuclear quest continues to this day. In 1963, Israel purchased 100 tons of uranium ore from Argentina and, during the October 1973 Israel-Arab war, Israel "came close to making a nuclear preemptive strike," according to a 2002 United Press International article written by Richard Sale.

Israel is believed to have "enough fissionable material to fabricate 60-300 nuclear weapons," according to former US Army officer Edwin S.

**Some may argue that Israel's nuclear arsenal is intrinsically linked to real fears resulting from its historical conflict with the Arabs. However, this is not the case. As soon as Israel finalized its ethnic cleansing of Palestinians from their historic homeland — and long before any serious Arab or Palestinian resistance was carried out in response — Israel was already on the lookout for nuclear weapons.**

Cochran. Estimates vary, but the facts regarding Israel's weapons of mass destruction are hardly contested. Israel itself practices what is known as "deliberate ambiguity," sending a message to its enemies of its lethal power without revealing anything that may hold it accountable to international inspection.

What we know about Israel's nuclear weapons has been made possible partly because of the bravery of former technician Mordechai Vanunu, a whistleblower who was held in solitary confinement for a decade due to his courage in exposing the country's darkest secrets. Israel continues to refuse to sign the NPT, which is endorsed by 191 countries.

Israeli leaders adhere to what is known as the Begin doctrine, in reference to Menachem Begin, the right-wing Israeli prime minister who ordered the invasion of Lebanon in 1982, resulting in the killing of thousands. The doctrine is formulated around the idea that, while Israel gives itself the right to own nuclear weapons, its enemies in the Middle East must not be allowed to do the same. This continues to direct Israeli actions to this day.

The US support for Israel is not confined to ensuring the latter has the "military edge" over its neighbors in terms of traditional weapons, but also to ensure Israel remains the region's only superpower, even if that entails escaping international accountability for the development of WMDs. The efforts of Arab and other countries at the UN General Assembly to create a Middle East free of nuclear weapons are welcome. It behooves everyone, Washington included, to join the rest of the world in finally forcing Israel to join the NPT, which would be a

first, critical step toward long-delayed accountability.

Source: <https://www.arabnews.com/node/2207641>, 28 November 2022.

**OPINION – Danielle Zanzalari, Seton Hall**

**Why Nuclear Energy May Be State's Best Clean Energy Bet**

**What we know about Israel's nuclear weapons has been made possible partly because of the bravery of former technician Mordechai Vanunu, a whistleblower who was held in solitary confinement for a decade due to his courage in exposing the country's darkest secrets.**

A recent poll from Pew Research shows that a majority of U.S. adults (69%) want the U.S. to become carbon-neutral by 2050 and want to prioritize developing alternative energy sources. Gov. Phil Murphy announced similar goals three years prior, in

his administration's 2019 Energy Master Plan. He declared a goal for New Jersey to lead the nation in clean energy by becoming dependent on 50% clean energy by 2030 and 100% by 2050.

The questions left outstanding for policymakers are: How do we get there, and at what costs to New Jersey's ratepayers and taxpayers? While these goals are aggressive, New Jersey already is making progress with businesses in clean energy (e.g., PSEG Nuclear Salem and Hope Creek stations, Holtec International, etc.) and through subsidization of other clean energy projects (e.g., Ørsted's Ocean Wind 1 and 2 projects).

**In order to meet the goal of 100% clean energy by 2050, Murphy and the Legislature need to align energy subsidization with economics. This involves supporting clean energy projects, such as nuclear, in the same way we have supported recent wind investments and shifting current subsidies for solar energy to more reliable energy sources.**

However, in order to meet the goal of 100% clean energy by 2050, Murphy and the Legislature need to align energy subsidization with economics. This involves supporting clean energy projects, such as nuclear, in the same way we have supported recent wind investments and shifting current subsidies for solar energy to more reliable energy sources. In order to reach the admirable and desirable 2030

and 2050 goals, New Jersey needs to balance energy economics with politics when deciding how to allocate tax dollars toward our green future.

Here are six thoughts on reaching these clean-energy goals:

### **1. Nuclear Energy is Cleaner and More Reliable**

Currently, 40% of the state's electricity comes from two nuclear plants along the Delaware River, which accounts for 90% of carbon-free energy in New Jersey. Investing in nuclear energy is critical because, unlike other clean energy sources, nuclear plants emit water vapor and warm water when cooling reactors, not carbon dioxide. They also use less carbon-emitting resources, such as cement, when constructing them, compared to wind or solar energy. Since carbon dioxide is a leading cause of the warming planet, investing more in nuclear energy can provide the most environmental benefit.

In addition to being one of the cleanest energy sources, nuclear is also the most reliable. According to analysis from the U.S. Department of Energy, nuclear energy has the highest capacity factor, provides 24/7 power, requires less maintenance and does not rely on uncontrollable elements that lead to irregular energy production, which is common with solar or wind energy. One nuclear reactor produces 1 gigawatt (or 1,000 megawatts) of electricity. It takes 2-4 coal plants, 3.125 million solar panels or 431 utility-scale wind turbines to generate the same amount of electricity. Nuclear energy also uses less land than other clean energy sources and the risks of nuclear energy are very small compared to its vast benefits.

**Investing in nuclear energy is critical because, unlike other clean energy sources, nuclear plants emit water vapor and warm water when cooling reactors, not carbon dioxide. They also use less carbon-emitting resources, such as cement, when constructing them, compared to wind or solar energy.**

**Approximately 19% of all electricity in the U.S. is generated from nuclear sources, despite only 54 nuclear power plants existing in the U.S. Interestingly, New Jersey is currently in the Top 10 of states in producing nuclear energy (and the smallest state by geographic size). If New Jersey expands this industry, it could become a net exporter of nuclear energy — similar to France.**

### **2. Nuclear Energy can be a Billion-Dollar Net Export for N.J.**

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France gets 70% of its energy from nuclear energy due its low cost of generation and gains €3 billion (\$3.006 billion) per year in exporting energy to other European countries. New Jersey could generate

a new state export — energy — if we increase our capacity in nuclear.

### **3. Wait to See the Outcome of State's Large Offshore Wind Investment**

Murphy has pledged to increase electric wind generation to 11,000 megawatts by 2040 with "breezes from the Jersey Shore." This follows President Joe Biden's initiative to have 30 gigawatts of energy by 2030. While diversification of energy is important from an energy security perspective, and wind

energy is cheaper than nuclear and many other clean energy sources, the state Legislature and governor should wait to see whether its current investment provides enough benefits to outweigh the costs before increasing wind subsidies. The projected 11,000 megawatts of electric wind energy are expected to provide energy to about 4.4 million households, but come at the added cost per home of \$3.49 per month in addition to the \$500 million already allocated for a wind port.

#### 4. *The Solar Act is a Waste of Resources*

The Solar Act of 2021 has directed our Board of Public Utilities to double our solar program and obtain 3,750 megawatts of energy by 2026, increasing our solar energy to about 5.1% of total energy. However, this act sets an arbitrary goal without taking into account costs. New Jersey's solar program is one of the most expensive in the country and subsidizes solar at \$210 per megawatt hour and rooftop solar at \$304/MWh. Nuclear energy, on the other hand, is only subsidized at \$11/MWh, yet provides 40% of New Jersey's total energy, compared to the goal of 5.1% for solar. New Jersey should consider abandoning the arbitrary solar energy goal and use that money to subsidize more reliable energy sources.

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#### 5. *Stop Subsidizing Electric Vehicles for the Rich*

New Jersey does not need to provide additional incentives for people to switch to electric vehicles. The federal government already has a program to subsidize up to \$7,500 per vehicle. Research shows that the wealthy are the ones buying electric vehicles and many would have bought them without the subsidy. Subsidizing the purchase of electric vehicles for up to \$5,000 has cost New Jersey taxpayers \$59 million in Year One. This money could have been better spent subsidizing cleaner energy sources for all.

#### 6. *Invest in Startup Wave Energy Companies*

Investing in new energy companies, like those developing clean electricity from ocean waves, could provide clean energy without environmental impact on marine and ocean floor life caused by wind energy. The New Jersey coast makes wave energy a promising potential clean energy investment for New Jersey. Moreover, the

potential award for investing early in wave energy (such as an equity stake) may outweigh the costs of early investments in the technology.

**Final Points:** If New Jersey continues to subsidize clean energy, the state Legislature and governor must focus on energy sources that provide our state with more bang (energy) for our buck (tax dollars). Currently, nuclear energy provides a greater benefit than most other

energy sources yet is subsidized less per megawatt hour than other energy sources. More investment in nuclear energy could make New Jersey a net energy exporter, which not only would provide jobs for our residents but increase income — all factors that need to be considered when allocating our tax dollars.

Source: <https://www.roi-nj.com/2022/11/29/opinion/op-ed/why-nuclear-energy-which-can-be-billion-dollar-net-export-may-be-states-best-clean-energy-bet/>, 29 November 2022.

### NUCLEAR STRATEGY

#### CHINA

#### China's Nuclear Arsenal Likely to Triple by 2035: Pentagon

**The Department of Defense estimates that (China's) operational nuclear warheads stockpile has surpassed 400," the report said. "If China continues the pace of its nuclear expansion, it will likely field a stockpile of about 1,500 warheads" by 2035.**

Washington has identified Beijing as the most consequential challenge to the United States, and the annual report on China's military emphasized improvements to both its nuclear and conventional

forces. China's nuclear arsenal is set to more than triple to 1,500 warheads by 2035, the Pentagon said in a Tuesday report also highlighting the increasing sophistication of the country's air force. Washington has identified Beijing as the most consequential challenge to the United States, and the annual report on China's military emphasized improvements to both its nuclear and conventional forces. "The Department of Defense estimates

that (China's) operational nuclear warheads stockpile has surpassed 400," the report said. "If China continues the pace of its nuclear expansion, it will likely field a stockpile of about 1,500 warheads" by 2035.

That figure would still however lag far behind the arsenals of the United States and Russia, which each include several thousand nuclear warheads. China is also working to modernize its ballistic missiles that could deliver nuclear weapons, launching some 135 in testing during 2021 — "more than the rest of the world combined," excluding those fired in conflicts, the report said. And Beijing's air force is making strides, "rapidly catching up to Western air forces," it said.

A senior defense official, speaking before the report's release, said the Chinese air force is "trying to... progress rapidly on all fronts," including on the equipment it operates as well as its pilots and other personnel. The report takes aim at the way in which China is employing its military in the Indo-Pacific region, saying it has "adopted more coercive and aggressive actions." That is especially the case around Taiwan, the self-governing democratic island Beijing claims as its own. ...

Source: <https://www.ndtv.com/world-news/chinas-nuclear-arsenal-likely-to-triple-by-2035-pentagon-3564250>, 29 November 2022.

### **China Making South China Sea a Nuclear Missile Launchpad**

China is one step closer to turning the South China Sea into a sanctuary for its SSBN, a move that would put the continental United States

within range of its JL-3 SLBM from the semi-enclosed and hotly contested body of water. On November 18, US Pacific Fleet Commander Admiral Paparo acknowledged...that China has fielded its JL-3 SLBM on its six Type 094 SSBNs, giving it the capability to hit the US from waters closer to America's shore...these SSBNs were built to threaten the US and that the US Navy is keeping close track of them. In 2021, the Pentagon said that the PLA-N would gain the capability to target the US from China's coastal waters, with Paparo declining to comment

when asked if China's Type 094 SSBNs have conducted deterrence patrols close to Hawaii.

The JL-3 has an estimated range of more than 10,000 kilometers, which allows China to target the US "from a protected bastion in the South China

Sea.... If true, the JL-3 is a significant improvement over the previous missile, the JL-2, which has a range of 7,200 kilometers...that gives China's Type 094 SSBNs the ability to attack Alaska from the Bohai Sea...As such, the JL-3's introduction may allow China to implement a South China Sea "bastion strategy," obviating the need for its SSBNs to sail into the Pacific

to launch their SLBMs. In this strategy, China would use the South China Sea as a sanctuary for its SSBNs, with the area protected by land-based aircraft and missiles, naval forces and fortified islands.

The South China Sea's semi-enclosed configuration and proximity to China's shores make it an ideal area to implement the strategy, with China's large submarine base in Hainan showing that it is moving in that direction with its SSBN fleet. Logistically speaking, it would be much easier for China to sustain short-range SSBN than open-water patrols with command-and-control facilities stationed in nearby waters. As the South China Sea

**On November 18, US Pacific Fleet Commander Admiral Paparo acknowledged...that China has fielded its JL-3 SLBM on its six Type 094 SSBNs, giving it the capability to hit the US from waters closer to America's shore...these SSBNs were built to threaten the US and that the US Navy is keeping close track of them.**

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is straddled by major SLOCs, the underwater noise environment makes it more difficult to detect China's SSBNs, allowing them to hide amid the area's unique underwater noise, thermal and acoustic features.

Source: <https://asiatimes.com/2022/11/china-making-south-china-sea-a-nuclear-missile-launchpad/>, 22 November 2022.

## **NORTH KOREA**

### **North Korea Plans for World's 'Most Powerful' Arsenal of Nuclear Weapons, Claims Report**

The state-run media KNCA announced that Kim Jong-un is planning to build the most potent nuclear force in the world after successfully testing a long-range ICBM. Many military officials were promoted to higher posts on Saturday in a function where he made this statement. The Supreme Leader said at the function that he intends to make the defences so strong that North Korea would own hundreds of millions of nuclear units. The country aims to seize the most potent strategic force in the world, giving North Korea unprecedented powers. Kim has said that his scientists and comrades in the Republic have created the most powerful strategic weapon in "Hwaseongpo", an intercontinental ballistic missile, according to a report in Mirror.

The Supreme Leader maintains that with the build-up of the nuclear stockpile and missiles and their functionality tested, North Korea has successfully displayed their preparedness and power to the world. With this, they are now poised to become the most powerful in the world, and they will surely be successful in their quest.

North Korea, on November 18, tested the Hwasong-17 ICBM, which landed in the Japan sea. Japan had expressed alarm with the missile landing close to their country in the ocean. It is said that the rogue

nation does this to give it more credibility in negotiations with other powerful countries. ...

Source: <https://economictimes.indiatimes.com/news/international/us/north-korea-plans-for-worlds-most-powerful-arsenal-of-nuclear-weapons-claims-report/articleshow/95835238.cms>, 28 November 2022.

## **RUSSIA**

### **Russia's 200-Ton 'Monster Missile' RS-28 Sarmat ICBM that can Fire Hypersonic Weapons Enters Serial Production**

**The country aims to seize the most potent strategic force in the world, giving North Korea unprecedented powers. Kim has said that his scientists and comrades in the Republic have created the most powerful strategic weapon in "Hwaseongpo", an intercontinental ballistic missile, according to a report in Mirror.**

...The serial production of the latest R-28 Sarmat intercontinental ballistic missile has started in Russia...the R-28 Sarmat missile will boost the Russian military's combat capability over the next 40 to 50 years to ensure the nation's security...this ICBM would become the primary means of the nuclear deterrent... This announcement comes at a time when Russia is allegedly reeling through difficult times due to a shortage of missiles in its arsenal. With Ukraine having retaken some of the territories that Moscow occupied in the initial weeks of the operations, there's a significant need to hold on to other regions in the south...

primary means of the nuclear deterrent... This announcement comes at a time when Russia is allegedly reeling through difficult times due to a shortage of missiles in its arsenal. With Ukraine

**The R-28 Sarmat missile will boost the Russian military's combat capability over the next 40 to 50 years to ensure the nation's security...this ICBM would become the primary means of the nuclear deterrent**

Source: <https://eurasianimes.com/russias-200-ton-rs-28-sarmat-icbm-hypersonic/>, 24 November 2022.

## **BALLISTIC MISSILE DEFENSE**

## **JAPAN**

### **Two Japanese Destroyers Score in Ballistic Missile Defense Test Off Hawaii**

Two Japanese Maya-class destroyers successfully test-fired SM-3 interceptors against ballistic missile targets off Hawaii...the Japan

Maritime Self-Defense Force (JMSDF) announced on November 21. The tests at the Pacific Missile Range on Kauai Island, Hawaii, validated the ballistic missile defense capabilities of Japan's newest destroyers JS Maya (DDG-179) and JS Haguro (DDG-180) in cooperation with the U.S. Navy and U.S. Missile Defense Agency. On November 16, Maya fired an SM-3 Block IIA missile, successfully intercepting the target outside the atmosphere in the first launch of the missile from a Japanese ship. The SM-3 Block IIA has two distinct new features: larger rocket motors that will allow the missile to defend broader areas from ballistic missile threats and a larger kinetic warhead.

**The tests at the Pacific Missile Range on Kauai Island, Hawaii, validated the ballistic missile defense capabilities of Japan's newest destroyers JS Maya (DDG-179) and JS Haguro (DDG-180) in cooperation with the U.S. Navy and U.S. Missile Defense Agency.**

On November 18, Haguro fired an SM-3 Block IB missile with a successful hit outside the atmosphere. This was the first time the two ships conducted SM-3 firings in the same time period. In a Sunday test, the two ships worked together to share tracking data in a simulated ballistic missile shutdown. "The success of this joint test marks a critical milestone in demonstrating, for the first time, a live fire of an SM-3 BIK IIA from a Japanese ship"....

**After further missile attacks (from Russia), I turned to (Germany) to have the proposed (Poland) Patriot batteries transferred to (Ukraine) and deployed at the western border".... "This will protect (Ukraine) from further victims and blackout and will increase security at our eastern border.**

"The cooperative development of the SM-3 BIK IIA by the Japanese government, U.S. government and industry team, and the integration with the Aegis Weapon System on Japan's Ballistic Missile Defense-capable ships, is a remarkable achievement and vitally important in defending against an ever-increasing threat. I congratulate the Japan Maritime Self Defense Force, U.S. Navy, MDA team, and our industry partners on this accomplishment." Maya and Haguro are Japan's newest destroyers, commissioned in 2020 and 2021 respectively, and, along with the two Atago-class and four Kongo-class destroyers, are equipped with the Aegis

Combat System. Japan is planning to build two Aegis destroyers with BMD capabilities....

Source: <https://news.usni.org/2022/11/21/two-japanese-destroyers-score-in-ballistic-missile-defense-test-off-hawaii>, 21 November 2022.

## POLAND

### Poland Says Ukraine should Get Patriot Missile Air Defense System Offered by Germany

Poland's defence minister Blaszczak said on November 23 the Patriot missile defense system that Germany offered Poland should go to Ukraine instead. "After further missile

attacks (from Russia), I turned to (Germany) to have the proposed (Poland) Patriot batteries transferred to (Ukraine) and deployed at the western border".... "This will protect (Ukraine) from further victims and blackout and will increase security at our eastern border."

Ukraine's ambassador to Warsaw, Vasyl Zvarych, responded.... "We need as many modern anti-missile systems as possible to keep the sky above Ukraine safe. Successful defense of (Ukraine) against Russia is a contribution to the security of Poland and the whole of Europe, because Russian terror does not respect borders." Germany's offer to

Poland came after a missile hit Polish territory and killed two people near the Ukrainian border on November 15. The leaders of Poland and NATO said that projectile was likely fired by Ukrainian forces defending their country against Russian strikes, and that the incident appeared to be an accident....

Source: <https://egyptindependent.com/poland-says-ukraine-should-get-patriot-missile-air-defense-system-offered-by-germany/>, 24 November 2022.



SOUTH KOREA

South Korea has Allegedly Successfully Tested its L-SAM Anti-missile Defense System

...South Korea has successfully tested its cutting-edge Long-range Surface-to-Air Missile (L-SAM) missile interception system. A crucial component of the country's envisioned layered missile defense shield known as the Korea Air and Missile Defense (KAMD) intended to counter advancing threats from North Korea. The L-SAM is a local air defense system currently being developed by the government-run Agency for Defense Development (ADD) with ABM capabilities.... The L-SAM is a cutting-edge indigenous weapon system currently being developed to defend against long-range/high-altitude aerial vehicles while combining with Cheongung II to provide multi-layered missile defense. The latter weapon, a Medium-range Surface-to-Air Missile (M-SAM), is already in use and is designed to eliminate threats posed by lower-tier ballistic missiles.

A kill vehicle with a divert and attitude control system (DACS) is utilized by the anti-ballistic missile defense system to provide movement during the terminal phase of the engagement. The kill vehicle interceptors are believed to have a range of about 90 miles (145 km) and are designed to eliminate high-speed ballistic targets at great heights, up to between 25 miles (40 km) and 60 miles (97 km). The KAMD is the name given to South Korea's layered air defense system, which includes the L-SAM and M-SAM. South Korea can also use other ABM-capable systems, such as the Patriot PAC-3 provided by the United States. Thanks to two different missile types—one for taking out airplanes and other air-breathing threats and another for destroying ballistic missiles—the L-

**The L-SAM is a cutting-edge indigenous weapon system currently being developed to defend against long-range/high-altitude aerial vehicles while combining with Cheongung II to provide multi-layered missile defense.**

**Similar to the US THAAD, the L-SAM, or Long-range Surface-to-Air Missile, is designed to fire down ballistic missiles at an altitude of 50 to 60 kilometers. The government-run Agency for Defense Development (ADD) will finish the system's development by 2024, with mass production set to begin in 2026 and deployment as early as 2027.**

SAM can take on various aerial threats.

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in 2026 and deployment as early as 2027....

Source: <https://interestingengineering.com/innovation/south-korea-anti-icbm-defenses>,

23 November 2022.

NUCLEAR ENERGY

CHINA

China Plans to Build its First Moon Base Powered by Nuclear Energy by 2028

China plans to build its first base on the moon by 2028, ahead of landing astronauts there in subsequent years as the country steps up its challenge to NASA's dominance in space exploration. The lunar base will likely be powered by nuclear energy.... Its basic configuration will consist of a lander, hopper, orbiter and rover, all of which would be constructed by the Chang'e 6, 7 and 8 missions.... Nuclear energy can address the lunar station's long-term, high-power energy needs.... China has ramped up its ambitions in space in recent years, sending probes to the moon, building its own space station and setting its sights on Mars....

Source: [https://www.business-standard.com/article/international/china-plans-to-build-its-first-moon-base-powered-by-nuclear-energy-by-2028-122112500622\\_1.html](https://www.business-standard.com/article/international/china-plans-to-build-its-first-moon-base-powered-by-nuclear-energy-by-2028-122112500622_1.html), 26 November 2022.

**GENERAL**

**Will the World See a U-Turn in Nuclear Energy?**

The global energy crisis brought about by Russia's invasion of Ukraine has increased interest in alternative energy sources, including nuclear, around the world. However, as Statista's Katharina Buchholz explains below, the age of nuclear infrastructure, the fact that the technology had entered a phase-out mode in many nations, and the continued resistance to new nuclear projects complicates a quick u-turn for many nuclear programs.

**Poland at the end of October announced that it is looking to start using nuclear energy in 2033. Around that time, six other nuclear programs - among them the ones in Belgium, Germany, Switzerland and Spain - will be scheduled to have shut down, even though this could now be subject to change. Balancing out a dip in nuclear programs could be Italy, which is discussing taking up the technology again under its new right-wing government.**

As seen in data by the World Nuclear Industry Status Report, most nuclear energy programs were started in the 1970s, a fact that reflects in the age of nuclear reactors today. Despite some nuclear programs having ended (and many more scheduled for phase-out), the number of nuclear programs in the world has plateaued for many decades as some nations still take up the technology, most recently the UAE and Belarus in 2020. Poland at the end of October announced that it is looking to start using nuclear energy in 2033. Around that time, six other nuclear programs - among them the ones in Belgium, Germany, Switzerland and Spain - will be scheduled to have shut down, even though this could now be subject to change. Balancing out a dip in nuclear programs could be Italy, which is discussing taking up the technology again under its new right-wing government despite abandoning and even outlawing it after the 1986 Chernobyl disaster. More u-turns are possible in Sweden and

**Some small steps towards nuclear extension are happening in countries known for die-hard opposition to nuclear energy, but they are facing the expected roadblocks. Germany recently extended the ability to use its remaining three reactors until April 2023 among a lively public debate. Originally, the country had planned to shut off all reactors by the end of this year.**

the Netherlands.

Some small steps towards nuclear extension are happening in countries known for die-hard opposition to nuclear energy, but they are facing the expected roadblocks. Germany recently extended the ability to use its remaining three reactors until April 2023 among a lively public debate. Originally, the country had planned to shut off all reactors by the end of this year. In Japan, which reduced the number of operating reactors significantly since the Fukushima disaster in 2011, some reactors are approaching 60 years of

age – the former lifespan cap that the country might now do away with due to the current circumstances. In Belgium, where mean reactor age is above 40 years, a petition to postpone the September shut-off of one reactor failed, while the government extended the end-of-life of three others from 2023 to 2025 after the invasion of Ukraine and might even run some until 2035.

Despite the plateau in nuclear energy programs, the relative importance of the technology has still decreased as the capacity of other energy types outgrew nuclear. In 2021, the technology produced less than 10 percent of global electricity, down from a high of 17.4 percent in 1995 and 1996. Looking at all of the world's energy needs, not just electricity, nuclear contributed just 4.3 percent.

*Source: <https://oilprice.com/Alternative-Energy/Nuclear-Power/Will-The-World-See-A-U-turn-In-Nuclear-Energy.html>, 26 November 2022.*

## RUSSIA

### Russia's Nuclear Fuel Firm Busy 'Breeding' New Kinds of Fuels, Technology

Russian nuclear fuel manufacturer TVEL Fuel Company is "breeding" or developing new kinds of fuels and technologies that increase refueling cycle; a balanced integrated fuel cycle for traditional and fast breeder reactors, 3D printing and others.... TVE Fuel is part of Russia's integrated nuclear power company." All the six 1,000 MW units at Kudankulam in India will be powered by TVS 2M fuel. The fuel has been introduced in Unit 1,"...The earlier fuel that was used in Unit 1 was called UTVS. "In 2024 we will do the same in Unit 2. With the new fuel the units will operate with an 18-month refueling cycle from earlier 12 months."...The units that are under construction — 3,4,5 and 6 — will not need any modification to house the new fuel bundles...nuclear fuel with 6 per cent enrichment will enable operations of VVER-1000 reactors (like the ones that are being set up in India) in longer 24 months fuel cycles.

The extension of the fuel cycle makes the power plant work for a longer period before it is stopped for refuelling. The longer a nuclear power plant works, the more power it generates. The other economic benefits are: purchase fewer fresh fuel assemblies, and also offload less irradiated fuel bundles (handling of spent fuel also requires expenses)...using fuel with uranium enrichment over five per cent may decrease the amount of annually replaced fuel bundles by the rate which would provide a significant economic impact on the power units life cycle.

...Another development at TVEL Fuel is the development of Advanced Technology Fuel (ATF), with new cladding materials, chromium-nickel alloy and zirconium alloy, that enhances the safety.... Another new technology is the development of the dual-component nuclear

power industry with thermal and fast neutron reactors, as well as the introduction of closed nuclear fuel cycle technologies, which are based on fabrication of fresh uranium-plutonium fuel from reprocessed irradiated fuel. The technologies of fast reactors and nuclear recycling enable Rosatom to offer to its foreign customers a new integrated product — Balanced Nuclear Fuel Cycle. It is aimed at fundamental reduction of both, the volume of nuclear waste sent for disposal, and its radiation activity level. It will multiply increase the feed-stock base of nuclear energy through involvement of secondary nuclear fuel cycle products, such as depleted uranium and plutonium...The Balanced Nuclear Fuel Cycle is part of the big major strategy of the Russian nuclear power sector.

To the query on supply of such fuel bundles to the Kudankulam units as India is also following a closed nuclear fuel cycle...there should be reference experience before that. By 2030, there will be sufficient reference

experience to export the Balanced Nuclear Fuel Cycle. On the reprocessing of the spent fuel at Kudankulam reactors...Russia can reprocess the same at India's request and also supply fuel with reprocessed uranium.

Source: [https://www.business-standard.com/article/international/russia-s-nuclear-fuel-firm-busy-breeding-new-kinds-of-fuels-technology-122112200289\\_1.html](https://www.business-standard.com/article/international/russia-s-nuclear-fuel-firm-busy-breeding-new-kinds-of-fuels-technology-122112200289_1.html), 22 November 2022.

## UK

### Sizewell C Nuclear Power Plant Backed by Government

A new £20bn nuclear power plant would help Britain move towards "greater energy independence", the business secretary said as he backed the plans. Grant Shapps visited the Suffolk coast to mark the signing of contracts with French energy firm EDF for £700m of government investment in Sizewell C. He said ministers were

**The extension of the fuel cycle makes the power plant work for a longer period before it is stopped for refuelling. The longer a nuclear power plant works, the more power it generates. The other economic benefits are: purchase fewer fresh fuel assemblies, and also offload less irradiated fuel bundles (handling of spent fuel also requires expenses).**

also committed to developing other new nuclear projects and the Energy Security Bill.

Critics said there was a “huge amount” of money still to find for the project. The two-reactor plant, claimed to be able to generate 7% of the UK’s electricity needs, was approved by the government in July when Boris Johnson was prime minister. It had been rumoured to be under review, which Downing Street quashed, and then in the Autumn Statement the chancellor pledged the government’s £700m investment.

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Mr Shapps, the business and energy secretary, said with global gas prices at “record highs”, caused by Russia’s invasion of Ukraine, the nation needed “British energy for British homes”. “Today’s historic deal giving government backing to Sizewell C’s development is crucial to this, moving us towards greater energy independence and away from the risks that a reliance on volatile global energy markets for our supply comes with,” he said. “This is at the heart of a package of measures that - together with the new Great British Nuclear and powers of the Energy Security Bill - will ensure secure supply for now and for generations to come.”

Shadow climate change secretary Ed Miliband said Labour supported the announcement on Sizewell C, new nuclear plants and the return of the “delayed energy bill which should have never been paused”. Under the Sizewell deal, the government would become a 50% shareholder in the project’s development with EDF. Mr Shapps confirmed the deal meant the government had bought out China General Nuclear and that the state-owned Chinese nuclear power company was “no longer involved” in the plans.

The government said its investment was its first

direct input into a new nuclear power project since Sizewell B, which was approved in 1987 and was the last to be built in the UK. EDF’s chief executive, Simone Rossi, said Sizewell C would “deliver another big boost to jobs and skills in the nuclear industry and provide huge new opportunities for communities in Suffolk”. ...

Source: <https://www.bbc.com/news/uk-england-suffolk-63784517>, 29 November 2022.

## NUCLEAR COOPERATION

### JAPAN-POLAND

#### Japanese-Polish Cooperation Continues on High-Temperature Reactor Technology

The President of the Japanese Atomic Energy Agency (JAEA), Koguchi Masanori, and the Director of Poland’s National Centre for Nuclear Research (NCBJ), Professor Krzysztof Kurek have signed an Implementing Arrangement regarding the cooperation in research and development in the field of high-temperature gas-cooled reactors technology. Poland has been cooperating with Japan for several years in implementing the technology of high-temperature gas-cooled reactor (HTGR). This type of test facility was built in Japan and is operating successfully. In May 2021, the Polish Government decided to proceed to the next stage of research and development (R&D) of the HTGR technology, and NCBJ started work on the conceptual design of the HTGR research reactor. The task is to create a basic design and a pre-prepared safety report.

**Poland has been cooperating with Japan for several years in implementing the technology of high-temperature gas-cooled reactor (HTGR). This type of test facility was built in Japan and is operating successfully.**

After establishing research cooperation in 2019, NCBJ and JAEA started negotiations to expand cooperation in the area of research and development in the field of HTGR technology. An

Implementing Arrangement signed by JAEA and NCBJ in September 2019 has now been supplemented. The new arrangement provides for R&D cooperation on the project of the main HTGR research reactor, which would be built in Poland at the NCBJ. The contract concluded in parallel provides for the provision of technical information to NCBJ regarding the Japanese HTGR R&D. The documentation, which JAEA will hand over to NCBJ by 2024, will be intended for joint use in the partners' work.

Source: <https://www.neimagazine.com/news/newsjapanese-polish-cooperation-continues-on-high-temperature-reactor-technology-10381447>, 24 November 2022.

#### **MYANMAR–RUSSIA**

##### **Myanmar and Russia Agree to Establish Nuclear Technology Hub in Yangon**

...According to a report published on November 21...the Myanmar junta's Science and Technology Minister Dr. Kyaw signed a deal at the nuclear technology center in St. Petersburg on November 18 with Rosatom, Russia's state-run nuclear corporation, to establish a similar institution in Yangon, Myanmar's largest city. The agreement represents a step on the roadmap for nuclear energy cooperation that the military junta signed with Rosatom during the Eastern Economic Forum in Vladivostok in September 2022, which could culminate in the possible construction of a modular reactor project in Myanmar.

...Rosatom said that the roadmap would guide cooperation in the field of "peaceful use of atomic energy" for 2022-23...the Russia-Myanmar agreement "provides for the expanding of bilateral legal framework, possibility of implementing a small modular reactors project in Myanmar, as well as personnel training and work

**Russia-Myanmar agreement "provides for the expanding of bilateral legal framework, possibility of implementing a small modular reactors project in Myanmar, as well as personnel training and work related to the improvement of public acceptance of nuclear energy in Myanmar.**

related to the improvement of public acceptance of nuclear energy in Myanmar."...The Myanmar-Russia nuclear cooperation is the fruit of the converging strategic interests of the two nations, at a time when both are under growing international pressure... However, it remains an open question whether the military administration will still be in power for as long as it takes for Myanmar to develop a workable civilian nuclear capability.

Source: <https://thediplomat.com/2022/11/myanmar-and-russia-agree-to-establish-nuclear-technology-hub-in-yangon/>, 22 November 2022.

#### **RUSSIA–BELARUS**

##### **Russia and Belarus Sign Agreement for Spent Nuclear Fuel Management**

Russia and Belarus on November 21 signed an agreement on cooperation in the field of spent nuclear fuel management here.... The draft Agreement contains specific provisions that will regulate the mutual obligations of the Russian and Belarusian parties in the management of spent nuclear fuel from the Belarusian nuclear power reactors.

Source: [https://www.business-standard.com/article/international/russia-and-belarus-sign-agreement-for-spent-nuclear-fuel-management-122112200079\\_1.html](https://www.business-standard.com/article/international/russia-and-belarus-sign-agreement-for-spent-nuclear-fuel-management-122112200079_1.html), 22 November 2022.

#### **RUSSIA–TURKEY**

##### **EU's Sanctions to Not Impede Turkish Akkuyu Nuclear Plant Financing: Rosatom**

Russia's state-run nuclear energy agency said ON 28 November European Union sanctions would not pose an issue for the financing of Türkiye's \$20 billion nuclear power plant. Rosatom is building Akkuyu Nuclear Power Plant, Türkiye's first, on the Mediterranean coast. Ankara aims to start

operating the first reactor at the plant by the middle of 2023, the 100th anniversary of the founding of the Republic of Türkiye.

Akkuyu is the world's first nuclear power plant project implemented through a build-own-operate model. Under the long-term contract, Rosatom has agreed to provide the power plant's design, construction, maintenance, operation and decommissioning. Kirill Komarov, the first deputy CEO of Rosatom, stressed Russia was solely responsible for project financing, which he said is fully funded for the next few years.

The funding comes from Rosatom's own funds and loans from Russian banks. Last year alone, said Komarov, Rosatom for the first time acquired more than \$800 million in green financing from banks, along with regular loans not linked to green commitments. ...Komarov dubbed Akkuyu as the current largest nuclear power plant construction site in the world, with a capacity of almost 5 GW, and the only site in the world where four reactors are being built at the same time. ...With a project of this size, more than 20,000 people are employed on-site, and the most active project phase is currently ongoing, with the scheduled completion of the first unit along with the delivery of nuclear fuel set for 2023.

The remaining three reactors are due to start operation by the end of 2026, at a rate of one per year to ultimately have a total installed capacity of 4,800 MW. Once completed, the plant is expected to produce up to 10% of domestic electricity needs. The plant, which will have an estimated service life of 60 years with the

possibility to extend it for another 20 years, will produce carbon-free energy around the clock. As a baseload plant, it will play a leading role in reducing dependence on imported energy resources, especially natural gas. The giant project is expected to employ around 4,000 people during its operations.

President Recep Tayyip Erdoğan has previously suggested that Türkiye could work with Russia on the construction of two further plants. Negotiations on what would be Türkiye's second nuclear power plant have started, Deputy Energy and Natural Resources Minister Alparslan Bayraktar said. The plant is planned to be built in the northern province of Sinop, Bayraktar said. "We need at least 16 to 20 reactors, according to our initial estimates, or we need 12 to 16 reactors in addition to the Akkuyu Nuclear Power Plant to be a carbon-neutral economy by the turn of the century," he told the Atomexpo 2022 conference.

Bayraktar also disclosed that Türkiye is in talks with South Korean and U.S. companies for nuclear energy development, while negotiations are ongoing with the Chinese government for the third power plant. Rosatom General Manager Alexey Likhachev said with nuclear energy on the verge of a transformation, Russia is prioritizing Türkiye, Bangladesh, Hungary, Egypt and African countries for the construction of nuclear power plants.

Rosatom holds a 99.2% stake in the Akkuyu plant that is estimated to cost around \$20 billion, marking the biggest investment in Türkiye's history implemented at a single site. Komarov refuted claims that the plant would generate power at

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**The plant would generate power at high prices, which when the agreement was signed in 2010 between Russia and Türkiye were expected to be around \$0.12 per kilowatt-hour. According to Komarov, the current generation price range is between \$0.18 and \$0.20 per kilowatt-hour, a level that is much higher than \$0.12 per kilowatt-hour, which will prevail regardless of the cost of uranium in the world or the cost of other energy sources.**

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Source: <https://www.dailysabah.com/business/energy/eus-sanctions-to-not-impede-turkish-akkuyu-nuclear-plant-financing-rosatom>, 28 November 2022.

## **UK-CHINA**

### **UK Removes China from Sizewell Nuclear Project, as Ties with Beijing Sour**

Britain on 29 November removed China General Nuclear from construction of its new Sizewell C power station, announcing it would take a joint stake alongside French partner EDF as relations sour with Beijing. The CGN announcement came after Prime Minister Rishi Sunak warned the "golden era" of UK-China links was "over" and said the Asian giant posed a "systemic challenge" to UK interests and values.

Tuesday's (29 Nov) news comes also with a diplomatic storm brewing over the arrest and alleged assault of a BBC journalist covering widespread protests against Covid restrictions in a rare defiance of the Chinese authorities. Sunak's Conservative government is stripping CGN of its controversial 20 per cent Sizewell stake, and forming a joint venture with EDF.

The UK will invest £700 million (US\$843 million) in the project, a figure that was matched by EDF. Sizewell C, which is under development on the

Suffolk coast in eastern England, will comprise two EPRs or European Pressurised Reactors that will power the equivalent of about 6 million homes. It is expected to start producing electricity from 2035. Nuclear and renewables, such as offshore wind, are seen as critical to ramp up Britain's energy security, after key producer Russia's invasion of Ukraine sent gas and electricity bills rocketing across Europe. EDF, which is in the process of being fully nationalised amid the region's worsening energy crisis, confirmed on Tuesday it is still working with CGN to build Hinkley Point power station in southwestern England.

Hinkley, which has been blighted by delays and soaring costs, will be Britain's first new nuclear power plant in more than two decades and aims to provide 7 per cent of UK power needs. ...The news meanwhile comes as some of EDF's EPR nuclear reactors have been dogged by maintenance issues and delays.

The UK has 15 nuclear reactors at eight sites but many are approaching the end of their lifespan. Sizewell comprises two power plants: Sizewell A, which opened in the 1960s and shut in 2006. Sizewell B, which opened in 1995, is still in operation. Britain is turning to new plants also

to help meet its long-running target of net zero carbon emissions by 2050. The government added it would create Great British Nuclear, a body overseeing development of more projects.

Source: <https://www.scmp.com/news/world/europe/article/3201464/uk-removes-china-sizewell-nuclear-project-ties-beijing-sour>, 30 November 2022.

## **USA-PHILIPINES**

### **Makabayan Bloc, Scientists Oppose US-PH Civil Nuclear Deal**

Lawmakers from the Makabayan bloc and scientists raised opposition to negotiations for a

**Britain on 29 November removed China General Nuclear from construction of its new Sizewell C power station, announcing it would take a joint stake alongside French partner EDF as relations sour with Beijing. The CGN announcement came after Prime Minister Rishi Sunak warned the "golden era" of UK-China links was "over" and said the Asian giant posed a "systemic challenge" to UK interests and values.**

civil nuclear energy cooperation agreement between the US and the Philippines, saying it poses threats to host communities and the environment...filed a resolution urging the House of Representatives to investigate the civil nuclear cooperation deal, also known as the "123 agreement." They said that Filipinos may be used as "guinea pigs" for testing nuclear technologies. "Given the high threats posed to the health and safety of Filipinos and our environment by experimental nuclear technology, it is therefore urgent that Congress and the Filipino people are clued in on the proposed terms and conditions and other details of the said 123 Agreement."...

**They said that Filipinos may be used as "guinea pigs" for testing nuclear technologies. "Given the high threats posed to the health and safety of Filipinos and our environment by experimental nuclear technology, it is therefore urgent that Congress and the Filipino people are clued in on the proposed terms and conditions and other details of the said 123 Agreement."**

The "123 agreement" — announced during the visit of US VP Harris to the Philippines — aims to support collaboration on zero-emission energy and non-proliferation priorities. Once in force, the agreement allows the US to export nuclear equipment and material to the Philippines to help the country achieve energy security and transition to clean energy...While advocates of nuclear energy argued that it is a reliable source of electricity...however...the country will be dependent on imported nuclear technology for plants to function. "Again, we are being held hostage by the whims and wants of those in power to impose a technology that in the end will not benefit the majority of Filipinos."....

**The U.S. nuclear technology plans for Thailand and the Philippines are firsts involving Southeast Asian nations. The SMRs, which can be as small as a bucket and transportable, are to be constructed under "the highest standards of safety, security and nonproliferation."**

Source: <https://www.philstar.com/headlines/climate-and-environment/2022/11/23/2225930/makabayan-bloc-scientists-oppose-us-ph-civil-nuclear-deal>,

23 November 2022

## **USA-THAILAND-PHILIPPINES**

### **US to Supply Thailand, Philippines with Modular Nuclear Reactors**

...Plans by the U.S. to supply its longtime Southeast Asian allies with so-called SMRs were unveiled during US VP Harris' trip to both countries.... While attending the Asia-Pacific Economic Cooperation meetings in Bangkok on

November 19-20, Harris launched a new clean energy partnership with Thailand. From there, the VP went to the Philippines where she announced that Washington and Manila were starting negotiations on the 123 Agreement, which would allow for civilian nuclear cooperation.

The U.S. nuclear technology plans for Thailand and the Philippines are firsts involving Southeast Asian nations. The SMRs, which can be as small as a bucket and transportable, are to be constructed under "the highest standards of

safety, security and nonproliferation."... Another country in Southeast Asia that has shown interest in developing such reactors – Indonesia – appears to be looking at designs from several countries.... Small modular reactors generally are defined as advanced nuclear reactors with a capacity of less than 300 MW, according to the IEA.

The agreement with Manila calls for the U.S. and the Philippines to cooperate on advanced nuclear technologies to ensure energy security as that Southeast Asian country transitions to clean energy. Once in force, the 123 agreement "will provide the legal basis for U.S. exports of nuclear equipment and material to the Philippines. The United States is committed to working with the



Philippines to increase energy security and deploying advanced nuclear reactor technology as quickly as safety and security conditions permit to meet the Philippines' dire baseload power needs," the White House said in a statement....

Source: <https://www.benarnews.org/english/news/philippine/nuclear-reactors-11232022142149.html>, 23 November 2022.

**NUCLEAR PROLIFERATION**

**IRAN**

**Iran Planning Massive Expansion of Uranium Capacity – UN Nuclear Watchdog**

The UN nuclear watchdog has confirmed Iran is enriching uranium to 60% at a second plant, amid the breakdown of the nuclear deal with major powers. The IAEA said on November 22 that Iran was also planning a massive expansion of its enrichment capacity. Iran said earlier on November 22 that it had started to enrich uranium to 60% at the Fordo site, having already done so at its above-ground pilot plant at Natanz for more than a year. The increased enrichment was seen as a significant addition to its nuclear programme. Enrichment to 60% purity is one short technical step away from weapons grade, 90%. Nonproliferation experts have warned in recent months that Iran has enough 60% enriched uranium to reprocess into fuel for at least one nuclear bomb.

Iran has always denied any ambition to develop a nuclear bomb, insisting its nuclear activities are for civilian purposes. The move was part of Iran's response to the UN nuclear watchdog's adoption

last week of a censure motion drafted by western governments accusing it of non-cooperation. It also comes as talks have stalled to revive a 2015 landmark deal that curbed Iran's nuclear programme in exchange for sanctions relief. The deal started to unravel in 2018 when the US withdrew and reimposed sanctions. In response, Iran started to step up its nuclear programme....

Source: <https://www.theguardian.com/world/2022/nov/23/iran-planning-massive-expansion-of-uranium-capacity-un-nuclear-watchdog>, 23 November 2022.

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**Iranian Foreign Minister Abdollahian had on November 20 condemned the resolution, accusing the four countries of trying to exert "maximum pressure" on Tehran amid two months of nationwide protests in the Islamic republic.**

**Iran Says Taking Retaliatory Measures Over Nuclear Watchdog's Resolution**

Iran has said it is taking retaliatory measures against the IAEA over a resolution criticizing Tehran's lack of cooperation with the nuclear watchdog. The US, Britain, France, and Germany had on November 17 brought the motion

adopted by the UN agency — the second of its kind within six months. "In response to the recent action of three European countries and the United States in the adoption of a resolution against Iran, some initial measures have been decided by the Atomic Energy Organisation of Iran,"... "The implementation of these measures was realised today in the presence of IAEA inspectors in the Natanz and Fordo enrichment complexes," he added, without specifying what the measures were...the likelihood that the IAEA delegation's next visit to Iran would be cancelled.

Iranian Foreign Minister Abdollahian had on November 20 condemned the resolution, accusing the four countries of trying to exert "maximum

pressure” on Tehran amid two months of nationwide protests in the Islamic republic. The resolution came amid an impasse over undeclared Uranian particles in Iran, and as talks seeking to revive Tehran’s 2015 nuclear deal with world powers have stalled....

Source: <https://www.ndtv.com/world-news/iran-says-taking-retaliatory-measures-over-nuclear-watchdogs-resolution-3539600>, 22 November 2022.

## **NORTH KOREA**

### **India Condemns Ballistic Missile Launches by North Korea at UNSC**

India on November 21 condemned the recent ballistic missile launches by North Korea at the UNSC. India’s Permanent Representative to the UN, Ambassador Kamboj said that the recent ICBM launch by the DPRK “affect the peace and security of the region and beyond.” Incidentally, this was the second meeting on DPRK after Pyongyang fired an intercontinental ballistic missile. The isolated country fired an ICBM toward the East Sea last Friday, the South Korean military said, in protest over the United States move to reinforce its “extended deterrence” protection of South Korea and Japan.... “India condemns the recent ICBM launch by the DPRK. This follows other ballistic missile launches in the preceding month, following which the Security Council had met”... “These launches constitute a violation of resolutions of Security Council relating to the DPRK. They affect the peace and security of the region and beyond.”

The launch is presumed to have involved the Hwasong-17 ICBM...the same ICBM was test-fired on November 3, but the launch was seen as a failure. The launch of the Hwasong-17 ICBM was

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confirmed by the north and was part of a “top-priority defence-building strategy” aimed at building “the most powerful and absolute nuclear deterrence”...calling it “the strongest strategic weapon in the world.” The Hwasong-17 ICBM was called a “monster” of a missile for its sheer size. It is able to carry multiple warheads and has a range of around 15,000 km, according to North Korea, long enough to reach the entire US mainland....

Source: <https://theprint.in/world/india-condemns-ballistic-missile-launches-by-north-korea-at-unsc/1228921/>, 22 November 2022.

## **NUCLEAR SAFETY**

### **GENERAL**

#### **Radiological Protection and Public Health Challenges of SMRs**

SMRs and Generation IV nuclear energy systems could provide new, advanced energy production options to address long-term energy security and environmental challenges. The NEA is considering SMRs across the full range of its ongoing work:

Nuclear safety technology and regulation; Human aspects of nuclear safety; Nuclear science; Development and innovation in the civil use of nuclear energy; Radiological protection of

people and the environment; Radioactive waste and spent fuel management; and Nuclear decommissioning and legacy management. In this context, the Committee on Radiological Protection and Public Health (CRPPH) created a task force to explore and report on the radiological protection and public health challenges related to the deployment of SMRs....

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**The task force identified emergency preparedness and response, compact design, fuel and coolant, radioactive waste management, and human aspects related to SMRs as potential focus areas for further reflection.**

and coolant, radioactive waste management, and human aspects related to SMRs as potential focus areas for further reflection. On this basis, the group plans to produce a report providing a brief high-level analysis of radiological protection and public health challenges related to the deployment of SMRs and a list of priority issues for consideration by the Committee at its next annual meeting in April 2023.

Source: [https://www.oecd-nea.org/jcms/pl\\_76067/radiological-protection-and-public-health-challenges-of-small-modular-reactors](https://www.oecd-nea.org/jcms/pl_76067/radiological-protection-and-public-health-challenges-of-small-modular-reactors), 25 November 2022.

## **SWEDEN**

### **IAEA Mission Says Sweden Is Committed to a High Level of Safety, Sees Areas for Further Enhancement**

An IAEA mission said Sweden has a comprehensive regulatory infrastructure for nuclear and radiation safety and the protection of people and the environment. The team also identified areas for possible improvements, such as ensuring that the Swedish Radiation Safety Authority (SSM), the national regulatory authority for nuclear and radiation safety, has sufficient qualified staff to fulfil all statutory and regulatory functions. The Integrated Regulatory Review Service (IRRS) team concluded today a 12-day mission to Sweden from 14 to 25 November. The mission, conducted at the request of the Government of Sweden and hosted by SSM, was part of the second Swedish IRRS cycle. The first IRRS mission in Sweden took place in 2012 with a follow-up review in 2016. Using IAEA safety standards and international good practices, IRRS missions are designed to strengthen the effectiveness of the national regulatory infrastructure for nuclear and radiation safety, while recognizing the responsibility of each

country.

...The IRRS team made several recommendations and suggestions to further reinforce continuous improvement of the Swedish regulatory system and the effectiveness of the regulatory functions in line with IAEA safety standards.

#### **Recommendations and Suggestions for Sweden**

**Include:** Establishment of a national strategy addressing competence needs, taking into account the possible expansion of nuclear power; Improved coordination between SSM and other national authorities with responsibilities for safety; Further development of expert services in the event of a nuclear or radiological emergency.

The mission will be followed by an IAEA Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS) mission — scheduled for April 2023 — which will assess radioactive waste

and spent fuel management, decommissioning and remediation programmes in the country. The final mission report will be provided to SSM in about three months. Sweden plans to make the report public....

Source: [https://www.iaea.org/newscenter/pressreleases/iaea-mission-says-sweden-is-committed-](https://www.iaea.org/newscenter/pressreleases/iaea-mission-says-sweden-is-committed-to-a-high-level-of-safety-sees-areas-for-further-enhancement)

[to-a-high-level-of-safety-sees-areas-for-further-enhancement](https://www.iaea.org/newscenter/pressreleases/iaea-mission-says-sweden-is-committed-to-a-high-level-of-safety-sees-areas-for-further-enhancement), 25 November 2022.

## **UKRAINE**

### **Power Returns to Nuclear Plants**

Ukraine's four operational nuclear power plant sites now all have access to the national grid once more, a group of IAEA inspectors concluded on November 23 following an inspection visit...the four sites (had) lost off-site power amid Russia's intensified strikes targeting infrastructure. In a statement, IAEA Director General Grossi said on November 23 that the external power connection to the Zaporizhzhya nuclear plant was re-

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established one day after it was disconnected. Although the plant, which is Europe's largest, remains in shutdown mode, safety and security functions depend on access to outside electricity.

The nuclear power plants in Zaporizhzhia, Rivne, South Ukraine, and Khmelnytskyi had been disconnected from the grid and "forced to rely on emergency diesel generators for the electricity they needed to ensure their continued safety and security"...Power has also been restored to Rivne, South Ukraine, Khmelnytskyi and Chornobyl, Grossi said....Meanwhile, Rosatom, the Russian state nuclear energy company, backed an IAEA protection zone around the Zaporizhzhia plant....

Source: <https://www.dw.com/en/ukraine-updates-power-returns-to-nuclear-plants/a-63882550>. 25 November 2022.

### Russia Denies Planning to Give Up Vast Ukrainian Nuclear Plant

The head of Ukraine's state-run nuclear energy company said on Sunday there were signs that Russian forces might be preparing to vacate Europe's biggest nuclear plant, which they seized in March, soon after invading Ukraine. The Zaporizhzhia nuclear power plant in Ukraine is still under Russian control and will remain so, the Kremlin said, after a Ukrainian official suggested Russian forces were preparing to leave.

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in March, soon after invading Ukraine. The Kremlin dismissed the statement. "There's no need to look for signs where there are none and cannot be any," spokesman Dmitry Peskov told reporters on Monday. Ukrainian President Volodymyr Zelensky cautioned on Sunday Russia was "planning new strikes" on his country, urging defence forces and

citizens to be prepared to withstand a new week of strain on the power grid amid freezing temperatures.

Moscow has targeted vital infrastructure in recent weeks, sparking power outages, killing civilians. "We understand that the terrorists are planning new strikes. We know this for a fact," Zelensky said. "And as long as they have missiles, they, unfortunately, will not calm down."

Source: <https://www.mid-day.com/news/world-news/article/russia-denies-planning-to-give-up-vast-ukrainian-nuclear-plant-23257999>, 09 November 2022.

### Putin Fires Cruise Missiles with Dummy Nuclear Warheads at Ukraine because Their Missile Stocks are so Depleted, UK Government Says

Putin is firing cruise missiles with dummy nuclear warheads at Ukrainian targets because Russia's missile stocks are so low.... In an intelligence update on November 26 the UK MoD said the improvisation by the Russian President's struggling forces is 'unlikely to achieve reliable effects'. The evidence cited are pictures of apparently shot down AS-15 Kent air launched cruise missiles, which were said to have been

designed in the 1980s as a nuclear delivery system...the nuclear warheads had probably been substituted for ballast, with the Kremlin's hope likely that the missiles will distract Ukrainian air defences. 'Although such an inert system will still produce some damage through the missile's kinetic energy and any unspent fuel, it is unlikely to achieve reliable effects against intended targets.... 'Whatever Russia's intent, this improvisation highlights the level of depletion in Russia's stock of long-range missiles'....

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Source: <https://www.dailymail.co.uk/news/article-11471743/UK-government-claims-Putin-firing-cruise-missiles-dummy-nuclear-warheads-Ukraine.html>, 26 November 2022.

## **NUCLEAR WASTE MANAGEMENT**

### **USA**

#### **New Mexico Nuclear Waste Repository Begins Filling New Disposal Area**

Workers at the nation's only underground nuclear waste repository have started using a newly mined disposal area at the underground facility in southeastern New Mexico. Officials at the Waste Isolation Pilot Plant made the announcement last week, saying the first containers of waste to be entombed in the new area came from Oak Ridge National Laboratory in Tennessee — one of the many labs and government sites across the country that package up waste and ship it to WIPP.

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In 2014, a fire and separate radiation release forced a nearly three-year closure of the repository and a costly overhaul of the policies and procedures that govern WIPP and the nation's multibillion-dollar cleanup program for Cold War-era waste. Operations had to be reduced after the repository reopened because areas of the facility were contaminated and airflow needed for mining and disposal operations was limited. Now, a multimillion-dollar project is underway to install a new ventilation system, and state regulators are considering a permit change that some critics have said could lead to expanded operations.

The state Environment Department's Hazardous Waste Bureau issued a plan this month aimed at ensuring the public has opportunities to comment on modifications or permit renewal applications. Sean Dunagan, president and project manager of Nuclear Waste Partnership, the contractor that manages the repository, said in a statement that operations

already have become more efficient with the new panel. Creating a panel requires mining nearly 160,000 tons of salt, and it takes about two and a half years to fill it with waste. For example, Panel

7 is filled with 20,056 containers, with most of them being 55-gallon drums.

*Source: Susan Montoya Bryan, <https://www.santafenewmexican.com>, 26 November 2022.*



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