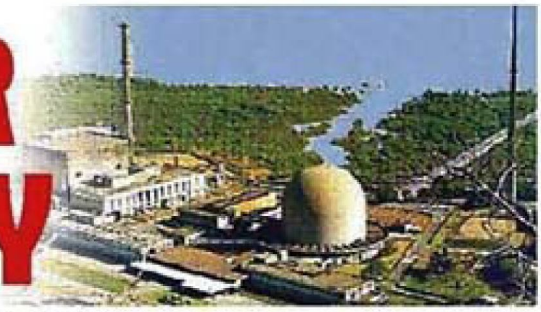
NUCLEAR SECURITY



A FORTNIGHTLY NEWSLETTER ON NUCLEAR DEFENCE, ENERGY AND PROLIFERATION FROM CENTRE FOR AIR POWER STUDIES

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OPINION – Anil Chopra

Could a Desperate Russia use a Nuclear Weapon in Ukraine?

The United States warned of "catastrophic consequences" if Moscow were to cross the line and use nuclear weapons in Ukraine, after Russia's foreign minister said that regions holding referendums would get full protection. Russia is conscious of possible Western support for Ukraine to retake the lost territory. It could raise the risk of a direct military confrontation between Russia and NATO.

Earlier, after a few battlefield losses in eastern Ukraine, Russian President Putin had issued an ambiguous yet threatening warning to use a nuclear weapon. "If the territorial integrity of our country is threatened, we will without a doubt use all available means to protect Russia and our people," he said in a nationally televised speech. "This is not a bluff." There is already talk in Europe to build a nuclear arsenal to deter Russia's nuclear threat. The only country ever to have used atomic bombs was the US in 1945 to strike Hiroshima and Nagasaki, ostensibly to force Japan to surrender in World War II.

If the territorial integrity of our country is threatened, we will without a doubt use all available means to protect Russia and our people," he said in a nationally televised speech. "This is not a bluff." There is already talk in Europe to build a nuclear arsenal to deter Russia's nuclear threat.

Understanding TNW: A tactical nuclear weapon (TNW) is a nuclear weapon designed to be used on a battlefield in military situations. It could involve use with friendly forces in proximity and perhaps even on contested friendly territory. The weapon has a relatively lower explosive power. The TNW could be in the form of gravity bombs, short-range missiles, or even artillery shells among many other means of delivery.

The "tactical" category is not clearly defined in terms of range or yield of the nuclear weapon. In fact, many experts disagree that there is actually a clear distinction between tactical and strategic nuclear weapons. Modern TNW could have yields from one kiloton or less, to as much as 100 kilotons. This is compared to 15 and 20 kilotons used in the atomic bombings of Hiroshima and Nagasaki respectively. One 100-

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kiloton nuclear weapon dropped on New York City could lead to roughly 583,160 fatalities, it is estimated. One can thus imagine the destructive power of a TNW. Yet each side does have some very small TNWs that can cover areas of jurisdiction of a typical Army Battalion or Brigade. But casualties from radiation and fallouts for years ahead could be huge. The area once nuked cannot be easily occupied or governed for a considerable period of time.

Modern TNW could have yields from one kiloton or less, to as much as 100 kilotons. This is compared to 15 and 20 kilotons used in the atomic bombings of Hiroshima and Nagasaki respectively. One 100-kiloton nuclear weapon dropped on New York City could lead to roughly 583,160 fatalities, it is estimated. One can thus imagine the destructive power of a TNW.

The risk that use of TNW could lead to a rapid escalation to full use of strategic weapons necessitates greater transparency on possession of TNWs. During the Cold War, both the Soviet Union and the US had a significant TNW stockpile. At the end of the Cold War both sides withdrew most of their TNWs. It is estimated that both the US and Russia still possess around 250 and 1,000 TNW respectively. Countries like South Korea think that possession of TNW could provide a local strategic deterrent to North Korea's growing nuclear arsenal. Unfortunately, the TNWs are not governed by any international agreement. Luckily, no TNW has ever been used in a combat situation.

It is estimated that both the US and Russia still possess around 250 and 1,000 TNW respectively. Countries like South Korea think that possession of TNW could provide a local strategic deterrent to North Korea's growing nuclear arsenal. Unfortunately, the TNWs are not governed by any international agreement. Luckily, no TNW has ever been used in a combat situation.

Escalate to De-escalate Approach: During America's precision bombing campaign in Kosovo, Vladimir Putin, then-secretary of the Security Council of Russia, formulated a concept called "escalate to de-escalate". It essentially meant using both tactical and strategic nuclear strike threats to de-escalate or cause an enemy to disengage from a conventional conflict threatening what Russia considers a strategic interest. Most experts feel that this does not lower the threshold for use of nuclear weapons by Russia.

Nuclear Weapon Stockpiles: It is estimated that there are approximately 13,080 nuclear warheads in the world today. Russia is known to have 6,257 nuclear weapons; USA 5,550; China 350 and expanding; France 290; UK 225; Pakistan 165; India 156; Israel 90; and North Korea estimated 50. Some of the Russian and American weapons have been retired but are still counted in the total arsenal as they have still to be dismantled. International treaties like the 1970 NPT, the 1972 SALT, and the 1991 START attempt to reduce nuclear weapons and prevent proliferation.

No First Use Policy: NFU policy is when a nuclear power formally refrains from the use of nuclear weapons or other weapons of mass destruction in warfare, except for a second strike in retaliation to an attack by an enemy power using WMDs. Though invoked in reference to nuclear mutually assured destruction, some countries, including India, apply it to chemical and biological warfare weapons too. China and India are currently the only two nuclear powers to formally maintain a NFU policy, pledges that the two made immediately on possessing nuclear weapons. NATO and many of its members have repeatedly rejected calls for adopting a NFU policy.

During the Cold War a pre-emptive nuclear strike was commonly argued as a key option to afford NATO a credible nuclear deterrent, compensating for the overwhelming conventional weapon superiority enjoyed by the Soviet military. In 1982 Russian president Brezhnev had pledged that the Soviet Union would not use the nuclear weapon first. The same was dropped in 1993 by Russia. In

2000 Russian military doctrine stated that they reserve the right to use nuclear weapons "in response to a large-scale conventional aggression".

Pakistan too has a similar position in reference to large conventional military superiority of India. North Korea has publicly pledged to refrain from a pre-emptive nuclear strike, while threatening full scale retaliation against conventional aggression. However, it is difficult to predict the actions of the autocratic North Korean regime.

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Russia's Threats during Ukraine Conflict: The war in Ukraine has led to a resurgence of fears about the use of nukes. Russian foreign minister Sergey Lavrov made a fairly direct statement recently at a news conference after addressing the UN General Assembly in New York City. When asked under what circumstances would Russia use nuclear weapons to defend the annexed regions, he said Russian territory, including territory "further enshrined" in Russia's constitution in the future, "is under the full protection of the state".

Most analysts feel that such a scenario can only be conceived if Russia was to suffer huge losses in Ukraine. The fact that Russia initiated partial military mobilisation in view of some significant territorial setbacks in occupied areas has brought the 'N' word back into posturing. But Russia too is conscious that the West is also hugely armed with Nukes. Any foolhardy act could escalate out of control. Russia meanwhile is banking on a much softer approach of democratic free world. Question is who will blink first, and whose bluff will be called.

Breaking the Nuclear Taboo: For nearly eight decades the use of nuclear weapons has been a taboo that was not broken by any side even in long face-offs and wars in Korea and Vietnam. Nukes remain a deterrent. Russia has in the past carried out military exercises simulating the use of TNW against NATO members. These could at best be for coercive signalling or doctrinal evaluation. Even in the unlikely case of Russia being completely pushed out of Ukraine, there will be no situation where Russia would lose its own territory. Therefore, there should be no trigger to use the nuclear weapon.

By using the 'N' word so often, is Russia exposing its conventional military force weakness against the West-backed Ukraine? Remember, Putin announced on 27 February 2022, just days after invading Ukraine, that he had moved Russia's nuclear deterrent forces into alert. Russia has used its dual-capable hypersonic Kinzhal and the long-range Kalibr cruise missiles with conventional warheads. There are no indications, or intelligence inputs, that Russia has moved out any TNWs for preparation or mating.

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Another debate that continues is that if Putin were to use a TNW on a non-NATO member, what would be the American response. Will the US take it as crossing of the never crossed line? Analysts say Russia's goal in using a TNW in Ukraine would be to frighten it into surrender or submission to negotiations, and to divide the country's Western backers. Another school of thought is that Moscow could achieve nuclear signalling by detonating a nuclear bomb over water, or make a high altitude explosion over Ukraine to generate an electromagnetic pulse to knock out electronic equipment, and in the process avoid casualties.

The US has warned of 'catastrophic consequences'

and that it will 'respond decisively'. Will that mean that NATO will enter the war, or will there be a nuclear response, are questions still as conjectures. There is a talk that Russian annexation itself raises the risk of a direct military confrontation between Russia and NATO. This would have to be watched in the next few days. Nuclear wars are much beyond individual egos of despotic leaders. They are the tools of the otherwise weak. Use of such weapons means annihilation of their own people too. There is no existential threat to Russia whatsoever. A powerful leader and his family and friends who enjoy high status and good life would not trade all that for total destruction. The world has withstood many such crises. At the peak of the Cold War, in 1986, the two sides had nearly 65,000 nuclear warheads.

My assessment is the risk of nuclear weapon use may have gotten heightened, but remains low. They will remain veiled threats to pressurise adversary governments and to create public anxiety. The gains of use of TNW will be too small and the risks of introducing nuclear weapons and nuclear fallout too huge. Putin and Russia are currently still victors, and are far from those levels of desperation that would necessitate use of TNW.

My assessment is the risk of nuclear weapon use may have gotten heightened, but remains low. They will remain veiled threats to pressurise adversary governments and to create public anxiety. The gains of use of TNW will be too small and the risks of introducing nuclear weapons and nuclear fallout too huge. Putin and Russia are currently still victors, and are far from those levels of desperation that would necessitate use of TNW.

Source: Air Marshal Anil Chopra is Director General of Centre for Air Power Studies, New Delhi. https://www.firstpost.com/opinion-news-expert-views-news-analysis-firstpost-viewpoint/could-a-desperate-russia-use-a-nuclear-weapon-in-ukraine-11382931.html, 04 October 2022.

OPINION – Leslie Dewan

Three Ways the CHIPS Act will Advance the Nuclear Energy Industry – and it's a Good Thing

The Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act of 2022 (the "CHIPS Act"), which contains myriad advanced nuclear energy technologies provisions, is a major positive step toward making nuclear part of our energy mix — a move we desperately need, and one that studies show U.S. citizens want.

Signed into law on Aug. 9, 2022, nuclear provisions in the CHIPS Act "promote higher education programs for nuclear science and engineering, invest in human capital for nuclear, provide funding for advanced nuclear activities, and allow for governmental and Native American Tribal entities, universities, and others involved in the nuclear supply chain to be eligible for the provided funding for such programs."

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The Commerce Department now faces the daunting task of distributing CHIPS Act funding in a way that quickly rebuilds U.S. technology supply chains and infuses new life into a nuclear industry that faltered in the wake of Chernobyl and Three Mile Island. As a nuclear engineer, I am most heartened by three aspects of the nuclear provisions eligible for funding, three of the most promising levers for rebuilding the nuclear industry.

Investing in People: First, the investment in people and existing and new nuclear infrastructure in universities is of paramount importance. Having research reactors at

universities and providing nuclear engineering students with experience is vital. There is only so much that can be learned in simulated environments; students must understand hands-on how reactors work to prepare them for researching and developing the processes, instruments, and systems used in full-fledged power reactors.

Another Benefit: The nuclear industry currently has a very bifurcated age distribution, with some nuclear engineers who are in their 70s and 80s and others in their 20s and 30s. Bringing more skilled nuclear engineers along will build a cadre of people who can help implement nuclear energy to move the world away from fossil fuels. It's exciting that the government is recognizing the rising numbers of nuclear engineers in the U.S. and putting more resources into training a new generation.

Broadening NEUP: Additional funding for the Nuclear Energy University Program (NEUP) to expand the program's scope and allot dollars for non-technical nuclear research will be a boon for advancing the industry. For example, universities could obtain funding for research into the legal and social science aspects of nuclear energy, such as looking at community engagement to answer questions like "How can we build nuclear reactors that communities want to have in their backyards?" This will be especially crucial in communities retiring coal-based power plants and making the transition to clean energy sources such as nuclear.

The nuclear industry currently has a very bifurcated age distribution, with some nuclear engineers who are in their 70s and 80s and others in their 20s and 30s. Bringing more skilled nuclear engineers along will build a cadre of people who can help implement nuclear energy to move the world away from fossil fuels.

Solving Supply-Chain Roadblocks to Advanced Nuclear: Finally, some CHIPS funding will be used to help solve the supply-chain issues associated with getting advanced nuclear reactors to market. Some advanced reactors depend on exotic materials. Various molten salt reactors, for instance, rely on specific isotopes. Other reactors require radiation- and corrosion-resistant steels and new fuel forms. Building up the necessary supply chains will be crucial, not only for first-of-a-kind units, but also for scaling to dozens or even hundreds of them. If we are to move away from fossil fuels — and we must — the advanced nuclear energy provisions in the CHIPS Act are a major positive step forward. We need to move the needle for advanced nuclear technology going forward. With investment in university research reactors, infusion of funds into NEUP, and supply-chain fixes, the industry will make big strides to help speed the clean energy transition.

Source: https://thehill.com/opinion/energy-environment/3675780-three-ways-the-chips-act-will-advance-the-nuclear-energy-industry-and-its-a-good-thing/, 06 October 2022.

OPINION – Allison Ogren

Nuclear Energy is More than Clean; It's Unifying

Professor Todd Allen and influencer Isabella Boemeke advocate for nuclear energy in starkly different ways, but they are both fighting for our clean energy independence. Together, Allen's pragmatism and Boemeke's "cool" factor can lead us into the future. Isabella Boemeke identifies herself as the world's first nuclear energy influencer. She created the social media identity "Isodope" for this purpose. In her recent TED Talk, Boemeke advocates for nuclear energy, which she calls our best hope for ditching fossil fuels. Boemeke describes how all of the relevant experts she talked to about nuclear energy agreed that "it's good, we need it, people hate it." While Boemeke takes a more humorous approach to nuclear energy advocacy through sarcasm and the use of popular TikTok trends in her videos, she provides a lot of the same arguments as the technical experts pursuing the same goal.

Todd Allen is a professor and chair of the nuclear engineering & radiological sciences department at the University of Michigan. Unlike Boemeke, Allen takes a pragmatic approach to advocacy.

Allen has pursued becoming an advocate of nuclear energy because he wanted access to public discussions and wanted to make sure we're not leaving out possible choices that would help us diversify energy sources to protect from cost or availability fluctuations. Allen noted that nuclear energy plants currently produce 20% of U.S. electricity, which is currently more than 50% of the zero-carbon sources. So, what are the arguments for nuclear energy according to these advocates?

Nuclear has a high energy density, so very little fuel input is needed to generate energy. "You compare one nuclear reaction to burning one coal atom to get a billion times more energy, so you get way more energy out of a fixed amount of fuel, and you also produce far less waste," Allen said.

Nuclear Energy is Clean, Efficient and Safe: When developing cleaner energy sources, the levels of carbon emissions (how clean the fuel is), efficiency and safety must all be considered. "You get no carbon dioxide emissions as you're producing electricity," Allen said of nuclear energy. This places nuclear energy in a position to be a valuable alternative to fossil fuels right from the start. Nuclear has a high energy density, so very little fuel input is needed to generate energy. "You compare one nuclear reaction to burning one coal atom to get a billion times more energy, so you get way more energy out of a fixed amount of fuel, and you also produce far less waste," Allen said.

Additionally, nuclear energy facilities can be built near enough to population centers that they may avoid some of the problems seen with wind and solar energy facilities. Often, wind and solar facilities are built out in open fields far away from where the electricity is needed. This results in some loss along the transmission lines and land jurisdiction issues in building and maintaining those transmission lines.

Nuclear energy is safer than many people have been taught to believe. Both Allen and Boemeke agree that many people have false assumptions about nuclear energy, often because of its association with nuclear weapons.

As Boemeke says in her TED Talk, "Their logic was nuclear bombs are bad. Therefore, nuclear energy is bad. Which, if you think about it, is like saying the electric chair is bad. Therefore, electricity is bad. The case against nuclear power was never based on science." Boemeke also notes that nuclear energy waste is "fully contained in concrete casks that are so good at blocking radiation that I [sic] might do a photo shoot there." Additionally, nuclear energy facilities can be built near enough to population centers that they may avoid some of the problems seen with wind and solar energy facilities. Often, wind and solar facilities are built out in open fields far away from where the electricity is needed. This results in some loss along the transmission lines and land jurisdiction issues in building and maintaining those transmission lines.

Allen noted that when building transmission lines, difficulties can arise from crossing state lines, tribal lands and federal lands. "You may be going through different states who have their own rules, and the types of tribal and federal lands there. You've got all these different jurisdictions that may end up being part of the pathway," he said. Wind and solar facilities also take up large amounts of land and only generate electricity when the wind is blowing or the sun is out. Wind and solar "change the way you deliver electricity because they're coming on and off, essentially, as the fuel is available," Allen said. Nuclear energy, however, can be generated constantly, regardless of weather conditions. As Boemeke noted, "in the last 10 years, we have spent trillions of dollars on renewables, yet, we only get 8% of our electricity from wind and solar. Now, don't get me wrong. I love renewables. But to me, it's clear that we need more. We need a source of energy that's clean and works 24/7 to complement them."

Nuclear Energy could Mean Energy Independence: If the conflict in Ukraine has reminded us of anything in the past several

months, it is that energy independence and diverse, reliable energy sources are critical to maintaining the security and financial health of nations. We can plainly see that dependence on fossil fuels can contribute to and fund wars. Europe is currently suffering an energy crisis due to its dependence on Russian fossil fuels in the midst of the invasion of Ukraine. European countries are beholden to buying Russian oil, while simultaneously supporting Ukraine's resistance. Boemeke noted, "Poland will use similar technology to convert their aging coal plants into nuclear plants, they'll use the same building, the same transmission lines, even retrain the same workers, but now make clean energy instead of buying dirty fuels from dictators."

If the conflict in Ukraine has reminded us of anything in the past several months, it is that energy independence and diverse, reliable energy sources are critical to maintaining the security and financial health of nations. We can plainly see that dependence on fossil fuels can contribute to and fund wars.

The US currently has 94 nuclear plants in operation. However, we could build more and develop a mutually beneficial model for ourselves and our allies abroad who have weaker economies or fewer resources. The US could invest in nuclear energy domestically to help reduce our carbon emissions and sell natural gas abroad to provide a cleaner fuel to other countries and therefore reduce carbon emissions abroad as well. This could allow for clean energy independence, not to mention the potential for job and economic growth.

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Nuclear Energy could Provide Political Common Ground: In an era of seemingly complete political divide on party lines, nuclear energy could provide some common ground in the political arena that we have not seen in a long time. Congress members across party lines have begun to show agreement on the move to nuclear energy. Allen noted there was a recent nuclear energy bill in Congress that had four sponsors, including Democrats Sheldon Whitehouse (RI) and Cory Booker (NJ) and Republicans Mike Crapo (ID) and James Inhofe (OK).

Allen noted the reasons for supporting this bill are likely different in each case. Whitehouse is fighting for climate change goals while Booker is focused on the health risks of coal. Crapo is representing a state that is very supportive of nuclear energy and Inhofe, who is usually in opposition to Whitehouse, supported this bill out of interest in American energy competitiveness and jobs.

With so many arguments that serve so many people from different political viewpoints, could nuclear energy be the political unifier we have been looking for? As Boemeke said, "What if, instead of viewing nuclear power as destructive, we view it as a force for energy independence, and even peace? What if this technology offers our best hope for the future? A future where wars aren't funded by our addiction to fossil fuels. A future where energy is clean. A future where electricity finally makes its way to the 700 million people on Earth who still don't have access to it. The idea that nuclear power is bad is costing us that future. And it's time to let go of it."

Source: https://mndaily.com/273753/opinion/ogren-nuclear-energy-is-more-than-clean-its-unifying/, 06 October 2022.

OPINION – Anjani Trivedi

South Korea Shows what a Nuclear-Powered Future Might Look Like

It's time to get realistic about the worsening energy situation. A power shortage is approaching and few alternatives to bridge the green transition exist right now. Nuclear is re-emerging as a front-

runner, as are doubts and skepticism around its safety as memories of past accidents loom large along with haunting images of mushroom clouds. South Korea, though, shows why nuclear isn't just a pipe dream — or a fuel to fear.

The country's worries — like those of many others — aren't just people feeling cold this winter, or rising prices. It's the lack of electricity that will ultimately hamper everything from industrial production of goods and food to electric vehicles and the infrastructure to charge them — industries account for over half of the nation's consumption. South Korean firms that supply high-tech goods to the rest of the world, including cars, batteries and chips, seem to have come to that realization. These energy-intensive sectors won't run on wind, solar and biofuels alone because the actual capacity just isn't enough and for large-scale operations, it isn't consistent. If power starts becoming an issue, so will their profits and global technological heft.

The likes of Daewoo Engineering & Construction Co. and Hyundai Engineering & Construction Co. are also working to push nuclear forward, while Bill Gates-backed TerraPower LLC is teaming up with South Korean chaebol SK Inc. to commercialize its advanced reactor technologies.

Powering Up: In South Korea, nuclear generation, a baseload source, accounts for over a quarter of electricity production. To deal with it, South Korea's biggest companies are putting their weight behind nuclear power plants, which contribute to about 27% of electricity there — an astute move. Samsung C&T Corp., the trading and construction arm of the Samsung empire, is working with NuScale Power Corp. to construct the first small modular reactor, or SMR, in the US and in eastern Europe. Meanwhile, Doosan Enerbility Co. has also tied up with NuScale to supply equipment. The US firm is the first and only to have had its SMR design receive certification — after a rigorous review process by the US Nuclear Regulatory Commission.

The likes of Daewoo Engineering & Construction Co. and Hyundai Engineering & Construction Co. are also working to push nuclear forward, while Bill Gates-backed TerraPower LLC is teaming up with South Korean chaebol SK Inc. to commercialize its advanced reactor technologies.

All told, the country has around two dozen atomic power plants. There is serious political will behind these efforts now, with recently elected President Yoon Suk Yeol pushing for nuclear to surpass coal usage. A draft long-term energy plan released recently calls for 201.7 terawatt-hours of electricity from nuclear by the end of the decade, or about 33% of the country's total, aided by six new reactors. Coal, natural gas and renewables will each make up just over 20% of generation.

The economics work, too: Nuclear has a clear cost advantage. As state-owned utility Korea Electric Power Corp. noted in its annual filing earlier this year around extending the life of its nuclear units, the failure to do so "would result in a loss of revenues from such units and the increase in our overall fuel costs (as nuclear is the cheapest compared to coal, LNG or oil)." For businesses, it costs 61.5 Korean won per kWh compared with 149.9 Korean won per kWh for solar, helping keep electricity prices low.

Instead of just going green, private and state-backed companies in South Korea are squarely focused on the commercialization of technologies. Nuclear energy consumption hasn't declined since at least 2017, despite the previous administration's plan to phase it out. Building facilities is relatively economical in the country, with the overnight cost — the price of constructing a plant without any

incurred interest — the cheapest among the developed world and even lower than in China and India.

South Korean companies' recent deals are focused on manufacturing and building nuclear technology, not just exploratory efforts to advance a far-off investment. A big advantage is that they draw from the existing supply chain. Parts are brought to the site and assembled there. Large manufacturers are already making the equipment and know how to run technical operations. Meanwhile, the government recently signed agreements with nuclear energy equipment makers to boost the industry by providing financing, research and development funds.

As with facilities elsewhere in the world, there are questions around how it will manage the waste. Still, it has been working on a near-surface disposal system, which would alleviate concerns about radioactive waste material. NuScale's reactors, for instance, use fuel that is consistent with the type used in the light pressurized water-type reactors employed today.

Part of the broader nuclear power problem is that countries facing energy supply issues haven't kept up their facilities, or have abandoned the technology altogether. Decommissioning these plants has added costs, too. Now, as the pressure rises to find alternative sources to reduce Europe's heavy reliance on Russian gas, there's little that can be done in a short period of time. French state-owned firm Electricite de France SA is exploring keeping two of its UK plants open for longer, as it also struggles to run them efficiently. Germany will make some of its facilities available to get it through the colder months.

The ability to tap existing nuclear resources is set to help dynamics across the world: The head of the IEA recently said Japan's restart of more nuclear power plants would help ease energy supply issues because global gas availability would rise. This isn't to say that South Korea has got its nuclear bet totally right — it's had its fair share of hitches in the domestic industry. As with facilities elsewhere in the world, there are questions around how it will manage the waste. Still, it has been working on a near-surface disposal system, which would alleviate concerns about radioactive waste material. NuScale's reactors, for instance, use fuel that is consistent with the type used in the light pressurized water-type reactors employed today. The US has been safely storing it for more than six decades. In addition, newer modules are developing designs that could reduce the overall inventory of spent quantities. Seoul has shown there are ways to fix the energy crisis — or at least, make it better. Other nations should take note.

Source: https://www.moneycontrol.com/news/opinion/south-korea-shows-what-a-nuclear-powered-future-might-look-like-9275651.html, 04 October 2022.

OPINION – C. Raja Mohan

Russia's Threat may Force Europe to Build a Nuclear Arsenal

This is certainly not the first time the Russian leader has rattled the nuclear sabre. Soon after he launched the Ukraine invasion in February, Putin issued a similar warning and ordered his armed forces to put Russian nuclear weapons on alert. What is different this time is Russia's weakening position in Ukraine.

In a major move, Russian President Putin threatened the use of nuclear weapons against Ukraine and its Western backers. "When the territorial integrity of our country is threatened, to protect Russia and our people, we will certainly use all the means at our disposal," he said, in an implicit reference to nuclear weapons. To underline the seriousness of his threat, Putin added it "is not a bluff."

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Putin issued a similar warning and ordered his armed forces to put Russian nuclear weapons on alert. What is different this time is Russia's weakening position in Ukraine. The recent setbacks on the battlefield have persuaded Putin to order the mobilisation of a larger number of troops and call for an annexation of the occupied territories in eastern Ukraine. The nuclear threat appears to be part of an effort to salvage a modicum of political gains from a "war of choice" that has gone terribly wrong. Putin's nuclear threat did not make a difference the last time around; this time he is signalling a greater commitment to using nuclear weapons by claiming that the occupied territories are now a part of Russia, and organising referendums to lend a veneer of political legitimacy to their annexation. That brings us to the link between Russia's "territorial integrity" and the threat to use nuclear weapons.

The nuclear threat appears to be part of an effort to salvage a modicum of political gains from a "war of choice" that has gone terribly wrong. Putin's nuclear threat did not make a difference the last time around; this time he is signalling a greater commitment to using nuclear weapons by claiming that the occupied territories are now a part of Russia, and organising referendums to lend a veneer of political legitimacy to their annexation. That brings us to the link between Russia's "territorial integrity" and the threat to use nuclear weapons.

Moscow's nuclear doctrine states that it will use nuclear weapons in a conventional war in the event of an attack on Russia and if the very existence of the state is threatened. By turning the "occupied territories" into "Russian territory", Putin is arguing that attempts by Ukraine and its Western supporters to liberate occupied territory would be met with a nuclear response. For those who can't see the nature of the threat this time, Dmitry Medvedev, Russia's former president and a close associate of Putin, has made the threat explicit. He has declared that Russia will use nuclear weapons, not just tactical nuclear weapons but also strategic ones, to defend the "new Russian territories".

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Putin will hope that the danger of a nuclear war would encourage those in the West who seek a compromise with Russia (at the expense of Ukraine, of course) and bring the war to a quick close. But Ukrainian leader Volodymyr Zelenskyy has dismissed the nuclear threat and vowed to fight on until the occupied territories are brought back under Kyiv's control. The US has warned Russia against the use of nuclear weapons, and is likely to continue its armed support to Ukraine.

That puts the nuclear ball back in Putin's court. Will Putin court the dangers of a full-scale nuclear war with the West for a few additional districts in Ukraine? Using nuclear weapons for offensive or coercive purposes has not been easy. The prospect of a national suicide has often acted as a self-deterrent. Even if it turns out to be a bluff, Putin's threat will have a major effect on the global nuclear security debate. That Russia, one of the architects of the post-War global nuclear order, can threaten a non-nuclear weapon state like Ukraine with the use of atomic weapons, has compelled many major powers in Europe and Asia to take a fresh look at their nuclear policies. Making matters worse is another troubling dimension of Putin's policy — the Russian President is using the nuclear threat to annex the territory of a neighbour it has seized through armed aggression. Several questions arise.

First, would Putin have ordered the invasion of Ukraine if Kyiv had nuclear weapons? Ukraine, which inherited a large nuclear complex when the

Soviet Union broke up in 1991, voluntarily gave up nuclear weapons in 1994 in return for guarantees of its security. Those assurances turned out to be worthless when Russia seized Crimea from Ukraine in 2014. The utility of nuclear weapons in preventing aggression by big powers appears to be an enduring one. While many in Ukraine might regret the decision to give up nuclear weapons, there is little that Kyiv can do to immediately reverse that decision.

First, would Putin have ordered the invasion of Ukraine if Kyiv had nuclear weapons? Ukraine, which inherited a large nuclear complex when the Soviet Union broke up in 1991, voluntarily gave up nuclear weapons in 1994 in return for guarantees of its security. Those assurances turned out to be worthless when Russia seized Crimea from Ukraine in 2014.

What about Europe? Europe has much to lose if Putin continues his territorial expansionism backed by the nuclear threat. Might Europe consider the development of its own nuclear weapons? On the face of it, the idea of a European nuclear bomb would seem odd. Barring France, all the members of the EU have voluntarily given up their nuclear weapon options by signing the NPT. While giving up their own atomic weapons, the EU members have relied on the US nuclear umbrella. Under the arrangement, the US had nuclear weapon-sharing arrangements with five NATO countries — Belgium, Germany, Italy, the Netherlands and Turkey.

The last few years have seen NATO come under stress. Donald Trump challenged the very premises of the American commitment to protect Europe and questioned the European reluctance to spend more on its own defence. Trump also accused the Europeans of free-riding on US commitments while conducting ever larger commercial business with Russia. Trump's threat to walk out of NATO has compelled the European states to rethink their security policies, emphasise the need to build their defence capabilities, and develop more "strategic autonomy" vis-a-vis the US. One element of this debate has been the question of Europe developing its own nuclear weapons.

The easiest way would be to turn the French nuclear arsenal into a European deterrent. France, however, has traditionally insisted that its arsenal is for its own national security. But in early 2020, French President Macron articulated a change. He declared that the French nuclear strategy has a "European dimension". France's nuclear forces "strengthen the security of Europe through their very existence," Macron said. There has been some talk of Germany financing the expansion of the French arsenal. The problem, however, may be less about building nuclear assets than developing a nuclear doctrine and command structure.

While the discourse on a Eurobomb gains traction, the immediate focus might well be on strengthening NATO's nuclear forces and boosting the US nuclear umbrella over Europe. This might involve new deployments of US nuclear weapons in Europe, wider nuclear sharing arrangements, and stronger conventional deterrent capabilities. One of the main objectives of Putin's invasion of Ukraine was to rearrange European geopolitics in favour of Russia. Putin might well succeed, but not in the manner that he might have hoped. His profound miscalculations in Ukraine are leading to an inevitable change in the European security order to the detriment of Russia.

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Source: https://indianexpress. com/article/ opinion/ columns/c-raja-mohan-writes-russias-nuclear-threat-may-force-europe-to-build-a-nuclear-arsenal-8174632/, 27 September 2022.

NUCLEAR STRATEGY

CHINA

China's Penchant for Nuclear Modernization Ambitions

Chinese intentions to expand its nuclear and militaristic power are its methods of wolf-warrior portrayals that are on a path of wreaking havoc in and around its neighbourhood. These aspirations, however, have already entered their next phase and are currently under execution. Therefore, it seems quite relevant and plausible to discuss Chinese implementation plans, as per Global Strat View analysis. Political and bureaucratic competition has ensured that the discussion around the issue remains as important as China's global vision for hegemony.

China was perhaps on its path to shedding an instrumental principle that had ensured peace and stability in the region and the world for decades. Since then, China has been on a war footing to diversify and modernize its nuclear-armed forces. It is on the verge of attaining the nuclear triad status, defined as all three military forces consisting of land-launchable nuclear missiles, nuclear missile-armed submarines, strategic fighter jets, and aircrafts powered with nuclear warheads.

In its Defence White Paper from 2006, China resolutely asserted its 'Self Defence Nuclear strategy,' proclaiming an assured retaliatory measure leading to inflicting unacceptable damage to the attacker. However, Beijing's nuclear stand over the years has only deteriorated towards a far more hawkish view of the global world, reported Global Strat View.

In 2013, their Defence White Paper excluded mentions of a lifelong nuclear principle of 'No First Use policy.' This led many scholars to conclude that China was perhaps on its path to shedding an instrumental principle that had ensured peace and stability in the region and the world for decades. Since then, China has been on a war footing to diversify and modernize its nuclear-armed forces. It is on the verge of attaining the nuclear triad status, defined as all three military forces consisting of land-launchable nuclear missiles, nuclear missile-armed submarines, strategic fighter jets, and aircrafts powered with nuclear warheads.

Chinese intentions to expand its nuclear and militaristic power are not a distant event that can be tackled later, said Global Strat View. Such acts require immediately thought-out foreign policy objectives, which can also lead to regional cooperation amongst members who find themselves at the forefront of such intimidating tactics.

If China doubles its arsenal by 2029 as predicted, in the coming years, the PLA will field as many as 24 DF-41's with a staggering 144 warheads leading to many consequential security threats to the region, reported Global Strat View. China's actions in the South-China Sea, Taiwan, and its boundaries with India have made it clear that the leadership is willing to provoke skirmishes and clashes in and around the area of contention.

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Moreover, given Chinese reoccurring behaviour, it would be wise to state that as much as the Chinese nuclear capabilities and weapons increase and improve, Beijing will attempt to adopt an offensive nuclear posture, advised Global Strat View. Thus, the region which is

witnessing such threatening nuclear augmentations must come together to tackle such challenges that China, as a nuclear state, wishes to pose in front of other peaceful countries of the continent and the world.

Source: https://www. newindiane xpress.com/world/2022/sep/27/chinas-penchant-for-nuclear-modernization-ambitions-2502440.html, 27 September 2022.

NATO

NATO's Annual Nuclear Exercise Gets Underway

Air forces from across NATO will exercise nuclear deterrence capabilities involving dozens of aircraft over north-western Europe starting on Monday (17 October 2022). The exercise, which runs until 30 October, is a routine, recurring training activity and it is not linked to any current world events.

Exercise "Steadfast Noon" involves 14 countries and up to 60 aircraft of various types, including fourth and fifth generation fighter jets, as well as surveillance and tanker aircraft. As in previous years, US B-52 long-range bombers will take part; this year, they will fly from Minot Air Base in North Dakota. Training flights will take place over Belgium, which is hosting the exercise, as well as over the North Sea and the United Kingdom. No live weapons are used.

NATO's new Strategic Concept, adopted by Allied leaders at the Madrid Summit in June makes clear that "the fundamental purpose of NATO's nuclear capability is to preserve peace, prevent coercion and deter aggression." It stresses that, "as long as nuclear weapons exist, NATO will remain a nuclear alliance.

Steadfast Noon is hosted by a different NATO Ally each year. "This exercise helps ensure that the Alliance's nuclear deterrent remains safe, secure and effective," said NATO Spokesperson Oana Lungescu. NATO's new Strategic Concept, adopted by Allied leaders at the Madrid Summit in June makes clear that "the fundamental purpose of NATO's nuclear capability is to preserve peace, prevent coercion and deter aggression." It stresses that, "as long as nuclear weapons exist, NATO will remain a nuclear alliance. NATO's goal is a safer world for all; we seek to create the security environment for a world without nuclear weapons."

Source: https://www. nato.int/cps/en/natohq/news_208399.htm, 14 October 2022.

NORTH KOREA

North Korea Passes Nuclear Law

North Korea passed a new law in September that updated its nuclear doctrine and provided greater clarity about command and control of the country's nuclear weapons. Although the central tenets of North Korea's nuclear strategy remain unchanged since 2013, the passage of the law further exacerbated tensions between North Korea and South Korea. In a Sept. 9 speech heralding the law, North Korean leader Kim Jong Un said that the country's status as a nuclear weapons state "has now become irreversible" and that there will "never be any declaration of giving up our nukes or denuclearization" in future negotiations. North Korea's willingness to denuclearize has long been questioned because it views its nuclear deterrent as necessary to protect the Kim regime and the state, but past commitments to give up nuclear weapons have never been tested by a credible negotiating process.

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The US and South Korea dismissed Kim's pronouncement and emphasized their continued goal of dismantling North Korea's nuclear weapons program. In a Sept. 12 press briefing, South Korean Defense Ministry spokesperson Moon Hong-sik said that South Korea "remains firm" in its commitment to "pursue North Korea's complete denuclearization." White House press secretary

Karine Jean-Pierre said that the US will continue to pursue "the complete denuclearization of the Korean peninsula" in close consultation with allies in the region and that U.S. policy toward Pyongyang remains unchanged.

The law also reiterated that Kim has sole authority over any decision to use nuclear weapons, but for the first time noted that "a nuclear strike shall be launched automatically and immediately" according to an "operation plan decided in advance" if the leader's command and control "is placed in danger owing to an attack by hostile forces." This provision signals that Pyongyang is prepared to use nuclear weapons in the event of a so-called decapitation strike designed to eliminate the North Korean leadership, which South Korea and the US have simulated in joint exercises, and to deter such an attack by demonstrating it will not neutralize the country's nuclear options.

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Furthermore, the law codifies the two missions for the nuclear arsenal that Kim laid out in an April 2022 speech. In those remarks, he reiterated that the primary mission of the North Korean nuclear arsenal is to deter an attack, but also suggested that nuclear weapons will be used to repel an attack if deterrence fails. Prior to Kim's speech, North Korean missile testing suggested that the country was developing repellent capabilities.

The law states that the nuclear forces "shall carry out an operational mission for repulsing hostile forces' aggression" to achieve victory if "war deterrence fails." In addition to laying out these two missions, the law enumerates circumstances under which North Korea could use nuclear weapons. They could be interpreted broadly to apply to a range of scenarios. The law, for instance, references the use of nuclear weapons if a "fatal military attack against important strategic objects" is "judged to be on the horizon" or if necessary for "taking the initiative in war." These ambiguous statements would allow for using nuclear weapons first against a non-nuclear-weapon state or conducting a preemptive nuclear strike.

Moon said that if North Korea attempts to use nuclear weapons against South Korea, the North will face "an overwhelming response" from the U.S.-South Korean alliance. He also noted that South Korea is enhancing its own deterrence capabilities. U.S. Defense Department press secretary Brig. Gen. Pat Ryder said Kim's speech was "unhelpful and destabilizing" but the US has a "tried and true policy and process" for deterring North Korea. The US and South Korea also continue to reevaluate alliance capabilities in response to North Korea's evolving nuclear capabilities, including at the third meeting of the Extended Deterrence Strategy and Consultation Group, which took place Sept. 16 in Washington.

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A joint statement released after the meeting described the new North Korean law as "escalatory and destabilizing" and said any nuclear attack by Pyongyang would be met with an "overwhelming and decisive response." The US also committed to continue deploying strategic assets in the region to "deter and respond" to North Korean threats, the statement said. Although the new law is consistent with Kim's pronouncements regarding North Korean nuclear policy, its passage by a largely symbolic legislature is unlikely to inhibit Pyongyang if future circumstances require changes to the nuclear policy. The law, for instance, states that North Korea "as a responsible nuclear weapons state" will not share or "transfer nuclear weapons, technology, and equipment" or weapons-

grade nuclear materials. But North Korea's record of assisting states in the past with illicit nuclear activities and ballistic missile programs suggests its willingness to assist proliferators under certain conditions.

Activity at North Korean nuclear sites suggests that the country continues to engage in activities that could be used to expand its stockpile of fissile material available for nuclear weapons to meet evolving deterrence requirements. IAEA Director-General Rafael Mariano Grossi told the agency's board of governors on Sept. 11 that there are indications that North Korea's five-megawatt electric reactor, which produces plutonium, continues to operate and that the expansion of the centrifuge enrichment facility at the Yongbyon nuclear complex is externally complete. Grossi also reported that the North Korean nuclear test site "remains active and prepared to support a nuclear test," although his agency did not observe extensive work at the location over the summer. He said the reopening of the test site is "deeply troubling."

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Source: https://www.armscontrol.org/act/2022-10/news/north-korea-passes-nuclear-law, October 2022.

USA

White House: US Nuclear Strategy Does Not Need to be Adjusted

The US sees no reason to change its nuclear strategy and sees no signs that Russia is preparing for an "inevitable" use of nuclear weapons, the White House said after President Biden warned Thursday night of the growing threat of a nuclear "Armageddon" in connection with the irresponsible rhetoric of the Russian leadership. The President "reiterated what we were talking about, namely, how seriously we take these threats," said White House Press Secretary Karine Jean-Pierre speaking to reporters on October 7 aboard the presidential plane bound for Maryland. "We see no reason to adjust our own strategic nuclear posture, and we see no sign that Russia is preparing to use nuclear weapons anytime soon," Jean-Pierre said. When asked by a reporter whether Biden's comment reflects any new intelligence, she replied in the negative.

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President Biden referred to the risk of a nuclear "Armageddon" while speaking on Thursday evening, October 6 at a gathering funds to support the Democratic Party's election campaign. Biden noted that Russian President Putin is a man he knows "quite well," adding that the Russian leader "doesn't joke when he talks about the use of tactical nuclear weapons, biological or chemical weapons." "We haven't seen the prospect of Armageddon since [President John] Kennedy and the Cuban Missile Crisis," he added. He signaled that Putin's threats were real, "because his armed forces, one might say, were not as effective as he hoped.

Source: https://thetimeshub.in/white-house-us-nuclear-strategy-does-not-need-to-be-adjusted/53472/, 07 October 2022.

BALLISTIC MISSLE DEFENCE

NORTH KOREA

North Korea Fires 3rd Ballistic Missile in 5 Days

North Korea fired two ballistic missiles 29 September, Seoul's military said, Pyongyang's third such launch in less than a week and just hours after US Vice President Harris left South

Korea. The South's military said it had detected the launch of "two short-range ballistic missiles from the Sunchon area in South Pyongan province". "Our military has reinforced monitoring and surveillance and is maintaining utmost readiness in coordination with the US," Seoul's Joint Chiefs of Staff said in a statement.

Japan's coast guard also confirmed a likely ballistic missile launch from North Korea, citing information from Tokyo's defence ministry. Public broadcaster NHK said the projectile "appears to have fallen outside Japan's Exclusive Economic Zone", citing unnamed sources from the defence ministry. While in South Korea, Ms Harris toured the country's heavily fortified border with the nuclear-armed North, part of a trip aimed at strengthening the security alliance with Seoul. Speaking at the Demilitarized Zone (DMZ), Kamala Harris said the US commitment to South Korea's defence was "ironclad", adding that the allies were "aligned" in their response to the growing threat posed by the North's weapons programs. Washington has about 28,500 troops stationed in South Korea to help protect it from the North, and the allies are conducting a large-scale joint naval exercise in a show of force. Pyongyang conducted two banned ballistic missile launches in the days before Ms Harris's arrival, continuing a record-breaking streak of weapons tests this year.

Seoul announced that it would hold trilateral anti-submarine drills with Japan and the US, the first such exercises since 2017. South Korean officials said they had detected signs Pyongyang could be preparing to fire a submarine-launched ballistic missile.

The North fired a SRBM and two SRBMs, Seoul and Tokyo said. Under the South's hawkish new President Yoon Suk-yeol, Seoul and Washington have boosted joint military exercises, which they insist are purely defensive. North Korea sees them as rehearsals for an invasion. Seoul announced that it would hold trilateral anti-submarine drills with Japan and the US, the first such exercises since 2017. South Korean officials said they had detected signs Pyongyang could be preparing to fire a submarine-launched ballistic missile.

Source: https://www.ndtv.com/world-news/north-korea-fires-3rd-ballistic-missile-in-5-days-seouls-military-3389392, 29 September 2022.

EMERGING TECHNOLOGIES AND DETERRENCE

USA

USAF Awards $985m Hypersonic Missile Contract to Raytheon

Hypersonic Attack Cruise Missile (HACM) is an air-launched, scramjet-powered hypersonic weapon built in partnership with Northrop Grumman. The missile is designed to hold high-value targets at risk in contested environments from standoff distances. "HACM is a powerful example of developing and integrating combat capabilities alongside our partners from the beginning," said USAF chief of staff, Gen. CQ Brown. "HACM will provide our commanders with tactical flexibility to employ fighters to hold high-value, time-sensitive targets at risk while maintaining bombers for other strategic targets."

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In 2020, USAF engaged in a multi-year, bilateral project arrangement with Australia known as the Southern Cross Integrated Flight Research Experiment to develop air-breathing hypersonic cruise missile prototypes. The Air Force awarded three 15-month SCIFiRE contracts in June 2021 to Boeing, Lockheed Martin, and Raytheon Technologies to complete preliminary designs of a hypersonic cruise missile.

The HACM programme will now operationalise the Raytheon SCIFiRE prototype design for fighter aircraft integration and deliver two leave-behind assets with operational utility. "We have over a decade of cooperation with our Australian allies in the advancement of hypersonic technologies, and now we will bring that shared knowledge to bear to address urgent national defense

requirements," said Andrew Hunter, assistant secretary of USAF for acquisition, technology and logistics.

Through the SCIFiRE agreement, the US and Australia will continue collaborating on HACM design and development, including using Australian test infrastructure for the initial all-up-round flight tests. Air Vice Marshal Robert Denney, AM, Head of Air Force Capability for the Royal Australian Air Force, said SCIFiRE is providing an opportunity to understand and influence the future of hypersonic weapons development and acquisition. "SCIFiRE demonstrates our commitment with the US to strengthen capability outcomes, deepen our alliance and strengthen our cooperation as we meet emerging challenges and support regional endeavours." USAF plans to deliver HACM with operational utility by fiscal year 2027.

The US and Norwegian governments jointly established the THOR-ER program in 2019. Its goal is to create full-size prototypes of solid-fuel ramjet technology that are affordable, capable of reaching high speeds and have an extended range. The program will culminate in flight demonstrations under real-world circumstances.

Source: https://www.aero-mag.com/hypersonic-attack-cruise-missile-hacm-29092022, 29 September 2022.

US Tests "THOR's Hammer" to Fight Russia, China; DoD Announces Success with Hypersonic Rocket Engine

The department of defense described it as "an important milestone," stating that the test vehicle successfully fired several times. The test demonstrated the effectiveness of ramjet propulsion technology and showed considerable increases in effective range. The US and Norwegian governments jointly established the THOR-ER program in 2019. Its goal is to create full-size prototypes of solid-fuel ramjet technology that are affordable, capable of reaching high speeds and have an extended range. The program will culminate in flight demonstrations under real-world circumstances.

...The recent tests achieved the goals of THOR-ER Phase 1. Phase 1's objective was to demonstrate jointly developed propulsion technology in flight, including novel high-energy fuels, sophisticated air injection, and throttling techniques, all of which will be necessary for future mission-flexible solid fuel ramjet (SFRJ) systems. The first flight, on August 17, demonstrated an unguided vehicle with a steady SFRJ operating at various heights and speeds. The second test focused on a high-thrust flight profile the following day. Both flights were successful, given that they demonstrated high supersonic speeds before ramjet burnout and splashdown.

For the first time, the US may lag behind its rivals in an increasingly significant new arms race — the race to create hypersonic missiles, which are already tested or fielded by China and Russia.

"Program officials will continue to evaluate system performance based upon telemetry and other data obtained during the test," said the Department of Defense in a press release. "The SFRJ flight vehicle was accelerated to above Mach 2 with the help of a solid rocket booster and transitioned to ramjet mode. The flight phase was a resounding success with stable flight, robust ramjet operation, and a high thrust-to-drag ratio," said the Executive Vice President of Aerospace Propulsion at the Nordic Ammunition Company (Nammo), Stein Erik Nodeland. "The flights performed in accordance with pre-flight calculations, demonstrating a high-speed, long-range trajectory. All in all, this is a real milestone. While not the first ramjet vehicle, it is the first modern ramjet, with a potential for a great improvement in range, time to target, and agility," he added.

USA's Efforts to Challenge Russia and China: For the first time, the US may lag behind its rivals in an increasingly significant new arms

race — the race to create hypersonic missiles, which are already tested or fielded by China and Russia. A missile is hypersonic if it moves at least five times the speed of sound or around 5,600 km/h. These missiles can reportedly carry nuclear or conventional weapons capable of destroying ships and other critical military infrastructure. This new arms competition has the potential to alter strategic calculations. Russian officials have positioned hypersonic craft with nuclear weapons to safeguard against potential US capability to shoot down ICBMs, which might compromise nuclear deterrence.

The latest test is another step in the US' research and development efforts to build hypersonic weapons. The Russian and Chinese demonstrations of hypersonic technology, according to the Norwegian aerospace partner Nammo, have forced Washington to step up its hypersonic research and development endeavors. The US hopes to catch up to prospective rivals in propulsion by investing in the technology.

The THOR-ER is hailed as an emerging technology that could significantly contribute to the security of the US and its allies. "The US needs to work closely with our allies to ensure our joint force has the most cutting-edge capabilities on the battlefield," said Heidi Shyu, Undersecretary of Defense for Research and Engineering. "I commend the THOR-ER team on their outstanding work weathering the pandemic environment, continuing the development of this significant propulsion technology, and promoting continued science and technology collaboration with our partners in Norway," she added.

Stephen Farmer, Director for Advanced Concepts, Prototyping & Experimentation at Naval Air Warfare Center Weapons Division (NAWCWD), predicted that the SFRJ would revolutionize the US Navy and its allies. Nevertheless, the latest efforts by the US and Norway could significantly aid the US' efforts to advance hypersonic technology.

Source: https://eurasiantimes.com/us-tests-thor-hammer-to-fight-russia-dod-announces-success/ , 06 October 2022.

NUCLEAR ENERGY

AFRICA

New IAEA Publication on Climate Change and Nuclear Power Highlights Potential in Africa

Government ministers and officials from several countries in Africa discussed the potential of nuclear power in supporting sustainable development and the transition to clean and reliable energy as the IAEA released a new publication on climate change and nuclear power at a side event during the 66th IAEA General Conference today.

Government ministers and officials from several countries in Africa discussed the potential of nuclear power in supporting sustainable development and the transition to clean and reliable energy as the IAEA released a new publication on climate change and nuclear power at a side event during the 66th IAEA General Conference today.

The event, *'Supporting the Energy Transition in Africa,'* showcased the 2022 edition of *Climate Change and Nuclear Power*, which is updated every two years and provides a wealth of technical information and data about the benefits of nuclear power in contributing to achieving net zero greenhouse gas emissions by 2050. This year's publication features a chapter on nuclear power in Africa, about which IAEA Director General Rafael Mariano Grossi held a wide-ranging discussion with representatives from Egypt, Ghana, Kenya and South Africa at the event today. "Everywhere I am hearing this global conversation about energy security, climate change and nuclear power, and whether by virtue of changes in circumstance, climate or security needs, it is quite clear that nuclear now has a place at the table," Mr Grossi said. "What I like about this discussion, is that there is no discussion without Africa. The Africans have said themselves [...] 'we need to contribute, and we need our own specific analysis of how this nuclear

jewel is going to be used for African economies.'"

According to the new publication, about 600 million people and 10 million small businesses in Africa have no reliable source of electricity, and increasingly, connection to a national grid is no guarantee of electricity supply. Blackouts are becoming more frequent, and in sub-Saharan Africa, the World Bank reports that almost 80 per cent of businesses suffer from power outages, greatly curtailing their activities. Meanwhile, Africa's energy demand is increasing twice as fast as the global average, largely driven by urban population growth.

Egypt, the host of the next UN climate summit, or COP27, in November, recently broke ground on the first of four 1200 MWe reactors it plans to build at El-Dabaa on the Mediterranean coast.

Against this backdrop, several countries in Africa are exploring the possibility of adding nuclear power to their energy mix, with Egypt recently starting construction on its first nuclear power plant. South Africa, the only nuclear operator on the continent with two reactors totalling almost 2000 MWe, is considering long term operation of the Koeberg nuclear power station and expanding its nuclear power programme.

Egypt, the host of the next UN climate summit, or COP27, in November, recently broke ground on the first of four 1200 MWe reactors it plans to build at El-Dabaa on the Mediterranean coast. "Egypt opted for nuclear power because it provides a steady source of energy that lasts for decades," said Mohamed H. El Molla, Egypt's Resident Representative to the IAEA.

Through its Milestones Approach, the IAEA supports around 30 so-called nuclear newcomer countries in Africa and around the world in their efforts to develop the necessary infrastructure for a safe, secure and sustainable nuclear power programme. Ghana has been working with the Agency for several years, including an IAEA-led Integrated Nuclear Infrastructure Review (INIR) mission in 2017.

"Ghana is looking to introduce nuclear power to provide the necessary diversity of baseload to ensure energy security for our future demands," said Kwaku Afriyie, Ghana's Minister of Environment, Science, Technology and Innovation. "Our hydropower potential is almost exhausted, and so our interest in nuclear is to make sure we have energy for our transition and development." While 40 per cent of Ghana's power comes from hydropower, it accounts for 17 per cent of all electricity generation in Africa and rising, according to the IEA. In countries such as Uganda, Zambia and Malawi, the share of hydropower generation exceeds 80 per cent.

Hydropower is low carbon and goes a long way to meeting net zero commitments, but as climate patterns are changing, so too is the availability and reliability of water supply. And Africa is particularly vulnerable to these changes. The IEA predicts that in the Democratic Republic of Congo, Morocco, Zambia and Zimbabwe, climate change will cause a considerable decline in hydropower capacity by the end of the century.

Hydropower is low carbon and goes a long way to meeting net zero commitments, but as climate patterns are changing, so too is the availability and reliability of water supply. And Africa is particularly vulnerable to these changes. The IEA predicts that in the Democratic Republic of Congo, Morocco, Zambia and Zimbabwe, climate change will cause a considerable decline in hydropower capacity by the end of the century. Many other nations will suffer from unpredictable fluctuations in their hydro supply.

If electricity demand keeps growing and climate change causes a lower output of hydropower, countries will be able to secure baseload electricity only through fossil fuel sources or nuclear power. But according to the World Bank, the public finances of developing African countries have worsened amid the COVID pandemic, leaving

many unable to fund large infrastructure projects themselves. "That means international financing will be vital," said Henri Paillere, Head of the IAEA's Planning and Economic Studies Section, which produces the biannual publication. "Establishing special economic zones with tailored economic regulations built around local, reliable infrastructure would be one way to attract foreign investment. Such zones could then serve as clean energy hubs that would benefit surrounding communities and act as a catalyst for energy transitions on a national scale."

Australia could soon follow in the footsteps of other leading countries that use nuclear energy as part of their power mix, after nine coalition senators backed laws to remove the nation's nuclear energy ban. The nine coalition senators moved to introduce a Private Senators Bill, arguing nuclear power is one of the safest forms of energy and will play a vital role in achieving the nation's emission targets moving forward.

New technology like small modular reactors (SMRs), with lower upfront costs and easier financing than traditional reactors, may provide one option and be a better fit for the small electricity grids found in many African countries, participants heard. As countries in Africa consider or embark on nuclear power, Mr Grossi stressed they would have the Agency's full support. "The IAEA will be with you every step of the way," he said.

Source: https://www. iaea.org/newscenter/news/new-iaea-publication-on-climate-change-and-nuclear-power-highlights-potential-in-africa, 28 September 2022.

AUSTRALIA

Bill Introduced to Remove Nuclear Energy Ban in Australia

Australia could soon follow in the footsteps of other leading countries that use nuclear energy as part of their power mix, after nine coalition senators backed laws to remove the nation's nuclear energy ban. The nine coalition senators moved to introduce a Private Senators Bill, arguing nuclear power is one of the safest forms of energy and will play a vital role in achieving the nation's emission targets moving forward.

Nationals senator Matt Canavan said the "mood is shifting" on nuclear energy, as the public and other politicians feel the need to explore all energy options for the future. "Australia's unusual legislative ban against nuclear power was moved and debated with less than 30 minutes of debate in the Senate" he said. The ban on nuclear energy originated in 1998 when the former Howard government needed to trade it off to get parliamentary support for the construction of a new, nuclear reactor for medical purposes at Lucas Heights.

Senator Canavan said the appetite for nuclear energy has grown since the government signed on to buy nuclear-powered submarines. "People realised, given the geopolitical situation we faced, whatever hang-ups we had on nuclear energy, we needed them in our submarines," he said. Not everyone was in favour of the move – with federal energy minister Chris Bowen saying it was the most expensive form of power Australia could invest in. Mr Bowen said industry groups suggested Australia would need about 80 nuclear plants to produce the electricity it needed. "That is one (for) every second MP. Put your hand up if you would like one," he said.

In the past year, other leading countries have embraced nuclear power, with the UK and France announcing plans to build new nuclear power stations, while Japan works to reopen its existing ones. Senator Canavan said now was the time to open discussions on energy options for the future. "Australia has made it almost illegal to build baseload coal or gas power stations. We cannot continue to deny our country all reliable power options, including nuclear," he said. "The nuclear ban may cause decades of pain if we continue to deny our country reliable power alternatives."

Research has shown nuclear power results in fewer deaths than dam failures, oil rig explosions and instances where people fall when installing solar panels. Across the globe, nuclear power produces double the electricity than that of solar and wind, yet between 1965 and 2018, global

investment on solar and wind has reached $2.3 trillion, compared to $2 trillion on nuclear.

Senator Canavan said Australia must follow suit and support nuclear energy as an energy means of the future. ...Coalition senator David Fawcett has backed senator Canavan's claims, saying he believed nuclear power was the best option for the long term. ... The push to overturn the nuclear energy ban is not intended to force the construction of nuclear power plants in the country, but, instead, get the ball rolling on discussions regarding future energy supply, in an effort to avoid a crisis.

Research has shown nuclear power results in fewer deaths than dam failures, oil rig explosions and instances where people fall when installing solar panels. Across the globe, nuclear power produces double the electricity than that of solar and wind, yet between 1965 and 2018, global investment on solar and wind has reached $2.3 trillion, compared to $2 trillion on nuclear.

In order to construct a nuclear power station, a licence under the Australian Radiation Protection and Nuclear Safety Act 1998 is still required, as well as a permit under the Nuclear Non-Proliferation (Safeguards) Act 1987, and also needing to comply with other state or territory laws. Senator Jacinta Price said Australia needs to fully support nuclear power to achieve its ambitious emission goals and targets. "If we truly as a nation want the cleanest and most reliable energy source there is available, then nuclear power is the logical option," she said.

Source: https://smallcaps.com.au/bill-introduced-remove-nuclear-energy-ban-australia/. 03 October 2022.

Germany's planned exit from nuclear power by the end of this year has been officially delayed in order to shore up energy supplies during an expected shortfall this winter, the economic minister, Robert Habeck, announced. The decision follows a shortage in supplies of electricity coming from France due to the fact that more than half of its nuclear power stations are offline, Habeck told journalists in Berlin.

GERMANY

Germany Delays Exit from Nuclear Power to Offset Energy Shortfall

Germany's planned exit from nuclear power by the end of this year has been officially delayed in order to shore up energy supplies during an expected shortfall this winter, the economic minister, Robert Habeck, announced. The decision follows a shortage in supplies of electricity coming from France due to the fact that more than half of its nuclear power stations are offline, Habeck told journalists in Berlin. He said that the resulting gap in electricity supplies was being "observed with concern", with Europe's energy network in danger of being put under too much strain, potentially leading to power cuts. The electricity that Germany is not able to acquire from France is being compensated for with electricity produced by gas-fired power stations in Germany. But this in turn involves using up valuable supplies of gas that Germany is trying to save before winter arrives.

Germany's three remaining nuclear power stations were due to be turned off at the end of this year, the end of an 11-year process. The decision to withdraw from nuclear power was made by the government of Angela Merkel after the 2011 Fukushima disaster in Japan. Habeck had long resisted calls for the power plants in southern Germany – Isar 2 and Neckarwestheim 2 – to be extended as Germany coped with the effect of Russia slowing down, and then turning off completely, its gas supply via the Baltic Sea pipeline Nord Stream 1 earlier this month. But his arguments against keeping the plants in operation became increasingly difficult to defend. A majority of Germans, despite being in favour of moving away from nuclear power, has said it is in favour of extending the plants' use temporarily. Habeck had announced earlier this month that the plants would be put into a standby mode but would effectively stay offline unless needed.

His decision amounts to an awkward U-turn, though Habeck said it was a reaction to the current

situation, including what he called an escalation of the situation in Russia, "which is developing fairly dramatically", and that he was resistant to populist demands. Habeck said that the necessary changes to the law covering the extension of the plants would be voted on in the Bundestag at the end of next month. Reacting to security concerns, and whether nuclear plants may be open to hacking attacks and terrorist threats, Habeck said the government was well aware of the concerns and was "doing its utmost" to secure them.

German and Danish authorities were examining evidence suggesting that the Nord Stream pipelines 1 and 2 may have been deliberately damaged on Monday night in an act of sabotage, after dramatic drops of pressure in them and evidence of gas leaking into the Baltic Sea with possible explosions. Fingers have inevitably been pointed at Russia as a possible culprit. The incident has heightened concerns over the vulnerability of energy infrastructure in Europe.

Source: https://www.theguardian.com/world/2022/sep/27/germany-delays-exit-from-nuclear-power-to-offset-energy-shortfall, 27 September 2022.

GENERAL

Nuclear Power Receives Record National Support at 66th IAEA General Conference

The global shift towards increasingly favourable attitudes about nuclear power was on display this week at the IAEA's 66th General Conference in Vienna, where a record number of countries officially recognized its key role in addressing current global challenges and achieving goals such as climate change mitigation, energy security and sustainable development. Of 140 national statements delivered at the General Conference, 50 Member States plus the 27-nation European Union favourably cited nuclear power. In addition to positive statements delivered by countries that already use nuclear power, many others came from Member States which do not have nuclear power within their energy mix, particularly Africa. "The climate crisis and the energy crisis have prompted more countries to look to nuclear power as part of the solution, with public opinion polls all over the world showing an increasing acceptance rate for it," IAEA Director General Rafael Mariano Grossi said in his statement at the start of the weeklong conference from 26 to 30 September. "The unique attributes of nuclear power as a safe, secure and reliable energy source are crucial to the world's green transition," he added.

The climate crisis and the energy crisis have prompted more countries to look to nuclear power as part of the solution, with public opinion polls all over the world showing an increasing acceptance rate for it," IAEA Director General Rafael Mariano Grossi said in his statement at the start of the weeklong conference from 26 to 30 September.

Besides the 32 countries that already use nuclear power, around 30 other so-called newcomers are either embarking on or consider adding it to their energy mix. The IAEA works closely with newcomers in supporting their development of the infrastructure—including safety and regulatory frameworks and human resources development—needed for a safe, secure and sustainable nuclear power programme.

In their national statements, major nuclear power operating countries such as China, France, Japan, South Korea, the US and Russia all made favourable mention of nuclear power as a reliable and low carbon energy source. "China is committed to building a clean, low-carbon, safe and efficient modern energy system, and regards nuclear energy as an important option to achieve the goal of carbon peaking and carbon neutrality," said the national statement by China, which currently has 18 nuclear reactors under construction—the most in the world. A list of national statements under country names that spanned the alphabet—from Algeria to Zimbabwe—underscored the growing appeal of the benefits of nuclear power among developing and middle-income countries.

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either embarking on or consider adding it to their energy mix. The IAEA works closely with newcomers in supporting their development of the infrastructure—including safety and regulatory frameworks and human resources development—needed for a safe, secure and sustainable nuclear power programme. The Agency carries out this work through its Milestones Approach, including the Integrated Nuclear Infrastructure Review (INIR) mission, which supports countries in assessing the status of their nuclear infrastructure.

Several countries from Asia to Africa have hosted INIR missions in recent years. Bangladesh, for example, hosted an INIR mission in 2016 and is now well advanced in the construction of its first nuclear power plant, which it hopes will help drive a national plan to become a developed economy by 2041. "Nuclear energy plays an integral role in low-carbon energy transitions," Bangladesh said in its national statement to the 66th General Conference. "Bangladesh considers nuclear energy as an important component of future energy generation mix." The country's new nuclear power plant—featuring two 1200 MW(e) reactors— "is moving fast towards its final shape", the statement added.

The IAEA is also gearing up to take part in the UN Climate Change Conference (COP27), to be held in November in Egypt, which is also building its first nuclear power plant. For the first time in its history, the IAEA will have its own nuclear themed pavilion at the COP27 to shine a light on the role of nuclear in climate mitigation and adaptation.

Nuclear power currently provides around 10 per cent of the world's electricity and 25 per cent of its low carbon electricity. This week, for a second successive year, the IAEA revised up its annual projections of the potential growth of nuclear power during the coming decades, reflecting a shift in the global debate over energy and the environment amid growing concerns over energy security and climate change. These issues will be front and centre next month when government ministers, officials and global experts come together at the IAEA International Ministerial Conference on Nuclear Power in the 21st Century. The conference, hosted by the US, will take place in Washington DC on 26-28 October.

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For example, Finland believes that "nuclear energy and renewable energy sources are not mutually exclusive," the country said in its national statement to the General Conference. "We have a long tradition in the use of nuclear power" and "we have in our energy mix one of the highest shares of renewables in Europe," the statement added. "Our goal is to make Finland carbon neutral by 2035. To get there, we need CO2-free energy sources."

Source: https://www.iaea.org/newscenter/news/nuclear-power-receives-record-national-support-at-66th-iaea-general-conference, 30 September 2022.

JAPAN

Japan Taps Industry to Build Safer, More Secure Nuclear Energy Future

Japan is about to change course on energy policy following the Fukushima disaster in 2011 with a focus on developing safer nuclear reactors. The country put a stop to the construction of new

nuclear plants after a tsunami hit the eastern prefecture, home to the Fukushima Daiichi Nuclear Power Plant, resulting in the most severe nuclear accident since Chernobyl in 1986. Now many of Japan's reactors lie idle.

In pursuit of carbon neutrality by 2050 and energy security due to Russia's war in Ukraine, the Japanese government has been considering a return to "next-generation nuclear reactors equipped with new safety mechanisms." With this shift, a new partnership led by Mitsubishi Heavy Industries with four power utilities – Kansai Electric, Hokkaido Electric Power, Shikoku Electric Power, and Kyushu Electric Power – to develop an "innovative light-water reactor based on existing units of the same type" to be launched by the mid-2030s, as reported by Nikkei Asia.

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Kansai Electric Power said in a statement: "We have been studying the design of a next-generation, light-water reactor with improved safety and economy, and are working with Mitsubishi Heavy Industries." The project builds on Mitsubishi Heavy's pressurized light-water reactor that has been used by the four power utilities. It will be capable of producing between 0.6 million and 1.2 million kilowatts of electricity. The focus is on improving the control-rod drive mechanism, responsible for adjusting nuclear reaction, to halve output or bring the reactor back online in 17 minutes, about a quarter of the time it takes existing reactors.

Robustness is also crucial, with the design purported to withstand natural disasters, terrorist attacks, and aircraft crashes. "The companies want to reduce the reactor's probability of sustaining damage to less than 1 percent of current models by installing it underground and fortifying the outer walls of the containment vessel," Nikkei said. Beneath the containment vessel, a "core catcher" will be installed to prevent molten fuel escaping in the event of a meltdown. Emergency power systems can then also used to cool the reactor will be strengthened and located on-site. Mitsubishi Heavy is also working on smaller and more efficient nuclear plants capable of producing 0.3 million kilowatts, as well as high-temperature, gas-cooled reactors to produce hydrogen.

PM Fumio Kishida's "green transformation" council has also been tasked with examining how Japan's existing reactors could be upgraded to safer light-water units. Light-water reactors are cooled and moderated with ordinary water as opposed to those that use heavy water (deuterium oxide, D_2O). Elsewhere, as the IEA does not believe 2050 carbon emission goals are achievable without nuclear power, there have been signs of innovation in small modular reactors (SMRs), notably in Britain, where Rolls-Royce has secured funding to build plants based on the design. SMRs are much smaller than the current generation of nuclear reactors under construction and produce far less power. But what they lack in economies of scale, they make up for in modular design and off-site

As the IEA does not believe 2050 carbon emission goals are achievable without nuclear power, there have been signs of innovation in small modular reactors (SMRs), notably in Britain, where Rolls-Royce has secured funding to build plants based on the design. SMRs are much smaller than the current generation of nuclear reactors under construction and produce far less power. But what they lack in economies of scale, they make up for in modular design and off-site construction.

construction.

The IAEA Energy Authority says that "prefabricated units of SMRs can be manufactured and then shipped and installed on-site, making them more affordable to build than large power reactors, which are often custom designed for a particular location, sometimes leading to construction delays. SMRs offer savings in cost and construction time, and they can be deployed incrementally to match increasing energy demand." However, a study by Stanford University and the University of British Columbia concluded that SMRs may generate up to 35 times more waste to produce the same amount of power as a regular plant. The research and methodology was heavily contested by companies developing the technology. In any case, a global surge in nuclear power could be on the cards as governments wake up to climate change and over-reliance on rogue states for their energy needs – as demonstrated by the Nord Stream pipeline crisis.

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Source: https://www.theregister.com/2022/09/29/mitsubishi_heavy_safer_nuclear_reactor /, 29 September 2022.

NUCLEAR SECURITY

PAKISTAN

Pakistan With Nuclear Weapons One of Most Dangerous Places in World: US President Joe Biden

US President Joe Biden has called Pakistan "one of the most dangerous nations in the world" because of its nuclear weapons. Biden's comments is the latest in the long line of expression of concerns by the United States and the West over Pakistan's nuclear weapons.

Ever since Pakistan went public with its nuclear weapons in 1998, the United States has been concerned about the safety of its nuclear weapons as the country is home to several Islamist and jihadist groups which are deeply associated with the state. Concerns have therefore been raised over these extremist and terrorist groups getting their hands on the country's nuclear weapons.

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...The top US general Mark Milley had warned that a rapid withdrawal of forces from Afghanistan would pose an increased risk to the security of Pakistan's nuclear arsenal. In his speech, Biden said the world was changing rapidly and countries were rethinking their alliances. He said, "And the truth of the matter is —I genuinely believe this— that the world is looking to us. Not a joke. Even our enemies are looking to us to figure out how we figure this out, what we do."

... Earlier this week, it emerged that Pakistan, once a key US ally, was not even mentioned in the US National Security Strategy 2022, which identified China as "America's most consequential geopolitical challenge". The 48-page document does mention terrorism and other geo-strategic threats in the South and Central Asia, but, unlike in the recent past, it does not name Pakistan as an ally needed to tackle those threats. Pakistan was also absent from the 2021 strategy paper. ...

Source: https://www. outlookindia.com/

international / pakistan-with-nuclear-weapons-one-of-most-dangerous-places-in-world-us-president-joe-biden-news-230139, 15 October 2022.

UKRAINE

Congress Passes Ukraine Nuclear Security Funding

The House on 30 September passed 230-201 an additional $12.35 billion Ukraine aid package, including money to help Kyiv respond to a potential nuclear security incident, as part of its stopgap funding bill to avert a government shutdown. The package includes $35 million in defense nuclear non-proliferation funding for the NNSA to prepare Ukraine for a potential incident from shelling at the besieged Zaporizhzhia power plant.

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Craig Branson, a spokesman for the NNSA, told *Defense News* in a statement the agency is "modeling potential consequences of damages to nuclear facilities" in Ukraine. "Specifically, the funds will support procurement and maintenance of additional radiation sensors, data assessment and analysis, equipment and supplies for the National Guard of Ukraine for protective capabilities at nuclear facilities, counter-nuclear smuggling equipment for the Ukraine State Border Guard and potentially consolidation of radiological materials," Branson wrote. He noted the agency has already "provided significant assistance to Ukraine to monitor radiation levels" at sites such as Zaporizhzhia and the Chornobyl Exclusion Zone.

The White House asked Congress for additional funding to bolster security around Zaporizhzhia before Russian President Putin expanded his threats to use nuclear weapons in the conflict earlier this month. Putin said he would use nuclear weapons if Russian territory comes under attack. During the same speech, he announced a referendum in Zaporizhzhia and other Russian-occupied areas of Ukraine. He proceeded to annex those areas on 30 September.

Source: https://www.defensenews.com/congress/2022/09/30/congress-passes-ukraine-nuclear-security-funding/, 30 September 2022.

IAEA Chief Enroute to Kyiv to Discuss Nuclear Plant Security as Russia Shells Zaporizhzhia

The chief of IAEA Grossi was on way to Kyiv to hold important meetings regarding the need to set up a Nuclear Safety and Security Protection Zone (NSSPZ) around the Zaporizhzhia Nuclear Power Plant. This visit comes at a time when Ukraine alleged that Russian missile attack in southeastern city of Zaporizhzhia has killed two people in the early hours of 6 October morning.

The chief of IAEA Grossi was on way to Kyiv to hold important meetings regarding the need to set up a Nuclear Safety and Security Protection Zone (NSSPZ) around the Zaporizhzhia Nuclear Power Plant. This visit comes at a time when Ukraine alleged that Russian missile attack in southeastern city of Zaporizhzhia has killed two people in the early hours of 6 October morning. Moreover, Grossi is set to travel to Russia later to agree upon the quick implementation of the notion of a Nuclear Safety and Security Protection Zone with the relevant authorities.

Furthermore, the step comes after IAEA learned of Russia's plans to supervise operations of Ukraine's Zaporizhzhya Nuclear Power Plant, stated an IAEA statement. Grossi has repeatedly expressed grave concern about the challenging

and extremely stressful working conditions at the ZNPP - Europe's largest nuclear power plant- during the ongoing military conflict between Russia and Ukraine. IAEA's statement further states that one of the seven nuclear security and safety pillars states that "operating staff must be able to fulfil their safety and security duties and have the capacity to make decisions free of undue pressure"....

ZNPP Planning to Restart 1 of 6 Reactors: An IAEA statement published on October 5 further revealed that IAEA experts deployed at the site have learned of Russia's intentions to restart one of the six reactors of ZNPP, which are currently all in a cold shutdown. The nuclear power plant is currently occupied by the Russian military and operated by Ukrainian staff. One senior Ukrainian staff member informed the IAEA experts that preparations are underway to start unit 5 of the power plant at reduced power to produce steam and heat to meet the needs of the plant. The plant's last operating reactor – unit 6 – which provided the plant with electricity for cooling and other essential safety functions was shut down on 11 September.

Source: https://www.republicworld.com/world-news/russia-ukraine-crisis/iaea-chief-enroute-to-kyiv-to-discuss-nuclear-plant-security-as-russia-shells-zaporizhzhia-articleshow.html, 06 October 2022.

NUCLEAR SAFETY

EUROPE

IAEA and European Commission Expand Cooperation on Nuclear Safety

The IAEA and the EU today agreed to broaden the scope of their longstanding cooperation in the area of nuclear safety. The Memorandum of Understanding between the IAEA and the Euratom which was signed today on the margins of the 66th IAEA General Conference by the IAEA Director General, Mr Grossi, and the European Commissioner for Energy, Ms Kadri Simson, builds on a decade of successful cooperation in the field of nuclear safety. "This MoU is a fantastic opportunity to expand our long-standing cooperation with the European Union in the field of nuclear safety. I welcome the fact that the MoU covers new areas of cooperation between our two organizations, particularly in relation to innovative reactors and SMR technology," said IAEA Director General Grossi.

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Financial and political support from the EU has been instrumental in enabling the IAEA to implement its nuclear safety mandate. Over the years the EU has helped the IAEA deliver many projects around the world addressing its Member States' development needs in areas such as establishing and reinforcing the competence of nuclear and radiation safety authorities, safe management of radioactive waste, support to and cooperation with regulatory authorities with regard to training services, safety reviews and assessments and emergency preparedness and response exercises, providing support with environmental remediation and assessment, and the development and application of the IAEA Safety Standards.

The EU also continues to support the IAEA's peer review services, particularly the Integrated Regulatory Review Service (IRRS) and the Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS). These review services have enabled EU Member States to comply with their obligations under the EU Nuclear Safety and Waste Directives. At a meeting in March 2022, EU officials noted that all EU Member States have now received an initial IRRS peer review mission.

The partnership agreement will also allow the IAEA to continue, with EU support, to assist countries to maintain and further develop expertise and competence in the field of nuclear safety, including strengthening the capacity of regulators and TSOs of embarking countries in reviewing site safety documents and external events design of new nuclear installations; enhancing countries' understanding of the seismic performance of structure systems and components installed in nuclear installations; and addressing African Member States' needs for building national competence in radiation safety, in line with IAEA safety standards.

Countries in the Mediterranean that are not EU Member States have received IAEA's support, through EU funding, to strengthen their coastal emergency preparedness and response arrangements in case of radiological emergencies as well as the full control of radioactive sources during and after their operations, under what is known as the "cradle to grave" approach.

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IAEA Director General Grossi earlier said that new attacks on the territory of the Zaporizhzhia NPP on September 26-27 demonstrate the "urgent need" to create a nuclear and physical security zone around the plant and that he is ready to continue consultations on this topic in Ukraine and Russia.

Through EU co-funding, the IAEA has also successfully implemented the International School of Nuclear and Radiological Leadership for Safety. Courses were held in France, Mexico, India, Turkey, Brazil, Pakistan, Morocco and Japan, training future leaders in nuclear safety throughout the world.

Source: https://www.iaea.org/newscenter/news/iaea-and-european-commission-expand-cooperation-on-nuclear-safety-including-on-innovative-reactors-and-small-modular-reactor-technology, 27 September 2022.

UKRAINE

Zelensky, Guterres Discuss Nuclear Safety

"I spoke with UN Secretary-General Guterres. We discussed the issue of nuclear safety in the context of the threatening situation at the Zaporizhzhia NPP. Grateful for the clear position regarding the UN's non-recognition of sham referenda held in the occupied territories of Ukraine," the president wrote.

IAEA Director General Grossi earlier said that new attacks on the territory of the Zaporizhzhia NPP on September 26-27 demonstrate the "urgent need" to create a nuclear and physical security zone around the plant and that he is ready to continue consultations on this topic in Ukraine and Russia.

ZNPP, the largest nuclear power plant in Europe, has been captured by the Russian military since March 4. Since then, the invaders have placed military equipment and ammunition at the station, shelling the surrounding area. The Russians are also shelling the station itself, destroying power lines, causing nuclear reactors to shut down, and blaming the Ukrainian Armed Forces for this.

Source: https://www.ukrinform.net/rubric-polytics/3581674-zelensky-guterres-discuss-nuclear-safety.html, 28 September 2022.

SMALL MODULAR REACTORS

ROMANIA

RoPower Nuclear Established to Develop SMRs in Romania

Romanian nuclear utility Compania Nationala Nuclearelectrica (SNN) and Romanian private company Nova Power & Gas have launched

RoPower Nuclear - a project company for development of SMRs in Romania - on the site of the former coal-fired power plant in Doicesti, Dambovita County. Jose W Fernandez, US Under Secretary for Economic Growth, Energy and Environment, US Department of State, and Romanian Minister of Energy Virgil Popescu observed the signing ceremony of the Shareholders Declaration, at Romania's Ministry of Energy.

Romanian nuclear utility Compania Nationala Nuclearelectrica (SNN) and Romanian private company Nova Power & Gas have launched RoPower Nuclear - a project company for development of SMRs in Romania - on the site of the former coal-fired power plant in Doicesti, Dambovita County.

RoPower Nuclear will take steps towards deploying the first NuScale VOYGR-6 (462MWe) power plant in Romania this decade. The power plant will use the NuScale Power Module technology of NuScale, the only SMR company so far to obtained design approval from the US Nuclear Regulatory Commission. The installed capacity can also be supplemented with renewables amounting to a capacity of around 80MWe, which would make the new energy complex exceed the capacity of the former Doicesti plant. The joint nuclear-renewable solution would represent not only an optimal production capacity, with the ability to vary output, but also a vision of the generation sources for the power grid of the future.

In June, US President Joe Biden allocated a $14 million grant for the next stage of NuScale SMR development in Romania – the preliminary engineering and initial design (FEED) study for the project. Within the FEED Study, IAEA recommendations will be applied, following the IAEA Site Design and External Events (SEED) mission carried out in August 2022, at the request of SNN.

... Teodor Chirica, President of the SNN Board, added: "The long cooperation between the United States and Romania in the nuclear field has a very successful track record. Thus, I am firmly convinced that the RoPower Nuclear will have an excellent cooperation with both the US nuclear industry and Romanian industry, under the frame of the USA-Romania strategic partnership, providing clean energy and security of supply for our country and the region." SNN operates under the authority of the Romanian Ministry of Energy, with the state owning 82.49% of the shares and other shareholders, 17.50. The Cernavoda NPP operates two Candu nuclear units, which contribute more than 18% of total energy production.

... In 2020, Romania signed an Intergovernmental Agreement (IGA) with the USA on nuclear energy, which was also ratified by the Romanian Parliament, while US Exim Bank concluded a MOU with Romania's Ministry of Energy on energy investment projects in Romania totalling $7 billion. In 2021 NuScale and SNN signed a collaboration agreement to accelerate the implementation of the first SMR in Europe. Nuclearelectrica received $1.2 million in funding from the USTDA to identify and evaluate potential sites for SMRs. Earlier in 2022, several suitable potential sites were identified and the former thermal power plant in Doice?ti qualified as a candidate site for further in-depth studies and development. In May Nuclearelectrica, NuScale and E-Infra (the owner of the site) signed a MOU to analyse the development of the first SMR in Doice?ti.

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Source: https://www.neimagazine.com/news/newsropower-nuclear-established-to-develop-smrs-in-romania-10062373, 05 October 2022.

USA

Governor Wants Small Modular Nuclear Reactors in Southwest Virginia

Gov. Glenn Youngkin said Monday that Virginia must be "all in" on nuclear energy and he wants to deploy a small modular nuclear reactor somewhere in Southwest Virginia within 10 years. Nuclear energy is a big part of the governor's energy plan, which he unveiled Monday in Lynchburg. "When it comes to reliability, affordability and when it comes to clean, nothing beats nuclear energy. It is the baseload of all baseloads," Youngkin said during an event at Delta Star, which makes electrical transformers. He added: "I want to call our moonshot. Virginia will build a small, modular reactor that will supply baseload demands within the next 10 years."

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SMRs are nuclear fission reactors used for power generation and heat. The power capacity is about a third of traditional nuclear power reactors. The advantages of SMRs are that they can be constructed in a factory in one location and shipped to the site, which saves money. They require a smaller initial capital investment, have enhanced safety features, are more efficient than earlier designs and can create jobs and boost the economy, proponents say. But nuclear energy remains a controversial energy source with worries about safety, costs and waste.

So, why build an SMR in Southwest Virginia? Chelsea Jenkins, the state's deputy secretary for commerce and trade, said: "Because of geography, history and a talented workforce, Southwest is in a great position. They have always been about energy and will always be about energy." Following his speech, Youngkin said that Southwest Virginia has a "talented workforce, and has a feedstock in academia through Virginia Tech." ...

...An SMR would require a years-long host of approvals, the most important being the Nuclear Regulatory Commission and federal, state and local agencies, including the State Corporation Commission, the Virginia Department of Environmental Quality, the federal Fish and Wildlife Service and the Army Corps of Engineers, Kilgore said.

...Another big supporter is Will Payne, managing partner of Coalfield Strategies, the firm leading business development for the Energy DELTA Lab and InvestSWVA, who said an SMR would be a "natural fit." "There is significant brownfield land available throughout the region that has been previously disturbed from coal mining," Payne wrote in an email. "With these locations, the mining activities required significant power and land attributes that are conducive to the deployment of SMRs."

There are currently no SMRs in operation in the US, although in July a reactor designed by an Oregon-based company became the first SMR design certified for use in the U.S. by the Nuclear Regulatory Commission.

Currently, the LENOWISCO Planning District Commission is completing a feasibility study of locating SMRs in Southwest Virginia, according to Payne. The commission represents the counties of Lee, Scott and Wise and the city of Norton. ...There are currently no SMRs in operation in the US, although in July a reactor designed by an Oregon-based company became the first SMR design certified for use in the U.S. by the Nuclear Regulatory Commission.

Source: https://cardinalnews.org/2022/10/03/governor-wants-small-modular-nuclear-reactor-in-southwest-virginia/, 03 October 2022.

USA–CANADA

US, Canadian Regulators Further SMR Collaboration

International collaboration and initiatives to harmonise the regulatory process are seen as vital

for the safe and successful deployment of new reactor designs such as SMRs. The CNSC and NRC have been working together on this for several years, and in 2019 signed a memorandum of cooperation (MoC) covering technical reviews of advanced reactor and SMR technologies.

The regulatory agreement comes after Tennessee Valley Authority (TVA) and Ontario Power Generation (OPG) earlier this year announced plans to work together to develop and deploy SMRs in Canada and the USA. GE-Hitachi's (GEH) BWRX-300 - a 300 MWe water-cooled, natural circulation SMR - has already been selected by OPG for deployment at its Darlington site, and TVA is preparing to submit a licence application to build a BWRX-300 at Clinch River.

A memorandum of understanding between TVO and OPG allows the companies to coordinate efforts on the design, licensing, construction, and operation of SMRs, but differing regulations, regulatory guidance and review practices for licensing in Canada and the United States may impact the licensing and construction timelines for the proposed projects.

The new charter between the CNSC and USNRC aims to enhance their cooperative work under the 2019 MoC by working on regulatory and safety issues in the licensing review of the BWRX-300 design. Objectives include collaborating to reduce duplication of licensing review efforts, jointly utilising third party verification, identifying areas for collaborative verification, sharing expertise and leveraging analysis done by each organisation, while supporting each regulator's adherence to national laws and regulations. The ultimate goal will be joint safety reviews and/or a risk-informed acceptance of the other regulator's technical conclusions, according to information from the CNSC.

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The agreement aims to enhance the regulators' pre-application activities with OPG and TVA, and with GEH for design-led activities. OPG, TVA and GEH will identify licensing topics for consideration by the CNSC and NRC for cooperative reviews. They will also identify challenges with applying existing guidance or frameworks, provide technical information to facilitate timely and efficient safety reviews, and ensure efficient communication with both regulators.

CNSC and NRC will develop work plans to identify specific deliverables, conduct "coordinated and efficient" technical reviews within established schedules, and work to align on common regulatory technical positions that enhance standardisation of the GEH BWRX-300 SMR design "to the extent practicable".

This work will be monitored by the Advanced Reactor Technologies and Small Modular Reactors Sub Committee (ART-SMR Sub Committee) and as set out under the Terms of Reference for the MOC between the CNSC and the USNRC. Working groups of the CNSC and USNRC staff will be established as needed....

Source: https://www.world-nuclear-news.org/Articles/US,-Canadian-regulators-further-SMR-collaboration, 07 October 2022.

NUCLEAR COOPERATION

BRAZIL–RUSSIA

Brazil's ENBPar and Rosatom Agree to Cooperate

The MoU, which does not involve financial obligations, was signed during the IAEA Atomic Energy Agency's 66th General Conference in Vienna by Kirill Komarov Rosatom's First Deputy

Director General for Corporate Development and International Business and ENBPar CEO Ney Zanella dos Santos. The CEO of ENBPar, a state-owned company linked to the Ministry of Mines and Energy, said: "The idea is for us to take advantage of the great experience they have in the nuclear sector, learn about the entire production cycle of this type of energy and be able to apply it in Brazil."

The MoU will allow for "more dialogue between the two countries on the construction, operation and decommissioning of state-of-the-art, high- and small-capacity nuclear power plants", including floating plants. It says mutual cooperation areas include: Maintenance and life cycle, operation and decommissioning of existing plants in Brazil; construction, operation and decommissioning of new high-capacity nuclear power plants based on Russian technologies in the Brazil; supply of existing and future nuclear power plants in Brazil with goods and services in the nuclear fuel cycle including uranium products such as HALEU, uranium conversion and enrichment services as well as solutions for the management of spent nuclear fuel and radioactive waste resulting from its processing; and also the training of "specialists in the field of the application of nuclear energy for peaceful purposes".

It also seeks to reinforce the agendas of bilateral interest such as the promotion of nuclear's green credentials, with mutual visits, organisation of seminars and workshops and "interaction with the IAEA and other international organisations to promote nuclear energy as a low-carbon 'green' energy source that is effective at combating climate change and achieving global energy targets for sustainable development". "Conversations and actions on the transfer of technologies to form a cluster of companies aimed at services and supplies for the nuclear sector" - and also related to hydroelectric plants - will also be facilitated. ENBPar works with clean energy, from the Angra Nuclear Power Plants, through Electronuclear and will start working with mining and manufacturing of nuclear fuel, by Industrias Nucleares do Brasil.

Existing Ties: Russia and Brazil already have ties in the nuclear energy field with an MoU signed in 2017 by Rosatom and Brazil's Electrobras and Electonuclear to promote cooperation in nuclear power. Brazil currently has two nuclear reactors generating about 3% of its electricity and work is expected to resume shortly, after a seven-year break, on unit 3 of the Angra nuclear power plant in Rio de Janeiro. But it is looking to further expand its nuclear capacity - in January Brazil began the process of identifying sites for new nuclear power units it wants to have in operation by 2050. And Brazil's President Bolsonaro and Russian President Putin discussed possible bilateral nuclear energy cooperation when they met in Febuary this year.

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And at the COP26 meeting in Glasgow last year, the Minister of Mines and Energy, Bento Costa Lima, said nuclear energy "was, is and will be essential and fundamental for the energy transition," adding that "we will add 10 GW in the next 30 years." In June, Brazil's Eletronuclear and France's EDF signed a fresh MoU valid for five years promoting mutual cooperation in the development of nuclear energy projects. It was a renewal of a previous cooperation agreement from 2018, but with expanded scope, including small modular reactors, hydrogen generation and more research and development.

Source: *https://www. world-nuclear-news.org/ Articles/Brazils-ENBPar-and-Rosatom-agree-to-cooperate, 05 October 2022.*

RUSSIA–FRANCE

Russia's Nuclear Trade Flows with France, Imports Continue in EU Despite Ukraine War

While the European Union agreed to curtail its use of Russian oil and gas, its member nations continue to import and export nuclear fuel that is not under EU sanctions - to the chagrin of the Ukrainian government and environmental activists. A cargo ship carrying uranium that departed from the French port of Dunkirk traveled the North Sea on Thursday, heading toward the Russian Baltic port of Ust-Luga.

French authorities have repeatedly said the country does not depend on Russia to supply the nuclear power plants that provide 67% of its electricity — more than any other nation. Greenpeace France said a shipment of Russian uranium that an Associated Press reporter saw getting unloaded in Dunkirk earlier this month was transported by trucks to a plant in Lingen, Germany.

It was the third time in just over a month that the Panama-flagged Mikhail Dudin ship docked in Dunkirk to transport uranium. Environmental group Greenpeace France denounced the ongoing shipments to and from Russia and called for an end to all trade in nuclear fuel. The EU's executive arm, the European Commission, did not propose targeting Russia's nuclear sector in its latest sanctions package presented Wednesday.

Enriched uranium unloaded from the Mikhail Dudin in Dunkirk was destined for the Rhone valley in southern France, which is home to major sites of the French civil nuclear industry, according to Greenpeace France. The French nuclear sector has a series of contracts with Russian state-controlled energy giant Rosatom, including some to import enriched uranium destined for European nuclear power plants and to export reprocessed uranium to Russia.

"France ensures strict compliance by economic players with all the European sanctions adopted against Russia. Civil nuclear power is not affected by these sanctions," the French Foreign Affairs Ministry told the Associated Press. Ukraine, meanwhile, is pushing for European sanctions in that area. According to Greenpeace France, reprocessed uranium meant to be transported to Russia was loaded onto the Mikhail Dudin. A video provided by the environmental group shows a crane lifting containers onto the ship.

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At the end of last month, enriched uranium unloaded from the Mikhail Dudin in Dunkirk was destined for the Rhone valley in southern France, which is home to major sites of the French civil nuclear industry, according to Greenpeace France. The French nuclear sector has a series of contracts with Russian state-controlled energy giant Rosatom, including some to import enriched uranium destined for European nuclear power plants and to export reprocessed uranium to Russia. Rosatom is one of the world's biggest actors in the nuclear energy market.

Source: https://www.republicworld.com/world-news/russia-ukraine-crisis/russias-nuclear-trade-flows-with-france-imports-continue-in-eu-despite-ukraine-war-articleshow.html, 29 September 2022.

UK–FRANCE

British, French Leaders in Support of Sizewell C

Following a meeting on the sidelines of the first Summit of the European Political Community in Prague, the two leaders issued a joint statement saying they had discussed advancing

bilateral cooperation, in particular on energy. "Energy transition and decoupling from Russian hydro-carbons are common challenges," they said. "They reaffirmed their belief that both renewable and nuclear energies are part of consistent strategies to achieve energy transition and strategic autonomy". Truss and Macron "confirmed the full support of the UK and French governments for the new nuclear power station at Sizewell and expect the relevant bodies to finalise arrangements in the coming month".

The plan is for Sizewell C to feature two EPRs producing 3.2 GW of electricity, enough to power the equivalent of around six million homes. It would be a "replica" of the Hinkley Point C plant, under construction in Somerset. EDF Energy submitted a development consent order (a planning application) for the plant in May 2020, which was granted in July this year. EDF Energy has earlier said it expects to make a final investment decision later this year or in 2023. Truss and Macron also committed to advance and increase UK-France civil-nuclear cooperation, including on innovation, infrastructure development and workforce skills.

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Tom Greatrex, Chief Executive of the Nuclear Industry Association, said: "Sizewell C will be one of the UK's most important green infrastructure projects ever, and critical to the government's plan to strengthen energy security, cut gas use and bring down bills, so this joint statement is very welcome. "The UK needs to urgently get on with building new nuclear capacity alongside renewables, and it's now important that a Final Investment Decision on Sizewell is reached swiftly so construction can begin."

Source: https://www.world-nuclear-news.org/Articles/British,-French-leaders-in-support-of-Sizewell-C, 07 October 2022.

NUCLEAR PROLIFERATION

PAKISTAN–NORTH KOREA

India Raises at UNSC Pakistan's Nuclear Proliferation Linkage with North Korea

India has drawn the attention of the UNSC on the proliferation of nuclear and defence technologies from North Korea to Pakistan. "India would like to reiterate the importance of addressing the proliferation of nuclear and missile technologies related to DPRK in our region," New Delhi's envoy to the UN, Ruchira, said at the Security Council. "These linkages have an adverse impact on peace and security in the region, including on India."

Kamboj was presenting the statement on behalf of the Government of India during a meeting of the UNSC on North Korea, which had recently fired an intermediate-range ballistic missile that had flown over Japan. "We have noted with concern the reports of ballistic missile launches by the DPRK over the last week. These follow the launch of the intercontinental ballistic missile by the DPRK in March this year, which was discussed in this council, as well as other successive launches," she said. "These launches constitute a violation of the resolutions of the Security Council relating to the DPRK. They affect the peace and security of the region and beyond," she added.

India called for full implementation of the relevant UNSC resolutions relating to North Korea. The pariah nation led by Kim Jong-un also launched on Thursday two more short-range ballistic missiles. India has long been concerned over North Korea's clandestine defence technology cooperation with Pakistan. New Delhi, according to the sources, suspects that Pyongyang-Islamabad secret defence cooperation, which in the mid-1990s led to supply of Rodong Missiles technology to Pakistan, continues. Abdul Qadeer Khan, the founder of the nuclear program of Pakistan, was in 2003 found to have traded know-

how and technology with Iran, Libya and North Korea. Khan in 2011 made public documents in support of his claim that North Korea had bribed senior officials of the Pakistani Army and got them to allow him to share nuclear technology and certain equipment with the pariah nation.

New Delhi received inputs, suggesting that certain nuclear materials supplied to the Pakistan Atomic Energy Commission by the Suntech Technology Company Limited of China in recent years were being diverted to North Korea in violation of the sanctions imposed by the UN Security Council. "We reiterate our continued support for denuclearization towards peace and security in the Korean peninsula," India's Permanent Representative to the UN stated.

SKB noted that since the last cost estimate, submitted in 2019, several important milestones have been reached that are of "great importance" to its operations. The government has approved a final repository for used nuclear fuel as well as the expansion of the existing SFR repository for low and intermediate-level waste.

Source: https://www.deccanherald.com/national/india-raises-at-unsc-pakistans-nuclear-proliferation-linkage-with-north-korea-1151328.html, 07 October 2022.

NUCLEAR WASTE MANAGEMENT

SWEDEN

SKB Revises Cost of Swedish Nuclear Waste Programme

The licensees of Swedish nuclear power plants take responsibility for all costs for the Swedish nuclear waste programme, which includes decommissioning and demolition of the power plants, as well as the handling and final disposal of the nuclear waste and used nuclear fuel. Under Swedish regulations, SKB - on behalf of the country's nuclear power companies - must submit the estimated future costs to the National Debt Office at three-year intervals. The National Debt Office has the overall responsibility to ensure the payment liability of the nuclear industry and to monitor the proper functioning of the financing system.

SKB noted that since the last cost estimate, submitted in 2019, several important milestones have been reached that are of "great importance" to its operations. The government has approved a final repository for used nuclear fuel as well as the expansion of the existing SFR repository for low and intermediate-level waste. "After the positive government decisions, there are more concrete conditions and time frames for the remaining work," said SKB's head of communications Anna Porelius. "This is reflected in the new cost estimate. On the other hand, the government decisions took longer than expected in previous forecasts and the shift in the timetables as a whole is also reflected in the new planning calculation."

In addition, the remaining steps in the continued permitting process have been taken, which further postpones the scheduling in its entirety, SKB said. The commissioning of the nuclear fuel storage facility and the encapsulation facility has been postponed and is something that has consequences for other operations as well. "The combined result of this year's calculation work therefore gives a remaining basic cost of SEK124.1 billion (costs from and including 2024, price level January 2022) for the Swedish nuclear waste programme," SKB said. "The corresponding amount in the calculation from 2019 is SEK110.0 billion (costs from and including 2021 at the January 2021 price level)."

The National Debt Office will examine the submitted material, which then forms the basis for which fees the nuclear power companies must pay into the Nuclear Waste Fund. It is the government that decides on the level of the fees as well as on the collateral that the licence holders issue. At the end of August, there were SEK73 billion in the Nuclear Waste Fund. The remaining funding is partly covered by continued payments to the fund from the nuclear power companies, and partly by future returns from the fund. SKB noted that so far some SEK64 billion has already been invested in research and development, as well as the construction and operation of the Clab central intermediate storage for used nuclear fuel,

the SFR repository and SKB's transport system.

Source: https://www.world-nuclear-news.org/Articles/SKB-revises-cost-of-Swedish-nuclear-waste-programm, 03 October 2022.

UK

Nuclear Waste Disposal Advice Service Launched

The Nuclear Waste Advisory Associates (NWAA) includes members with specialist knowledge in policy, planning, public engagement, geology, and technical aspects of nuclear waste disposal and storage. The disposal of high activity nuclear waste remains an unsolved problem. The launch of NWAA's new advisory service coincides with a renewed search for a deep geological disposal facility (GDF) in England and Wales. In addition, any new programme of reactors could require more than one facility of this kind, NWAA said. "Although NWAA is an advisory agency, we find it difficult to justify support for the government's new nuclear programme as the high-level waste that would be generated would complicate disposal as it is much hotter and radioactive than the legacy waste, so would require more space underground, and would almost certainly require the identification of more than one GDF, possibly as many as three," the advisory group says in its new brochure.

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Currently the GDF siting process is being led by the Nuclear Decommissioning Authority. Its Nuclear Waste Services division has already established community partnerships to consider hosting a GDF in four areas of England. Three are in Cumbria – mid-Copeland, South Copeland and Allerdale – and a fourth, Theddlethorpe, in Lincolnshire. ...As such, the NWAA seeks to offer advice on radioactive waste management to local authorities, working groups, community partnerships and other local and community groups and organisations.\

Source: https://www.geplus.co.uk/news/nuclear-waste-disposal-advice-service-launched-06-10-2022/, 06 October 2022.

Centre for Air Power Studies

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

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