



OPINION – Manpreet Sethi

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Amending the Weapons of Mass Destruction Act

What were the stipulations under the earlier Act in 2005? Why did an amendment become necessary?

The Story So Far: On April 5, 2022, the WMD and their Delivery Systems (Prohibition of Unlawful Activities) Amendment Bill, 2022 was introduced in the Lok Sabha. It was passed the next day. The Bill amends the WMD and their Delivery Systems (Prohibition of Unlawful Activities) Act, 2005 which prohibits the unlawful manufacture, transport, or transfer of WMD (chemical, biological and nuclear weapons) and their means of delivery. It is popularly referred to as the WMD Act. The recent amendment extends the scope of banned activities to include financing of already prohibited activities.

What was the purpose of the original WMD Act?

The WMD and their Delivery Systems (Prohibition of Unlawful Activities) Act came into being in July 2005. Its primary objective was to provide an integrated and overarching legislation on prohibiting unlawful activities in relation to all three types of WMD, their delivery systems and related materials,

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What is the UNSCR 1540?

In April 2004 the UN Security Council adopted resolution 1540 to address the growing threat of non-state actors gaining access to WMD material, equipment or

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technology to undertake acts of terrorism. In order to address this challenge to international peace and security, UNSCR 1540 established binding obligations on all UN member states under Chapter VII of the UN Charter. Nations were mandated to take and enforce effective measures against proliferation of WMD, their means of delivery and related materials to non-state actors.

UNSCR 1540 enforced three primary obligations upon nation states — to not provide any form of support to non-state actors seeking to acquire WMD, related materials, or their means of delivery; to adopt and enforce laws criminalising the possession and acquisition of such items by non-state actors; to adopt and enforce domestic controls over relevant materials, in order to prevent their proliferation.

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What has the Amendment added to the existing Act?

The Amendment expands the scope to include prohibition of financing of any activity related to WMD and their delivery systems. To prevent such financing, the Central government shall have the power to freeze, seize or attach funds, financial assets, or economic resources of suspected individuals (whether owned, held, or controlled directly or indirectly). It also prohibits persons from making finances or related services available for other persons indulging in such activity.

Why was this Amendment necessary?

With advancements in technologies, new kinds of threats have emerged that were not sufficiently catered for in the existing legislation. These notably include developments in the field of drones or unauthorised work in biomedical labs that could maliciously be used for terrorist activity.

UNSCR 1540 undergoes periodic reviews to determine the success of its implementation and to identify gaps in enforcement. In one such review undertaken in 2016, it was concluded that the risk of proliferation to non-state actors is increasing due to rapid advances in science, technology, and international commerce.

The statement of objects and reasons of the Bill presented in India echoes these developments for having made the

Amendment necessary. Two specific gaps are being addressed — first, as the relevant organisations at the international level, such as the Financial Action Task Force have expanded the scope of targeted financial sanctions and demand tighter controls on the financing of WMD activities, India's own legislation has been harmonised to align with international benchmarks.

Secondly, with advancements in technologies, new kinds of threats have emerged that were not sufficiently catered for in the existing legislation. These notably include developments in the field

of drones or unauthorised work in biomedical labs that could maliciously be used for terrorist activity. Therefore, the Amendment keeps pace with evolving threats. In fact, domestic legislations and international measures that address issues of

WMD security cannot afford to become fossilised. They must be agile and amenable to modifications in keeping with the changing tactics of non-state actors.

What more should India do?

India's responsible behaviour and actions on non-proliferation are well recognised. It has a strong statutory national export control system and is

committed to preventing proliferation of WMD. This includes transit and trans-shipment controls, retransfer control, technology transfer controls, brokering controls and end-use based controls. Every time India takes additional steps to fulfil new obligations, it must showcase its legislative, regulatory and enforcement frameworks to the international community.

At the domestic level, this Amendment will have to be enforced through proper outreach measures to industry and other stakeholders to make them realise their obligations under the new provisions. India's outreach efforts with respect to the WMD Act have straddled both region-specific and sector-specific issues. Similar efforts will be necessary to explain the new aspects of the law.

It is also necessary that India keeps WMD security in international focus. There is no room for complacency. Even countries which do not have WMD technology have to be sensitised to their role in the control framework to prevent weak links in the global control system. India can offer help to other countries on developing national legislation, institutions and regulatory framework through the IAEA or on bilateral basis.

Could the Amendment become troublesome to people on account of mistaken identity?

In the discussion on the Bill in Parliament, some members expressed concern on whether the new legislation could make existing business entities or people in the specific sector susceptible to a case of mistaken identity. The EAM, S. Jaishankar, however, assured the House that such chances were minimal since identification of concerned individuals/entities would be based on a long list of specifics.

What is the international significance of these legislation? What is in it for India?

Preventing acts of terrorism that involve WMD or

their delivery systems requires building a network of national and international measures in which all nation states are equally invested. Such actions are necessary to strengthen global enforcement of standards relating to the export of sensitive items and to prohibit even the financing of such activities to ensure that non-state actors, including terrorist and black-market networks, do not gain access to such materials. Sharing of best practices on legislations and their implementation can enable harmonisation of global WMD controls.

India initially had reservations on enacting laws mandated by the UNSCR. This is not seen by India as an appropriate body for making such a demand. However, given the danger of WMD terrorism that

India faces in view of the difficult neighbourhood that it inhabits, the country supported the Resolution and has fulfilled its requirements.

It is in India's interest to facilitate highest controls at the international level and adopt them at the domestic level. Having now

updated its own legislation, India can demand the same of others, especially from those in its neighbourhood that have a history of proliferation and of supporting terrorist organisations.

Source: <https://www.thehindu.com/news/national/amending-the-weapons-of-mass-destruction-act/article65311030.ece>, 12 April 2022.

OPINION – Joesph Winters

As Russia Attacks Ukraine, Experts Weigh European 'Renaissance' for Nuclear Energy

As European leaders condemn Russia's unprovoked invasion of Ukraine and unspeakable violence against civilians, many have found themselves in an awkward situation: They need Russian gas to heat buildings and generate electricity. Roughly one-fourth of Europe's energy comes from natural gas, and as much as 40 percent of it flows from Russia.

To help wean Europe off Russian gas as soon as possible, some experts are now calling for a boost in nuclear power generation. Although nuclear power plants already represent an important energy source for the continent, at least 30 facilities have either recently been decommissioned or are slated to close in the next few years. Keeping them running could provide a reliable and low-emissions alternative to fossil fuels.

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The idea is controversial — especially because of fears of a meltdown — but advocates have argued that, in the face of a crisis, existing reactors should be kept online and those scheduled for retirement should be allowed to keep producing energy.

“Nuclear provides a lot of energy and it does so without impacting the environment by producing greenhouse gases,” said Stein, director of nuclear energy innovation at the Breakthrough Institute. “Keeping those plants on the grid allows them to offset potential imports of fossil fuels.”

Indeed, this was the argument made last month by the IEA in a 10-point plan for European Union leaders.

To cut reliance on Russian natural gas this year, the agency said, countries should “maximize generation from existing dispatchable low-emissions sources” — including by completing a reactor that’s being built in Finland and by resuming operations of facilities that were taken offline last year for maintenance and safety checks.

According to the IEA, these two actions alone could quickly add 20 terawatt-hours of power generation to the European grid in 2022. Additionally, delaying the closure of five nuclear

reactors slated for retirement later this year and in 2023 could reduce the European Union’s gas demand by nearly 1 billion cubic meters per month — slightly more than one-third of Spain’s natural gas consumption in 2020.

Part...logic. In mid-March, Belgium announced it would keep its seven nuclear reactors online for another decade, despite previous plans to retire them by 2025. The U.K. has also toyed with the idea of keeping one of its nuclear

power plants online past its planned retirement date, but has yet to make a final decision.

Stein, with the Breakthrough Institute, thinks that more countries should adopt this approach to foster a “nuclear renaissance” — not only keeping existing reactors in operation but bringing back those that have recently been retired. Germany, for example — which has pledged to end all

nuclear power generation by the end of this year — lost about 4 gigawatts of nuclear power capacity between 2020 and 2021 as it switched off three of its last six power plants. For context, this is roughly enough energy to power 3 million homes. But the plants are still there and

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could, in theory, be turned back on. Any obstacles to doing so, such as procuring a workforce or quickly lining up uranium orders — which are typically placed years in advance — are largely “overcomable,” Stein said, and regulators could streamline the process by loosening recertification requirements for facilities that have only recently shut down.

The German government, however, didn’t find the nuclear argument quite as compelling. Germany ruled out a nuclear revival earlier this month on the grounds that it would “not help”

alleviate the country's energy crunch. An assessment by the German economy and environment ministries concluded that bringing back nuclear power generation would not begin to offset fossil fuel demand until fall 2023 and would pose legal and safety risks.

Public polling suggests that much of the German public would agree with this decision. In a series of Europe-wide surveys...nearly 60 percent of German respondents said the country should not produce nuclear energy or that it should only play only a "small role" in the country's energy mix. The poll showed similar skepticism in countries with longstanding stances against nuclear power, such as Denmark and Italy. Respondents from countries that are more dependent on nuclear power — particularly France and Sweden — expressed greater support, with up to 45 percent saying nuclear should play a "major role" in their countries' energy mix, on par with solar and wind.

European opposition to nuclear power is informed by high-profile disasters in decades past, including the 2011 meltdown at Japan's Fukushima Daiichi facility. These fears were heightened in early March, when Ukraine's Zaporizhzhia power plant was attacked by Russian forces. Many feared an unintended radiation leak or the weaponization of the facility's atomic resources.

"This sort of thing could happen anywhere at any time," said Linda Pentz Gunter, director of media and development for the nonprofit Beyond Nuclear. Even short of a deliberate attack on nuclear facilities, she added, a natural disaster or even a prolonged power outage could lead to a potential catastrophe — especially for reactors that are decades old and are nearing the end of their scheduled lifetimes. "The potential for a high amount of radioactivity, for where it could blow, is really frightening." This view is contested by those who point out that nuclear power plants are associated with far fewer deaths per year than

other energy sources such as natural gas and even wind power.

Vetter, a nuclear engineering professor at the University of California pointed out that there are downsides to any power source. Natural gas fuels war, creates air pollution, and contributes to climate change; nuclear power carries some risk of a meltdown; and the expansion of renewables requires destructive mining for rare earth metals... However, there is further controversy over the economics of nuclear power. The cost of renewable energy has fallen dramatically over the past few years, and some experts say that it would be faster and cheaper to offset Russian gas demand by building new solar and wind and making efficiency improvements to help buildings

use less energy. According to Amory Lovins, an adjunct professor of civil and environmental engineering at Stanford University, unsubsidized efficiency upgrades or renewables can compete with existing nuclear reactors' operating costs.

A yearly benchmarking study from the asset manager Lazard estimated that

generating nuclear energy from existing facilities costs between \$24 and \$33 per megawatt-hour, whereas the levelized cost of unsubsidized energy from solar and wind — which includes the money it takes to build solar panels and wind turbines in the first place — can be as low as \$26 per megawatt-hour.

Plus, Lovins argues that there is an opportunity cost to keeping nuclear reactors online: More money going into nuclear operations equals less money available for renewables, which most countries agree they need more of.... It's not yet clear whether the crisis in Ukraine will spur a significant change in European nuclear power. Countries that have long opposed nuclear continue to do so, while those that are heavily reliant on it have no plans to change course. It may take a policy change at the E.U. to turn the

Countries that have long opposed nuclear continue to do so, while those that are heavily reliant on it have no plans to change course. It may take a policy change at the E.U. to turn the tide one way or the other. Against the backdrop of the war in Ukraine, the bloc is in the midst of a fierce debate over whether to define nuclear as a "green" source of energy.

tide one way or the other. Against the backdrop of the war in Ukraine, the bloc is in the midst of a fierce debate over whether to define nuclear as a “green” source of energy. A final taxonomy is set to inform climate-conscious investors as they decide which new energy projects to fund....

Source: <https://grist.org/energy/as-russia-attacks-ukraine-experts-weigh-european-renaissance-nuclear-energy/>, 07 April 2022.

OPINION – Bruno Merk

The UK Nuclear Energy Strategy – How Sustainable is this Approach?

The UK Government has announced that up to eight more nuclear reactors could be delivered on existing sites as part of the UK’s new energy strategy to boost UK energy independence and tackle rising prices. The proposed aim is to get nuclear energy back to deliver around 25% of the UK electricity demand equivalent to the proportion in the late 1990s. This is welcome news as one of the big advantages of nuclear is that it is a net-zero technology, which is in addition characterized through high reliability, low operational expenses, and high energy density.

Where there is so much light, there must be shadow too; there are some issues with current nuclear technology reactors in relation to sustainability including possible environmental damage, this is what which happens when Uranium is mined and converted into the base material for nuclear fuel plus fuel waste disposal concerns.

All of these issues could be dealt with using a more advanced technology. The most promising one, iMAGINE, could operate directly on spent

nuclear fuel, almost as it comes out of the current reactors. Thus, what is currently called a fuel waste storage problem would be turned into a large, secure and independent energy reservoir reducing our need to import energy. Maybe we will appreciate this soon. The technology could provide a factor of 100 more energy form of every gram Uranium mined in the past and would significantly reduce the final disposal challenge.

Now to the elephant in the room, the long construction time-frame and the uncertainties associated with delays and cost overruns, see e.g. the delays already experienced at Hinckley Point C, a real challenge for attracting investors. Rolls-

Royce tries to make the case that they are working on this in the UK SMR programme, a reactor which could be factory built and delivered in serial production. Up to now, the gains are not proven yet and it is hard to imagine a real serial production like in the car industry.

Anyway, this still only address investors concerns and do nothing to address the waste and supply concerns.

How would engineers approach this problem? A nuclear power plant is the establishment of a process facility which turns a resource (primary energy Uranium) into usable energy (secondary energy heat or electricity). When engineers develop a process, they think and do so in steps – see e.g. the successful vaccine production in the pandemic. The process would be theoretical research, first table experiments and tests in a laboratory in the gram scale, small scale production in the kg scale, and finally industrial production in tons. Why not to go these steps for the development of a future nuclear technology

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reducing the development risk while qualifying the required number of subject matter experts rather than dreaming big in the first step? Let's start iMAGINE, the nuclear of the 21st century now! A reactor experiment would be the first step to making nuclear energy an even more attractive investment for future generations as a basis for a safe and sustainable long-term energy strategy for the people of the UK.

A nice side effect of iMAGINE would be that we don't need budgetary creativity like the "regulated asset base" funding model, designed to transfer some of the multi-billion-pound investment risk into the field of the taxpayer. The proposed stepwise development will reduce the delivery risk, which is one of the key problems for investors, who fear losing money when the facility is not delivering electricity in time. In addition, iMAGINE creates more energy resource for future generations from existing resources – thus creating an attractive sustainable, green investment

Source: <https://news.liverpool.ac.uk/2022/04/08/the-uk-nuclear-energy-strategy-how-sustainable-is-this-approach/>, 08 April 2022.

OPINION – Aderito Vicente

The Ukraine War has Ushered in a New Global Nuclear (Dis)order

Here are five ways we can safely say that even before the Russian invasion, non-proliferation was under pressure and on the skids. The world's nuclear order was essentially designed to mitigate nuclear dangers, to inhibit arms races, to prevent the spread of nuclear weapons to additional states and, more importantly, to create

conditions for their elimination. At the heart of this nuclear order lies the 1968 NPT, which remains until today, for better or worse, the cornerstone of the global nuclear disarmament and non proliferation regime.

However, February 24, 2022 marked a critical and deeply disturbing challenge to the current NPT regime and the fragile global nuclear order with the Russian invasion of Ukraine. This ruthless act of war violated Article 2(4) of the UN Charter, which prohibits the use of force against the territorial integrity of another state. It also deepened the breach in the 1994 Budapest Memorandum on Security Assurances, in which Kyiv

committed to give up the nuclear weapons it inherited from the Soviet era in exchange for security assurances by the US, the UK, and Russia against the use of force that would potentially compromise Ukraine's territorial integrity and political independence. Moscow had already grossly violated these assurances in 2014 when it occupied Crimea and Donbass.

That event in itself inflicted a major wound on the nuclear order, which had already been under severe and growing pressure.

Besides the violation of the Budapest Memorandum, the post-Cold War era saw the spread of nuclear weapons (horizontal proliferation) to at least three states: India, Pakistan, and North Korea. Like Israel, India, and Pakistan, of course, had never signed the NPT, but North Korea, which had been an NPT member since 1985, announced its withdrawal from the treaty in 2003 and became a state in possession of nuclear weapons as of 2006 when it tested its first device.

Moreover, despite progress in reducing nuclear weapon arsenals since the Cold War, the number

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of warheads in global military stockpiles has been increasing once again. While the US is still reducing its nuclear stockpile and France and Israel have relatively stable inventories, China, India, North Korea, Pakistan, and the UK, as well as possibly Russia, are all thought to be increasing their nuclear inventory (vertical proliferation). Thus, the NPT regime has not prevented nuclear proliferation in the post-Cold War era.

States such as North Korea and Iran appear to have learned the lessons from regimes, notably in Iraq and Libya, which give up their nuclear weapon programs and whose regimes were later toppled by the U.S. and its allies. While no evidence that Iran intends to build a weapon has yet surfaced, its nuclear program has progressed to such an extent that it could quickly become a threshold state if it made such a decision.

Second, states such as North Korea and Iran appear to have learned the lessons from regimes, notably in Iraq and Libya, which give up their nuclear weapon programs and whose regimes were later toppled by the U.S. and its allies. While no evidence that Iran intends to build a weapon has yet surfaced, its nuclear program has progressed to such an extent that it could quickly become a threshold state if it made such a decision. Meanwhile, Pyongyang is conducting new tests of ballistic missiles capable of carrying its growing arsenal on nuclear warheads.

Third, the current security environment has been deteriorating due to the growing perception of a great-power realignment that pits the existing U.S.-led, Western-dominated "liberal" international order against revisionist powers led by Beijing and Moscow. In this context, the two nuclear superpowers, the US and Russia, have been essentially reversing their previous progress in building bilateral agreements and other measures intended to limit and reduce their nuclear arsenals.

Due to mutual accusations of non-compliance, the INF Treaty, which was celebrated for its

elimination of an entire category of nuclear weapons rather than their simple limitation, collapsed in August 2019. Since then, both sides began developing weapons that were banned under the INF Treaty. In the absence of agreed limitations, there is now no obstacle to a descent into an arms race placing Europe as the most likely theater of operation.

As a result, the New START Treaty remains the only nuclear disarmament agreement between US and Russian in effect. Following

its extension in February 2021, however, it will expire in 2026. Barring any renewed détente between Washington and Moscow it too could also be at risk, particularly if the Russia-Ukraine conflict worsens or persists.

Fourth, while the risks of nuclear proliferation are likely to increase given the uncertain international security situation of this new era, expectations for

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progress at the multilateral level are low, including for the Tenth NPT Review Conference, which was already postponed twice due to the COVID-19 pandemic and will now take place in August. Specifically, obstacles that have bedeviled past progress to agreement on

key issue, this includes the inability for states to agree on: 1) the rapid entry into force of the Comprehensive Nuclear-Test-Ban Treaty; 2) the multilateral negotiations at CD towards the signature and ratification of a fissile material cut-off treaty; and 3) the establishment of a Middle East WMD Free Zone and their means of delivery. In addition, the Treaty on the Prohibition of Nuclear Weapons is symbolically important, but if nuclear-possessing states and NATO members don't come on board, it will remain ineffective as a tool for eliminating nuclear weapons.

Fifth, in a referendum on February 27, 2022, Belarusians renounced the wording of Article 18 of their Constitution, which had guaranteed the country's nuclear neutrality since its independence from the Soviet Union in August 1991. As a result, the number of countries that could host nuclear weapons has expanded, thus increasing the risk of their deployment in Europe. At the same time, Belarus's move challenges the strategic stability between NATO and Russia, and, more importantly, undermines the effectiveness of the NPT regime.

So, what kind of nuclear order does the world face now? The Russo-Ukrainian War has effectively confirmed the advent of a new nuclear disorder. First, the NPT regime was affected by both vertical and horizontal proliferation. Second, of the precedents of Iraq, Libya and now Ukraine, insecure states or regimes may have a new incentive for developing nuclear weapons. Third, there is a freeze in US-Russia nuclear arms control and disarmament agreements. Fourth, despite efforts to promote the stigmatization, prohibition, and elimination of nuclear weapons under the TPNW, disarmament negotiations are stuck at a multilateral level.

What are the direct consequences of this nuclear disorder? One is the weakening of the NPT regime. ... Putin's aggression towards Ukraine sets a dangerous precedent by abrogating the Budapest Memorandum and undermining the wider framework of security assurances and guarantees that nuclear-weapons states offer to non-nuclear

states. In addition, as an NPT signatory, Russia had pledged to disavow the use of negative security assurances. Thus, more non-nuclear states that do not have security guarantees with nuclear powers, such as Finland and Sweden in Europe, may be more willing to align themselves with one these powers or to pursue their own nuclear weapons to avoid a possible conventional confrontation with a nuclear power.

Another consequence is the likelihood of a nuclear war. The increase of this type of conflict has risen, either between two nuclear powers, or between one nuclear power and a non-nuclear power with any kind of security guarantee umbrella. That is perhaps the clearest outcome of the Russo-Ukraine war. Noted nuclear scholars...recently warned of the possibility of Russia using TNWs to deter and, if necessary, tip the course of a large-scale conventional war in Ukraine. The likelihood of this event would shatter the most resilient norms — the non-use of nuclear weapons since Hiroshima and Nagasaki. The end of the nuclear taboo, in this context, could normalize the use of nuclear weapons against non-nuclear weapons states.

All things considered, it seems that unless an abrupt reversal in the dangerous "West versus Russia/China" paradigm takes place, and soon, the nuclear disorder will persist and grow worse.

Source: <https://responsiblestatecraft.org/2022/04/06/ukraine-war-has-ushered-in-a-new-world-nuclear-order/>, 06 April 2022.

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NUCLEAR STRATEGY

CHINA

China is Accelerating Nuclear Weapons Despite Tension Arising with US

China's leaders say that the Chinese government has begun to accelerate the development of its nuclear arsenal after reassessing the threat posed to mainland China by the United States. *The Wallstreet Journal* said that China's nuclear effort "long predates Russia's invasion of Ukraine, but the U.S.'s wariness about getting directly involved in the war there has likely reinforced Beijing's decision to put greater emphasis on developing nuclear weapons as a deterrent." It is believed that Chinese leaders see a stronger nuclear arsenal as a way to deter the U.S. from involving itself in a potential future conflict over Taiwan. The Chinese government has also accelerated work on more than 100 suspected missile silos that could be used to store nuclear-tipped missiles in remote western regions of China. American officials and independent security analysts who study nuclear proliferation say they are unsure about what is motivating Beijing's race to develop its nuclear arsenal.

Source-<https://www.bolnews.com/international/2022/04/china-is-accelerating-nuclear-weapons-despite-tension-arising-with-us/>, 11 April 2022.

Could China's "Hot-Swappable" Missile System Start an Accidental Nuclear War?

In the U.S.-China Economic and Security Review Commission's most recent annual report to Congress, the commission suggested that the DF-26 Chinese missile system presents a unique escalatory threat in a potential conflict between

China and the US. The DF-26, which has a range of approximately 4,000 kilometers, is a dual-capable, "hot-swappable" system: The missile can carry either a conventional or a nuclear warhead, and warheads can be quickly swapped on launch-ready missiles. Ever since its public debut in 2015, the DF-26's nuclear role has attracted significant attention from experts in the field. Some have suggested that using these missiles may lead to accidental nuclear escalation between China and the US.

It is believed that Chinese leaders see a stronger nuclear arsenal as a way to deter the U.S. from involving itself in a potential future conflict over Taiwan. The Chinese government has also accelerated work on more than 100 suspected missile silos that could be used to store nuclear-tipped missiles in remote western regions of China.

The worry is that the US might see an incoming salvo of DF-26s and assume they are loaded with nuclear warheads. The American leadership might then decide to retaliate with nuclear weapons of its own, not knowing that the Chinese missiles are actually carrying conventional warheads. Other analysts have argued that pre-launch ambiguity may contribute to unintended escalation. However, upon closer examination, nuclear escalation is not as likely as some believe.

The US Response to Incoming DF-26s: Modern early-warning systems are capable of calculating the trajectory and potential impact points for incoming warheads. In the

case of a Chinese missile attack against US forces in the Indo-Pacific region, the US would be able to identify incoming DF-26s as intermediate-range ballistic missiles heading toward US military bases located in the Pacific, rather than intercontinental ballistic missiles heading to the US homeland. Even if the Chinese missiles were loaded with nuclear warheads, these warheads would not hit major US population centers or reduce the effectiveness of US nuclear forces. US decision makers would not have much to lose by waiting until the missiles detonate before launching a counterattack. On the other hand, immediately

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launching a nuclear strike against China would likely result in a nuclear war that neither side wishes to fight.

The US also has a very survivable sea-based deterrent and significantly more nuclear warheads than China. It would be nearly impossible for China to disarm the US in a first strike. Even if American leaders were convinced that China was launching a nuclear strike against the US, they would not have to

immediately retaliate, as long as they were confident about US second-strike capabilities. Also, assets that are especially vulnerable to a first strike could be evacuated and dispersed to avoid destruction. For example, the US could immediately scramble strategic bombers carrying nuclear weapons, to avoid losing them on the ground. These measures can ensure that the US does not have to launch an immediate retaliation even when under threat, reducing the possibility of an accidental nuclear war.

The Chinese Response to a US Attack: Some experts have suggested another type of scenario, in which the US would fire conventional weapons at China's DF-26 launchers in an attempt to neutralize a conventional attack on Guam. China might see such an attack as a direct threat to its nuclear deterrent. This could drive Chinese leaders to launch a nuclear retaliation under the "use it or lose it" mentality. Yet, upon closer examination, such an idea is flawed.

First, China is not reliant on the DF-26 weapon system for its nuclear deterrence. The intermediate-range DF-26 is arguably less important than intercontinental ballistic missiles (ICBMs), such as the DF-41, in maintaining a credible deterrent against the US. This is reflected in the number of

warheads deployed with each type of missile. While the exact number of nuclear warheads

allocated to DF-26 units remains unknown, it is estimated that China has only deployed 60 out of some 350 total warheads with its intermediate-range force. It is therefore unlikely for China to worry about the credibility of its nuclear deterrent against the US, as long as its ICBMs remain survivable and effective.

The US also has a very survivable sea-based deterrent and significantly more nuclear warheads than China. It would be nearly impossible for China to disarm the US in a first strike. Even if American leaders were convinced that China was launching a nuclear strike against the US, they would not have to immediately retaliate, as long as they were confident about US second-strike capabilities.

Furthermore, China's nuclear warheads are deployed separately from its launch systems. The warheads are stored in underground bases and are only mated with their delivery systems in preparation for a strike. Warheads may also be dispersed and hidden within these large underground complexes to avoid destruction during a first strike. A conventional strike against missile launch vehicles on the ground is unlikely to damage nuclear warheads stored underground. In the worst-case scenario, in which a small number of nuclear warheads are accidentally destroyed by the US during a conventional strike, the Chinese nuclear deterrent would remain credible if it is able to inflict unacceptable losses on the US in a nuclear exchange. Finally, it is

unlikely that the US would accidentally hit Chinese ICBM launchers when trying to hit DF-26s. DF-26 brigades are separate from other types of Chinese missile brigades. ICBMs such as the DF-31 and DF-41 are also much larger than DF-26s. They do not share a common launch vehicle and can be

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identified more easily. Operationally, it is unlikely that China would intentionally disguise its ICBM launchers as intermediate-range missile launchers, knowing that the US would likely target the latter in a conventional conflict.

In the worst-case scenario, in which the US accidentally hits Chinese ICBM vehicles, it is unlikely that an accidental strike would be big enough to neutralize all Chinese second-strike assets immediately. China's silo-based missiles and nuclear submarines would also survive. There would be no need for China to immediately launch a nuclear retaliation. In short, DF-26s do not generate additional instability in the current deterrence relationship between China and the US. Launching conventional attacks with or against these missiles is unlikely to result in accidental nuclear escalation. The dual-use nature of DF-26s is unlikely to significantly change the US strategic calculus when considering a conventional strike against these launchers.

The Benefits of Dual Capability: Even if the DF-26's ambiguity is unlikely to trigger a nuclear war, why would China develop a hot-swappable missile? What are the strategic benefits of using a dual-capable delivery system when China could just as easily develop two variants of the same missile? Some analysts have suggested that China is deliberately trying to create ambiguity for its own sake. However, as established above, the escalatory risk of striking DF-26 launchers is relatively low, so the US is unlikely to be deterred from attacking these launchers based on the risk of accidental nuclear escalation alone. The benefit of strategic ambiguity seems questionable at best.

A better answer may be cost. Instead of building dedicated nuclear-strike platforms, dual-use platforms allow China to expand both its conventional and nuclear capabilities with one system. The operational costs might also be reduced, because fewer personnel are required

than for separate missile brigades. Furthermore, maintenance facilities for both the launch vehicle and the missiles can be shared to improve efficiency and reduce cost. This enables China to expand both its conventional and nuclear forces with a limited budget.

Apart from saving resources, dual-capable missiles are useful for maintaining secrecy and deceiving an adversary. China can hide the true number of its warheads with increased use of dual-use systems. As mentioned above, China's nuclear warheads are mainly stored underground and are difficult to identify using satellite imagery. On the other hand, launch systems (such as silos) can be more easily identified. Thus, it is easier for analysts to estimate the size of Chinese nuclear stockpile by tracking the number of launch systems. However, with the deployment of dual-use launch systems, it becomes more difficult for analysts to estimate the Chinese nuclear stockpile accurately, because the ratio of launch systems to warheads is unknown. The difficulty in estimating China's nuclear stockpile means that China can easily and diplomatically deflect any accusations about its nuclear build-up. It can also quietly expand its nuclear forces without drawing the attention of adversaries.

Finally, China may use these missiles as reserves for its main nuclear deterrent....Thus, there is a chance for at least some of the warheads to survive a major nuclear exchange. On the other hand, in a hypothetical first strike against China, ICBMs are very likely to be targeted by enemy nuclear forces or launched in the subsequent retaliation. In a post-war environment, China could choose to install left-

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over warheads on unused DF-26s to quickly build a reconstituted deterrent. While these missiles do not have sufficient range to strike targets in the continental United States, they would be useful for regional deterrence against adversaries closer to China, such as India.

Regardless of the reasoning behind its development, the DF-26 represents a leap in Chinese precision strike capabilities. The increasingly robust Chinese nuclear force will be an important player in the deterrence relationships between nuclear powers for the foreseeable future.

Source: https://thebulletin.org/2022/04/could-chinas-hot-swappable-missile-system-start-an-accidental-nuclear-war/#.YIUGj31_b1U.twitter, 08 April 2022.

RUSSIA

Russia 'Would Deploy Nuclear Arms' Near Finland, Sweden if Join NATO

Former Russian president Dmitry Medvedev warned that Russia would deploy nuclear weapons close to the Baltic States and Scandinavia if Finland or Sweden decide to join NATO. Medvedev, deputy chairman of Russia's Security Council and president from 2008-2012, wrote on Telegram that if the countries joined, this would more than double Russia's land border with NATO members.

"Naturally, we will have to reinforce these borders," he said. "In this case, it would not be possible to talk any more about the Baltic non-nuclear status. The balance has to be restored," he said, indicating that Russia would be entitled to deploy nuclear weapons in the region. The

former president said Russia would "seriously reinforce its group of ground forces and air defenses and deploy significant naval forces in the Gulf of Finland."

Moscow's military actions in Ukraine have sparked a dramatic U-turn in public and political opinion in both Finland and Sweden over long-held policies of military non-alignment. Finland said it will decide whether to apply for NATO membership within weeks and Sweden is also discussing membership.

weapons, Peskov said: "I can't say... There will be a whole list of measures, necessary steps. This will be covered at a separate meeting by the president."

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Source: <https://www.themoscowtimes.com/2022/04/14/russia-would-deploy-nuclear-arms-near-finland-sweden-if-join-nato-a77357>, 14 April 2022.

Russia already has nuclear weapons in the Baltic region, Lithuanian Defence Minister Arvydas Anusauskas said. One of Russian President Vladimir Putin's closest allies warned NATO that if Sweden and Finland joined the US-led military alliance then Russia would have to bolster its defences in the region, including by deploying nuclear weapons.

Kremlin spokesman Dmitry Peskov, asked about the comments by journalists, said that "this has been talked about many times" and President Vladimir Putin has issued an order on "reinforcing our western flank" due to NATO's growing military potential. Asked if this reinforcement would include nuclear

Russia Already has Nuclear Weapons in Baltic Region: Lithuania

Lithuanian Prime Minister Ingrida Simonyte said the Russian threat to increase military, including nuclear, in the Baltic region was

"nothing new". Russia already has nuclear weapons in the Baltic region, Lithuanian Defence Minister Arvydas Anusauskas said. One of Russian President Vladimir Putin's closest allies warned NATO that if Sweden and Finland joined the US-

led military alliance then Russia would have to bolster its defences in the region, including by deploying nuclear weapons.

Anusauskas told Lithuania's BNS wire that nuclear weapons have been deployed in Russia's Kaliningrad exclave on the Baltic Sea since before the current crisis. "The current Russian threats look quite strange, when we know that, even without the present security situation, they keep the weapon 100 km from Lithuania's border," the minister was quoted by the wire. "Nuclear weapons have always been kept in Kaliningrad...the international community, the countries in the region, are perfectly aware of this ... They use it as a threat," he was quoted. Russia's Kaliningrad exclave, on the shore of the Baltic Sea, is sandwiched between NATO members Lithuania and Poland. Lithuanian Prime Minister Ingrida Simonyte said the Russian threat to increase military, including nuclear, in the Baltic region was "nothing new".

Source: <https://www.businesstoday.in/latest/world/story/russia-already-has-nuclear-weapons-in-baltic-region-lithuania-329841-2022-04-14>, 14 April 2022.

NUCLEAR ENERGY

INDIA

Centre Gives Nod for Six Reactors at Andhra's Kovvada Nuclear Power Plant

Centre has given in-principle approval for setting up six reactors of 1,208 MW each at Kovvada nuclear power plant in Andhra Pradesh's Srikakulam...the cost and investment details

would emerge on the finalisation of the project proposal and administrative approval and financial sanction by the government. Investment in similar ongoing projects furnished by the ministry shows

that the overall estimated investments in Kovvada nuclear power project would be as high as two lakh crore.

As far as employment is concerned, a large number of contract manpower would be required and the employment potential during construction would be high. A large employment potential would be generated with the

contractors/vendors and from the business opportunities that would open up in due course".... The ministry stated that the employment potential during construction will be for 8,000 persons at

the peak stage. On becoming operational, each of the twin unit stations is expected to generate employment (direct and indirect) for about 2,000 persons.

The minister further stated that there are 22 operational nuclear power plants in the country with combined power generation capacity of

6,780 MW, eleven (11) nuclear power reactors under construction / commissioning at various stages with a combined capacity of 4,600 MW and ten (10) reactors with a total capacity of 7,000 MW that have been accorded administrative approval and financial sanction by the central government to be set up in fleet mode.... "Kovvada nuclear power plant would be the largest nuclear power plant in the country and would have a power generation capacity of 7,248 MW which is more than the combined power generation capacity of 6,780 MW of 22 operational nuclear power plants in the country."

This project would have a huge positive impact on

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Andhra Pradesh's economy and will create huge employment opportunities in the backward North Andhra region. I thank PM Modi for sanctioning such a massive project and his government's efforts for faster execution of the project"....

Source: <https://www.indiatoday.in/india/story/kovvada-nuclear-plant-approval-six-new-reactors-andhra-pradesh-1932087-2022-03-31>, 31 March 2022.

Indian Minister Provides Uranium, Construction Updates

As of February this year, uranium resources identified by the Atomic Minerals Directorate for Exploration and Research (AMD) - a constituent unit of the DAE - stand at 369,042 tU3O8 in 45 uranium deposits located in Andhra Pradesh, Telangana, Jharkhand, Meghalaya, Rajasthan, Karnataka, Chhattisgarh, Uttar Pradesh, Uttarakhand, Himachal Pradesh and Maharashtra. Seven uranium mines in Jharkhand have produced in total 1,592,292 tU3O8, with a single mine in Andhra Pradesh producing 671,560 tU3O8.

Natural uranium required for India's pressurised heavy water reactors operating under IAEA safeguards was imported from Kazakhstan, Canada, Russia and France and a reserve is being maintained to ensure supply security of fuel for those reactors.... The requirements of the PHWRs which are under Indian, rather than IAEA, safeguards are "adequately met" with domestic uranium production, which is undertaken by Uranium Corporation of India Ltd. "Towards fuel requirement of BWRs and VVERs, imports are made from Russia".... TVEL, the fuel manufacturer subsidiary of Russia's Rosatom, has supplied fuel pellets for India's two BWR units at

As of February this year, uranium resources identified by the Atomic Minerals Directorate for Exploration and Research (AMD) - a constituent unit of the DAE - stand at 369,042 tU3O8 in 45 uranium deposits located in Andhra Pradesh, Telangana, Jharkhand, Meghalaya, Rajasthan, Karnataka, Chhattisgarh, Uttar Pradesh, Uttarakhand, Himachal Pradesh and Maharashtra.

Over the past three years, India has imported a total of 4557.67 tU from Kazatomprom and 2988.37 tU from Cameco, all as natural uranium ore concentrate. It imported 56.78 tU from TVEL, in the form of enriched uranium fuel pellets. All the imports from Russia took place during 2019-2020.

Tarapur since the signing of a cooperation agreement between India and Russia in 2008.

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according to the information released by the Rajya Sabha. In answer to a separate question, Singh said 22 nuclear reactors with a capacity of 6780 MWe are currently in operation in India, in addition to Kakrapar unit 3 which was connected to the grid in January 2021.

Further units described by Singh as under construction, with their expected completion dates, are: Kakrapar 4 (expected completion 2022), Rajasthan 7 and 8 (2023), Kudankulam 3 and 4 (2023), Kudankulam 5 and 6 (2027)

Gorakhpur 1 and 2 (2028), and the Kalpakkam Prototype Fast Breeder Reactor (2022). Kaiga 5 and 6, Gorakhpur 3 and 4, Chutka 1 and 2, and Mahi Banswara units 1-4 have all been "accorded sanction"....

Source: <https://world-nuclear-news.org/Articles/Indian-minister-provides-uranium,-construction-upd>, 05 April 2022.

Govt Looks to Extend Validity of Green Clearance for Nuclear, Hydro Projects

The Union environment ministry is planning to extend the validity of green clearances granted to nuclear projects, hydro power projects and mines by several years. The Union environment ministry is planning to extend the validity of green

clearances granted to nuclear projects, hydro power projects and mines by several years, people familiar with the matter said, triggering concerns among experts about the environmental and social impacts of such a move.

A draft notification issued by the ministry on April 12 said environmental clearances granted to hydro projects will be valid for 13 years. The clearances given to nuclear projects will last for 15 years and for mining projects, upto 50 years.

Under the Environment Impact Assessment (EIA) Notification 2006, the validity of prior environmental clearance granted to a river valley project or activity is 10 years, a maximum of 30 years for mining projects and seven years for other projects and activities.

“Based on the past experiences, it is noted that nuclear power projects and hydro power projects have high gestation period due to various issues such as geological surprises, delay in forest clearance, land acquisition, local issues, rehabilitation and resettlement, etc., which are often beyond the control of project proponents and in this context, the Central Government deems it necessary to extend the validity of Environmental Clearance (EC) for such projects,” the draft notification, seen by HT, said. “...And whereas, for other projects also, considering the time taken for addressing local concerns including environmental issues related to the implementation of such projects, the Central Government deems it necessary to extend the validity of such ECs.”

As per provisions of Mines and Minerals (Development and Regulation) Act, 1957 on and from the date of commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2015, all leases for mining projects will be granted for a period of 50 years, the notification said.

In a separate office memorandum issued on April 11, the environment ministry said the validity of

the green nod granted to infrastructure or other projects which involve forest land and stage I and stage II forest clearance can be extended by two years. This decision was taken as projects involving a large forest area require time to obtain the stage II forest clearance and because of this, the project proponent may not be able to implement the project within the validity period of the clearance. ...

Source: Jayashree Nandi, <https://www.hindustantimes.com/india-news/centre-looks-to-extend-validity-of-environmental-clearance-for-nuclear-hydro-projects-101649959890650.html>, 15 April 2022.

SRI LANKA

IAEA Reviews Sri Lanka's Nuclear Power Infrastructure Development

A draft notification issued by the ministry on April 12 said environmental clearances granted to hydro projects will be valid for 13 years. The clearances given to nuclear projects will last for 15 years and for mining projects, upto 50 years.

An IAEA team of experts has concluded a six-day mission to Sri Lanka to review the country's infrastructure development for a nuclear power programme. The Integrated Nuclear Infrastructure Review (INIR) was carried

out from 4 to 11 April at the request of the Government of Sri Lanka. Sri Lanka is seeking to increase and diversify its power production capacity. The Government is looking at nuclear power as a reliable and low carbon option for its energy mix as it aims to achieve carbon neutrality of the electricity sector by 2050.

The INIR team reviewed the status of nuclear infrastructure development using the Phase 1 criteria from the IAEA's Milestones Approach, which provides detailed guidance across three phases of development (consider, prepare, construct). Phase 1 evaluates the readiness of a country to make a knowledgeable commitment to a nuclear power programme. The Sri Lanka Atomic Energy Board hosted the mission.

The INIR team made recommendations and suggestions to support the country in making further progress in developing its nuclear

infrastructure. "The INIR team concluded that Sri Lanka has engaged the relevant stakeholders in considering the introduction of nuclear power and initiated the appropriate studies to enable the Government to make a decision on the nuclear power programme," said team leader Jose Bastos from the IAEA's Nuclear Infrastructure Development Section. The INIR team comprised five international experts from Algeria, the Czech Republic, Romania, the United Kingdom and the United States, and four IAEA staff. Before the mission, Sri Lanka prepared and submitted a self-evaluation report and supporting documents covering all infrastructure issues to the IAEA.

The INIR team said that Sri Lanka needs to further develop its pre-feasibility study on introducing a nuclear power programme. The team also noted that Sri Lanka's Nuclear Energy Programme Implementing Organization should prepare recommendations for the Government to make an informed decision on the nuclear power programme. The country also needs to complete its analysis of the legal and regulatory framework required for nuclear power, including preparations for establishing an independent regulatory body. Moreover, the team raised the need to further develop relevant human resources and competencies required for a nuclear programme. It called on the country to further intensify its already promising stakeholder involvement activities.

Welcoming the mission's outcome, Professor S.R. D. Rosa, Chairman, Sri Lanka Atomic Energy Board said: "Sri Lanka is looking for nuclear power as a reliable, low carbon base load source of electricity

to complement renewable energy sources in the future. Electricity is vital for society's functioning, and the steady production of nuclear electricity will help us avoid shortages and outages. The results of this INIR mission will help us to move forward with the next steps in nuclear power development as Sri Lanka strives to further develop its economy and achieve the goal of zero emissions."

Source: <https://www.iaea.org/newscenter/pressreleases/iaea-reviews-sri-lankas-nuclear-power-infrastructure-development>, 14 April 2022.

The INIR team concluded that Sri Lanka has engaged the relevant stakeholders in considering the introduction of nuclear power and initiated the appropriate studies to enable the Government to make a decision on the nuclear power programme," said team leader Jose Bastos from the IAEA's Nuclear Infrastructure Development Section.

Sri Lanka's Nuclear Energy Programme Implementing Organization should prepare recommendations for the Government to make an informed decision on the nuclear power programme. The country also needs to complete its analysis of the legal and regulatory framework required for nuclear power, including preparations for establishing an independent regulatory body.

UK

The UK could Build Seven Nuclear Power Plants by 2050

The country is implementing a new strategy to increase its energy independence after the Russian invasion of Ukraine. The Energy Minister said on April 3 that the UK could build seven nuclear power plants by 2050 as part of a new strategy to increase its energy independence following the Russian invasion of Ukraine.

"The point is, as far as Putin is concerned, we do not want to live in a world that relies on Russian

hydrocarbons. Quasi Quarteng said *Telegraph* Insist on it "Sea air, especially nuclear 'Was' Ways to Gain Power Generation Skills in the UK". According to the newspaper, after intense discussions within the government, the government of Conservative PM Johnson is set to present its strategy to reduce the UK's energy dependence and achieve net zero emissions by 2050. There is a sense within the government that we can do more in nuclear power Quasi Quarteng said.

Net Zero Emissions by 2050: In 2050, "The UK has a world of six or seven bases", he continued. "It's not going to happen in the next two years, but it's definitely what we want."...The plan calls for the construction of at least two large-scale nuclear power plants by 2030, with the exception of small modular reactors, so most of the existing nuclear power plants should be shut down by this deadline. Conversely, hydraulic fracturing and coastal winds will not play a key role in the new strategy. Strong local opposition faced with these technologies, the Minister underlined. In addition to sanctions against Russian interests, London is also targeting the energy sector, which has imposed a ban on oil imports by the end of this year.

Source: <https://presstories.com/2022/04/03/the-uk-could-build-seven-nuclear-power-plants-by-2050/>, 03 April 2022.

Wind and Nuclear to Lead Government Energy Strategy

The government is set to unveil a new energy strategy that will shift the UK away from oil and gas imports as it faces hefty price increases and supply disruption caused by Russia's invasion of Ukraine. Ministers have indicated that they want to increase investment in North Sea gas production and expand nuclear and wind power.

However, increasing the number of wind farms will require changes to planning laws and has long been a divisive issue with the governing Conservative party. The government is not expected to change its stance on shale gas production, arguing that the economic and environmental costs are too significant. However, ministers insisted at the weekend that energy will not be rationed in the UK, despite pressure on supplies and a hefty 40% rise in consumer energy bills....

Source: <https://www.euractiv.com/section/politics/>

short_news/wind-and-nuclear-to-lead-government-energy-strategy/, 04 April 2022.

USA

Pentagon's 'Mobile' Nuclear Microreactor will be Demonstrated at Idaho National Lab

The Defense Department is set to prototype a mobile microreactor and ultimately demonstrate that small nuclear device at the Energy Department's Idaho National Laboratory. In a record of decision regarding Project Pele issued by the Pentagon's Strategic Capabilities Office, officials confirmed plans to produce an "inherently safe by design" transportable microreactor that can deliver 1 to 5 megawatts of electrical power for at least 3 years in full operation.

Microreactors can operate independently from the electric grid and generate roughly up to 50 megawatts of power. Project Pele marks the first electricity-generating, fourth-generation nuclear reactor to be designed and built in the United States. Once operational, it will be a High-Temperature Gas Reactor that relies on High-Assay Low Enriched Uranium Tristructural Isotropic fuel. China's HTR-PM was the first nuclear reactor demonstrated in the world, reaching criticality last September.

"Advanced nuclear power has the potential to be a strategic game-changer for the United States, both for the DOD and for the commercial sector," Project Pele Program Manager Dr. Jeff Waksman said. "For it to be adopted, it must first be successfully demonstrated under real-world operating conditions." Microreactors can operate independently from the electric grid and generate roughly up to 50 megawatts of power. Project Pele marks the first electricity-generating, fourth-generation nuclear reactor to be designed and built in the United States. Once operational, it will be a High-Temperature Gas Reactor that relies on High-Assay Low Enriched Uranium Tristructural Isotropic fuel. China's HTR-PM was the first nuclear reactor demonstrated in the world, reaching criticality last September.

This announcement comes several years after Defense officials articulated intent to conduct an environmental analysis associated with making such a reactor, as mandated by the National Environmental Policy Act—and also launched a

microreactor design competition. With expectations to select one engineering design in the spring, DOD is considering separate competing options from BWXT Advanced Technologies LLC of Lynchburg, Virginia and X-energy LLC of Greenbelt, Maryland.

At this point, the DOD uses approximately 30 terawatt-hours—or 30 million megawatt-hours—of electricity per year, which is more than some small nations, and more than 10 million gallons of fuel per day, officials noted. Those levels will likely increase going forward, as new weapons and radars systems and the electrification of non-tactical vehicles come into fruition. “A safe, small, transportable nuclear reactor would address this growing demand with a resilient, carbon-free energy source that would not add to the DOD’s fuel needs, while supporting mission-critical operations in remote and austere environments,” according to the Pentagon’s press release.

... Once the prototype is demonstrated, DOD will decide “whether or not to transition the technology and to use it operationally,” officials noted. Beyond Energy and Defense, the Nuclear Regulatory Commission, the U.S. Army Corps of Engineers, the National Nuclear Security Administration and NASA are involved in this effort.

Source: Brandi Vincent, <https://www.nextgov.com/emerging-tech/2022/04/pentagons-mobile-nuclear-microreactor-will-be-demonstrated-idaho-national-lab/365693/>, 14 April 2022.

US Organisation Calls for Doubling of Nuclear

Doubling domestic nuclear energy production by 2050 is an “ambitious but achievable” national goal that would help the USA achieve 100% clean energy, US think-tank the Nuclear Innovation Alliance (NIA) said. The organisation is calling for the US Department of Energy (DOE) to launch an Advanced Nuclear Energy Earthshot as part of its Energy Earthshots initiative to help achieve this.

“Significant development of advanced nuclear technologies is needed for the United States to reach mid-century climate goals,” NIA Executive Director Judi Greenwald said on the release of

Fission Vision, the organisation’s blueprint to achieve this goal. “Fission Vision answers the question: What is the role advanced nuclear energy could play at a scale and at a pace to help provide safe, reliable and affordable clean energy?”

Fission Vision has three objectives, Greenwald said: catalysing a robust US innovation and commercialisation ecosystem; ensuring “social licence” to operate advanced nuclear energy; and re-imagining and integrating advanced nuclear energy with other clean energy sources. “If we can achieve these objectives - and we think we can - advanced reactors will play a major role in meeting our climate and energy goals by at least doubling US nuclear energy production by 2050,” she added. ...

Earthshot: Doubling nuclear energy production will catalyse deployment of advanced nuclear energy technologies and play a major role in transitioning the USA to 100% clean energy by 2050, the report says, with “crosscutting technical and policy leadership” from the DOE an essential first step towards realising that. “Creation of a new Advanced Nuclear Energy Earthshot at the Department of Energy, based on the DOE Earthshot initiative model pioneered for other technologies, could rapidly accelerate US development and deployment of advanced nuclear energy technologies,” it adds.

The DOE’s Energy Earthshots Initiative was launched in June 2021 to accelerate breakthroughs of more abundant, affordable, and reliable clean energy solutions within the decade, with the first - Hydrogen Shot - seeking to reduce the cost of clean hydrogen by 80% to USD1 per kg in one decade. Long Duration Storage Shot - which aims to achieve affordable grid storage for clean power - was launched in July, and Carbon Negative Shot - focusing on innovative technologies to remove CO2 from the atmosphere and store it at meaningful scales - in November. In total, 6 to 8 Energy Earthshots are planned.

The DOE’s Earthshots model should be used to organise an integrated, cross-cutting approach to achieve dramatic reductions in nuclear project

costs and timelines this decade, Fission Vision says: "An Advanced Nuclear Energy Earthshot would integrate DOE activities across multiple dimensions. It would integrate DOE Office of Nuclear Energy's more traditional R&D efforts with demonstrations in the new Office of Clean Energy Demonstration, innovative financing through the Loan Programs Office, and commercialisation and testing capabilities of the national laboratories. It would integrate innovation efforts from the front end through the back end of the fuel cycle.

It would integrate advanced reactor innovation with supply chain innovation. It would also integrate DOE's efforts with the broader innovation and commercialisation ecosystem that includes a wide array of private companies. This will likely require DOE to develop new skills, new contracting and financing mechanisms and new partnerships, as well as better utilise existing ones....

Source: <https://www.world-nuclear-news.org/Articles/US-organisation-calls-for-doubling-of-nuclear>, 14 April 2022.

UZBEKISTAN

Russia's Invasion of Ukraine has Upset Uzbekistan's Nuclear Plans

In 2018, Uzbekistan turned to nuclear energy as a way to address its chronic energy shortages, relying on Russian investment and expertise to drive the projects forward. Today, with Russia facing sanctions from the international community due to its invasion of Ukraine, Uzbekistan's nuclear future is suddenly looking very uncertain. Uzbekistan is stuck between a rock and a hard place, not wanting to antagonize Russia by canceling the projects and wanting to avoid sanctions when the projects are completed

When Uzbekistan fired the starting pistol four years ago on plans to go nuclear as a way to

address the chronic energy shortages that plague it every winter, the world was a different place. Russian President Putin was not an international pariah. And Shavkat Mirziyoyev, his Uzbek counterpart, was courting him as a guest of honor in Tashkent. The high point of Putin's visit was when he and Mirziyoyev symbolically inaugurated the start of a project to build an \$11 billion nuclear power plant in an area just east of Bukhara. The work was to be done by Russia's state-owned Rosatom, a commanding

The high point of Putin's visit was when he and Mirziyoyev symbolically inaugurated the start of a project to build an \$11 billion nuclear power plant in an area just east of Bukhara. The work was to be done by Russia's state-owned Rosatom, a commanding presence in the global nuclear power industry, and to be funded with loans from Moscow.

presence in the global nuclear power industry, and to be funded with loans from Moscow. Tashkent hailed the environmental upside of a plant that would reduce reliance on fossil fuels – coal and natural gas – for power generation. It is furthermore hoped that nuclear-generated electricity could advance

Tashkent's economic goals by freeing up gas currently used for power generation for processing into value-added products. But an agreement that looked like a winner could now become collateral damage in Russia's invasion of Ukraine.

Uzbekistan's choice of partner may have looked logical back in 2017 when it first signed the nuclear deal with Russia on joint construction of the plant. But with Russia now the target of international sanctions, Rosatom looks a lot less attractive as a partner – even though the sanctions regime in its current form does not extend to the company itself.

Rosatom is Bullish on the Uzbekistan Project:

"The details of this project are under discussion. We all understand perfectly that the construction of the atomic power station is a strategic bilateral cooperation project in the interests of our countries," said senior Rosatom representative Vadim Titov on April 4 in remarks quoted by *Podrobno.uz*. Titov, the president of the Rosatom International Network, which represents the company's global interests, was speaking at an

online event in the run-up to an international trade fair in Tashkent later this month.

But with the full implication of the sanctions now in place yet to become fully clear, that confidence may be misplaced. ...While there are clear risks to proceeding with the project, there are risks to scrapping it, too. Aside from the certainty that cancellation would antagonize a belligerent Russia, finding a new partner to build a plant that Mirziyoyev said in 2018 would be completed within a decade would take time.

So is Building the Russo-Uzbek Nuclear Power Station Still Viable?

"Possibly, though given the long lead times required to develop and implement nuclear reactor projects, by the time such a project were to begin, it could be covered by sanctions," said Nephew. "In general, it would not be advisable to start development of such projects now, given this risk."

Source: <https://oilprice.com/Alternative-Energy/Nuclear-Power/Russias-Invasion-Of-Ukraine-Has-Upset-Uzbekistans-Nuclear-Plans.html>, 10 April 2022.

VIETNAM

Consider Return to Nuclear Energy, Vietnam Urged

Vietnam should restart its nuclear energy program by 2030 to reach the goal of carbon emission neutrality that it has committed to achieve by 2050, said experts. "Restarting the nuclear power program by 2030 is the only way to achieve our net-zero carbon commitment by 2050 (as committed at COP26)," former head of the Vietnam Institute of Energy Nguyen Manh Hien said at the second Vietnam Clean Energy Forum on April 7 2022.

In 2009, Vietnam had announced plans to build two nuclear power plants in the south-central province of Ninh Thuan at a cost of several billion

dollars, but the National Assembly shot down the proposal in 2016 saying the nation could not afford it then. Tran Chi Thanh, head of Vietnam Atomic Energy Institute, said the nuclear energy program "must restart soon", but did not specify a date for doing so. It takes about 15-20 years to complete a nuclear power plant, including planning, constructing and test runs. Thanh also recommended that previously chosen sites for nuclear power plants are not abandoned, saying it was hard to find a suitable location.

Vietnam should restart its nuclear energy program by 2030 to reach the goal of carbon emission neutrality that it has committed to achieve by 2050, said experts. "Restarting the nuclear power program by 2030 is the only way to achieve our net-zero carbon commitment by 2050 (as committed at COP26)," former head of the Vietnam Institute of Energy Nguyen Manh Hien.

This is not the first time that energy experts are recommending that Vietnam treads the nuclear path. In a previous report, experts of *Vietnam Energy Magazine* under the Vietnam Energy Association exhorted the government to restart the nuclear energy program as soon as possible. The renewed focus

on nuclear energy has happened after PM Chinh committed that Vietnam would reach carbon emission neutrality by 2050. The country is yet to incorporate nuclear energy into its official planning. It finds no mention in the National Electricity Development Plan for 2021-2030 (with vision to 2045). However, Chinh has said that proposals for nuclear energy will continue to be developed and submitted for consideration later.

Source: <https://e.vnexpress.net/news/industries/consider-return-to-nuclear-energy-vietnam-urged-4449287.html>, 09 April 2022.

BALLISTIC MISSILE DEFENCE

CHINA

Could China Use a High-Speed 'Doomsday Train' to Launch Nuclear Missiles?

High-speed rail is being considered as a potential launch platform for nuclear strikes after a new study by Chinese researchers suggested it was more suitable than previously thought.... A modern ICBM could fit inside a carriage but when blasting off, its weight generates thrust two to

four times the train's maximum load capacity.... It is not clear if or when the Chinese military would deploy a nuclear launch platform based on high-speed rail.

A train-based ICBM launch system would be more likely to survive the first wave of nuclear attack than other land-based systems, such as silos and trucks, according to military experts. And a train could carry as many missiles as a nuclear submarine, according to some estimates. A locomotive carrying nuclear weapons, also known as doomsday

train, was first proposed by the American military during the Cold War. The former Soviet Union built such a system and employed it for decades. From the outside, the doomsday train looks almost identical to a normal train. Besides carrying missiles, it also provided living quarters for military personnel and technicians.

Even if the train was identified by a passing spy satellite, the enemy would find tracking and destroying it difficult, especially in a country with a massive railway system going through mountains and

tunnels. In less than two decades China has built up the world's largest high-speed railway network. It plays an important role in the Chinese military's logistic support system by serving as rapid transport for personnel and cargo, but its use in nuclear warfare has not been openly discussed. China reportedly tested using rail to launch a DF-41 missile in 2016. The missile was ejected into the air by pressurised gas without igniting its rocket engine. The DF-41 missile is an 80-tonne ICBM carrying multiple nuclear warheads with a range up to 15,000km (9,300 miles). It is about 20 metres long and 2 metres wide. The carriage of a typical Chinese high-speed train is about 27 metres long and more than 3 metres in diameter.

Source: <https://www.scmp.com/news/china/>

[science/article/3172173/could-china-use-high-speed-doomsday-train-launch-nuclear?s=08](https://www.scmp.com/news/china/science/article/3172173/could-china-use-high-speed-doomsday-train-launch-nuclear?s=08), 29 March 2022.

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Shaheen-III is a surface-to-surface ballistic missile with a range of 2,750 kilometres, which makes it capable of reaching the farthest point in India's northeast and Andaman and Nicobar Islands....It is solid-fuelled and equipped with the Post-Separation Altitude Correction (PSAC) system.

surface-to-surface medium-range ballistic missile Shaheen-III which can strike targets up to 2,750 kilometres, bringing a number of Indian cities under its range. "The test flight was aimed at revalidating various design and technical parameters of the weapon system," the military's

media wing Inter Services Public Relations said in a statement.

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and Nicobar Islands....It is solid-fuelled and equipped with the Post-Separation Altitude Correction (PSAC) system. Solid fuel is suited for rapid response capabilities, while the PSAC feature provides it the ability to adjust the warhead trajectory for greater accuracy and evading anti-ballistic missile defence systems, the report said. The missile was first tested in March 2015. Last year, the Pakistan Army conducted a successful test launch of an "enhanced-range" version of the indigenously-developed Babur Cruise Missile 1B....

Source: <https://www.ndtv.com/world-news/pakistan-successfully-conducts-test-flight-of-ballistic-missile-shaheen-iii-2873772>, 09 April 2022.

PAKISTAN

Pakistan Successfully Conducts Test Flight of Ballistic Missile Shaheen-III

Shaheen-III is a surface-to-surface ballistic missile capable of reaching the farthest point in India's northeast and Andaman and Nicobar Islands. Pakistan's Army on 9th April, 2022 conducted a successful flight test of the

USA

US Sends Patriot Missile-Defence System to Slovakia

The Pentagon has sent a Patriot missile-defence system to Slovakia after the Nato ally sent one of its own systems — the Russian-made S-300 — to Ukraine, US President Biden said. The temporary deployment comes as the West seeks to bolster Ukraine’s defences from an onslaught of Russian missile attacks that appear to be targeting civilians.... A missile hit a crowded train station in eastern Ukraine that was an evacuation point for civilians, killing dozens of people. Russia denied responsibility, but the Pentagon said Moscow had used a short-range ballistic missile. “It is our full expectation that this was a Russian strike”.... “We believe they used a short-range ballistic missile, an SS-21.” The SS-21 is a Soviet-era tactical ballistic missile.

Moscow has accused Kyiv of carrying out the attack deliberately.... The senior US defence official said discussions are underway with other ally nations, including Bulgaria, that also have missile-defence systems to co-ordinate potential additional swaps for Patriot batteries. “We continue to have conversations with allies and partners who have these kinds of long-range air-defence systems,” the official told Pentagon reporters....

Source: <https://www.thenationalnews.com/world/us-news/2022/04/08/us-sends-patriot-missile-defence-system-to-slovakia/>, 09 April 2022.

URANIUM PRODUCTION

INDIA

India to Import 100 Tonne of Uranium to Power Nuclear Power Plants in FY23

Minister of State for Personnel, Public Grievances; Pensions Singh said 100 tonne of natural uranium in the form of uranium ore concentrate is scheduled to be imported during 2022-23.

He also said 133 numbers of fuel assemblies are scheduled to be imported next fiscal.

Singh said the Indian government has entered into an agreement with the Government of Russian Federation for supply of fuel for Russian reactors at Kudankulam, throughout the operation of power units. India also entered into a uranium Purchase Agreement with Canada, Kazakhstan, Russia and Uzbekistan, Singh said.

As on date, an adequate stockpile of imported Natural uranium is available at the Nuclear Fuel Complex (NFC), for supply of fuel to various reactor sites under IAEA safeguards, he added. During the fiscal 2021-22, no nuclear fuel was imported by India. On the other hand, during FY21, 999.82 tonne natural uranium ore concentrate was...imported from Kazakhstan for Rs 572.44 crore and 1,000.479 tonne was imported from Canada for Rs 618.95 crore....

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Source: https://economictimes.indiatimes.com/news/india/india-to-import-100-tonne-of-uranium-to-power-nuclear-power-plants-in-fy23/articleshow/90561182.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst, 31 March 2022.

NUCLEAR PROLIFERATION

AUSTRALIA

Aukus Partnership Plans to Develop Hypersonic Weapons in Apparent Response to China’s Build-up

US, Britain and Australia leaders cite ‘Russia’s unprovoked, unjustified and unlawful invasion of Ukraine’ as they reaffirm commitment ‘to a free and open Indo-Pacific’. The three nations also pledge ‘to deepen cooperation on cyber capabilities, artificial intelligence, quantum technologies and additional undersea capabilities’ The United States, Britain and Australia announced plans to cooperate on state-of-the-art weaponry – including hypersonic missiles and “counter-hypersonics”, an apparent response to China’s aggressive pursuit of its own

hypersonic arsenal.

It is the latest sign that Washington and many of its closest allies, including those in the new "Aukus" security partnership, remain focused on the growing military threat from Beijing, even as the war in Ukraine grinds on with no obvious end in sight. In a joint statement signed by US President Biden, British Prime Minister Boris Johnson and Australian Prime Minister Scott Morrison, the three leaders "reaffirmed our commitment to Aukus and to a free and open Indo-Pacific. "In light of Russia's unprovoked, unjustified, and unlawful invasion of Ukraine, we reiterated our unwavering commitment to an international system that respects human rights, the rule of law, and the peaceful resolution of disputes free from coercion." The leaders said they would cooperate on "hypersonics and counter-hypersonics, and electronic warfare capabilities", and would "expand information sharing" and work together more on defence innovation.

"These initiatives will add to our existing efforts to deepen cooperation on cyber capabilities, artificial intelligence, quantum technologies and additional undersea capabilities," the statement said. "As our work progresses on these and other critical defence and security capabilities, we will seek opportunities to engage allies and close partners." China's rapid drive to build more hypersonic weapons, which can fly five times the speed of sound, has caused alarm in Washington and other capitals around the world. Last year, the Pentagon said that a Chinese hypersonic missile test flight had circled the planet before crashing inside China. Analysts say the weapons can fly so fast and so far that current missile defence systems may be ineffective against them. Martinez, comptroller of the US Missile Defence Agency, said that the US had plans over the next year to launch "two prototype hypersonic and ballistic tracking space

sensors" meant to detect hypersonic missiles.

A US congressional research report last month found that China and Russia have both developed hypersonic missiles that can carry nuclear warheads. Russia claims it has used hypersonic missiles in its invasion of Ukraine. North Korea also claims to be developing its own hypersonic missiles, despite UN sanctions targeting the country's illicit nuclear weapon and ballistic missile programmes.

Zhang Jun, China's ambassador to the UN, condemned the Aukus announcement on April 5, warning that it could "lead the other parts of the world into a crisis" like that in Ukraine, according to Reuters Beijing insisted last year that its test

was not of a hypersonic missile, merely part of a "routine spacecraft experiment".... On 5 April a senior US military official told CNN that the US had tested one in mid-March, but did not publicise it to avoid raising tensions with Russia.

All of this comes as Aukus emerges as a new focus of Washington's engagement

in Asia. The Biden administration has emphasised that it regards such partnerships as vital to countering an increasingly assertive China. The group was announced in September, and a White House strategy document published in February lists it as a key part of Washington's plans to "reinforce deterrence" in the Indo-Pacific region. April 5, 2022 announcement was the first joint statement from the three leaders since the partnership was formed. The statement also said the three were "pleased" with the progress in getting nuclear-powered submarines to Australia, a move announced when the group was created.

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Source-<https://www.scmp.com/news/china/military/article/3173187/aukus-partnership-plans-develop-hypersonic-weapons-apparent>, 06 April 2022.

IRAN

Iran's President Vows to Continue Nuclear Activities

The nuclear deal collapsed four years ago when former President Trump withdrew the US and imposed crushing sanctions on Iran. In the meantime, Iran has vastly expanded its nuclear work. President Raisi said on April 9 2022 that Iran will continue nuclear development activities as talks to revive Tehran's nuclear deal with world powers remain stalled, state media reported. Speaking in a ceremony marking Iran's national day of nuclear technology, the hard-line president said his administration will support an acceleration in research of peaceful nuclear technology. "Our knowledge and technology in the nuclear field is not reversible. Iran's (continuation of) research in peaceful nuclear fields will not depend on others' demands or viewpoints," said Raisi.

Iran has vastly expanded its nuclear work. President Raisi said on April 9 2022 that Iran will continue nuclear development activities as talks to revive Tehran's nuclear deal with world powers remain stalled, state media reported.

The head of Iran's civilian Atomic Energy Organization, Mohammad Eslami, said Iran will soon pursue construction of a new nuclear power plant with 360-megawatt capacity. It is to be located near the town of Darkhovin in oil-rich Khuzestan province in the country's southwest.

Raisi's comments came as talks between Iran and world powers in Vienna to revive the 2015 nuclear deal have stalled. There is concern that Iran could be closer to being able to construct an atomic weapon if it chose to pursue one. The nuclear deal collapsed four years ago when former President Trump withdrew the United States and imposed crushing sanctions on Iran. In the meantime, Iran has vastly expanded its nuclear work. Iran has long insisted that its nuclear program has had peaceful purposes like generating electric power and medical isotopes.

During April 9th ceremony, Iran displayed its new civil nuclear achievements, including several medical isotopes, agricultural pesticides, detoxification equipment and nuclear fuel material. The report did not elaborate. The head of Iran's civilian Atomic Energy Organization, Mohammad Eslami, said Iran will soon pursue

construction of a new nuclear power plant with 360-megawatt capacity. It is to be located near the town of Darkhovin in oil-rich Khuzestan province in the country's southwest.

The plant was supposed to be built before the 1979 Islamic Revolution with help from France but the project was halted in its initial phase. The site became a major battlefield in the 8-year war between Iran and Iraq that began in 1980. Iran's sole nuclear power plant, with 1,000-megawatt capacity, went online in 2011 with help from Russia in the southern port city of Bushehr. Iran's stockpile of enriched uranium continues to grow and it is currently enriching it at up to 60 per cent purity. That's the highest level ever by Iran and is a short technical step from weapons-grade levels of 90 per cent. It is far greater than the nuclear deal's 3.67 per cent cap. Meanwhile, Iran imposed symbolic sanctions on U.S. officials over their roles in

harming Iran, the country's Foreign Ministry said in a statement....

Source-<https://indianexpress.com/article/world/irans-president-vows-continue-nuclear-activities-ebrahim-raisi-7861843/>, 09 April 2022.

NUCLEAR NON-PROLIFERATION

ISRAEL

Iran Urges International Community to Pressurize Israel to Join NPT

The annual meeting of the UN Disarmament Commission kicked off on April 5 2022 after a three-year hiatus due to non-cooperation of the United States in issuing visas to the Russian delegation. Finally, the Commission began its work with resolving this problem and issuance of necessary recommendations with regards to disarmament and nuclear non-proliferation as well

as confidence building in line with banning arms races in outer space.

In the third plenary session of the Commission, held in presence of chairman and representatives of member states, Zahra Ershadi, deputy permanent representative of the Islamic Republic of Iran to the UN presented Iran's statement on both issues of this year's agenda. Referring to the current geopolitical crises in the world and danger of using nuclear weapons, Iran's envoy stressed that the recent danger is intensifying due to the arms race and modernization of nuclear arsenals in the platform of new technologies.

What the international community needs is the political will of nuclear powers to agree on a plan of action to destroy nuclear weapons within a specified timespan and in this regard, any research and development, testing, production of nuclear weapons must be stopped, she said, adding that nuclear countries should stop trying to modernize their nuclear arsenals and correct their policies and doctrines in this regard. Referring to the two successful sessions of the annual conference entitled "Middle East Free of Weapons of Mass Destruction", Ershadi called on the international community to put pressure on Zionist regime to join the Nuclear Non-Proliferation Treaty and to accept IAEA's inspections.

Source: <https://en.mehrnews.com/news/185386/Iran-urges-intl-community-to-pressurize-Israel-to-join-NPT>, 05 April 2022.

NUCLEAR SAFETY

UKRAINE

IAEA Director General Statement on Situation in Ukraine

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Director General Rafael Mariano Grossi said today that he is working closely with Ukraine to finalize the dates and other arrangements for the upcoming IAEA mission to help ensure safety and security at the country's Chernobyl NPP. The Director General will head the team of IAEA safety, security and safeguards experts that is expected to travel to the site in northern Ukraine later

this month, a few weeks after he went to the South Ukraine NPP to meet with senior Ukrainian government officials and plant staff.

The IAEA is planning a series of technical assistance missions in the coming weeks to reduce the risk of a nuclear accident during the conflict in Ukraine. The country has 15 nuclear power reactors at four plants in addition to various radioactive waste management facilities at Chernobyl, which was held by Russian forces for five weeks before their withdrawal on 31 March.

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by Russian forces for five weeks before their withdrawal on 31 March.

As part of the preparations for the missions, the IAEA and its Ukrainian counterparts are discussing what kind of safety-related equipment – including spare parts and components – is needed at the different nuclear sites. At Chernobyl, the site of the 1986 accident, the IAEA experts will also conduct radiological assessments and repair remote safeguards monitoring equipment.

Ukraine separately informed the IAEA today that

there had been no significant new developments related to nuclear safety and security over the past 24 hours, Director General Grossi said. Regarding Ukraine's nuclear energy reactors, seven are currently connected to the grid, including two at the Russian-controlled Zaporizhzhya NPP, two at the Rivne NPP, two at the South Ukraine NPP, and one at the Khmelnytsky NPP. The eight other reactors are shut down for regular maintenance or held in reserve. Safety systems remain operational at the four NPPs and they also continue to have off-site power available.

In relation to safeguards, the IAEA said that the situation remained unchanged from that reported previously. The Agency was still not receiving remote data transmission from its monitoring systems installed at the Chernobyl NPP, but such data was being transferred to IAEA headquarters from the other NPPs in Ukraine.

Source: [https://www.iaea.org/newscenter/pressreleases/update-51-iaea-director-general-statement-on-situation-in-ukraine#:~:text=Director%20General%20Rafael%20Mariano%20Grossi,Nuclear%20Power%20Plant%20\(NPP\),13%20April%202022](https://www.iaea.org/newscenter/pressreleases/update-51-iaea-director-general-statement-on-situation-in-ukraine#:~:text=Director%20General%20Rafael%20Mariano%20Grossi,Nuclear%20Power%20Plant%20(NPP),13%20April%202022).

IAEA to Assist in Safeguarding Ukraine Nuclear Sites

The head of the U.N. nuclear watchdog agency said he has reached separate agreements with Ukrainian and Russian authorities on what assistance his agency will provide as Russia's invasion of Ukraine enters a second month. Fears have been high throughout the five-week-long war of a potential nuclear accident, as Russia

indiscriminately shells many parts of Ukraine. On March 3, shelling around the Zaporizhzhia nuclear plant in southeastern Ukraine exacerbated those fears. "We delivered some equipment; this is a start," DG, IAEA told reporters after returning to Vienna from a field visit to Ukraine and meetings in Russia. "But we have a structured set of activities that are going to start as of next week."

That assistance will include sending expert teams and equipment, as well as establishing a rapid assistance mechanism. "In case there was a situation — an emergency — that maybe taking place, we are setting up a mechanism whereby we could be sending a team to assess and to assist almost immediately," Grossi said.

Early in its invasion, Russian troops occupied the defunct Chernobyl plant. On Thursday (31 March), it was confirmed they were leaving. Reports emerged that hundreds of Russian soldiers had radiation poisoning after digging trenches in the

most polluted part of the Exclusion Zone, known as the Red Forest. Grossi said the general radiation situation around the plant is "quite normal" now and he could not confirm the reports about the Russian troops being sickened.

"There was a relatively higher level of localized radiation because of the movement of heavy vehicles at the time of the occupation of the plant, and apparently this might have been the case again on the way out," Grossi said. "We heard about the possibility of some personnel being contaminated, but we don't have any confirmation about that." The director general said that his staff would be moving to Chernobyl "very, very soon" and that there is a lot of technical work to be done there, as they have lost

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a lot of remote monitoring capabilities that need to be reconnected. He said that could be done quickly.

Source-<https://www.newdelhitimes.com/iaea-to-assist-in-safeguarding-ukraine-nuclear-sites/>, 02 April 2022.

SOUTH AFRICA

IAEA Concludes Long Term Operational Safety Review of South Africa's Koeberg Nuclear Power Plant

IAEA team of experts today completed a review of long term operational safety at the Koeberg NPP in South Africa. The SALTO (Safety Aspects of Long Term Operation) review mission was conducted at the request of the Government of South Africa's Department of Mineral Resources and Energy from 22 until 31 March. It focused on aspects essential to the safe Long Term Operation (LTO) of two units of Koeberg NPP, South Africa's only nuclear power plant operated by the public utility Eskom.

Unit 1 went into commercial operation in 1984 and Unit 2 in 1985. Eskom is planning to extend operation of the units by 20 years until 2045 for a total operational lifetime of 60 years each. The plant is currently carrying out a periodic safety review to identify safety improvements for the LTO period. The ten-person team comprising experts from Argentina, Belgium, Czech Republic, France, Hungary, Pakistan, Spain, Sweden and two IAEA staff members reviewed the plant's preparedness, organization and programmes for safe LTO....

The team also provided recommendations and suggestions to further enhance the preparations for safe LTO, including that Eskom should: Comprehensively review and implement all plant programmes relevant for long term operation. Complete the revalidation of qualification of

cables in the containment for the long term operation period. Ensure full functionality of the containment structure monitoring system....The plant management said it was committed to implement the recommendations and requested that the IAEA schedule a SALTO follow-up mission to Koeberg NPP in 2024. The team provided a draft report to the plant management at the end of the mission. The plant management and the South African National Nuclear Regulator (NRR) will have an opportunity to make factual comments on the draft. A final report will be submitted to the plant management, the NNR and the Government of South Africa within three months.

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Background: The Koeberg mission was the 50th IAEA SALTO mission conducted since 2005. General information about SALTO missions can be found on the IAEA Website. A SALTO peer review is a comprehensive safety review addressing strategy and key elements for the safe LTO of nuclear power plants. They

complement OSART missions, which are designed as a review of programmes and activities essential to operational safety. Neither SALTO nor OSART reviews are regulatory inspections, nor are they design reviews or substitutes for an exhaustive assessment of a plant's overall safety status.

LTO of nuclear power plants is defined as operation beyond an established time frame determined by the license term, the original plant design, relevant standards, or national regulations. As stated in IAEA safety standards, to maintain a plant's fitness for service, consideration should be given to life limiting processes and features of systems, structures, and components, as well as to reasonably practicable safety upgrades to enhance the safety of the plant to a level approaching that of modern plants. ...

Source-<https://www.iaea.org/newscenter/pressreleases/iaea-concludes-long-term-operational-safety-review-of-south-african-koeberg-nuclear-power-plant>, 31 March 2022.

INDIA

India Provides Data on its Nuclear Power Development

India has imported just over 7600 tons of uranium over the past three years, mostly from Kazakhstan and Canada, according to official figures released by the government. Minister of State Singh presented these data, as well as data on domestic uranium production and an update on nuclear power plant projects, in written responses to questions in the Indian government's upper house, the Rajya Sabha on 6 April.

As of February 2022, the uranium resources identified by the Atomic Minerals Exploration and Research Authority (AMD) of the DAE are 369,042t U3O8 in 45 uranium deposits located in Andhra Pradesh, Telangana, Jharkhand, Meghalaya, Rajasthan, Karnataka, Chhattisgarh, Uttar Pradesh, Uttarakhand, Himachal Pradesh and Maharashtra. Seven uranium mines in Jharkhand produced a total of 1,592,292t U3O8 and one mine in Andhra Pradesh produced 671,560t U3O8. "Natural uranium required for India's IAEA-safeguarded PHWRs has been imported from Kazakhstan, Canada, Russia and France, and a reserve is being built to ensure the reliability of fuel supplies for these

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He listed the following power units under construction with an indication of the expected time frame for their completion: Kakrapar 4 – 2022, Rajasthan 7&8- 2023, Kudankulam 3&4 – 2023, Kudankulam 5&6 – 2027, Gorakhpur 1&2 – 2028, PFBR at Kalpakkam – 2022. Singh added that Kaiga 5&6, Gorakhpur 3&4, Chutka 1&2, and the first four power units of Mahi Banswara nuclear power plant have received approval for construction. India's nuclear capacity expected to reach 22,480 MWe by 2031.

reactors," Singh said. The needs of the PHWRs, which are under Indian rather than IAEA safeguards, are "adequately met" by domestic uranium production operated by the Uranium Corporation of India Ltd. He added: "As for the demand for fuel for BWRs and VVER reactors, it is imported from Russia."

Russian fuel company TVEL has been supplying nuclear fuel for two Indian BWR units at the Tarapur NPP since the signing of a cooperation agreement between India and Russia in 2008.

Over the past three years, India has imported a total of 4557tU from Kazatomprom and 2988tU from Cameco, all in the form of natural uranium ore concentrate. The country also imported 56.7tU from Russia's TVEL in the form of

enriched uranium fuel pellets. All imports from the Russian Federation were carried out during 2019-2020.

Answering a separate question, Singh said that there are currently 22 nuclear power reactors operating in India with a total capacity of 6780 MWe, in addition to the third unit of the Kakrapar nuclear power plant, which was connected to the grid in January 2021. He listed the following power units under construction with an indication of the expected time frame for their completion: Kakrapar 4 – 2022, Rajasthan 7&8- 2023, Kudankulam 3&4 – 2023, Kudankulam 5&6 – 2027, Gorakhpur 1&2 – 2028, PFBR at Kalpakkam – 2022. Singh added that Kaiga 5&6, Gorakhpur 3&4, Chutka 1&2, and the first four power units

of Mahi Banswara nuclear power plant have received approval for construction. India's nuclear capacity expected to reach 22,480 MWe by 2031.

Source-<https://www.neimagazine.com/news/newsindia-provides-data-on-its-nuclear-power-development-9611717>, 07 April 2022.

DISARMAMENT

USA

Biden Administration Kills Trump-Era Nuclear Cruise Missile Program

After conducting the upcoming Nuclear Posture Review, the Biden administration has chosen to end the sea-launched cruise missile program, a senior Pentagon official said. In a rare political win for non-proliferation advocates, the Biden administration has cancelled the Sea-Launched Cruise Missile-Nuclear program, one of the two new nuclear weapons greenlit by the Trump administration. The Pentagon's fiscal year 2023 budget request, released on March 28 2022, zeroes out funding planned for the so-called SLCM-N program, according to a senior defense official who spoke to reporters about the pending proposal.

"Really this decision came out of the Nuclear Posture Review," the official said. "There was direction from the president to reduce the role of nuclear weapons in our defense strategy. That [decision to cancel SLCM-N] was a component." The determination is the latest in a back-and-forth spanning multiple administrations about the utility of a nuclear-armed cruise missile that could be launched from destroyers or Virginia-class attack submarines

that typically use conventional weapons. The Obama administration's 2010 Nuclear Posture Review called on the Navy to sunset the nuclear-version of its Tomahawk cruise missile, which was retired by 2013, according to the Federation of American Scientists.

The Trump administration's 2018 NPR effectively reversed course, recommending the development of two new nukes: a new nuclear-tipped sea-launched cruise missile and the W76-2 nuclear warhead, a low-yield nuke launched from submarines that first deployed in 2019. Last year, the Navy asked for \$15.2 million to begin research and development activities for SLCM-N and an accompanying nuclear warhead. However, the Biden administration's ultimate decision to cancel the program is not entirely a surprise.

... Despite the cancellation of SLCM-N, funding for other nuclear programs flourished in the FY23 request. When asked about the fate of the W76-2, the senior defense official responded that there is "no change there," hinting that the upcoming Nuclear Posture Review — due to be released in the coming weeks — will continue to support the low-yield warhead. According to a department fact sheet on the budget, the Pentagon requested a total of \$34.4 billion across the nuclear enterprise for FY23, including \$4.8 billion for nuclear command, control and communications. The Navy requested \$6.3 billion for the Columbia-class submarine, its leg of the nuclear triad. Meanwhile, the Air Force is also modernizing its two components of the triad, asking \$5 billion for the B-21 bomber program and \$3.6 billion for the Ground Based Strategic

In a rare political win for non-proliferation advocates, the Biden administration has cancelled the Sea-Launched Cruise Missile-Nuclear program, one of the two new nuclear weapons greenlit by the Trump administration. The Pentagon's fiscal year 2023 budget request, released on March 28 2022, zeroes out funding planned for the so-called SLCM-N program.

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Deterrent program that will replace Minuteman III intercontinental missiles.

Source-<https://breakingdefense.com/2022/03/biden-administration-kills-trump-era-nuclear-cruise-missile-program/>, 28 March 2022.

NUCLEAR WASTE MANAGEMENT

FINLAND

The World's First Deep Geological Nuclear Vault will Store Radioactive Waste in Finland for 100,000 Years

In light of the geopolitical shift taking place around energy in the last month, with countries shunning Russia's oil and gas but needing replacement sources — and not wanting to go back to long-term reliance on coal — the debate around nuclear energy has reignited. Except this time, there's even more reason to be in favour of the ever-contentious power source than against it.

The biggest anti-nuclear arguments include the risk of lethal accidents, increased access to materials that could be used to build nuclear weapons, and lack of a safe disposal method for nuclear waste. The latter could soon get some heavy pushback, though, as the world's first permanent disposal facility for nuclear waste prepares to open in Finland. There were already two operating nuclear reactors on Olkiluoto, and after more than a decade of delays, a third finally launched test production at 0.1 gigawatts earlier this month, aiming to reach its full 1.6 GW capacity by July. Once that happens, nuclear power will account for more than 40% of Finland's total electricity production, bumping it even higher from its existing spot on the list of top countries in the world for nuclear energy reliance.

Each statistic about the disposal facility's

development and how it will function is more mind-blowing than the last. Here's the basic premise: spent fuel rods from nuclear reactors will be encased in layers of various materials before being lowered into tunnels 430 meters (1,411 feet, right around the height of the Empire State Building counting its spire) underground, where they'll safely decompose over the course of 100,000 years — the amount of time for which nuclear waste remains toxic...

Scientists, engineers, energy companies, and governments will grapple with the costs and benefits of nuclear power for decades to come, and despite growing urgency, it remains to be seen whether it will ultimately triumph as a sustainable energy source. In the meantime, kudos to Finland for being the first to take a big step forward. The Onkalo facility is currently under construction, and slated to start operating in 2024.

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Source: <https://www.themandarin.com.au/185845-the-worlds-first-deep-geological-nuclear-vault-will-store-radioactive-waste-in-finland-for-100000-years/>, 04 April 2022.

INDIA

Environmental Clearances Underway for Six 'Away From Reactor' Spent Nuclear Fuel Storage Sites in Kudankulam

The environmental clearance process for the 'Away From Reactor' (AFR) facility to store the spent nuclear fuel of the 1,000 MW atomic power plants — Unit 1 and 2 — in Tamil Nadu's Kudankulam is underway, the Parliament was informed on April 7, 2022. The process to obtain environmental clearance for AFR to store the spent nuclear fuel is in progress... Construction of nuclear fuel storage facilities in the country require safety clearances from the AERB, in addition to all the necessary statutory approvals such as

environmental clearances. This is done to ensure the spent fuel does not pose any radiological hazard to the nearby people and environment.

NPCIL is constructing four additional 1,000 MW reactors at Kudankulam, bringing the total number of power plants to six. Units 1-4 of the AFR wet storage facilities have received clearance for the building site at Kudankulam after verification with the regulatory and safety requirements, while the design safety reviews are currently being carried out by the AERB, Singh said.

EIA studies of spent fuel storage facilities were carried out to assess the environmental impact of Units 3-6, following which they received the appropriate clearances. The AERB has accorded consent to establish the facility in Units 3 and 4, Singh added. Furthermore, he stated that such spent nuclear fuel storage facilities are already in operation at the Tarapur (Maharashtra) and Rawatbhata (Rajasthan) sites, and that they are operating safely with no impact on personnel, the public, or the environment.

Source: <https://weather.com/en-IN/india/pollution/news/2022-04-08-environmental-clearances-for-storage-sites-in-kudankulam>, 08 April 2022.

SWITZERLAND

In 'Project of the Century', Swiss Seek to Bury Radioactive Waste

The Mont Terri international laboratory was built to study the effects of burying radioactive waste in clay which sits 300 metres (985 feet) below the surface near Saint-Ursanne in the northwestern Jura region. The underground laboratory stretches across 1.2 kilometres (0.7 miles) of tunnels. Niches along the way, each around five metres high, are filled with various

storage simulations, containing small quantities of radioactive material monitored by thousands of sensors.

More than 170 experiments have been carried out to simulate the different phases of the process – positioning the waste, sealing off the tunnels, surveillance – and to reproduce every imaginable physical and chemical effect. According to experts, it takes 200,000 years for the radioactivity in the most toxic waste to return to natural levels. Geologist Nussbaum, who heads the laboratory, said researchers wanted to determine what the

possible effects could be “on storage that needs to last for nearly one million years.” That “is the duration that we need to ensure safe confinement,” he said, adding that so far, “the results are positive.”

Potential Sites Identified: Three prospective sites in the northeast, near the German border, have been identified to receive such radioactive waste. Switzerland’s nuclear plant operators are expected to choose their preferred option in September. The Swiss government is not due to make the final decision until 2029, but that is unlikely to be the last word as the issue would probably go to a referendum under Switzerland’s famous direct democracy system.

Despite the drawn-out process, environmental campaigners Greenpeace say Switzerland is moving too fast. “There are a myriad of technical questions that have not been resolved,” Florian Kasser, in charge of nuclear issues for the environmental activist group, told AFP. For starters, he said, it remains to be seen if the systems in place can “guarantee there will be no radioactive

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leakage in 100, 1,000 or 100,000 years.”... Swiss nuclear power plants have been pumping out radioactive waste for more than half a century. Until now, it has been handled by the National Cooperative for the Disposal of Radioactive Waste, or NAGRA, founded in 1972 by the plant operators in conjunction with the state.

For now, the waste is being stored in an “intermediary depot” in Wurenlingen, some 15 kilometres from the German border. Switzerland hopes to join an elite club of countries closing in on deep geological storage. So far, only Finland has built a site, in granite, and Sweden gave the green light in January to build its own site for burying spent nuclear fuel in granite. Next up is France, whose Cigeo project, led by the National Agency for Radioactive Waste Management (ANDRA), plans to store radioactive waste underground in clay. ...

Following the 2011 nuclear accident at the

Fukushima power station in Japan, Switzerland decided to phase out nuclear power gradually: its reactors can continue for as long as they remain safe. A projected 83,000 cubic metres of radioactive waste, including some high activity waste, will have to be buried. This volume corresponds to a 60-year operating life of the Beznau, Gosgen and Leibstadt nuclear power plants, and the 47 years that Muhleberg was in operation before closing in 2019. Filling in the underground nuclear waste tombs should begin by 2060. “It’s the project of the century: we have carried out the scientific research for 50 years, and we now have 50 years for the authorisation and the realisation of the project,” said Nagra spokesman Felix Glauser. The monitoring period will span several decades before the site is sealed some time in the 22nd century.

Source: <https://www.france24.com/en/live-news/20220409-in-project-of-the-century-swiss-seek-to-bury-radioactive-waste, 09 April 2022>.

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