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OPINION – Manpreet Sethi

Another Date-Change for the NPT RevCon: Fresh Opportunity to Shape its Success

The NPT that conducts a review conference (RevCon) every five years was due to hold one in April-May 2020. This RevCon had special significance as it was to mark the 50th anniversary of the NPT, as also the 25th anniversary of the indefinite and unconditional extension of the treaty in 1995. However, it had to be postponed because of the pandemic, and was rescheduled for January 2021. But, earlier this month, keeping in view the still raging and unprecedented health emergency, the meeting has been further postponed to August 2021. While the several date changes are unfortunate, the time so gained may be useful in shaping a more productive outcome of the meeting.

Had the RevCon been held earlier this year as scheduled, it would have taken place amidst a rather polarised political backdrop. Even now, relations between the major nuclear powers, the US and Russia, as well as the US and China, are afflicted with mistrust. The existing arms control architecture appears on the verge of total collapse in case the New START expires in February 2021. Also, while nuclear risks are mounting, the NWS remain unconcerned; immersed as they are in modernising their nuclear capabilities. Some are even following risk-

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increasing strategies to enhance deterrence.

There is also a deepening of fissures between the NNWS and the nuclear weapon states on the issues of non-proliferation and disarmament. There is a strong sentiment among the NNWS that the promises and commitments made by NWS with respect to disarmament and conclusion of a Middle East WMD Free Zone at the time of the NPT's extension in 1995 remain unfulfilled. Meanwhile, there has been an addition to their obligations through strengthening of IAEA safeguards.

The shadow of this fractious atmosphere was felt in the third meeting of the Preparatory

Committee, held in 2019. As per the NPT's strengthened 1995 review process, the third PrepCom is required to provide a consensus report with recommendations for the RevCon. But the 2019 meeting could only manage a Chair's Working Paper because the final report was rejected by the US for not being a balanced document.

In view of the apparent discordance between the NWS and NNWS, the first postponement of the NPT RevCon was considered by many as a blessing in disguise for allowing more time to states parties to get their act together. Unfortunately, the period April to December 2020 has been consumed with battling the global health crisis. The common threat of the pandemic has done little to improve inter-state relations that remain strained and difficult.

In this backdrop, the news of the RevCon's further postponement—from January 2021 to August is not necessarily a bad thing. This could be particularly beneficial from the point of view of allowing time for two developments to settle down by January 2021. Both of them would have a bearing on the NPT. The first of these is the swearing-in of Joe Biden as the new US president. He is widely expected to reverse some of the nuclear-related decisions been taken by President Donald Trump. In past positions within the US administration, Biden has shown an inclination towards multilateral institutions—he even played a constructive role in shaping the outcome of the NPT RevCon 2010. As the new occupant of the White House, he is expected to reinvigorate the spirit of the NPT and underscore the seriousness of American commitment to non-proliferation. He is also likely to initiate effort to return to the JCPOA, which would add to this 'feel good' factor.

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Meanwhile, any indication of détente towards Russia, especially through a New START extension, would also cast a benign shadow on the RevCon.

The second development in January would be the entry into force of the Treaty on Prohibition of Nuclear Weapons (TPNW) or the ban treaty. While the NNWS supporters of the treaty hail this as a success and intend to mount pressure for its universalisation, the action is likely to deepen the wedge with NWS and those under the nuclear umbrella who oppose the treaty. The repercussions of this divide will be felt on the 2021 NPT RevCon; the first such meeting to be held after the ban treaty's entry into force. Would the NNWS supporters of the ban treaty come to the meeting with a sense of jubilation that might further alienate the NWS? Many NPT traditionalists have expressed concern that the ban treaty may lead to the NPT's fragmentation.

This is an outcome that no country, including those that are non-members of the NPT, wants. All member states acknowledge the worth of the treaty. However, it is also true that

there is growing frustration with its inability to balance non-proliferation obligations with disarmament commitments. This, in fact, was the underlying factor that made the NNWS move ahead with the conclusion of the TPNW. As the treaty becomes operational in January, there will be a focus on its strengths and limitations, and this churning may prove to be helpful to develop a modus vivendi between the two treaties.

It would be imperative for NPT stakeholders to spend this time until the RevCon in August 2021 to build bridges that can ensure a constructive meeting outcome. If the NPT is to celebrate its diamond jubilee in 2030, some deep thinking and

committed actions will be needed to balance the responsibilities of the two sets of states. Nuclear non-proliferation can be sustainable only when there is simultaneous and credible movement towards disarmament.

Source: http://ipcs.org/comm_select.php?articleNo=5742,25 November 2020.

OPINION – Miles A. Pomper

The New Nuclear Weapons Ban Treaty will be an Early Trial for Biden

With support from nearly half the world's nations, a new United Nations treaty banning the possession and use of nuclear weapons will take effect early next year. The UN confirmed last month (Oct 2020) that the TPNW had been ratified by the required 50 countries. Secretary-General Antonio Guterres called it "a tribute to the survivors of nuclear explosions and tests, many of whom advocated for this treaty." Many non-nuclear-armed states, as well as pro-disarmament activists and organizations like the Nobel Peace Prize-winning International Campaign to Abolish Nuclear Weapons, have celebrated the agreement, which they see as a milestone in global efforts to prevent nuclear war.

However, it has drawn strong opposition from nuclear-armed states, especially the five permanent members of the U.N. Security Council... The Trump administration has called on the treaty's 84 signatories to back out of it. Its entry into force on Jan. 22, 2021, will pose a thorny diplomatic challenge for the incoming Biden administration.

Many non-proliferation experts question whether the TPNW will achieve its lofty goals. None of the world's nuclear-armed states have signed on to

the agreement, and there is little sign they will do so. Moreover, they fear the pact will further undermine the longstanding...NPT, which includes many similar aspirations. Caught in the middle are some of America's NATO allies, which shelter under the U.S. nuclear security umbrella. No member of the trans-

Atlantic alliance has signed the TPNW yet, but many of them have considerable domestic political constituencies that support nuclear disarmament.

The TPNW prohibits signatories from developing, testing, producing, acquiring, possessing, storing, and using or threatening to use nuclear weapons.

It also requires them not to "assist, encourage or induce" anyone in activities prohibited by the treaty, or to seek such assistance. It is modelled on previous treaties that have had considerable success in limiting or eliminating entire classes of weapons, such as those banning anti-personnel landmines and

the Chemical Weapons and Biological Weapons Conventions.

Like the landmine treaty, the TPNW sought to draw on the longstanding tradition of international humanitarian law under which states should seek to minimize civilian casualties and avoid unnecessary, indiscriminate or disproportional military attacks. In the case of the Chemical and Biological Weapons Conventions, the major possessors of these arsenals, such as the US and Russia, helped draft and build support for the pacts. However, the TPNW was drawn up by non-nuclear-armed states over the objections of nuclear powers. The initiative reflected the frustration of non-nuclear-weapons states with what they contended was the failure of their nuclear-armed counterparts to uphold their end of the "grand bargain" at the heart of the NPT. That bargain calls

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on the non-nuclear-weapon states to permanently renounce nuclear arms in exchange for access to peaceful nuclear technology and a commitment by nuclear powers to “pursue negotiations in good faith on effective measures” toward nuclear disarmament.

Since the end of the Cold War, nuclear-armed countries—primarily the U.S. and Russia—have made massive cuts in their arsenals from over 70,000 weapons in the 1980s to around 15,000 today. Former President Barack Obama gave fresh impetus to disarmament efforts when, in a 2009 speech in Prague, he called for moving to “a world free of nuclear weapons” and concluded a new strategic arms treaty with Russia, known as New START. However, Vladimir Putin’s return to the Russian presidency in 2012, followed by Russia’s annexation of Crimea and military intervention in eastern Ukraine in 2014, dashed the hopes Obama stirred. Despite his disarmament efforts, Obama also embarked on a \$1.2 trillion modernization of the U.S. nuclear arsenal, which Republicans in the Senate required as a condition to ratify New START.

A resurgent Russia undertook its own massive modernization program, complete with exotic new weapons such as a nuclear-powered cruise missile, hypersonic missiles and underwater drones. The election of Donald Trump as American president further dashed Obama’s dreams of a world without nuclear weapons. After the U.S. accused Russia of developing and deploying a missile that violated the 1987 Intermediate Nuclear Forces treaty, the Trump administration withdrew from it in 2019. Meanwhile, China’s relatively small but increasingly capable nuclear arsenal continued to

grow, with the Pentagon estimating it would double by the end of the 2020s.

But nuclear powers, particularly the U.S., have simultaneously sought to strengthen the non-proliferation provisions of the NPT to prevent countries like North Korea and Iran from acquiring or stockpiling nuclear weapons. That provoked cries of unfairness from non-nuclear-weapon states, which accused the nuclear-armed countries of not holding up their end of the bargain. In December 2016, the U.N. General Assembly passed a resolution calling for negotiations on a nuclear ban treaty, and the TPNW was concluded in July 2017, after only four weeks of formal negotiations.

The treaty does not establish its own verification system but requires state parties to maintain or quickly negotiate safeguard agreements with the IAEA. Some non-proliferation experts have called these provisions inadequate, as they don’t require countries to implement the IAEA’s voluntary Additional Protocol, which boosts the agency’s ability to detect undeclared nuclear activities.

Moreover, even if nuclear-armed states agreed to join the TPNW, it does not spell out how these countries would verifiably eliminate their arsenals, undermining confidence that signatories couldn’t simply cheat on their commitments.

Still, the treaty could pose a political problem in the future for NATO members and other countries that shelter under the U.S.

nuclear umbrella, given the TPNW’s call not to support actions inconsistent with the treaty. That challenge is especially acute for the five NATO members that host an estimated 150 forward-deployed U.S nuclear weapons: Belgium, Germany, the Netherlands, Italy and Turkey. German, Dutch

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and Belgian disarmament advocates, in particular, enjoy strong mainstream political support among centre-left parties in all three countries. And 56 former world leaders, including many from NATO countries, argued recently in an open letter that the new nuclear ban treaty can “help end decades of paralysis in disarmament.”

NATO has beaten back such arguments before, most recently in the wake of Obama’s Prague speech. However, handling the TPNW and tensions within the alliance more generally will likely prove a challenge for President-elect Joe Biden, who will take office just two days before the treaty enters into force. At the same time, Biden’s election could deflate some of the TPNW’s momentum, given his pledge to extend New START, work with Russia on other arms control challenges and repair strained ties between the U.S. and many of its NATO allies.

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Another important event looms on the horizon: In August 2021, state parties to the NPT are scheduled to meet and review that treaty for the first time since the TPNW was concluded. Such conferences—which usually take place every five years, though the 2020 meeting was delayed until next year due to the COVID-19 pandemic—are always a headache for U.S. negotiators, as they provide an opportunity for the far more numerous non-nuclear-weapon states to bash Washington and other nuclear-armed states for their disarmament shortcomings, and thus of the NPT more generally. These arguments will only become more intense now that the TPNW is a legal alternative. Making progress on U.S. non-proliferation goals in this new environment, with a U.N. treaty that bans nuclear

weapons, is sure to prove a tough diplomatic test of the new administration.

Source: <https://www.worldpoliticsreview.com/articles/29225/the-new-nuclear-weapons-ban-treaty-will-be-an-early-trial-for-biden>, 18 November 2020.

OPINION – Seoc Woo Kim, et al.

South Korea’s Risky Quest to Build Nuclear-Powered Attack Submarines

In mid-September, South Korea’s deputy national security advisor, Hyun-Chong Kim, visited Washington to discuss the possibility of the US supplying fuel for proposed South Korean nuclear-powered attack submarines.

Why does South Korea Want Nuclear-Powered Submarines?

They do have advantages over their conventionally-powered counterparts. As Britain showed in 1982 when it sank Argentina’s cruiser, *General Belgrano*, during the Falklands war, a nuclear-powered submarine can, if necessary, travel at high speed invisibly below the ocean surface to anywhere in the world. And for countries that have nuclear weapons, the part of their arsenal that sits aboard nuclear-powered submarines is considered the most invulnerable, also because of the submarines’ ability to travel undetected for great distances in the deep oceans.

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Modern conventional submarines are sufficient, however, for fending off foreign fleets from coastal

waters, as a stealthy Swedish submarine demonstrated during a military exercise in 2005 by “sinking” a US nuclear-powered aircraft carrier and its protective

destroyers and nuclear-powered attack submarines. Moreover, conventional submarines are substantially cheaper than their nuclear-powered counterparts. Sweden's A26 submarines cost about five hundred million dollars each, while US *Virginia*-class nuclear-powered attack submarines will cost at least seven times as much at a production rate of about two per year, not including research and development and infrastructure costs.

In South Korea's case, however, there is little military rationale for nuclear-powered submarines, and pursuing them may not be worth the political or financial costs. And in any case, international agreements may prevent South Korea from acquiring the fuel necessary to power them, either through direct purchase or through an indigenous enrichment capacity.

Which Countries have Nuclear-Powered Submarines? Only six countries—the US, Russia, Britain, France, China, and India—have nuclear-powered submarines. These are all nuclear-armed countries with far flung interests. The only non-nuclear-armed state that has seriously pursued a nuclear-powered attack submarine is Brazil, which has the largest gross domestic product of any country in the Southern Hemisphere. For four decades, Brazil's navy has sought nuclear-powered submarines to patrol the South Atlantic.

In the early 1980s, Brazil's navy acquired gas-centrifuge uranium enrichment technology to fuel its future nuclear submarines. At that time, Brazil was governed by a brutal military junta, which compounded US suspicions that Brazil was pursuing nuclear weapons. The US cut Brazil off from high-tech exports such as supercomputers

that might have been used for designing nuclear weapons. US concerns were only relieved after a civilian government took over from the junta in the 1990s, established a mutual nuclear

inspection regime with Argentina in 1991, and joined the NPT in 1998. But the country's interest in nuclear-powered submarines has not waned.

Currently, with the assistance of a French defence contractor, it is building five submarines, the fifth of which is to be powered by a Brazilian-

designed nuclear reactor. Naval propulsion has also played a minor part in the more recent nuclear proliferation crisis relating to Iran's uranium enrichment program. In 2013, during a confrontational period with the US, before the Obama and Rouhani administrations reached their agreement on interim limits on Iran's nuclear program, Iran stated that it was interested in naval nuclear propulsion as a rationale for producing highly enriched uranium, containing 20 percent

or more uranium 235. By international agreement, highly enriched uranium is considered nuclear-weapon usable.

South Korea's On-again, Off-again Interest in Nuclear Submarines: South Korea has had an on-again, off-again interest in acquiring nuclear attack

submarines ever since 1994, the year of the first international crisis over North Korea's plutonium separation program. Then-President Kim Young-Sam ordered the Korea Atomic Energy Research Institute to design a nuclear-powered submarine reactor. The research institute is a politically-active organization that has, since its founding, tried to push the boundaries of what South Korea is allowed to do in the nuclear area, including especially plutonium separation.

Kim Young-Sam's successor, President Kim Dae-

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Jung— famous for his “sunshine” policy toward North Korea—cancelled the project. Instead, his administration ordered diesel-powered German submarines equipped with fuel cells powered by compressed hydrogen and oxygen for extended submerged operations. Kim Dae-Jung’s successor, President Roh Moo-Hyun, relaunched the project to build nuclear-powered submarines in 2003 but, perhaps under US pressure, suspended it the following year. In 2010, Roh’s successor, Lee Myung-Bak, discussed the possibility of purchasing nuclear-powered submarines with Britain’s Prime Minister Gordon Brown. Lee tried to assuage US proliferation concerns by specifying that the submarines would be fuelled by non-weapon-usable low enriched uranium, enriched to less than 20 percent uranium 235. But UK nuclear submarines depend on US technology, and the US government probably vetoed the idea.

In 2015, North Korea gave new impetus to South Korea’s nuclear-powered submarine advocates by launching a ballistic missile from a diesel submarine. North Korea also has been carrying out nuclear tests with increasing yields, culminating in 2017 with a thermonuclear test with about ten times the explosive power of the Hiroshima and Nagasaki bombs. Since then, public opinion in South Korea has turned supportive of the country acquiring its own nuclear deterrent or inviting the US to redeploy nuclear weapons in South Korea. During the Cold War, the United States stationed up to 1,000 nuclear weapons in South Korea, but withdrew the last ones in 1991.

South Korea’s current President, Moon Jae-in, who came into office in 2017, tried to revive Kim Dae-Jung’s sunshine policy and has evinced no interest in South Korea acquiring its own nuclear

weapons. He has, however, expressed support for South Korea acquiring nuclear-powered attack submarines. Indeed, they were part of his electoral platform. During his November 2017 meeting in Seoul with US President Trump, President Moon raised the possibility of purchasing US nuclear-powered attack submarines. It is not clear what President Trump’s immediate response was, but the final answer appears to have been negative.

In March 2018, the South Korean Navy concluded that the country should follow the route taken by Brazil: South Korea would build a submarine similar to France’s Barracuda or *Suffren*-class nuclear attack submarine and equip it with a propulsion reactor designed by the Korea Atomic Energy Research Institute—possibly with Russian assistance. This past August, during the public presentation of the country’s proposed five-year defence budget (2021–2025), a military official indicated the Défense Ministry’s strong interest in building three 4,000-ton displacement nuclear-powered attack submarines. There are several possible reasons

why President Moon has backed the South Korean Navy in seeking a nuclear-powered attack submarine. One reason might be that it is a way to deflect public pressure to acquire nuclear weapons, which would isolate the country internationally and most likely result in damaging economic sanctions. Following Brazil’s route might attract some suspicion, but if accompanied by scrupulous adherence to South Korea’s Nuclear Non-Proliferation Treaty obligations, it might be accepted, just as Japan’s uranium enrichment and reprocessing programs have been accepted.

The US–South Korea Agreement on Nuclear Cooperation: If South Korea followed Brazil and

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Iran and built its own uranium enrichment capacity, that capacity could quickly be repurposed to make weapon-grade uranium for a bomb. This simple fact is what turned Brazil's and Iran's acquisitions of uranium enrichment technology into non-proliferation crises. The Moon administration would like to avoid such a crisis—especially with the US, its principal security partner. This is why South Korean Deputy National Security advisor Kim travelled to Washington in August 2020 with the request that the US supply South Korea with enriched uranium for its submarine reactors. That uranium could be 19.75 percent enriched, just below the 20 percent threshold for highly enriched uranium. France fuels its submarines with 6 percent low-enriched uranium. Brazil plans to fuel its nuclear submarine with low-enriched uranium, and it is believed that China also uses it in its own submarines.

For the US to supply South Korea with low-enriched uranium for naval reactors would, however, require renegotiation of the US–Republic of Korea Agreement of Cooperation Concerning the Use of Atomic Energy for Peaceful Purposes, which was most recently updated in 2015 after prolonged and difficult negotiations. That agreement restricts cooperation to “peaceful uses.” Naval reactors are not a peaceful use. In 2017, President Moon announced he would pursue such a renegotiation. But it is unlikely the US would ever agree to it, particularly since any new agreement would require the approval of US Congress. The US Congress has mobilized on a bipartisan basis around the idea of a “gold standard” for US nuclear cooperation agreements. That standard requires non-nuclear-armed states

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If South Korea does acquire an enrichment plant, aside from perhaps attracting international suspicion, it would also make more difficult the objective of “denuclearizing” the Korean Peninsula. According to the 1992 Joint Declaration of the Denuclearization of the Korean Peninsula, “The South and the North shall not possess nuclear reprocessing and uranium enrichment facilities.

not to establish either national uranium enrichment or spent fuel reprocessing programs. The Dutch and German and Japanese enrichment programs, which launched around 1970, are exceptions.

South Korea is unlikely to be able to procure low-enriched uranium for submarine reactors elsewhere. Currently, the four global suppliers of nuclear enrichment services (Russia, France, China, and the British-Dutch company URENCO) all restrict the low-enriched uranium they supply to peaceful use. This

means that a country planning to acquire nuclear-powered vessels for its navy must enrich its own fuel for its naval reactors. Brazil, the first non-nuclear-armed state to embark on building a nuclear submarine, is doing just that.

South Korea could establish its own uranium enrichment capacity. That is its right under the Nuclear Non-Proliferation Treaty, which allows non-weapon-state members to pursue any peaceful nuclear activity under IAEA safeguards. And while the treaty prohibits non-nuclear-armed states from building nuclear explosives, it does not explicitly prohibit other military applications, and traditional safeguards do not apply to these applications. The IAEA plans

to negotiate arrangements with Brazil to build confidence that no material is being diverted from Brazil's submarine fuel cycle, but verifying such non-diversion in the case of a nuclear-powered submarine is complicated by its unpredictable availability for inspections, a secret reactor and fuel design, and likely 10 years or more between refuelling's.

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suspicion, it would also make more difficult the objective of “denuclearizing” the Korean Peninsula. According to the 1992 Joint Declaration of the Denuclearization of the Korean Peninsula, “The South and the North shall not possess nuclear reprocessing and uranium enrichment facilities.” So, South Korea is in a difficult situation. President Moon has endorsed the Navy’s desire for nuclear-powered attack submarines, but the United States, South Korea’s primary security partner, is unwilling either to agree to supply enriched uranium fuel for the nuclear submarines or to agree to South Korea establishing its own national enrichment capacity.

Does South Korea Need Nuclear Attack Submarines? Left out of this whole discussion thus far is the question of why South Korea needs nuclear-powered attack submarines at all. The primary rationale being put forward is to be able to hunt down and destroy North Korea’s future diesel-powered ballistic missile submarines before they can launch their missiles at South Korea during a conflict. But, for that purpose, in addition to conventional attack submarines, the South Korean Navy has many other anti-submarine-warfare assets, including undersea sonar sensor nets, long-range aircraft, and helicopters based on frigates, and destroyers that can drop sensors and homing torpedoes. These manned systems could soon be supplemented by the surface and underwater counterparts of aerial drones.

In this context, it is difficult to justify the huge extra costs of: training a specialized nuclear-submarine construction force and sustaining it between construction campaigns; the special security and safety requirements associated with nuclear-reactor technology; the shipyard and fuel-cycle infrastructure, including a shore-based reactor and simulators for training reactor operators; and the radioactive waste management and storage facilities for spent fuel and decommissioning waste, including reactor

pressure vessels. It would be far less costly to get an equal increment of anti-submarine warfare capability by enhancing South Korea’s already existing assets. It seems absurd to make such huge investments to build three nuclear submarines, only one or two of which might be at sea at any one time.

Two additional missions are being proposed for South Korea’s future nuclear-powered attack submarines. The first is to carry conventionally-armed ballistic missiles. In its most recent generation of conventional attack submarines, South Korea is installing launch tubes for short-range conventionally-armed ballistic missiles for a pre-emptive attack on North Korea’s nuclear missiles if they are brought out of their tunnels

for possible launch. There is no obvious reason why nuclear propulsion would be advantageous for this purpose, however, if more conventional submarines could be bought for the same price.

The final argument being made for South Korean nuclear attack submarines is to augment the US Navy in its dangerous confrontations with China in the South and East China Seas. These areas are within range for quiet conventional submarines, which, as exercises have shown, can be deadly against both conventional and nuclear-powered ships. The South Korean Navy has been interested in acquiring nuclear-powered attack submarines since 1994. The United States has obstructed this interest on non-proliferation grounds by being unwilling to either supply South Korea with enriched uranium to fuel its proposed nuclear submarines or agree to South Korea building its own national uranium enrichment plant. In any case, the program would be extremely costly and could be replaced by more cost-effective programs that would satisfy the same mission requirements.

Source: <https://thebulletin.org/2020/11/south-koreas-risky-quest-to-build-nuclear-powered-attack-submarines/>, 18 November 2020.

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OPINION – Viktor Katona

Will Japan Ever Reboot its Nuclear Industry?

Nearly a decade following the Fukushima Daiichi 2011 nuclear disaster, Japan is trying to reassess its energy prospects. One of the most energy dependent economies globally, nuclear energy has traditionally been the energy source that combines reliably low costs and zero carbon dioxide emissions. Fukushima, however, has shifted the previously positive public sentiment towards widespread protests demanding a full nuclear ban. Time has healed some wounds and has allowed to take stock of what Japan has on its hands yet most of the concluding observations could barely exhilarate Japanese policy makers. With no real alternative if Japan is to stick to its commitments of carbon neutrality, neutral energy is slowly making its way back into the nation's life.

The Fukushima nuclear incident has resulted in a "lost nuclear decade" for Japan – before 2011, Tokyo was dreaming big about bringing nuclear energy's share in the national electricity generation tally even higher, beyond 40% by 2020 and to 50% by 2030. Such plans were considered to be really ambitious, considering that in 2010 (i.e. the last "normal" year for nuclear generation in Japan) the share of nuclear power stood at 25%. On the back of the public outcry, further aggravated by the new 2012 regulatory requirements stipulated by Japan's Nuclear Regulation Authority (NRA), nuclear went into a tailspin and zeroed out in 2014.

Although Japan has been restarting some reactors from 2015 onwards (Sendai 1&2 in 2015, Takahama 3&4 in 2016, Genkai 3&4 and Ohi 3&4

in 2018), the share of nuclear is still at a meagre 6-7%, a fraction of where it was a decade ago. Japanese grid operators are now doing their utmost to bring unused capacities, primarily the ones which were on the verge of commissioning when the Fukushima nuclear disaster happened.

Take, for instance, the Kashiwazaki-Kariwa nuclear plant, temporarily damaged and hence idled following a previous earthquake in 2007. Now it's merely a couple of steps away from being restarted. TEPCO has filed for safety assessments of the Kashiwazaki-Kariwa units 6 and 7 way back in 2013 and by 2017 the Japanese Nuclear

Regulatory Authority approved a preliminary report that both units conformed to national standards, all the while listing the additional safety measures that the reactor needed to have (seismic reinforcements, filtered venting systems, seawall). Reportedly TEPCO is expecting to be ready with these works this December, paving the way for the units' restart.

Nuclear reactors that sustained significant damage in the 2011 Great East Japan Earthquake are also seeing their safety revamps validated, bringing them closer to the point of reopening. The Onagawa Nuclear Plant

will most likely become the first nuclear object to come back from the deadly tsunami – the NRA safety inspection was carried out in February 2020 and the reactor restart already received the political support of all relevant constituencies. As with Kashiwazaki-Kariwa, the plant's operator, Tohoku Electric Power, has outdone itself in making the nuclear plant as tsunami-proof as our current technological expertise can allow, including a 29-meter high coastal levee and a reactor fortification system.

The root cause of Japan's willingness to go down the nuclear road again is fairly self-explanatory,

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The root cause of Japan's willingness to go down the nuclear road again is fairly self-explanatory, profitability. If we are to revisit the case of the Kashiwazaki-Kariwa plant's two units, according to TEPCO estimations the Japanese firm would increase its earnings by almost \$1 billion per year if it restarts them.

profitability. If we are to revisit the case of the Kashiwazaki-Kariwa plant's two units, according to TEPCO estimations the Japanese firm would increase its earnings by almost \$1 billion per year if it restarts them. It needs to be pointed out that the missing volumes of electricity generation were met by increasing LNG imports which have increased quite significantly within the 2010-2012 timeframe, jumping from 96 BCM in 2010 to 120 BCM in 2012-2014. Although the slow restart of some nuclear capacities and the demand slump have carved down the erstwhile record highs, Japan's LNG imports remain higher than they were before the Fukushima disaster.

Up until 2011 the average gas price Japanese companies have paid for their LNG imports roughly corresponded to European levels (see Graph 2 for comparison with German import prices). The Fukushima disaster, however, has decoupled the two and sent Japanese LNG prices skyrocketing into double digits for most of the 2010s, all this of course borne by business and taxpayers. Thus, when one is to understand the state of mind with which Japanese authorities have taken the decision not to phase out nuclear power, it is against this background that the dilemma should be put. The ascent of Shinzo Abe to the top of Japan's politics has coincided with a strategic reorientation towards nuclear power, labelling it the nation's "most important energy source".

Nuclear plants have been a landmark feature of Japan's energy policy in the post-1973 era. Before that, when oil accounted for two-thirds of electricity generation despite the high rates of economic growth and industrial production, it depended on fossil fuel imports. Today, as immediate fears of Fukushima repeating itself again have subsided slightly, Japan is once again dependent on fossil fuels, this time natural gas being the main source. Of the 54 nuclear reactors available in the pre-Fukushima period, only 9 operate today (17 were assessed to be too

obsolete to be retrofitted).

All this leads up to the million-dollar question – should Japan relaunch its nuclear drive? Its recurring earthquakes and tsunamis point in the opposite direction, however per-unit profitability of nuclear still surpasses any other energy source. The new government of Yoshihide Suga has vowed not to build new nuclear plants until 2050, concurrently maintaining that nuclear should compose 20-25% of Japan's future electricity generation, i.e. tripling current nuclear output. As difficult it may seem to decide between one's heart and their mind, Tokyo will need someone to take the brave step of authorizing further nuclear start-ups should the NRA find the reactors adequate, otherwise it is going to cost the taxpayer even more.

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Source: <https://oilprice.com/Alternative-Energy/nuclear-Power/Will-Japan-Ever-Reboot-Its-Nuclear-Industry.html>, 14 November 2020.

OPINION – Oliver Meier, Maximilian Hoell

Getting P5 Strategic Risk Reduction Right: What NATO Non-Nuclear-Weapon States Seek from Nuclear-Weapon States

Substantive new strategic risk reduction measures are an important means of improving strategic stability if they lower the dangers of the unintended use of nuclear weapons. The five nuclear-weapon states recognised by the NPT also regard such steps as genuine progress toward the fulfilment of their nuclear disarmament obligations under Article VI of the NPT. Many non-nuclear-weapon states outside of military alliances with nuclear-weapon states, such as the states of the Non-Aligned Movement, perceive strategic risk reduction as a modest contribution to nuclear disarmament.

To be sure, they, too, would like to see nuclear risks reduced but they are concerned that nuclear-weapon states may emphasise strategic risk

reduction as a way of deflecting pressure from reducing the number and role of nuclear weapons. Allies of nuclear-weapon states, such as NATO's 27 non-nuclear-weapon states, tend to sit between these two positions. For them, P5 strategic risk reduction brings the potential for viable interim measures to facilitate further nuclear reductions in the future. However, some NATO non-nuclear-weapon states, including Poland and other Central and Eastern European allies, are concerned that nuclear allies may go too far and adopt measures that could undermine the effectiveness of nuclear deterrence.

Allies of nuclear-weapon states, such as NATO's 27 non-nuclear-weapon states, tend to sit between these two positions. For them, P5 strategic risk reduction brings the potential for viable interim measures to facilitate further nuclear reductions in the future. However, some NATO non-nuclear-weapon states, including Poland and other Central and Eastern European allies, are concerned that nuclear allies may go too far and adopt measures that could undermine the effectiveness of nuclear deterrence.

Others, such as Germany, would like to see the P5 being more proactive on risk reduction. NATO collectively has stated that it remains committed to promoting predictability and transparency, seeks to reduce risks and has 'call[ed] on Russia to do so as well'.

Generally speaking, NATO non-nuclear-weapon states would therefore support the 'regular, sustained, and open-ended dialogue on strategic risk reduction' among the P5 to 'improve global strategic stability and create a constructive working environment for the next NPT review conference', that Thomson, Svilanoviæ, and Üzümcü called for in a recent commentary. After all, a P5 working group to reduce the risk of unintended nuclear war could indicate that the P5 are willing to dedicate substantial diplomatic resources to this issue.

At the February 2020 Berlin ministerial meeting, the states of the Stockholm Initiative, which include the NATO non-nuclear-weapon states of Canada, Germany, the Netherlands, Norway and Spain, have called upon the P5 to 'take practical measures to reduce the role of nuclear weapons in their security and defence policies.'

But to ensure that P5 strategic risk reduction measures actually 'improve global strategic stability and create a constructive working environment for the next NPT review conference', as Thomson, Svilanoviæ, and Üzümcü suggest, the

P5 need to get strategic risk reduction right. From the perspective of NATO non-nuclear-weapon states, there are two specific dimensions along which the P5 can, and should, demonstrate a willingness to engage beyond merely talking among themselves.

Actions Speak Louder than Words: First, many NATO non-nuclear-weapon states would like to see concrete P5 measures to reduce the risks of a nuclear exchange on European soil. For example, at the February 2020 Berlin ministerial meeting, the states of the Stockholm Initiative, which

include the NATO non-nuclear-weapon states of Canada, Germany, the Netherlands, Norway and Spain, have called upon the P5 to 'take practical measures to reduce the role of nuclear weapons in their security and defence policies'. Similarly, at the First Committee of the 74th session of the UN General Assembly, 25 NATO non-nuclear-weapon states advocated 'an inclusive dialogue on nuclear doctrines and measures aimed at nuclear risk reduction' as a means of 'advancing nuclear disarmament in practical terms.'

These pleas by NATO non-nuclear-weapon states to reduce the role of nuclear weapons come in the context of a heightened risk of nuclear war. Over

the past decade, all P5 states have modernised their nuclear arsenals instead of delivering further nuclear reductions, and some P5 states have lowered the threshold for nuclear weapons use by contemplating the employment of low-yield nuclear weapons early on in a conventional conflict. If Russia-West tensions escalate, Europe could become the theatre of an accidental or

intentional nuclear exchange.

Another important element fuelling the risk of nuclear use has been the near-total erosion of arms control. The INF Treaty has collapsed. While US president-elect Biden has indicated his interest in extending the New Start and in re-entering the Joint Comprehensive Plan of Action (JCPOA), the future of these important legal barriers to untamed nuclear programmes remains uncertain In light of these developments, the establishment of a P5 strategic risk reduction working group at the tenth NPT review conference would be a useful basis to foster a dialogue on specific steps to lower the dangers of the unintended use of nuclear weapons.

But from the perspective of NATO's European non-nuclear-weapon states, which are situated between the nuclear arsenals of the two largest possessor states, the P5 must also deliver concrete measures to reduce the role of nuclear weapons during the next review cycle. Specific actions that the P5 could consider to this end include inter alia transparency and confidence-building measures, such as de-targeting and de-alerting, which increase the threshold to use nuclear weapons. These steps would not only reduce the risk of a nuclear exchange and therefore strengthen strategic stability, but they could feed into wider efforts to reduce tensions among the P5 and, ultimately, facilitate further nuclear reductions.

Toward P5 Risk Reduction

Accountability: Second, for a P5 strategic risk reduction dialogue to earn recognition as a serious vehicle for producing stepping stones to further nuclear reductions, the P5 would need to be receptive to non-nuclear-weapon state

interest in engaging with the P5 on this issue in a structured conversation. In this respect, NATO non-nuclear-weapon states are in a bind. They have privileged access to the majority of the P5 through NATO consultative bodies, which include the UK, the US and, to a lesser degree, France. They value the opportunity to discuss NATO nuclear policies.

But the current doctrines, confidentiality rules and an overarching desire for NATO coherence and harmony have so far constrained a concrete risk reduction agenda.

At the same time, some influential NATO non-

nuclear weapons states have engaged in groups of like-minded states to pursue a more ambitious risk reduction agenda. The participants of the Stockholm Initiative have recently called upon 'nuclear-weapon states and nuclear possessor states to engage in a structured dialogue to assess, minimize and address nuclear risks' and urged nuclear-weapon states to 'improve or establish crisis communication and protocol among each other, e.g. by hotlines and risk reduction centres.'

While the P5 have at regular intervals de-briefed the states of the Non-Proliferation and Disarmament Initiative (NPDI) on their P5 process deliberations, these briefings have fallen short of a structured exchange of views on specific issues.

One way for NATO non-nuclear-weapon states to reduce the frictions between the various conversations they entertain with nuclear-weapon states on risk reduction would be for the P5 to agree to a structured dialogue about strategic risk reduction with non-nuclear

weapon states. Such a dialogue should set new standards of openness and responsiveness, such as regular meetings with groups like the Stockholm Initiative or the NPDI; public debriefings following such interactions; and standardised reporting by

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the P5 on the progress made on risk reduction. These steps would help the P5 to counter the oft-cited criticism of P5 opacity and foster a collaborative working environment for the NPT review process.

Getting P5 Strategic Risk Reduction Right: The Role of NATO Non-Nuclear-Weapon States: NATO non-nuclear-weapon states have an important role to play in working with the P5 on shaping their strategic risk reduction deliberations. While the P5 states must demonstrate a willingness to engage, NATO non-nuclear-weapon states can, and should, assume responsibility for pressing the P5 for substantive outcomes that go beyond the mere initiation of a working group.

To this end, NATO non-nuclear-weapon states should *proactively* seek a structured conversation with the P5 about strategic risk reduction. This conversation could help identify feasible and concrete P5 measures to lower the risk of nuclear use. NATO non-nuclear-weapon states should also ensure that such a structured conversation between them and the P5 lays the foundation for a credible accountability framework that makes it easier for all NPT non-nuclear-weapon states parties to assess the P5's progress on strategic risk reduction. Such an accountability framework would foster transparency and pave the way for the P5's strategic risk reduction efforts to earn recognition from all NPT non-nuclear-weapon states parties as a promising stepping stone to nuclear reductions at a future date. To get strategic risk reduction right, the P5 will need to work with interested non-nuclear-weapon states in a structured and transparent manner on concrete measures to lower the risk of nuclear use.

While the P5 states must demonstrate a willingness to engage, NATO non-nuclear-weapon states can, and should, assume responsibility for pressing the P5 for substantive outcomes that go beyond the mere initiation of a working group.

The NPT is not a self-implementing treaty, it requires enabling actions, for example, safeguards agreements by NNWS with the IAEA to verify non-proliferation commitments under Articles II and III of the NPT; NWFZ treaties are required to implement Article VII, while nuclear cooperation agreements are needed to implement Article IV of the NPT on peaceful uses of nuclear energy.

Source: <https://www.europeanleadershipnetwork.org/commentary/getting-p5-strategic-risk-reduction-right-what-nato-non-nuclear-weapon-states-look-for-from-nuclear-weapon-states/>, 23 November 2020.

OPINION – Tariq Rauf

Does the TPNW Contradict or Undermine the NPT?

The Treaty on the Prohibition of Nuclear Weapons (TPNW) unnecessarily has become a bitter bone of contention between the non-nuclear-weapon States (NNWS) supporting this treaty and most of the nuclear-armed States and US allies in defence arrangements underpinned by US nuclear weapons. The opponents of the TPNW have raised a number of concerns and shortcomings relating to the TPNW. This short paper responds to some of these.

Critics claim that the TPNW does *not*:

- 1. Define a Nuclear Weapon:** This is correct it does not – but neither does the NPT nor four of the five nuclear-weapon zone (NWFZ) treaties – only the Treaty of Tlatelolco has a definition (article 5);
- 2. Constitute an “Effective Measure” for Nuclear Disarmament under the NPT (Article VI):** The TPNW is an “effective measure” as called for in NPT Article VI on nuclear disarmament, in parallel with the 1996 CTBT, the bilateral USSR/Russia-US treaties such as 2010 New START and the 1987 INF even though these were concluded for national security not NPT reasons; and the five NWFZ treaties operational in Latin America and the Caribbean, South Pacific, Southeast Asia, Africa and Central Asia; the NPT is not a self-implementing treaty, it requires enabling actions, for example, safeguards

agreements by NNWS with the IAEA to verify non-proliferation commitments under Articles II and III of the NPT; NWFZ treaties are required to implement Article VII, while nuclear cooperation agreements are needed to implement Article IV of the NPT on peaceful uses of nuclear energy;

3. Include the Latest IAEA Safeguards (Additional Protocol): To be precise, Article 3 of the TPNW stipulates that each NNWS party “shall, at a minimum, maintain its [IAEA] safeguards obligations in force at the time of entry into force of this Treaty, without prejudice to any additional relevant instruments that it may adopt in the future”; while it is indeed unfortunate that the IAEA’s Board of Governors has been unable to agree to make the 1997 Model Additional Protocol (AP)(INFCIRC/540) an essential component of the IAEA NPT comprehensive safeguards agreement (INFCIRC/153) for NPT NNWS, and the IAEA General Conference in its annual safeguards resolution has said that “it is the sovereign decision of any State to conclude an additional protocol”; the TPNW requires adhering NNWS to maintain, as a minimum, their existing safeguards agreements and provides for further strengthened safeguards, thus for the 80% of NPT NNWS with APs in force, the TPNW secures the current de facto standard of non-proliferation verification, which is higher than the one stipulated by the NPT; and

4. Include Verification of Nuclear Disarmament: This is correct, but neither the NPT nor NWFZ treaties include the technical details of verification. This is left to the “Agency’s [IAEA] safeguards system” in reality. The IAEA collaboratively with its Member States during 1970-1971 drew up (INFCIRC/153) comprehensive safeguards after the entry into force in 1970 of the NPT and the Additional Protocol (INFCIRC/540) during 1993-1997; TPNW/IAEA States, at the first meeting of States Parties to be convened within one year of the entry into force of the TPNW, should invite the IAEA to set up a technical working group to develop verification approaches and to this end sponsor a resolution at the 2021 IAEA General Conference; and unlike the 1972 Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (BTWC) that has

acquired customary international law status and has no provisions for verification, the TPNW does in fact stipulate an approach to verification.

Other criticisms, for example, include that:

1. *The TPNW is inconsistent as it allows for States with nuclear weapons to adhere to it and it also allows States to join that had nuclear weapons but have disarmed:* It is instructive to recall that the Chemical Weapons Convention (CWC) allows both declared chemical weapon possessor States as well as those that have previously destroyed their CW stocks to adhere to the CWC; hence the TPNW follows similar logic, States with nuclear weapons can adhere to the TPNW and then proceed to verifiably destroy them under auspices of a competent international authority to be designated by States parties;

2. *The TPNW “demonstrates that there is no legal norm on non-possession of nuclear weapons”:* One of the purposes of the TPNW is to establish a legal norm against the possession of nuclear weapons, much along the lines of the BTWC and CWC outlawing biological and chemical weapons respectively;

3. *The TPNW will establish a “competitor regime to the NPT” and may entice “defections from the NPT”:* The Treaty of Tlatelolco was the first to “prohibit” nuclear weapons in its zone of application and the subsequent four NWFZ treaties renounce nuclear weapons, but none are regarded as competitors or alternatives to the NPT; rather they are considered as complementary; and it is spectacularly illogical to suggest that a TPNW State party could “defect” from the NPT to “shirk” its non-proliferation obligations because as already noted above the TPNW itself requires each State party to “at a minimum, maintain its International Atomic Energy Agency safeguards obligations in force at the time of entry into force of this Treaty, without prejudice to any additional relevant instruments that it may adopt in the future” (article 3);

4. *The TPNW would “delegitimize extended deterrence alliance relationships” and*

thus incentivize alliance NNWS to develop indigenous nuclear weapon programmes: Such a claim calls into question the integrity and commitment of alliance NNWS to the NPT and suggests that their non-proliferation credentials may be suspect as their fealty to the NPT is only because of reliance on extended nuclear deterrence thus a case of "having one's cake and eating it too", i.e. to benefit from nuclear weapons, including in cases where such weapons are stationed on their territory, without actual possession, and also to preach non-proliferation to other NNWS, and thus result in effectively undermining trust in the NPT.

To conclude it is abundantly clear that the TPNW shall create a prohibition of nuclear weapons, under customary international law, when it enters into force and more of the 122 States that voted for it complete their ratification procedures, and as such establish a *jus cogens* rule creating an *erga omnes* not only for all NPT States parties but for other nuclear-armed States as well.

Source: <https://www.pressenza.com/2020/11/does-the-tpnw-contradict-or-undermine-the-npt/>, 25 November 2020.

STATEMENT

Director-General FU Cong at the EU Non-proliferation and Disarmament Conference

On November 12, 2020, Director-General of the Department of Arms Control of the Foreign Ministry FU Cong attended the EU Non-proliferation and Disarmament Conference via video link and made a statement centred on the theme of "Rebuilding Mutual Trust in Arms Control, Non-proliferation and Disarmament: The Way Ahead". The

The TPNW shall create a prohibition of nuclear weapons, under customary international law, when it enters into force and more of the 122 States that voted for it complete their ratification procedures, and as such establish a *jus cogens* rule creating an *erga omnes* not only for all NPT States parties but for other nuclear-armed States as well.

Cold War mentality and double standard are impeding international non-proliferation cooperation and undermining the authority and effectiveness of the international non-proliferation mechanism. The development of science and technology is bringing forth complex and profound repercussions on strategic stability and giving rise to a host of humanitarian, legal and ethical challenges.

excerpted text of Director-General FU's statement is as follows:

...Today, international strategic situation is faced with the gravest challenges since the end of Cold War, and the international arms control architecture is at a critical juncture. The pursuit of unilateralist policies and withdrawal from a large number of international treaties and

organizations by the US have dealt heavy blows to the multilateral and bilateral arms control and disarmament regime established since the end of WWII. Cold War mentality and double standard are impeding international non-proliferation cooperation and undermining the authority and effectiveness of the international non-proliferation mechanism. The development of science and technology is bringing forth complex and profound repercussions on strategic stability and giving rise to a host of humanitarian, legal and ethical challenges.

Against this backdrop, it is pertinent and timely to exchange views on the theme of "Rebuilding Mutual Trust in Arms Control, Non-proliferation and Disarmament". ...

First, we should Adhere to the Basic Principles and Concepts of Arms Control:

The purpose of international arms control is to enhance the security of all countries through cooperation, so as to achieve equal, common and universal security. Arms control that aims at increasing one's own security at the expense of the security of others is neither acceptable nor sustainable. Over the past century, despite the changes in arms control both in terms of content and paradigm, the basic international consensus has always been that maintaining strategic

balance and stability should be a basic principle of arms control.

However, what the United States has done in recent years has violated this basic principle. Its real intention is to negate the checks and balances between the major powers and establish a uni-polar world. That is the root cause of the stalemate in the international arms control and disarmament process. Competition between major powers is only natural and even inevitable. What is important is to search for win-win solutions instead of playing a zero-sum game, to keep this competition under control by maintaining global strategic stability, so as to reduce the risks of war. Recently, some US officials have come up with some absurd theories or coinages, such as “three largest nuclear-weapon states” or depicting arms control as a battle between democracies and non-democracies. These rhetoric’s distort the basic narratives of international arms control efforts, harm the atmosphere of international dialogues and cannot be conducive to rebuilding trust. The international community should be vigilant against them.

Second, we should Safeguard the Existing International Arms Control Architecture: As Rome was not built in a day, progress could only be made by building upon past achievements. The existing international arms control, disarmament and non-proliferation regime, including the bilateral arms control treaties between the United States and Russia, is an important component of the international security system, and the basis for resolving security dilemmas through a cooperative approach and for realizing common security and universal disarmament.

That system is a valuable common asset of the international community, and should be strengthened, rather than weakened. That continuous withdrawal of the US from

international treaties has not only damaged its own credibility, but also jeopardized international security. The international community should be united in rejecting the totally irresponsible actions taken by the current US administration aimed at sabotaging the international arms control architecture. The immediate priority now is to urge the United States to respond as soon as possible to Russia’s call for the unconditional extension of the New START. In addition, the international community should adhere to the existing international consensus, including the Final Document of SSOD-I and the outcome documents

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of the previous NPT Review Conferences, highlight the special and primary responsibilities of the two largest nuclear-weapon States for nuclear disarmament, and say no to the words and deeds that overthrow or undermine international consensus on arms control.

Third, we should Further Strengthen and Expand the International Arms Control

Architecture: While upholding the past achievements of the existing international arms control system, we also need to keep moving with the times and constantly renew and improve the system. The international community need to agree that fruits of scientific and technological development should be used to the maximum extent possible for peaceful development, and that there should be limits to their military utilization. We should push forward negotiations on cyber space, outer space, artificial intelligence, bio-technology and others, with a view to concluding legally-binding international instruments or codes of conduct as soon as possible, and establishing relevant international mechanisms, so as to guard against or reduce potential risks and challenges that these technologies could bring to international stability and security, due to the absence of international rules.

The sudden outbreak of COVID-19 has put bio-security under the spotlight, and highlighted the importance and urgency of strengthening global bio-security governance. In this context, it is important to restart the negotiation of BWC verification protocol as soon as possible, with a view to establishing an effective international verification mechanism to safeguard bio-security. We hope that next year's review conference of the Convention could make a decision in that respect. At the same time, it is also necessary to establish a scientific advisory body under the framework of the Convention and formulate codes of conduct to better regulate biological scientific research and promote the healthy development of biotechnology.

With the rapid development of digital economy, the issue of data security becomes increasingly prominent and calls for a global solution. It is high time that we formulated global rules reflecting the interests and concerns of the majority of countries on the basis of universal participation. For the purpose of effectively dealing with the risks and challenges associated with data security, China has lately launched the Global Initiative on Data Security, which calls on all countries to take action to prevent and put an end to activities that impair or steal important data of other countries' critical infrastructure, or jeopardize personal information, oppose mass surveillance against other countries through ICTs, remove mandatory requirements for domestic companies to store in their own territory data generated and obtained overseas, and require enterprises not to install backdoors in their products and services. This initiative provides a basis for the formulation of global rules and represents also solemn commitments by China on data security. China hopes that our interlocutors could support the initiative, and we also welcome suggestions for improvement.

Fourth, we should Resolve Non-proliferation Disputes through Peaceful Means: Non-proliferation issues such as the nuclear issue on

the Korean Peninsula and the Iranian nuclear issue are complex issues that can only be resolved through political and diplomatic means. Facts have shown that maximum pressure and the threat of force will only make the issues more complicated. Sanctions are not the end, nor a panacea. Sanctions are means, so are the lifting or relaxing of sanctions. If the legitimate security and development concerns of Iran or DPRK are not properly addressed, attempts to impose solutions through sanctions will go nowhere.

Under the current situation, all parties should firmly fulfil the JCPOA obligations and resolutely oppose unilateral sanctions and long-arm jurisdiction. The parties concerned should resolve their differences in the implementation of the

China has lately launched the Global Initiative on Data Security, which calls on all countries to take action to prevent and put an end to activities that impair or steal important data of other countries' critical infrastructure, or jeopardize personal information, oppose mass surveillance against other countries.

agreement through dialogue and consultation, and within the framework of the Joint Commission, by restoring the balance of rights and obligations under the agreement. China also attaches importance to the concerns of a new platform for dialogues on all issues related to regional security

and stability. Trying to force DPRK to abandon its entire nuclear weapons program in one go without addressing its security and economic concerns is unlikely to succeed. The best way forward is to make progress through a synchronized, reciprocal and phased process. China urges the United States to demonstrate its good faith by responding to the legitimate and reasonable concerns of DPRK on security and development with practical actions, so as to bring the denuclearization of the Peninsula back on track.

Fifth, we should Establish an Inclusive and Effective International Non-proliferation Mechanism: It is the common responsibility of the international community to prevent the proliferation of weapons of mass destruction. However, for a long time, the existing export control mechanisms have been hindered by the lack of representation and double standard or even outright discrimination. In recent years,

these problems have only been further exacerbated. The United States is trying to forge an alliance based on ideological demarcation against high-tech exports to countries like China, and transform these export control mechanisms into tools for high-tech blockade of, and decoupling from, China.

For that purpose, the US has strenuously obstructed China from joining these mechanisms. Such practices have seriously undermined the foundation of international non-proliferation cooperation and disrupted normal international cooperation on science and technology and trade. The international community should be in line with genuine multilateralism and the rule of law, oppose such tendencies of politicization and polarization, and endeavour to establish a fair and inclusive non-proliferation control regime based on equal participation of all countries. ...

Source: https://www.fmprc.gov.cn/mfa_eng/wjbxw/t1832223.shtml, 13 November 2020.

NUCLEAR STRATEGY

USA

F-35A Stealth Fighter Drops Mock Nuclear Bomb in Flight Test

Two major US defense initiatives recently came together as a US Air Force F-35A Lightning II dropped a mock refurbished B61-12 nuclear bomb for the first time. The test, which took place over Sandia National Laboratories' Tonopah Test Range in Nevada on August 25, saw the 5th-generation fighter release the bomb from an internal bay while flying at supersonic speed.

The F-35 has been garnering a lot of attention as it moves to full deployment after almost two decades of development. Its well-known qualities

of stealth, advanced sensors, supersonic speed, and network-ability make it as much a command center as a fighter plane, but it is still first and foremost a weapon system designed to deliver ordnance on target.

For a long time, the existing export control mechanisms have been hindered by the lack of representation and double standard or even outright discrimination. In recent years, these problems have only been further exacerbated.

The recent flight test mated the F-35 with a lesser known US weapons program, the B61-12 air-launched gravity nuclear bomb. Weighing in at 825 lb (374 kg) and with an explosive yield of between 0.3 and 50

kilotons, it's the latest variant of the B61 family of bombs that was fielded in 1968. Since then, it has flown on the B-2A bomber, F-15 and F-16 fighters, and the Panavia Tornado.

However, the US stockpile of these nuclear bombs is aging and Sandia has been tasked with helping to extend their service life by 20 years while making them more secure and more reliable. Sandia provides non-nuclear component development and acts as technical integrator for the complete weapon to make sure it works on the intended platforms. The life extension program includes 400 of the B61-12 bombs and involves refurbishment of parts, replacing fuses and batteries that are suffering from old age, adapting the bomb to new aircraft, and general technical upgrades.

The US has strenuously obstructed China from joining these mechanisms. Such practices have seriously undermined the foundation of international non-proliferation cooperation and disrupted normal international cooperation on science and technology and trade.

Sandia says mock refurbished B61-12s have already flown on an F-15E Strike Eagle fighter jet in March and a B-2 Spirit bomber in July. What made the F-35A test different is that not only was the aircraft equipped with a

nuclear weapon system, but it is the first time that such a bomb was carried in an internal bay on a fighter jet. Normally, the bomb is carried on the outside mounted on a hard point, but the F-35 can carry the bomb or other weapons on the inside to maintain stealth, as well as drop them while flying supersonic.

The flight demonstration was conducted in partnership with the National Nuclear Security Administration, Los Alamos National Laboratory, and the US Air Force. "This was the first test to exercise all systems, including mechanical, electrical, communication and release between the B61-12 and the F-35A" says Steven Samuels, a manager with Sandia's B61-12 Systems Team. "The latest test is a critical piece in the F-35A and B61-12 program Aboard the newest fighter, the B61-12 provides a strong piece of the overall nuclear deterrence strategy for our country and our allies."

Source: David Szondy, <https://newatlas.com/military/f-35a-mock-nuclear-bomb-flight-test/>, 23 November 2020.

BALLISTIC MISSILE DEFENCE

ALGERIA–RUSSIA

Algerian Army Reveals Russian Ballistic Missile for First Time

A video clip from the Algerian Ministry of Défense showed the capabilities of the Algerian Armed Forces, including their powerful missile arsenal, which includes Iskander ballistic missiles. The appearance of the Iskander ballistic missile for the first time in Algeria. In the video, the Algerian Armed Forces showcase their Russian-made Iskander missiles for the first time. This was first reported by the Algerian *Al-Nahar* newspaper, noting that the missile appeared for the first time during the second minute of the defence Ministry's report titled "Only the Land of Algeria." They continued, "During the video, the Iskander ballistic missile, which is from the Russian military industry, appeared for the first

This was the first test to exercise all systems, including mechanical, electrical, communication and release between the B61-12 and the F-35A "The latest test is a critical piece in the F-35A and B61-12 program Aboard the newest fighter, the B61-12 provides a strong piece of the overall nuclear deterrence strategy for our country and our allies.

time," noting that the maximum range of the Iskander ballistic missile is 280 km.

The newspaper pointed out that "these missiles aim to destroy the enemy's air and missile defence systems, as well as military equipment within the range of the missiles." The report, published by the Algerian Ministry of National Défense, says that "Algeria's national borders are a red line and that the sovereignty

of Algeria is a sacred principle." They said, "Our People's National Army, the scion of the mujahideen in every inch of this precious land, will defend it and its people, protecting its borders." The Algerian defence report affirmed that "the army is ready to strike and defeat every greedy person, and every aggressor," adding: "Our defences are a rock of stone. All ambitions are broken. Our national security is not limited to our geographical borders, but rather is linked to our security borders that take into account dealing with various threats."

Source: <https://www.almasdarnews.com/article/algerian-army-reveals-russian-ballistic-missile-for-first-time-video/>, 15 November 2020.

USA

The Army is Activating the Iron Dome, its New Rocket-Killing Weapon

The U.S. Army has announced the activation of two new air defence batteries that use the Iron Dome interceptor system. The batteries, based at Fort Bliss in Texas,

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In 2000, the Israeli military started seeing a new, asymmetric threat from regional terrorist groups.

Short-ranged rockets, each carrying a small high explosive warhead, were being smuggled to groups like Hamas and the Popular Front for the Liberation of Palestine. Fired from the Gaza Strip, these rockets are inaccurate and poorly aimed. They're also difficult to detect before launch and are fired in large numbers, becoming an effective terror weapon.

In response, the U.S. government paid Israeli defence contractors Rafael and Israeli Aerospace Industries to come up with an anti-rocket air defence system. The result was Iron Dome. Each battery consists of three to four stationary launchers with a combined 20 Tamir missiles and a battlefield radar system. According to Raytheon, which is partnering with Rafael to build Iron Dome in the U.S., each battery can protect an area of 60 square miles. This content is imported from {embed-name}. You may be able to find the same content in another format, or you may be able to find more information, at their web site.

Although the system has been criticized as a losing proposition economically—each Tamir missile costs \$20,000, and the average cost of a single unguided rocket is probably in the low hundreds—the system is reportedly 90 percent effective, and has brought peace of mind to communities previously under low-grade siege. The Army reports that an anti-ballistic missile THAAD battery based at Fort Bliss will reconfigure to two Iron Dome batteries. The new batteries will “protect critical fixed and semi-fixed site locations from multiple air and missile threats,” according to the service. In the summer of 2016, the Pentagon decided to send a THAAD unit to South

Korea. There, THAAD would protect U.S. forces on the ground from North Korea's growing arsenal of ballistic missiles—including nuclear-tipped ballistic missiles.

The move effectively checked the ballistic missile threat to U.S. Army installations and Air Force bases in South Korea, including Kunsan and Osan air bases. But that wasn't the end of the North Korean threat—not by far.

In response, North Korea began deploying large-caliber rocket artillery systems. The KN-09 multiple launch rocket system comprises eight 300-millimeter rocket launch tubes on an armoured truck chassis.

KN-09 can reportedly lob a rocket as far as 190 kilometres (118 miles). Importantly, the KN-09 rocket only reaches an altitude of 50 kilometres—far too low for the THAAD system to detect and shoot it down. North Korea would use rockets like the KN-09 rocket to destroy THAAD systems on the ground, opening the door for their larger, longer-range, and higher-flying ballistic missiles to proceed unimpeded to their targets. Of course, it doesn't end there.

What can end the KN-09 threat? Iron Dome. The system was designed to shoot down incoming artillery rounds and rockets fired from 2 to 43 miles, so it's reasonable to assume it has a chance against long-range North Korean rockets. The question is how effective it is against KN-09, which has a longer range and correspondingly different ballistic arc. The Army says its Iron Dome batteries will be ready for deployment by late 2021. If and when it happens, don't be surprised if one of the batteries is sent right away to South Korea. North Korea is almost certainly already working on a way to beat it.

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Source: Kyle Mizokami, [https:// www. popularmechanics. com/military/ weapons/a 34671440 /army-activating- iron-dome-rocket- killing-weapon/](https://www.popularmechanics.com/military/weapons/a34671440/army-activating-iron-dome-rocket-killing-weapon/), 16 November 2020.

Successful SM-3 Weapons Test Offers Missile Defense Opportunity

The US successfully demonstrated an ability to destroy an intercontinental ballistic missile with a Standard Missile-3 Block IIA interceptor. This major development provides an important opportunity to improve layered missile defense for Americans and their allies. According to the Missile Defense Agency, the “threat-representative” ICBM was launched from a test site in Kwajalein Atoll in the Marshall Islands toward a target near Hawaii. Simulating a “defense of Hawaii” scenario, the Navy destroyer John Finn, equipped with the Aegis ballistic missile defense system, successfully destroyed the missile using an SM-3 IIA interceptor. Congress, cognizant of the increasing missile threat from North Korea, used the fiscal 2018 National Defense Authorization Act to require MDA to conduct a test by the end of 2020 in order to see if the U.S. could use the SM-3 IIA interceptor against an ICBM.

As it turns out, Congress was prescient. While North Korea temporarily ceased flight tests of longer-range ballistic missiles, Pyongyang has continued to develop land and sea-based missiles. North Korea recently paraded its newest and largest ICBM to date. While the regime has not yet flight-tested the missile, dubbed the Hwasong-16 by analysts, Pyongyang has, or is developing, at least four platforms — the KN-08, the KN-14, the Hwasong-14 and the Hwasong-15 — that qualify as ICBMs. With the newly unveiled Hwasong-16, the North Korean arsenal now boasts five missiles with ICBM-class ranges. Pyongyang could potentially use some of those missiles to target the United States. A similar threat grows in Iran,

whose cooperation with North Korea in the missile domain has been identified and punished by the U.S. government.

This April, Iran’s Islamic Revolutionary Guard Corps’ Aerospace Force — the entity with operational control over the country’s ballistic missile arsenal — tested its first-ever military satellite on a space-launch vehicle featuring a solid-propellant second-stage motor. Iran currently has no

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ICBMs and is subject to a self-imposed range cap of 2,000 kilometers on its missiles. But as Iranian officials have boasted, that ban can be unilaterally ended. Already Tehran hosts the largest arsenal of short-and medium-range ballistic missiles in the Middle East. According to the 2019 Missile Defense Review, Iran’s “desire to have a strategic counter to the US could drive it to field an ICBM, and progress in its space program could shorten the pathway to an ICBM.”

The SM-3 IIA interceptor was originally designed to counter medium- or intermediate-range missiles. But successful test suggests that the MDA could use the interceptor to strengthen American layered missile defenses against a rogue state’s ICBM. The first layer of America’s existing homeland defense includes the Ground-based

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Midcourse Defense system, which features 44 Ground-Based Interceptors in California and Alaska designed to destroy ICBMs in their midcourse phase. The THAAD system uses a powerful radar to track ballistic missiles and

destroy them just before they reach friendly targets. The SM-3 IIA interceptor positioned on a destroyer or on land using the Aegis Ashore system could now provide another chance for the US to destroy an incoming ICBM, as this Department of Defense graphic depicts: Adding additional missile protection for Americans is common-sense, but some worry that deployment of this additional missile defense capability

against ICBMs could destabilize relations with Russia and China.

But such an argument is dubious. The U.S. homeland missile defense system is designed to counter a relatively modest attack from North Korea and perhaps Iran. Even with the welcome potential improvements associated with the SM-3 IIA interceptor, the U.S. missile defense system will remain thoroughly inadequate against a major missile attack from Russia or China.

The scale and sophistication of such an attack by either country would easily overwhelm the U.S. missile defense system. That is especially true given the hypersonic and cruise missile capabilities that both countries possess or are developing. Instead, the US relies on its nuclear triad to deter such an attack from Russia or China.

Russia and China know that America's existing missile defenses and any improvement that might be possible in the coming years using the SM-3 IIA could not defeat a major missile attack. But that fact will not likely prevent either great power competitor from issuing cynical and overwrought protests — even as they rush to expand their own missile defenses.

It is worth noting that Russia has more deployed homeland missile defense interceptors than the US. Congress should be lauded for its prescience in the 2018 NDAA regarding the potential capability of the SM-3 IIA against ICBMs. Following the successful test, Congress should now act to ensure associated missile defense programs are sufficiently funded. This opportunity to better protect Americans should not be missed.

Source: Bradley Bowman and Behnam Ben Taleblu, <https://www.defensenews.com/opinion/commentary/2020/11/21/successful-sm-3-weapons-test-offers-missile-defense-opportunity/>, 21 November 2020.

NUCLEAR ENERGY

CHINA

China's First Domestic Nuclear Reactor Goes Online

China has powered up its first domestically developed nuclear reactor – the Hualong One – a significant step in Beijing's attempts to become less dependent on Western allies for energy security and critical technology. The reactor, which was connected to the national grid on Friday (27 Nov), can generate 10 billion kilowatt-hours of electricity each year and cut carbon emissions by 8.16 million tons, according to China National Nuclear Corporation (CNNC). "This marks China breaking the monopoly of foreign nuclear power technology and officially entering the technology's first batch of advanced countries," CNNC said in a statement.

Nuclear plants supplied less than 5% of China's annual electricity needs in 2019, according to the National Energy Administration, but this share is expected to grow as Beijing attempts to become carbon neutral by 2060. Reducing its dependence on Western allies in critical high-tech sectors such as power generation is a key goal in Beijing's "Made in China 2025" plan.

Billions of dollars in state subsidies have been given to Chinese companies to speed the process – a move that has angered China's trade partners and sparked a protracted trade row with Washington. Work on the Hualong One reactor started in 2015, and there are currently six other reactors under construction at home and abroad, state-owned plant operator CNNC said. The Hualong One, deployed at a plant in east China's Fujian province, will be put into commercial use by the end of the year after undergoing tests.

China has 47 nuclear plants with a total generation capacity of 48.75 million kilowatts –

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the world's third-highest after the United States and France. Beijing has invested billions of dollars to develop its nuclear energy sector in recent years as it struggles to wean its economy from coal. Thirteen nuclear plants are under construction, more than in any other country, despite environmental and safety concerns. In August 2016, officials were forced to shelve plans for a nuclear waste facility in Lianyungang, a city in eastern Jiangsu province, after a rare public protest by thousands of residents.

Source: <https://www.dailysabah.com/world/asia-pacific/chinas-first-domestic-nuclear-reactor-goes-online>, 28 November 2020.

GENERAL

What are Small Modular Nuclear Reactors? A Power Technology Explainer

In recent months, world governments have proposed small modular reactors (SMR) as one means to ease their energy transition. The concept has existed for decades as a power source for vessels and district heating projects, and now the UK and the US have moved toward the technology. Small modular reactors (SMRs) allow energy developers to build smaller nuclear plants than conventional construction would. Parts would be fabricated at factories and assembled on site, minimising costs. Despite widespread interest, there are currently only four SMRs in construction; in Argentina, China, and Russia. Beyond this, the IAEA says approximately 50 SMR designs and concept exist worldwide. IAEA defines SMRs as a reactor that produces 300MW per module. Some SMRs can work as a multi-module plant, meaning greater combined capacities.

An independent report to the Dutch

government recently described SMRs as carrying "a promise for great simplification and related cost reduction while applying industrial manufacturing and construction technologies at factory rather than on site". Their small size and relatively easy construction mean they offer greater flexibility than conventional, long-term nuclear projects. With their smaller cost, SMRs present a 'stopgap' measure for countries looking to fill power shortfalls as older plants retire and new renewable plants come online.

A study by the University of Cambridge found that modularisation would reduce the cost of nuclear power by 25% in a best-case scenario. Similarly, standardisation and changes to construction would reduce cost by 16% each. Thereafter, production learning would further suppress costs by 17%. Additionally, SMRs can help balance grids, moving at comparatively short notice as new power comes online. They can ensure power continuity in areas that rely on intermittent renewable power without significant storage capacity.

Source: Matthew Farmer, <https://www.power-technology.com/features/small-modular-nuclear-reactors-uk-us-iaea-development-explainer-investment-johnson-climate-list/>, 20 November 2020.

UK

UK Includes New Nuclear in 'Green Industrial Revolution'

UK PM Boris Johnson has unveiled a 10-point plan that he says can be "a global template" for delivering net-zero emissions. Point 3 of the plan is the government's commitment to develop new nuclear power, from large-scale to small and advanced modular reactors. This includes

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investment of GBP525 million (USD696 million) for “the next generation of small and advanced reactors”.

The inclusion of nuclear power reflects advice that the Nuclear Innovation Research and Advisory Board (NIRAB) gave in a recent report for the Department for Business, Energy and Industrial Strategy. NIRAB said there that it would be prudent to plan for nuclear energy to provide at least half of the firm low-carbon electricity not provided by renewables.

The plan announced on 18 November also includes a previously announced pledge to quadruple offshore wind power capacity by 2030, to 40GW, and “to turn water into energy” with up to GBP500 millions of investment in hydrogen. It also includes investment of more than GBP2.8 billion in electric vehicles and establishing a new world-leading industry in carbon capture and storage, backed by GBP1 billions of government investment for clusters across the North, Wales and Scotland. The government’s GBP1 billion energy innovation fund will help commercialise new low-carbon technologies, Johnson said, such as the world’s first liquid air battery, and the City of London will become the global centre for green finance through the sovereign bond, carbon offset markets and disclosure requirements.

Writing in the *Financial Times* today, Johnson said the 10-point plan “will turn the UK into the world’s number one centre for green technology and finance, creating the foundations for decades of economic growth”. His government will establish a “task force net zero” committed to reaching net zero by 2050, and through next year’s COP26 summit it will urge countries and companies around the world to join the UK in delivering net zero globally. ...

Landmark Moment: *The Climate Change Committee (CCC) described Johnson’s announcement as a “landmark moment”. In May 2019, the independent body set up to advise the*

government on climate change laid out a set of proposals to enable the UK to achieve net zero greenhouse gas emissions by 2050. ...

Details to Come: Tom Greatrex, CEO of the UK’s Nuclear Industry Association, welcomed the scale of the ambition indicated by the plan, noting that more details will come in the Energy White Paper, which is expected later this month. “Meeting net zero while delivering long term, skilled jobs, economic growth and export potential are the opportunities for the country. Low-carbon technology working together - not being pitted against each other - is the right approach to take,” Greatrex said.

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“We welcome the government setting a 2030 target for low-carbon hydrogen production. Nuclear power can produce clean, ‘green’ hydrogen without any carbon emissions, so it has a critical role to play in developing the hydrogen economy. We hope the government will support ‘green’ hydrogen, since our goal is to use hydrogen to reduce emissions. There is

no use in deploying hydrogen if we have to emit large amount of carbon to create it,” he added. ...

One of those projects is Sizewell C, the proposed new nuclear power plant on the Suffolk coast. This will be a near replica of Hinkley Point C (HPC), which EDF Energy is building in Somerset and, like HPC, it will be able to supply 7% of the UK’s electricity once it enters commercial operation.

Supply Chain: Sizewell C Consortium - a group of more than 100 companies and organisations from the UK nuclear supply chain to encourage the government to support a state-guaranteed financing model for Sizewell C - welcomed the Prime Minister’s commitment to large-scale nuclear. The group’s spokesperson, Cameron Gilmour, said the Sizewell C project will create “tens of thousands of jobs in the UK industrial heartlands”.

Separately, French nuclear engineering firm

Framatome announced that it had joined the Sizewell C Consortium. Marc Duret, managing director of Framatome in the UK, said: "Framatome has called the UK home for more than 25 years and we remain committed to contributing to the country's economic recovery and clean future with low-carbon energy." Framatome said it is helping the UK reach its 'net zero by 2050' target by contributing to the construction of two EPR reactors at HPC and two at the proposed Sizewell C plant. Framatome also assists maintenance and long-term operations at Sizewell B. As part of the Sizewell C project, Framatome said it expects to create 100 British jobs with engineering and construction expertise.

The UK SMR consortium, led by Rolls-Royce, said it expects to create 6000 jobs within the next five years and 40,000 in 15 years "if the government makes a clear commitment" that enables a fleet of 16 small modular reactor power stations to be built over the next 20 years.

Source: <https://www.world-nuclear-news.org/Articles/UK-includes-new-nuclear-in-green-revolution-policy>, 18 November 2020.

USA

Commercializing Next-Generation Nuclear Energy Technology

All of the nuclear power plants operating in the U.S. today were built using the same general formula. For one thing, companies made their reactors big, with power capacities measured in the hundreds of megawatts. They also relied heavily on funding from the federal government, which through large grants and lengthy application processes has dictated many aspects of nuclear plant design and development.

That landscape has had varying degrees of success over the years, but it's never been particularly inviting for new companies interested

in deploying unique technologies. Now the start-up Oklo is forging a new path to building innovative nuclear power plants that meet federal safety regulations. Earlier this year, the company

became the first to get its application for an advanced nuclear reactor accepted by the U.S. Nuclear Regulatory Commission (NRC). The acceptance was the culmination of a novel application process that set a number of milestones in the industry, and it has positioned Oklo to build an advanced reactor that differs in several important

ways from the nuclear power plants currently operating in the country.

Conventional reactors use moderators like water to slow neutrons down before they split, or fission, uranium and plutonium atoms. Oklo's reactors won't use moderators, enabling the construction of much smaller plants and allowing neutrons to move faster. Faster-moving neutrons can sustain nuclear fission with a different type of fuel. Compared to traditional reactors, Oklo's fuel source will be enriched with a much higher concentration of the uranium-235 isotope, which fissions more easily than the more common uranium-238. The added

proportion of uranium-235 allows Oklo's reactor to run for longer time periods without having to refuel. As a result of these differences, Oklo's powerhouses will bear little resemblance to conventional nuclear plants. The company's first

reactor, dubbed the Aurora, is housed in an unassuming A-frame building that is hundreds of times smaller than traditional reactors, and it will run on used fuel recovered from an experimental reactor at the Idaho National Laboratory that was shut down in 1994. Oklo says the plant will run for 20 years without having to refuel in its lifetime.

But perhaps the most unique aspect of Oklo is its approach to commercialization. In many ways, the

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Silicon Valley-based company has cultivated a start-up mindset, eschewing government grants to raise smaller, venture capital-backed funding rounds and iterating on its designs as it moves through the application process much more quickly than its predecessors. ... Now Oklo is hoping its progress will encourage others to pursue new approaches in the nuclear power industry. ...

Charting a New Path:

DeWitte came to MIT in 2008 and studied advanced reactors during work for his master's degree. For his PhD, he considered ways to extend the lifetime and power output of the large reactors already in use around the world. But while DeWitte studied the big reactors of today, he was increasingly drawn to the idea of commercializing the small reactors of tomorrow. ... What DeWitte learned about the nuclear power landscape was not particularly encouraging for start-ups. The industry is plagued with stories of plant construction taking a decade or more, with cost overruns in the billions.

In the U.S., the Nuclear Regulatory Commission sets design standards for reactors and issues guidance for meeting those standards. But the guidance was created for the large reactors that have been the norm in the industry for more than 50 years, making it poorly suited to help companies interested in building smaller reactors based on different technology. DeWitte began thinking about starting an advanced nuclear company while he was still a PhD student. In 2013 he partnered with Cochran and others from MIT, and the team participated in the MIT \$100K Entrepreneurship Competition and the MIT Clean Energy Prize, where Oklo got early feedback and validation, including winning the energy track of the \$100K. Oklo's reactor design changed considerably over the years as DeWitte and Cochran — the only co-founders to stick with the company — worked first with advisors at MIT, then with industry experts, and eventually with officials at the NRC. ...

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Oklo's first reactor will generate 1.5 megawatts of electric energy, although later versions of the company's reactor could generate much more. The company's first reactor will also use a unique uranium fuel source provided by the Idaho National Laboratory.

Oklo raised small funding rounds in 2013 and 2014 as the company went through the Mass Challenge and Y Combinator start-up accelerators. In 2016, the Department of Energy (DOE) did some innovating of its own, beginning an industry-led effort to build new approval processes for advanced nuclear reactor applications. Two years later, Oklo piloted the new structure. The process resulted in Oklo developing a novel application and becoming the first company to get a combined license application to build a power

plant accepted by the NRC since 2009. "We had to look at regulations with a fresh eye and not through the distortion of everything that had been done in the past," DeWitte says. "In other words, we had to find more efficient ways to meet the regulations."

Leading by Example: Oklo's first reactor will generate 1.5 megawatts of electric energy, although later versions of the company's reactor could generate much more. The company's first reactor will also use a unique uranium fuel source provided by the Idaho National Laboratory. Natural uranium consists of more than 99 percent uranium-238 and about 0.7 percent uranium-235. In conventional nuclear reactors, uranium is enriched to include up to 5 percent uranium-235. The uranium fuel in Oklo's reactors will be enriched to include between 5 and 20 percent uranium-235. Because Oklo's reactors will be able to operate for years without refuelling, DeWitte says they're particularly well-suited for remote areas that often rely on environmentally harmful diesel fuel.

Oklo isn't committing to an exact timeline for construction, but the co-founders have said they expect the reactor to be operational in the early 2020s. DeWitte says it will serve as a proof of concept. Oklo is already talking with potential customers about additional plants. DeWitte has said later versions of its plants could run for 40 years or more without needing to refuel. For now, though, DeWitte is hoping Oklo's progress can

inspire the industry to rethink the way it brings new technologies to market. “[Oklo’s progress] opens the door up to say nuclear innovation is alive and well,” DeWitte says. “And it’s not just the technology, it’s the full stack: It’s technology, regulations, manufacturing, business models, financing models, etc. So being able to get these milestones and do it in an unprecedented manner is really significant because it shows there are more pathways for nuclear to get to market.”

Source: *India Education Diary Bureau Admin*, <https://indiaeducationdiary.in/commercializing-next-generation-nuclear-energy-technology/>, 15 November 2020.

NUCLEAR COOPERATION

INDIA–USA

India-US Issue Joint Statement on 10 Years of Cooperation Over GCNEP & Nuclear Energy

United States’ Embassy and Consulates in India on 24 November, issued a joint press statement on 10 years of Cooperation regarding Global Centre for Nuclear Energy Partnership and Extension of the MoU for Cooperation between India and the US for an additional 10 years.

‘Looking Forward to Robust Cooperation’: According to the statement, the Government of India and the Government of the USA, recognizing and appreciating the strength of the enduring partnership between the two countries on matters of security and reaffirming the important contributions of the U.S.-India nuclear and radiological security cooperation for the benefit of their citizens and the world, extended their cooperation in this area in October 2020 by signing a ten-year extension of the GCNEP MOU. The two Governments, seeking to build on the first ten years of strong cooperation and looking

The Government of India and the Government of the USA, reaffirming the important contributions of the U.S.-India nuclear and radiological security cooperation for the benefit of their citizens and the world, extended their cooperation in this area in October 2020 by signing a ten-year extension of the GCNEP MOU.

forward to robust cooperation over the next ten years, commit to:

- Promote cooperation on initiatives aimed at giving an impetus to nuclear safety and security, research and development in nuclear science and technology under various schools of GCNEP;
- Deepen the dialogue on nuclear and other radioactive material security by collaborating on advanced projects in the field (e.g. future technology), with the goal of sharing the outcomes in the international arena;
- Wider inclusion of agencies of both Governments and relevant entities, as appropriate, involved in nuclear and radioactive material security, in order to ensure that the full spectrum of perspectives are shared; and
- Build on the international recognition of the GCNEP, and reinforce that the two countries are partners for nuclear and radioactive material security by jointly developing and /or delivering training and other capacity-building opportunities for regional and international partners, including online content.

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India-US Extend MoU Concerning Cooperation with GCNEP: *In October, India and the US had announced the extension of the duration of an MoU between them concerning cooperation with the GCNEP. The US*

also reaffirmed its “continued strong support” for India’s early entry into the NSG, according to a joint statement issued after the 2+2 strategic dialogue between Defence Minister Rajnath Singh, External Minister S Jaishankar and their US counterparts Secretary of State Mike Pompeo and Secretary of Defence Mark T Esper.

“Recalling the historic India-US Civil Nuclear Agreement, the ministers welcomed the project Division of Responsibility principles between the

NPCIL and the Westinghouse Electric Company (WEC) for the construction of six nuclear reactors at Kovvada (in Andhra Pradesh), and looked forward to the detailed Division of Responsibility that would pave the way for a techno-commercial offer," it said. ...

Source: <https://www.republicworld.com/india-news/general-news/india-us-issue-joint-statement-on-10-years-of-cooperation-over-gcnep-and-nuclear-energy.html>, 24 November 2020.

UAE-SAUDI ARABIA

UAE, Saudi Nuclear Regulators Strengthen Cooperation

The UAE's Federal Authority for Nuclear Regulation (FANR) and Saudi Arabia's Nuclear and Radiological Regulatory Commission (NRRC) have agreed to cooperate in nuclear and radiation regulatory matters, and to form topical working groups. The agreement follows the signing of a bilateral accord on cooperation in nuclear energy between the two countries in 2019.

Representatives from FANR and NRRC met on 16 November to explore and strengthen collaboration in regulatory aspects related to nuclear safety, nuclear security, non-proliferation, legal and regulatory framework, emergency preparedness and response. The virtual meeting was chaired by FANR Director-General Christer Viktorsson and NRRC CEO Khalid Al Eissa.

NRRC presented the status of Saudi Arabia's nuclear programme and regulatory framework, while FANR gave updates on the UAE's nuclear energy programme, including the recent start-up of unit 1 at its Barakah nuclear power plant. FANR also discussed its regulatory framework in terms of the nuclear and radiological sectors in the UAE,

and efforts to protect the public, workers and the environment from radiation risks.

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smart licensing communications. ...

Under a USD20 billion deal announced in December 2009, four Korean-designed APR1400 reactors are being built at Barakah in the UAE by a consortium led by the Korea Electric Power Corporation. Unit 1 was grid connected in mid-August and is scheduled to enter full commercial operation later this year.

Saudi Arabia plans to construct two large nuclear power reactors and also small reactors for desalination. The King Abdullah City for Atomic and Renewable Energy (KA-CARE) in 2017 announced it was soliciting proposals for 2.9 GWe nuclear capacity, and in November 2018 awarded a contract to Worley Parsons to provide consultancy services for the Saudi National Atomic

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Energy Project. This covers project governance, resource management, project services, training and compliance across the full scope of large plants, small modular reactors and the nuclear fuel cycle.

KA-CARE has contracted French engineering group Assystem to conduct site characterisation and impact studies for the country's first nuclear power plant. South Korean companies Kepco Engineering & Construction and Korea Hydro & Nuclear Power in December 2018 signed a

Memorandum of Understanding to jointly develop a project to construct a plant based on their SMART (System-integrated Modular Advanced Reactor) in Saudi Arabia.

Source: <https://www.world-nuclear-news.org/Articles/UAE-Saudi-nuclear-regulators-strengthen-cooperation>, 16 November 2020.

Russia's Siberian Chemical Combine (SCC) has produced more than 1000 experimental fuel elements based on mixed uranium-plutonium nitride (MNUP) fuel during its eight years of participation in the Proryv (Breakthrough) project. Fuel elements of various standard sizes and structural materials were manufactured in order to find and justify the optimal configuration, SCC said in a 13 November statement.

and no structural element defects were identified, SCC said. In the spring of the year 2020, new batches of experimental fuel assemblies were loaded into the reactor and each one contained 61 fuel rods. "Tests of the innovative MNUP fuel are continuing successfully. More than 21 experimental assemblies were irradiated directly in the BN-600 reactor and the

URANIUM PRODUCTION

RUSSIA

Siberian Chemical Combine Reports Milestone with New Fuel Production

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Experimental fuel elements and fuel assemblies are being tested in the BN-600 fast reactor at the Beloyarsk nuclear power plant to obtain the most complete experimental data on the properties and behaviour of pellet-form MNUP fuel in steel cladding. The data will serve to validate the fuel element design, which will be used for the manufacture of fuel rods for the BREST-OD-300 lead-cooled fast neutron reactor. BREST-OD-300 is part of the pilot energy complex (ODEK) in Seversk.

Irradiation of experimental fuel assemblies began in the spring of 2014. They were used in the reactor until the autumn of 2016 and their use for research has now been completed. All the fuel rods retained their original shape during irradiation

serviceability of this fuel has been proven," Yuri Mochalov, chief technologist of the Breakthrough project, said. The Breakthrough project aims to demonstrate a closed fuel cycle. SCC is part of fuel company TVEL, which is a subsidiary of state nuclear corporation Rosatom.

Source: <https://www.world-nuclear-news.org/Articles/Siberian-Chemical-Combine-reports-milestone-with-n>, 23 November 2020.

NUCLEAR PROLIFERATION

IRAN

Europe Sees Opportunity for Transatlantic Cooperation against Iran

... European countries signatory to a 2015 Iran nuclear deal seem to be in a rush to lay the groundwork for a transatlantic policy that would secure U.S.-European interests with regard to Iran. As Joe Biden prepares to move into the White House, politicians and diplomats around the world hold their breath to see how Biden would deal with Iran after four years of aggressive rhetoric from Trump against Iran.

Biden himself has said in a mid-September op-ed for CNN that he will re-join the Iran nuclear deal – officially known as the Joint Comprehensive Plan of Action (JCPOA) – if Iran reverses the five nuclear steps that it has taken to reduce compliance with the nuclear deal following Trump's withdrawal from it. "I will offer Tehran a

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credible path back to diplomacy. If Iran returns to strict compliance with the nuclear deal, the US would re-join the agreement as a starting point for follow-on negotiations," Biden wrote. "With our allies, we will work to strengthen and extend the nuclear deal's provisions, while also addressing other issues of concern."

Since then, Biden has refrained from elaborating on his plan to re-join the deal, and since the November election, in which he was projected to win, he has been quite silent about his expected Iran policy. But this doesn't mean that there are no behind-the-scene consultations. It seems that European diplomats and "former U.S. officials" are busy drawing plans to create consensus between the U.S. and Europe on Iran. These diplomats and former officials even prompted speculations about how Biden might return to the JCPOA.

Citing former U.S. officials and European diplomats, *NBC News* outlined on 21 November, a step by step strategy that could lead to both Iran and the U.S. returning to the nuclear deal. Rather than removing sanctions all at once or Iran returning immediately to full compliance, a more likely scenario could see an incremental approach over a period of three or four months, *NBC* reported. It said that a first step could have Iran freeze its nuclear work, in return for some level of sanctions relief. Further steps could see Iran eventually return to compliance and all the nuclear-related sanctions lifted.

Blame Game: The U.S.-European cooperation was on full display during a recent phone conversation between Biden and French President Emanuel Macron. During the conversation, Biden told Macron that he would like the U.S. to once again work with its European ally on Iran's nuclear policy, according to *Newsweek*. Biden "expressed his readiness to work together on global

challenges, including security and development in Africa, the conflicts in Ukraine and Syria, and Iran's nuclear program" Biden's transition team said in a press release emailed to *Newsweek*.

The three European countries that are signatories to the JCPOA – France, Germany, and the UK (E3) - have stepped up their criticism of Iran in recent days, with France even renewing calls for new negotiations over Iran's missile program and its influence across the West Asia region. The E3 issued a joint statement..., expressing concerns over Iran's nuclear activities, which they described as "hollowing out the core non-proliferation benefits" of the JCPOA.

"As participants to the JCPOA, we reiterate our continued commitment to the preservation and full implementation of the nuclear agreement....

We have lifted sanctions as foreseen by the JCPOA and taken additional efforts to allow Iran to pursue legitimate trade, by developing the financial mechanism INSTEX," the E3 statement said, adding, "However, despite these good faith efforts, Iran has engaged, for a year and a half now, in numerous, serious violations of its nuclear commitments. We continue to be extremely concerned by Iran's actions, which are hollowing out the core non-proliferation benefits of the deal. Advancements on Research & Development have irreversible consequences."

The European parties to the JCPOA also called on Iran to "immediately" roll back its nuclear steps. "It is now critical that Iran immediately reverses its steps and returns to full compliance with the JCPOA without further delay. We remain committed to working with all JCPOA participants to find a diplomatic way forward and we intend to pursue these discussions within the framework of the JCPOA" the statement said.

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Iran hit back at the E3, accusing them of playing “political blame games.” In a statement Foreign Ministry spokesman Saeed Khatibzadeh said the E3 is expected to implement its JCPOA commitments in full, act upon what the Joint Commission has approved, and return to the full implementation of the JCPOA instead of playing such political blame games. “The Islamic Republic of Iran’s peaceful nuclear activities are totally legal, legitimate, and within the framework of international law, and are pursued as part of the inherent and essential rights of the world countries,” the statement said.

Khatibzadeh also pointed out that the E3 failed to uphold their obligations under the nuclear deal, underlining that Iran’s nuclear steps were taken in accordance with the terms of the nuclear deal. “Following the US’ withdrawal from the JCPOA and the reimposition of sanctions, and considering Europe’s continued failure to live up to its commitments to helping Iran reap the economic benefits of the removal of sanctions as per the JCPOA, the Islamic Republic took nuclear steps according to the articles 26 and 36 of the JCPOA,” Khatibzadeh said, adding, “These steps were taken in full compliance with the JCPOA, and the country has always stressed that they will be reversible once the other parties to the JCPOA implement the deal in full.”

Playing Politics: But despite their failure in complying with their commitments, the Europeans continue to demand more concessions from Iran. On 19 November, the French presidency called for broader negotiation with Iran that includes Iran’s regional role and its missiles, according to an Asharq Al-Aawsat report. According to the report, a French official pointed out in a press briefing on 19 November that the Iranian nuclear program has reached a dangerous stage, and that would not be the case if Iran continued to respect its obligations stipulated in the 2015 nuclear agreement. The official also said any subsequent negotiations with Tehran should expand to include

the ballistic missile program, regional policy, and what he called “interference in the affairs of other countries.” If true, this is not the first time that France calls for broader negotiations with Iran. In late August 2018, French Foreign Minister Jean-Yves Le Drian warned Iran “cannot avoid” talks on thorny issues like its ballistic missile program and its role in the West Asia region, according to an AFP report at the time.

Earlier in November 2017, French President Macron said during a visit to Dubai that he was “very concerned” by Tehran’s missile program. One month earlier, Macron told his Iranian counterpart Hassan Rouhani that France remained committed to JCPOA but stressed the necessity to have a dialogue with Iran on other strategic issues, including Tehran’s ballistic missile program, a proposal ruled out by Iran.

In June 2019, during a meeting with President Trump in France, Macron once again called for new negotiations with Iran that would contain Iran’s nuclear activities and reduce its missile capabilities as well as restrict Iran’s influence in the region. Now that Biden has won the election –at least in the eyes of the Europeans – the E3, especially France, seem to be trying to strike a tone of defiance against Iran in

what appears to be an effort to affect the content of the potential talks between the Biden administration and Iran. This may be the reason why Iran has called on the E3 to stop playing political blame games. The Europeans, France in particular, have a long history of playing politics against Iran. At the final days of the nuclear negotiations, France struck a more hard-line tone to get more concessions from Iran but it ultimately fell into line with other parties to negotiations after Iran showed defiance.

Source: <https://www.tehrantimes.com/news/454928/Europe-sees-opportunity-for-transatlantic-cooperation-against>, 21 November 2020.

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Israel Must Prepare for a Change in US Policy toward Iran

'The year is 1939 and Iran is Germany' – I heard PM Benjamin Netanyahu say at a Jewish conference in Los Angeles in 2006. This statement sounded to me anti-Zionist because it raised the question of whether we really are in the situation we were in 1939 before there was a Jewish state with the strongest army in the region. So, does Zionism justify itself? In addition, I wondered how this apocalyptic message is consistent with the attempt to bring American Jews to visit Israel and invest in it, and with us Israelis to raise our children in a country on the brink of a nuclear holocaust. I do not intend to diminish the Iranian strategic challenge and the importance to prevent Iran from achieving military nuclear capabilities, but a more rational and less hysterical perspective would benefit Israel. This alarmist approach was one

of the reasons for the conflicts the Netanyahu government had with the Obama-Biden administration. A new perspective would benefit the ability of Israel to work jointly with the Biden-Harris administration on a coordinated approach.

The prevailing axiom in our area is that Iran poses an existential threat, and that its efforts to achieve the ultimate weapon require us to use any means possible to prevent it. As part of our zigzagging between paranoia and hubris, we hear that Iran is a strong power that threatens the future of the Middle East, and the next day that Iran is on the verge of collapse if only we take one step or another. Both statements are far from reality. I would like to present a more balanced approach to Iran and the threat posed by it.

There are many similarities between Iran and Israel. According to foreign sources, Israel achieved military nuclear capabilities in the 1960s

and was the sixth country in the world to do so. Under the NPT, the five permanent members of the Security Council have recognized nuclear weapons, but since then – India, Pakistan and North Korea have already declared nuclear weapons in their possession. Iran is not on the list, and even if it will be, Iran's abilities are a long way from ours. Iran's motivation to acquire nuclear weapons, which is presented to us mainly as an aspiration for regional hegemony, is not different than Israel's motivation, which stems from existential anxiety and the goal of defence and deterrence. Iran is surrounded by enemies, represents a hated Persian minority in an area where an Arab and Turkish majority and represents

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an outcast Shi'ite minority in an area with a vast majority of Sunnis. Iran was traumatized by the war with Iraq, in which about a million Iranians were killed and wounded. As you may recall, the West supported Iraq.

Iran has chosen Israel as a target for its rhetoric because it pays off in terms of Iran's status in the region, but Israel is not the reason for Iran's motivation to acquire nuclear weapons. As in Israel, the Iranian public is one of the most educated and creative in the world. The Iranian people, from all over the Muslim world, are most similar to us Israelis.

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The governments of Israel and Iran are similar in the disproportionate influence of religious leaders and the lack of separation between religion and state, as opposed to liberal democracies. Israel often

talks about the lack of democracy in Iran, but in the global ranking of democracies, Iran is ahead of Saudi Arabia, which we see as a moderate country. In Iran, it is remembered that the West supported the tyranny of the Shah and that the US assisted in a coup that brought the Shah to power instead of a semi-democratic Mosaddegh regime. Israel, on the other hand, is in the process of declining in the democracy index.

Extremist elements in Iran have grown stronger thanks to the hysterical treatment of Iran by Israel and the US. During the Gulf War, the Bush administration overthrew Iran's enemy in Iraq – the Sunni Ba'ath party – and turned it into a chaotic Shi'ite-dominated state. Israel helped Iran export the revolution to Lebanon during its long stay in Lebanon after an unnecessary war (in which I participated) that turned Hezbollah into a legitimate organization in the eyes of the Lebanese. Netanyahu encouraged president George Bush to overthrow the Ba'athist regime in Iraq. Netanyahu encouraged President Donald Trump to abandon the JCPOA agreement between Iran and the powers (P5 + 1). The abandonment of the agreement dismantled the international coalition that imposed crippling sanctions on Iran, which eventually brought Iran into negotiations; weakened Rouhani's moderate leadership, which prefers a functioning economy to regional hegemony, strengthened extremist Revolutionary Guards, and brought Iran closer to a nuclear weapon.

I still remember as a diplomat serving in the US that the line we presented was that sanctions were not enough to bring about a change in Iranian policy, and after the agreement was signed, that if only they had continued with the sanctions, Iran would have surrendered. ... The concern we expressed during the negotiations about the possibility that President Obama would include regional agreements with Iran. And after the agreement was signed, Obama was accused of failing to reach a regional agreement that would prevent Iran from promoting terrorism. The alarmist Israeli position has caused harm and continues to do so. Israel is perceived as inconsistent, failing to convince the Europeans, Russians and Chinese, whose cooperation is

necessary.

Israel must be part of an international coalition trying to reach an agreement with Iran that will prevent it from reaching a nuclear bomb, but it must be understood that an agreement requires compromise. Israel must prevent Iran from transferring weapons to Hezbollah, but alongside military action, smart diplomacy must be exercised vis-à-vis Lebanon, where the mechanism of negotiations about the naval border can

Netanyahu encouraged President Donald Trump to abandon the JCPOA agreement between Iran and the powers (P5 + 1). The abandonment of the agreement dismantled the international coalition that imposed crippling sanctions on Iran, which eventually brought Iran into negotiations.

serve as an opportunity. Israel needs to find ways to reach out to the Iranian people and make a clear separation between our attitude toward the ayatollah's regime and our attitude toward the general public.

The Iranian people are a proud people who do not support the rule of the Ayatollahs, but want the change to come from within and not from outside intervention. A day will come and this proud people will change the political reality in Iran and the Arab Spring will also become the "Persian Spring." One can find Iranian exiles in the West who will say that an overthrow of the regime by US force will be welcomed there with flowers, as there were Iraqi exiles who claimed this before the attack on Iraq, and we know how that ended.

Israel must prevent Iran from transferring weapons to Hezbollah, but alongside military action, smart diplomacy must be exercised vis-à-vis Lebanon, where the mechanism of negotiations about the naval border can serve as an opportunity. Israel needs to find ways to reach out to the Iranian people and make a clear separation between our attitude toward the ayatollah's regime and our attitude toward the general public.

Another very important point of similarity between the Iranian and Israeli governments is that they are the only governments in the world that do not support the two-state solution to the Israeli-Palestinian conflict, and both benefit politically from this conflict as well as from the conflict between them. The Iranian position is understandable, the only way the apocalyptic calls of its leaders against Israel be realized is if we fail to reach a two-state

solution with the Palestinians and the status quo will eliminate us demographically or morally. But in this case, it is us eliminating Zionism, not the Iranians. The possible change of leadership in the US is an opportunity for Israel to change course to a more appropriate policy also in terms of the Iranian challenge.

Source: <https://www.jpost.com/opinion/israel-must-prepare-for-a-change-in-us-policy-toward-iran-649108>, 14 November 2020.

NUCLEAR TERRORISM

USA

Biden Must Act Promptly to Strengthen Global Efforts to Prevent Nuclear Terrorism

Renewing the New START nuclear weapons agreement with Russia before it expires in February 2021 will be an urgent priority for the Biden administration. Doing so will set the stage for managing relations with Russia — and engaging China — on nuclear arms control, and preventing states like Iran and North Korea from obtaining nuclear weapons.

But states are no longer the only source of nuclear threats to the U.S. Terrorist groups also pose a credible threat of attacking the U.S. using nuclear or radiological materials. A nuclear or radiological terrorist attack in a U.S. or other major global city would have severe and possibly devastating political, security, and economic consequences for the country attacked, as well as globally. The Biden administration will have an opportunity in 2021 to re-energize global efforts to prevent nuclear and radiological terrorism, but it will need to act promptly to do so.

Lack of knowledge about weaponizing nuclear or

radiological materials is no longer an impediment to nuclear terrorism, but lack of nuclear or radiological material is — but these materials are in widespread use globally for a variety of mostly peaceful purposes: 22 countries have at least one kilogram of fissile nuclear material needed for an improvised nuclear bomb, and virtually every country has radiological sources that could be used for a “dirty bomb.”

According to the IAEA, since 1993 there have been some 3,500 incidents of lost, stolen, or misplaced nuclear and radiological material. Reliably securing these potentially destructive materials is essential to preventing nuclear or radiological terrorism.

Recognizing that no country acting alone can protect itself from nuclear and radiological terrorism, the Obama administration launched the nuclear security summit process in 2010 to focus the world’s leaders on the need to strengthen global nuclear security. Obama’s initiative led to four summit meetings in six years and produced substantial improvements to global nuclear security awareness

and practices. Nonetheless, there was still much work left to be done when Obama left office — and that remains true as Trump’s exit nears.

The most important gap in global nuclear security is that while the terrorist threat is dynamic, the nuclear/radiological security regime is essentially static. The various agreements that currently make up the regime do not require assessments of how countries are meeting their nuclear and radiological security responsibilities and obligations or provide ways to help countries that need assistance in strengthening their nuclear or radiological security. There is also no agreed mechanism for identifying and addressing updates

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to strengthen the regime in response to changing threats or technologies.

Fortunately, there is a new opportunity to address gaps in the nuclear security regime, but it will require a return to active international leadership on nuclear issues by the Biden administration to realize it. During the Obama administration, the United States became a party to the Amended CPPNM. The Convention — the only binding international agreement on securing nuclear materials — calls for an initial conference of the over 100 member states in 2021 to review implementation of the agreement and “its adequacy in light of the then prevailing circumstances.”

This first review conference is critically important to establishing a process of periodic, member state-led substantive reviews to assess Convention implementation issues, as well as “the adequacy” of the Convention in light of evolving technologies and threats. This assessment could then be the basis for considering whether the Convention needs updating to deal with evolving challenges (i.e., “the then prevailing circumstances”). A substantive and regular review process for the Convention would not be unique for international agreements involving complex technologies and threats: the Montreal Protocol for the Protection of the Ozone Layer and the Convention on Nuclear Safety have demonstrated the value of countries assessing the effectiveness of an agreement and adapting it to deal with changing circumstances and technologies. Countries party to the Convention would drive the review process, with the International Atomic Energy Agency providing support.

The Biden administration will need to act quickly to shape the Convention’s first review conference,

which, depending on the pandemic, could occur in mid-2021. Reports on preparations for the conference to date suggest a lack of ambition in harnessing it to help the nuclear security regime become as dynamic as the technologies it deals with and the terrorist threats it faces. More engaged U.S. leadership is essential to building a coalition of countries who would support developing a periodic review process that regularly assesses the Convention and related nuclear and radiological security issues and develops substantive proposals for updating the Convention to deal with changing circumstances.

Source: Excerpted from article by Kenneth C. Brill, <https://thehill.com/opinion/national-security/527796-biden-must-act-promptly-to-strengthen-global-efforts-to-prevent>, 28 November 2020.

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NUCLEAR SAFETY

INDIA

Indian Regulator Gives Go-ahead for First Concrete at Gorkakhpur

The units are similar in design to the lead 700 MWe PHWRs that are being built as units 3 and 4 of the Kakrapar power plant in Gujarat state, AERB said. Kakrapar 3 reached first criticality in June of this year. Two further 700 MWe PHWRs are planned at GHAVP, and in total 12 - including the four GHAVP units - are currently planned for construction in India, according to the World Nuclear Association.

NPCIL has carried out detailed geotechnical investigations and seismo-tectonic studies at the GHAVP site because of the soft alluvial soil there, and ground improvement works have been completed, it added.

AERB issued siting consent for the four GHAVP

AERB said it has completed an in-depth safety review to verify conformance with safety codes ahead of pouring the first concrete. This safety review focused on civil engineering aspects and changes in the design and layout of GHAVP units 1 and 2 with respect to nuclear and radiological safety aspects, it said.

units in 2015, and approved the start of excavation work for the first two units in January 2018. AERB said it has completed an in-depth safety review to verify conformance with safety codes ahead of pouring the first concrete. This safety review focused on civil engineering aspects and changes in the design and layout of GHAVP units 1 and 2 with respect to nuclear and radiological safety aspects, it said.

Source: <https://world-nuclear-news.org/Articles/Indian-regulator-gives-go-ahead-for-first-concrete>, 27 November 2020.

NUCLEAR WASTE MANAGEMENT

CANADA

Canada to Develop Integrated Radioactive Waste Management Strategy

Canada's Nuclear Waste Management Organisation (NWMO) is to lead the development of an integrated radioactive waste management strategy, at the request of Minister of Natural Resources Canada Seamus O'Regan. This is part of the Government of Canada's Radioactive Waste Policy Review, and leverages the NWMO's 20 years of expertise in the engagement of Canadians and Indigenous peoples on plans for the safe long-term management of used nuclear fuel. "This is important work, and we look forward to lending our expertise to make informed and practical recommendations to the Canadian government on a more comprehensive radioactive waste management strategy for low- and intermediate-level waste," said Laurie Swami, president and CEO of the NWMO.

All of Canada's low- and intermediate-level radioactive waste is safely managed today in interim storage. An integrated strategy will ensure the material continues to be managed in accordance with international best practice over the longer-term. Building on previous work, this strategy represents a next step to identify and address any gaps in radioactive waste management planning, while looking further into the future.

NWMO said more details regarding the process will be shared in the coming weeks. Interested individuals and organisations will have a variety of ways to participate. NWMO was established in 2002 by Canada's nuclear electricity producers. Ontario Power Generation, NB Power and Hydro-Québec are the founding members, and along with Atomic Energy of Canada Limited, fund NWMO's operations. The organisation operates on a not-for-profit basis and derives its mandate from the federal Nuclear Fuel Waste Act.

Source: <https://www.neimagazine.com/news/newscanada-to-develop-integrated-radioactive-waste-management-strategy-8368905>, 19 November 2020.

JAPAN

Japanese High-Level Waste Repository Studies Begin

Japan's Nuclear Waste Management Organisation (NUMO) has begun the initial stage of assessing two municipalities in Hokkaido Prefecture for their suitability to host a final disposal facility for high-level radioactive waste. This marks the first time such preliminary surveys have ever been conducted in the country. NUMO said it received the necessary approval from the Ministry of Economy, Trade and Industry (METI) for so-called literature surveys to be carried out for the town of Suttsu and the village of Kamoenai. "For the time being, we will start by collecting and organising necessary documents and data such as geological maps and academic papers, and will explain to the local people how to proceed with the literature search," it said.

Based on the first-stage work, NUMO will pick candidate locations for a second-stage survey, called a preliminary investigation, in which drilling work would be carried out over a four-year period to analyse geographical layers. In the third stage, a test facility will be constructed.

The organisation will spend about two years checking geographical layers and the strength of bedrock in the two municipalities, based on geological maps and academic papers. Based on the first-stage work, NUMO will pick candidate locations for a second-stage survey, called a preliminary investigation, in which drilling work would be carried out over a four-year period to analyse geographical layers. In the third stage, a

test facility will be constructed. "The literature survey is to deepen the understanding of the geological disposal business in the municipalities by investigating and analysing the literature and data on the geology of the municipalities that have shown interest, and is a part of the dialogue activities," NUMO said.

Approval by the prefectural governor is required for NUMO to move on to the second-stage survey, once the literature survey is completed. However, Hokkaido Governor Naomichi Suzuki released a statement saying he opposed the process, citing a Hokkaido ordinance that states that no radioactive waste should be brought onto the main northern island, *Jiji Press* reported. NUMO began asking municipalities around Japan in 2002 to apply for consideration to host radioactive waste disposal facilities. In 2007, the town of Toyo in Kochi Prefecture became the first local government to apply, but later withdrew its application before the survey began. No other municipalities expressed an interest.

In May 2015, after a review of existing policies,

Japan adopted a new basic policy on the final disposal of high-level waste. This included the decision to present the scientific characteristics of the entire country in order to promote initiatives under the premise that development of a repository is the responsibility of the present generation. Having such information would also help gain the understanding and cooperation of the population and the regions.

In July 2017, METI released a "scientific characteristic map" for the geological disposal of high-level radioactive waste. The map identifies regions that are

likely to meet the necessary geological requirements for hosting a repository and could be included in a future detailed site selection survey. Areas near volcanoes or active faults are considered undesirable as candidate sites. As an enticement, the central government offered up to JPY2 billion (USD19 million) in grants to applicant municipalities in the first stage.

Source: <https://world-nuclear-news.org/Articles/Studies-begin-for-Japanese-high-level-waste-reposi>, 18 November 2020.

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Centre for Air Power Studies

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

Centre for Air Power Studies

P-284

Arjan Path, Subroto Park,

New Delhi - 110010

Tel.: +91 - 11 - 25699131/32

Fax: +91 - 11 - 25682533

Email: capsnetdroff@gmail.com

Website: www.capsindia.org

Edited by: Director General, CAPS

Editorial Team: Dr. Sitakanta Mishra, Dr. Hina Pandey, Dr. Poonam Mann, Sreoshi Sinha, Zoya Akhter, Nasima Khatoon, Sanjana Gogna

Composed by: CAPS

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