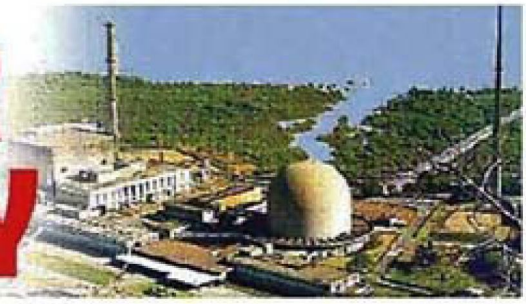
NUCLEAR SECURITY



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

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OPINION – Ramesh Thakur

North Korea's 2020 Vision: A Nuclear Shield, Not a Sword

The standard measure for good eyesight is 20/20. In 2020, several issues on the regional and global agendas that have been foggy for the last five years or so should become clearer. Two of the longest-standing regional concerns are Iran and North Korea. In the last five years they have influenced each other and this is likely to continue in 2020. Negotiations on Iran's nuclear program were successfully concluded in 2015 and the United Nations Security Council endorsed the Joint Comprehensive Plan of Action unanimously, enthusiastically and with considerable relief.

The JCPOA was a good deal in that it satisfied all sides' minimum demands without ceding maximum demands of any side. Iran's suspected pursuit of a nuclear weapon option was effectively checked by dismantling its infrastructure, eliminating almost all of its accumulated enriched uranium and subjecting Iran to a tough inspections regime in return for phased sanctions relief.

In 2020, several issues on the regional and global agendas that have been foggy for the last five years or so should become clearer. Two of the longest-standing regional concerns are Iran and North Korea. In the last five years they have influenced each other and this is likely to continue in 2020.

Meanwhile, Pyongyang accelerated its nuclear and missile testing program and, despite reciprocal bellicose rhetoric in 2017, North Korean leader Kim Jong Un was rewarded with a series of summits with U.S. President Donald Trump in 2018-2019. Iran's leadership have watched all this with amazement and their hardliners will feel vindicated in the belief that Washington respects strength and punishes moves toward accommodation as signs of weakness.

With a visceral dislike of any Obama achievement, Trump recklessly pulled out of the JCPOA in 2017 and reimposed unilateral and illegal sanctions. Tensions have continued to increase in Iran-U.S. relations ever since and Iran's leaders have cautioned Pyongyang not to fall into the same trap. The murder by drone of Gen. Qassem Soleimani will have made North Korea's leadership very jittery and eliminated whatever little incentive existed to give up the bomb.

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Confronting a Trump regime that Pyongyang believes is intent on isolating and strangulating North Korea through sanctions and pressure, nuclear weapons are treasured as the only guarantee of regime survival. At the same time, Soleimani's death confirms Trump's unpredictability and the lack of legal constraints on his actions. If he can, he will authorize taking out top North Korean military commanders and political leaders. It's hard to imagine that most of Trump's policies on North Korea this year will not be colored significantly by electoral considerations. Shifts in opinion polls, including the impact of impeachment politics, could make Trump either desperate to conclude any deal, even a bad one, in order to declare victory and go home; or else look for an excuse to launch punishing military strikes to take out a senior North Korean or destroy a military facility to demonstrate toughness. The latter course might come under active consideration should Pyongyang follow through on its threat to resume nuclear and ICBM tests.

Soleimani's death confirms Trump's unpredictability and the lack of legal constraints on his actions. If he can, he will authorize taking out top North Korean military commanders and political leaders. It's hard to imagine that most of Trump's policies on North Korea this year will not be colored significantly by electoral considerations.

A credible survey last year showed that one-third of Americans would approve of a preventive nuclear strike on North Korea, even if it killed 1 million civilians. As always, details will matter little to he who acts on gut instincts, and this makes U.S. foreign policy even more wildly unpredictable and volatile.

South Korean President Moon Jae-in has his own political compulsions to leave a legacy. He has been the main driver of the Korean peace train, held numerous summits with Kim and invested time, effort, prestige and credibility in a successful outcome that remains elusive, if not illusory. South Korea's presidential election will be held in mid-2022. Effectively this leaves only a narrow window of opportunity for meaningful progress on Pyongyang's denuclearization — if that is still a relevant policy goal — and inter-Korean peace. There is sufficient domestic opposition within South Korea to brazen appeasement of Pyongyang. On the other hand, South Koreans are on the front line of any war and only too aware of the grave risks of the use of weapons of mass destruction.

Nearly three years after acquiring ICBM capability, Kim still refrains from military adventurism. Perhaps nuclear weapons give him the necessary confidence to abandon belligerent rhetoric and behavior. The longer he keeps them, the more credible the claim will become that his primary interest is in a nuclear shield, not a nuclear sword. The region seems progressively resigned to a nuclear North Korea as the new normal. Pyongyang has succeeded in its nuclear quest not just because of the Kim dynasty's grim determination, but also because its near-total isolation makes sanctions pressure a depreciating asset, while geography makes South Korea a hostage to deter military attacks on the North.

Nearly three years after acquiring ICBM capability, Kim still refrains from military adventurism. Perhaps nuclear weapons give him the necessary confidence to abandon belligerent rhetoric and behavior. The longer he keeps them, the more credible the claim will become that his primary interest is in a nuclear shield, not a nuclear sword.

The obstacles to denuclearization and peace remain what they always have been. From the start many of us have cautioned against the irrational exuberance unleashed when the first Trump-Kim summit was announced, preferring to insert question marks where excitable commentators had put in exclamation marks.

So far process and optics have trumped serious negotiations and substance, with more asking and less giving from both sides. In addition, as China-U.S. relations settle into full-spectrum long-term antagonism, Beijing will prove correspondingly

less willing to abandon the Kim regime. Each side misperceives the other as coming to the negotiating table from a position of weakness and therefore vulnerable to even more pressure instead of reciprocal and symmetric concessions. Belying expectations of corresponding measures, both sides attempt to coax irreversible concessions from the other while offering easily withdrawable carrots in return.

Most critically, "denuclearization" is understood too differently for the two sides to come together. For the United States, it means complete, verifiable and irreversible denuclearization of North Korea. For Kim, it denotes a nuclear-free Korean Peninsula, including an end to the U.S. nuclear umbrella for Japan and South Korea and perhaps even an end to the U.S. alliance with them and the withdrawal of all U.S. troops from East Asia.

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The next date on the calendar will be the NPT Review Conference in New York from April 27 to May 22. Will delegates still insist on dealing with North Korea as a nonproliferation problem, or will they shift to think of it as a disarmament problem? In the meantime, the best we can hope for is a continued moratorium on nuclear and missile testing, North Korea's nuclear capability held at present levels and the existence of a diplomatic process on life support with open channels of communications between Seoul, Pyongyang and Washington.

Should Iran race for the bomb, it is almost inevitable that the United States and/or Israel will take preventative military action to stop it from crossing that fateful threshold. This could easily spiral into a regional war as Iran activates its various proxy forces against the United States and its allies.

Source: https://www.japantimes.co.jp/opinion/2020/02/02/commentary/world-commentary/north-koreas-2020-vision-nuclear-shield-not-sword/, The Japan Times, 02 February 2020.

OPINION – Kevin Chilton, Harry Hoshovsky

Avoiding a Nuclear Arms Race in the Middle East

U.S. President Donald Trump recently remarked that his foremost priority regarding Iran is preventing its regime from acquiring a nuclear weapon. Refocusing attention on Tehran's nuclear program is critical given its announcement that it will exceed the limits on how many centrifuges it can operate for uranium enrichment. This decision not only renders the Joint Comprehensive Plan of Action, or JCPOA, as increasingly obsolete, but it will also accelerate Iran's breakout timetable, which some experts now believe is only four to five months.

This raises two immediate concerns. First, should Iran race for the bomb, it is almost inevitable that the United States and/or Israel will take preventative military action to stop it from crossing that fateful threshold. This could easily spiral into a regional war as Iran activates its various proxy forces against the United States and its allies.

Second, an Iranian nuclear breakout attempt could spur a proliferation cascade throughout the Middle East, beginning with Saudi Arabia. Mohammed bin Salman, the Saudi crown prince, openly stated in 2018 that if Iran developed nuclear weapons, Riyadh would quickly "follow suit." One suggested approach would see Saudi Arabia purchase a nuclear power reactor from a major supplier like South Korea and then build a reprocessing plant that would yield enough weapons-grade plutonium in five years.

A half-decade delay isn't optimal, however, when the goal is achieving nuclear deterrence quickly. Thus, there is the so-called Islamabad option. This

refers to Riyadh's role in financing Pakistan's nuclear weapons program and an alleged commitment from Islamabad that it would repay the favor. While Pakistani and Saudi officials have denied any such understanding, there is the possibility that the two could work out an arrangement where Islamabad could deploy some of its nuclear arsenal on Saudi soil following a successful Iranian breakout.

If Saudi Arabia acquires nuclear weapons, many believe Turkey would follow suit. Last September, Turkish President Recep Tayyip Erdogan declared that he "cannot accept" the argument from Western nations that Turkey should not be allowed to attain nuclear weapons.

Although this maneuver would draw sharp, international criticism, in theory, it would allow Riyadh to remain in good standing vis-a-vis the NPT. Nevertheless, Pakistan might not be willing to play spoiler against a nuclearized Iran. If it is, Middle Eastern geopolitics would become extremely unstable.

If Saudi Arabia acquires nuclear weapons, many believe Turkey would follow suit. Last September, Turkish President Recep Tayyip Erdogan declared that he "cannot accept" the argument from Western nations that Turkey should not be allowed to attain nuclear weapons. In 1958, Charles de Gaulle proclaimed that a nation without nuclear weapons "does not command its own destiny"; two years later, France tested its first bomb. Erdogan's comments echo those earlier remarks and raise the possibility that Ankara could become the second NATO member to leave the alliance's nuclear umbrella in favor of its own independent arsenal.

A possible solution to Riyadh's dilemma would see the U.S. commit to extending its nuclear umbrella over Saudi Arabia should Iran declare itself a nuclear weapons power. This could help repair American credibility in the kingdom's eyes, which has slowly eroded over the last decade as Riyadh increasingly doubts Washington's strategic commitment to the region.

On the plus side, Egypt and the United Arab Emirates will probably refrain from joining the proliferation cascade. After initially flirting with a nuclear weapons program under Gamal Abdel Nasser, subsequent Egyptian presidents made nuclear disarmament a core pillar of their foreign policy objectives. For the UAE, it signed a "123 Agreement" with the United States in 2009 that contained what is now termed the "gold standard" addendum whereby Abu Dhabi forswore enrichment and reprocessing.

While the Emirates were understandably unhappy with Washington's subsequent signing of the far less restrictive JCPOA, reneging on their own nuclear commitments would only damage relations with Washington at this point.

Of course, concerns about a nuclear cascade can be avoided if Iran is prevented from going nuclear in the first place. A possible solution to Riyadh's dilemma would see the U.S. commit to extending its nuclear umbrella over Saudi Arabia should Iran declare itself a nuclear weapons power. This could help repair American credibility in the kingdom's eyes, which has slowly eroded over the last decade as Riyadh increasingly doubts Washington's strategic commitment to the region.

Earlier this month (Feb 2020), national security adviser Robert O'Brien told President Trump that continued sanctions and burgeoning civil unrest "will force [Iran] to negotiate." This process can be accelerated if Washington rallies its European allies to reimpose the so-called snapback sanctions. This refers to the fact that any JCPOA participant can officially complain about a possible Iranian violation of the accord. This launches the bureaucratic process that can conclude with the reimposition of U.N. sanctions if the complaint remains unresolved.

On this point, Germany, France and the United Kingdom announced that they would trigger the

snapback dispute mechanism after rejecting Iran's argument that it was justified in violating the JCPOA because the United States had withdrawn from the deal.

Unfortunately, this does not necessarily mean the return of multilateral sanctions, as the Europeans are still focused on bringing Tehran back into compliance with the nuclear accord. China and Russia have similarly called for diplomacy to save the JCPOA; however, their motivations are primarily self-serving. Beijing is Iran's largest trading partner, and bilateral trade has suffered because of U.S. sanctions; and Moscow views Tehran as a lucrative future market for its weapons, and is actively fighting attempts to extend the U.N. arms embargo that expires later this year.

For its European partners, Washington could argue that while its unilateral sanctions have put Tehran on the ropes, reinstating multilateral snapback sanctions can deliver the final knockout blow to a regime that has once again turned its guns on its citizens who seek its removal. While that argument may not appeal much to Russia and China, neither wants a nuclear proliferation cascade that undermines their various interests throughout the region.

Source: Gen. Kevin Chilton, (retired) U.S. Air Force, led U.S. Strategic Command; Harry Hoshovsky is a policy analyst at JINSA's Gemunder Center for Defense and Strategy. https://www.defensenews.com/opinion/commentary/2020/02/13/avoiding-a-nuclear-arms-race-in-the-middle-east/, 13 February 2020.

OPINION – Nah Liang Tuang

The Road to a Nuclear Breakout: Comparing Iran and North Korea

Even though North Korea and Iran differ like the proverbial chalk and cheese, there are enough fundamental similarities pertaining to their nuclear ambitions to derive worrying predictive value from Pyongyang's nuclear weapons development. Correspondingly, Tehran's recent threat to withdraw from the NPT should not be taken lightly.

On January 20, Iran threatened to withdraw from the NPT if Britain, France, and Germany referred Tehran to the UNSC for violations of the JCPOA, signed in 2015 between Iran and the P5+1 (the five permanent members of the UNSC along with Germany) and EU. In a nutshell, the JCPOA offered Iran access to global trade with the lifting of economically isolative sanctions, as long as Iran agreed to restrict its nuclear program.

Comparing the nuclear histories of North Korea and Iran, one arguably sees an analogous pattern that begins with declarations of nuclear nonproliferation, evolves into a hopeful phase where denuclearization deals are signed, and regrettably deteriorates into confrontation and nuclear escalation.

Following US withdrawal from the JCPOA in May 2018 due to President Donald Trump's objections, and the subsequent re-imposition of US unilateral sanctions, Tehran had resumed the enrichment of uranium beyond the limits agreed to in the JCPOA. Since uranium enriched beyond a certain threshold can be used in the critical cores of nuclear warheads, London, Paris, and Berlin have initiated procedures for referring Tehran's behavior to the UNSC. This could lead to the re-imposition of UN-wide sanctions, which nearly strangled Iran's economy before the JCPOA was signed.

Iran remaining an NPT signatory is significant because it contractually obligates Tehran to refrain from acquiring nuclear munitions in return for being allowed to pursue nuclear energy technology, with such technology being monitored by the IAEA, a UN organization. Comparing the nuclear histories of North Korea and Iran, one arguably sees an analogous pattern that begins with declarations of nuclear nonproliferation, evolves into a hopeful phase where denuclearization deals are signed, and regrettably deteriorates into confrontation and nuclear escalation.

Examining North Korea today, it may be hard to believe that the Kim regime once committed itself to non-nuclear status. Yet the 1991 "Joint

Declaration on the Denuclearisation of the Korean Peninsula," signed between Pyongyang and Seoul, saw each side pledge not to possess nuclear weapons or the means to process fissile material. This declaration is important because security and economic reasons both went against a North Korean signing. For instance, by 1991 the military technological gap favoring the South had widened considerably, and it would have been illogical for Pyongyang to rule out a nuclear equalizer. Also, losing Soviet patronage in the aftermath of the Cold War increased the value of a nuclear weapons program as a bargaining chip to win economic aid, but the joint declaration said nothing about South Korea granting economic concessions.

As for Iran, the theocratic leadership had a unique take on nuclear nonproliferation ideology. To them, nuclear weapons help to reinforce great power dominance and promote imperialistic influence over smaller states. Accordingly, since nuclear weapons are symbols of colonialism, Iran saw an obligation to oppose them just as it opposed the supposedly arrogant and oppressive Western states, so as to help international underdogs. It was even argued that as great powers held back weak states, global nuclear disarmament could limit the former's power and enable the latter to progress. Hence, the pursuit of nuclear weapons would reek of hypocrisy.

When analyzing both nations, we can also see they started off with promising denuclearization or nuclear limiting agreements with external powers. For the Kim regime, it signed the 1994 Agreed Framework with the United States. Under that deal, North Korea would receive nuclear proliferation-resistant LWRs, conventional fuel oil, and U.S. formal assurances against the threat and use of nuclear weapons in return for Pyongyang freezing its nuclear program, complying with all IAEA requirements, and completely dismantling all North Korean nuclear facilities upon completion of LWR construction.

However, in October 2002 the United States discovered that the North was circumventing the Agreed Framework via a clandestine HEU program. Despite Pyongyang's denials, the Kim regime later declared that North Korea was justified in pursuing HEU capabilities and was withdrawing from the Agreed Framework. Subsequently, in December 2002 North Korea withdrew from the NPT, started producing plutonium for nuclear arms, and declared itself a nuclear weapons state.

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Turning to Tehran, its "grand bargain" with the P5+1 and EU, the JCPOA, obligated Iran to never acquire nuclear weapons; curtail most of its uranium enrichment capacity and limit remaining enrichment quality to that suitable for only nuclear power generation; drastically limit its uranium stockpile; shelve uranium enrichment research; and modify its nuclear reactor to preclude the production of weapons-grade plutonium, while exporting all spent nuclear fuel (which can be reprocessed into weapons-grade plutonium).

In return, UN Security Council resolutions implementing sanctions relating to Iran's nuclear program would be terminated, all EU economic and financial sanctions linked to the aforementioned nuclear program would be abolished, and all U.S. sanctions designed to penalize Iran over its nuclear activities would be revoked. Following Washington's withdrawal from the JCPOA in 2018, Tehran has since distanced itself from the agreement and recently threatened to remove itself from the NPT. If this comes to pass, it would eliminate any legal obligation on Iran to limit its nuclear program, making a future Iranian atomic bomb a distinct reality.

History tells us that in 2006, within four years of North Korea's exit from the NPT, it detonated its first nuclear device, creating a source of instability in Northeast Asia that persists to today. While no one can predict when or even if Iran will leave the NPT, the probability of Iranian nuclear warheads making their international debut increases exponentially if Tehran takes that path. Consequently, as Iran's nuclear negotiating partners, the P5+1 and EU need to reach a rapid consensus on a unified stance: Either commit to a dedicated negotiated compromise that restores Iranian adherence to nuclear nonproliferation, or steadfastly uphold a massive pressure campaign of watertight sanctions. In either case, the tools, mechanisms, and approaches are well known with clearly envisaged policy objectives.

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The world cannot dither or resort to wishful thinking vis-à-vis Tehran's possible nuclear ambitions. Quick and decisive action is needed. We already have one nuclear antagonist in Asia and must do our utmost to prevent the occurrence of another.

Petrov broke with Soviet protocol and didn't launch a nuclear attack when his system erroneously detected United States missiles were en route. He thought it seemed wrong, and he waited. He was right, the system made an error, and no U.S. bombs arrived. But as technology has changed, so has the risk of nuclear use.

Source: https://thediplomat.com/2020/02/the-road-to-a-nuclear-breakout-comparing-iran-and-north-korea/, The Diplomat, 08 February 2020.

OPINION – Kristen De Groot

Nuclear Weapons in an Age of Emerging Technologies

Emerging technologies like artificial intelligence increase the risk that nuclear-armed states will use those weapons, said Beatrice Fihn, executive director of the International Campaign to Abolish Nuclear Weapons. The only way to prevent that from happening, she contends, is to eliminate nuclear weapons entirely. "The risk has always been there, and we are going on 75 years of being really, really lucky," said Fihn. "But based on our technologies, we'll run out of luck and if we keep nuclear weapons forever they will, at some point, be used."

Fihn, a Swedish lawyer who in 2017 accepted the Nobel Peace Prize on behalf of the Campaign, shared her thoughts on abolishing nuclear weapons in this age of artificial intelligence during a talk at Perry World House (PWH), moderated by Michael C. Horowitz, PWH interim director. The conversation was part of her weeklong visit to campus as a Distinguished Visiting Fellow at PWH. Other events in the week included meeting with undergraduate and graduate students, lectures at Penn Law and the political science department in the School of Arts and Sciences, and participating in a podcast.

Fihn was introduced by Provost Wendell Pritchett, who joked that she "knows more about technology and the dangers of nuclear proliferation than even Sarah Connor," the protagonist in the "Terminator" movie franchise. Ever since the advent of nuclear weapons, there have been close calls, accidents, and misunderstandings, Fihn said, pointing to the Cuban missile crisis, two nuclear bombs being accidentally dropped on North Carolina in 1961 (but failing to detonate), and the 1983 case of Stanislav Petrov, who became known as "The Man Who Saved the World." Petrov broke with Soviet protocol and didn't launch a nuclear attack when his system erroneously detected United States missiles were en route. He thought it seemed wrong, and he waited. He was right, the system made an error,

and no U.S. bombs arrived. But as technology has changed, so has the risk of nuclear use, Fihn said. That's compounded by increasing global tensions and "some irrational leaders in charge of nuclear weapons right now," Fihn said.

Examples of how emerging technologies increase the risk of nuclear use include offensive cyber technology, like data manipulation and cyber spoofing, and the increased uncertainties it can introduce in decision making; increased applications of machine learning in military operations; increased speed of warfare, bringing a shorter period of time for decision makers to choose whether to launch nuclear weapons; and efforts to develop killer robots. "There is a real concern about outsourcing decision-making to machines," she said. "Would the machine version of Stanislav Petrov wait?"

They are symbols of power. And when people start rejecting that and don't see that as power but as shameful, as something inhuman, unethical, it loses that power. And what do you have left? Quite expensive radioactive bombs. Maybe we should not have them then.

The evening wasn't all end-of-the-world doom and gloom, though. Fihn pointed out that only nine countries in the world have nuclear weapons, and she discussed the Treaty on the Prohibition of Nuclear Weapons, which more than 120 governments at the United Nations adopted in 2017."Most countries in the world do not believe that nuclear weapons are a solution to their security problems, they do not believe they are legitimate weapons to have or possess, and they are not interested in developing them. That's really good," she said. The Treaty on the Prohibition of Nuclear Weapons is the first agreement that completely bans nuclear weapons, and, step by step, governments are starting to join it, she said. Right now, 80 governments have signed the treaty, and 35 have ratified it.

Fifty countries must ratify it before it becomes international law, declaring such weapons are banned. She said that will enable activists to start pressuring the governments that are in the nuclear alliance agreement, as a way to introduce unacceptability. "We wouldn't accept our world leaders threatening to use chemical weapons; that's been banned. So, we should start thinking the same way about nuclear weapons," she said. Every country that signs the treaty chips away at the legitimacy of nuclear weapons, undermining the status they have, she said. "There is very little practical use of nuclear weapons. They're kind of clumsy, they're not great in a military operation, they are actually not that useful," Fihn said. "They are symbols of power. And when people start rejecting that and don't see that as power but as shameful, as something inhuman, unethical, it loses that power. And what do you have left? Quite expensive radioactive bombs. Maybe we should not have them then."

Source: https://penntoday.upenn.edu/news/nuclear-weapons-age-emerging-technologies, PennToday, 31 January 2020.

OPINION – Kazi Zahin Hussain

Safe Nuclear Power is not Science Fiction

The concentration of carbon dioxide in the atmosphere is now over 400ppm. Scientists think that this will cause the earth to heat up, and will melt enough polar ice to raise the sea level by 15 to 25 metres in the future. Please note that Dhaka is only a few metres above sea level. Thousands of power plants around the world burn fossil fuels. The world needs an alternative to fossil fuels; to reduce the level of CO2 in the atmosphere, we must dramatically reduce the consumption of fossil fuels.

The problem with sunlight and wind is that these are intermittent sources of power. Many cities experience winters with very little sunlight; many cities experience seasons with little or no wind. Modern cities need continuous power; solar and wind cannot provide this without expensive battery storage, which no city or utility has been willing to buy. That's why after billions of dollars of investment in solar and wind power, there is not a single major city which is powered exclusively by solar or wind. Most utilities which have invested in

solar or wind power use fossil fuel power as backup. That's why big investments in solar and wind power have not significantly reduced emissions of CO2.

Hydro-power is a good source of clean energy, but creating hydro-power requires building dams and flooding large areas; this is politically impossible in any densely-populated country. In Bangladesh, the construction of the Kaptai Dam and the displacement of the Pahari people in the area that became Kaptai Lake created resentment which contributed to an insurgency in the Chittagong Hill Tracts region of Bangladesh.

Nuclear power is, in fact, the only non-fossil energy which can easily be scaled up to replace fossil fuels. Nuclear power has become unpopular; the accidents at Chernobyl and Fukushima have convinced many people that nuclear power is inherently dangerous. Germany and Japan have shut down many nuclear plants since Fukushima. The nuclear plants at both Chernobyl and Fukushima, like most nuclear plants which exist today, used water-cooled reactors. The accidents at both of these plants were caused by failures in the circulation of coolant, which caused the reactor core to overheat and melt down.

In the 1950s, a different type of reactor was designed and tested at Argonne National Laboratories in Idaho; the EBR-II (Experimental breeder reactor II) which was cooled with liquid sodium. The use of liquid sodium as a coolant has huge advantages; reactors cooled with water must be operated under very high pressure, and overheating of the water coolant can cause a high-pressure steam explosion (which happened at Chernobyl). Liquid sodium coolant does not have to be pressurized. As the reactor vessel does not have to withstand high pressure, it can be designed to expand thermally if temperature goes up. The core of EBR-II sat in a pool of liquid sodium inside a metal reactor vessel. This design has important implications for safety. In April 1986, scientists at Argonne conducted a test: With the EBR-II reactor at full power, they turned off the coolant circulation. This would have caused a meltdown in any water-cooled reactor, but the design of EBR-II made such a meltdown impossible. As the core heated up, the heat was conducted by the liquid sodium to the metal reactor vessel, which then experienced thermal expansion; this thermal expansion of the vessel allowed neutrons to escape the core; this ended the chain reaction, and led the core to cool down without any human intervention. This kind of safety (safety which is designed into the nuclear plant, and which does not depend on operators doing the right thing) is known as "passive safety."

Many tests were conducted at Argonne to test the IFR (Integral Fast Reactor) design, which was a liquid sodium-cooled reactor design (like EBR-II) but with significant improvements on the EBR-II design. Reactors built with the IFR design will not need fresh uranium fuel; they can be fuelled with reprocessed spent uranium fuel (radioactive waste), which today's water-cooled reactors cannot burn. The world has thousands of tons of radioactive waste in storage; in its present form, it will have to be stored for at least 10,000 years.

However, if this waste is reprocessed and "burned" in reactors built using the IFR design, it will only be radioactive for a few centuries (as opposed to millennia) after being "burned." So the next generation of nuclear reactors will reduce the world's stock of radioactive waste; they will not add to it. Unfortunately, the US, after having developed the IFR technology, never used it; they stopped building nuclear plants because of pressure from the anti-nuclear movement. Russia has commissioned two commercial nuclear plants cooled by liquid sodium; BN-600 (commissioned 1980) and BN-800 (commissioned 2015). China has commissioned a small, experimental sodium-cooled reactor, CEFR (commissioned 2012), and obviously intends to build commercial sodium-cooled reactors. Russia and China are leading the way; tomorrow's nuclear plants will be sodium-cooled plants which will not melt down, and which will gradually use up existing stocks of radioactive waste. Chernobyl and Fukushima have convinced us that nuclear power is unsafe, but the truth is that nuclear plants are far safer than fossil fuel energy. The World Health Organization estimates that outdoor air pollution kills 4.2 million people every year; a significant number of these deaths

can be attributed to pollution from burning fossil fuels. In the long term, fossil fuels threaten to make much of our planet unliveable; nuclear power is a far better alternative.

Source: https://www.dhakatribune.com/opinion/op-ed/2020/02/01/safe-nuclear-power-is-not-science-fiction, Dhaka Tribune, 01 February 2020.

OPINION – Katie Allen

Keep an Open Mind about Nuclear Power for Our Carbon-Neutral Future

The world economy is transitioning to a carbon-neutral future in a bid to protect future generations from the effects of climate change. Most countries with the strongest ambitions in this transition rely on more renewables and other emerging technologies such as hydrogen to get there.

Most also incorporate gas and nuclear in their energy mix. So how is Australia stepping up to the technological imperative to develop new solutions? Australia has a long and complicated energy history but is now emerging as a leader in renewable technology investment. In 2019, Australia's investment per person in renewable energy was greater than countries such as the United States, Japan and Britain. More than 2.2 million Australians have rooftop solar panels, the highest uptake in the world. But there remains a gap in our energy options, particularly if, as expected, our transport sector also pivots to electrification. With an anticipated doubling of demand on our electricity sector, our energy mix will require an increase in energy generation that can deliver when customers need it.

Australia's investment per person in renewable energy was greater than countries such as the United States, Japan and Britain. More than 2.2 million Australians have rooftop solar panels, the highest uptake in the world. But there remains a gap in our energy options, particularly if, as expected, our transport sector also pivots to electrification.

Gas has a critical role to play as a backstop to our record investment in renewable energy generation. Gas can help us bridge the gap while our investments in batteries, hydrogen and pumped hydro energy storage help reduce the cost of these new technologies, bringing them online more rapidly. As a smart country with a willing citizenry, we are poised to identify new economic opportunities, particularly for technologies that provide storage and back-up to the electricity, industry and transport sectors. With this in mind the federal government is developing a technology investment roadmap. This will identify the most efficient deployment pathways for new technologies. This includes our $10 billion Clean Energy Finance Corporation driving down the cost of renewables, our $1 billion grid reliability fund to catalyse investment in battery and pumped-hydro energy storage, and our soon-to-be-released electric vehicle strategy to support the modernisation of our transport fleet. Last year, the government led the national hydrogen strategy and increased its commitment to $500 million to help develop a new industry "that benefits all Australians and [will be] a major global player by 2030". The Chief Scientist, Alan Finkel, calls it "shipping sunshine in a bottle".

Investment in hydrogen will be even more cost-effective if gas infrastructure can be modified for hydrogen usage in the future. Grasping early potential trade opportunities, Australia signed a joint statement on co-operation on hydrogen and fuel cells during the recent Australia-Japan ministerial economic dialogue in Melbourne in January.

The other emerging carbon-neutral technology that has received global interest is third and fourth-generation nuclear power. Many countries with a 2050 carbon-neutral target have nuclear somewhere in their energy mix. Concerns regarding nuclear have moderated with the development of this safer technology following the catastrophic events of Chernobyl and Fukushima, which used earlier technology. The new technology includes small modular reactors, significantly less nuclear waste and less risk of nuclear proliferation. The Gates Foundation has invested heavily in new nuclear. In December, the

House of Representatives environment and energy standing committee delivered its report following a six-month inquiry into nuclear technology in Australia. It found Australia has a unique opportunity to be involved in the research and development of safer and more effective nuclear power. The Environment Protection and Biodiversity Conservation Act 1999 imposes a moratorium on such involvement. The report recommended several steps would be required before it could be partially lifted so new nuclear development could be even considered. These would include an economic assessment by the Productivity Commission, a technology assessment by the Australian Nuclear Science and Technology Organisation, including of small modular reactors, and a readiness assessment by the Australian Radiation Protection and Nuclear Safety Agency, with regards to the provision of nuclear scientists, engineers and appropriate facilities for the development of a nuclear industry. Any changes to the moratorium would require bipartisan support and broad community acceptance. The government is now considering the committee's review and is in the process of formulating its official response.

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It is likely there will be a suite of technologies in our energy mix of the future, as there is today. Every country's circumstances are unique and there will be no silver bullet for the world's energy demands. We need to focus on harnessing the power of new technology and allowing natural markets to operate reducing emissions and keeping the economy strong. It is worth keeping an open mind. Energy technology is moving rapidly and we wouldn't want to miss any opportunity to lead the revolution in the world's bid for a carbon-neutral future.

The strategic stability which goes through the search for a balance of forces at the lowest possible level, is no longer guaranteed today" Behind the crisis of the great instruments of arms control and disarmament, it is the security of France and Europe which is at stake.

Source: https://www.smh.com.au/environment/climate-change/keep-an-open-mind-about-nuclear-power-for-our-carbon-neutral-future-20200207-p53yoa.html, The Sunday Morning Herlald, 08 February 2020.

NUCLEAR STRATEGY

EUROPE

Macron Calls for Coordinated EU Nuclear Defence Strategy — with France at Centre

Addressing military officers in Paris, French President Emmanuel Macron called for a more coordinated European Union defence strategy, with France and its nuclear arsenal to play a central role in it. His speech came one week after Britain has exited the EU, leaving France as Europe's only nuclear-armed state. Macron's vision over nuclear weapons laid emphasis on deterrence theory: countries with such weapons should be less likely to attack each other for fear of mutual destruction, the arms serving therefore as guarantors of peace. "The strategic stability which goes through the search for a balance of forces at the lowest possible level, is no longer guaranteed today" he declared. "Behind the crisis of the great instruments of arms control and disarmament, it is the security of France and Europe which is at stake."

Keeping Balance with a Diminished Power: France is one of the nine countries in the world to have nuclear force. It has reduced the size of its arsenal, which today stands at fewer than 300 warheads, Macron confirmed. Russia and the United States are far ahead with more than 6,000 warheads each. In addition to this list, with a reduced arsenal, stand China, the United

Kingdom, Pakistan, India, Israel and North Korea. Macron's speech comes at a time when NATO allies, who would ordinarily look to the United States for help in a nuclear standoff, worry about Washington's retreat from the multilateral stage. This address acts as a long-running push for a stronger European defence, as US President Donald Trump has pulled away from European allies and admonished them to pay more for their own protection.

Stronger Ties and Further Engagements? The central idea in the speech, however, was that of a boosted Europe-wide role for the French nuclear arsenal in a more coordinated European defense policy. He called for a collective response from European countries: Macron's comments were eagerly awaited after his speech in Warsaw in which he had promised to "take into account" European interests, and after remarks the by a German deputy close to Angela Merkel, Johann Wadephul, who said Berlin must "envisage cooperation with France concerning nuclear weapons." ...

Source: Julie Gaubert, https://www.euronews.com/2020/02/08/macron-calls-for-coordinated-eu-nuclear-defence-strategy-with-france-at-centre, Euronews, 10 February 2020.

USA

U.S. Deploys 'More Survivable' Submarine-Launched Low-Yield Nuclear Weapon

The US Defense Department said the Navy had fielded a low-yield, submarine-launched ballistic missile warhead, something the Pentagon believes is needed to deter adversaries like Russia but which critics say lowers the threshold for using nuclear weapons. Low-yield nuclear weapons, while still devastating, have a strength of less than 20 kilotons. The atomic bomb dropped on Hiroshima, in August 1945, had about the same explosive power.

"This supplemental capability strengthens deterrence and provides the United States a prompt, more survivable low-yield strategic weapon," John Rood, the under secretary of defense for policy, said in a statement. "(It) supports our commitment to extended deterrence; and demonstrates to potential adversaries that there is no advantage to limited nuclear employment because the United States can credibly and decisively respond to any threat scenario," Rood added.

A 2018 Pentagon document called for the military to expand its low-yield nuclear capability, saying the United States would modify a small number of submarine-launched ballistic missile warheads with low-yield options."The administration's decision to deploy the W76-2 warhead remains a misguided and dangerous one. The deployment of this warhead does nothing to make Americans safer," Democratic Representative Adam Smith, chairman of the House Armed Services Committee, said in a statement. Arms control advocates and some lawmakers have argued that such low-yield weapons reduce the threshold for potentially using nuclear weapons and could make a nuclear conflict more likely. The United States already has air-launched, low-yield nuclear weapons and critics say that should be sufficient.

Arms control advocates and some lawmakers have argued that such low-yield weapons reduce the threshold for potentially using nuclear weapons and could make a nuclear conflict more likely. The United States already has air-launched, low-yield nuclear weapons and critics say that should be sufficient.

"President Trump now has a more usable nuclear weapon that is a dangerous solution in search of a problem," said Kingston Reif, director for disarmament and threat reduction policy at the Arms Control Association advocacy group. The argument for these weapons is that larger nuclear bombs are so catastrophic that they would never be used, meaning they are not an effective deterrent. With less power and destruction, the low-yield option would potentially be more likely to be used, serving as an effective deterrent, military officials have said. The Federation of American Scientists said that the Navy was scheduled to deploy the low-yield warhead on the USS Tennessee in the Atlantic Ocean.

Source: Idrees Ali, https://www.reuters.com/article/us-usa-nuclear-pentagon/us-deploys-more-survivable-submarine-launched-low-yield-nuclear-weapon-idUSKBN1ZY2EQ, Reuters, 04 February 2020.

NUCLEAR ENERGY

GENERAL

Director General Grossi Outlines Plans to "Recalibrate" IAEA

Director General Rafael Mariano Grossi spoke about his plans to "recalibrate" the work of the IAEA at a prominent think-tank event in Washington D.C. today, signalling he would pay special attention to areas ranging from nuclear safety and security to cancer care and gender parity. Addressing a well-attended meeting at the Carnegie Endowment for International Peace at the end of a two-day official visit to the US capital, Mr Grossi said many countries were expanding or introducing nuclear power as part of their energy mix despite the Fukushima Daiichi accident in Japan almost a decade ago and highlighted its role in fighting climate change."Nuclear is growing," he told the audience of nuclear experts, diplomats, journalists and others, referring both to established nuclear power countries such as China, India and Russia as well as newcomer nations like Belarus, the United Arab Emirates and others.

Partly as a result of this atomic energy expansion as well as growing use of nuclear techniques in other areas, the amount of nuclear material in the world was constantly increasing, underlining the need for strengthened international efforts on nuclear safety and security, Mr Grossi said. "You can't be in this business without paying attention to nuclear security," he said. "We need to be bolder in our efforts in this area." Highlighting the IAEA's key role in international efforts to prevent nuclear terrorism, he said the Agency is hosting a high-level conference on nuclear security in Vienna, with more than 50 participants at ministerial level expected.

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Turning to other areas of the IAEA's activities, Mr Grossi said many of its 171 Member States benefited from what it has to offer on cancer care, water management, food security and much else. It was a "scandal", he added, that people in some 28 countries in Africa did not have access to radiotherapy to treat cancer. "The IAEA can do a lot in this respect," Mr Grossi said.

He also responded to several audience questions about the IAEA's safeguards activities in Iran, as well as about its readiness to return to the DPRK once there is a political agreement among the countries concerned. The visit to Washington D.C. was his first to the country since taking office two months ago. He met with Secretary of State Michael R. Pompeo, National Security Advisor Robert O'Brien and other senior US government officials, who expressed strong support for the IAEA's work for global peace and development. Earlier, he met with members of the US Senate Foreign Relations Committee on Capitol Hill, including Chairman James Risch and Ranking Member Robert Menendez.

Source: Fredrik Dahl, https://www.iaea.org/newscenter/news/director-general-grossi-outlines-plans-to-recalibrate-iaea, International Atomic Energy Agency, 05 February 2020.

INDIA

India's Clean Energy Future Depends on Rapid Growth of its Nuclear Power: Anil Kakodkar

Anil Kakodkar, former chairman of the Atomic Energy Commission, warned that the tipping-point for climate change issues was fast approaching and added that India's clean energy future "invariably depends" on the rapid growth of its nuclear power. "The warming process has started ... I do not know if this is the last century. There are uncertainties in this," he said. "But the have-nots in the world will be left in the lurch. There is a huge disparity in the world; there is huge resource-constraint in the world," Kakodkar

added. "This (climate) crisis is becoming deeper and deeper," he said. "So implementation of the atomic energy programme will become more and more aggressive with time ... There is a need to do things faster." Kakodkar was speaking at the discussion on his book, *Fire and Fury: Transforming India's Strategic Identity*, organised by Research and Information System for Developing Countries (RIS).

'India should Enter Nuclear Trade': According to Kakodkar, who was instrumental in the signing of the US-India civil nuclear deal in 2006, India's entry into the nuclear trading market will not only boost the country's economic growth but will also "enhance our global standing". In his book, Kakodkar speaks of how India missed the bus on nuclear trade. "Nuclear export is an area we have not paid enough attention to. Countries like China and Argentina managed a better entry into the export market even as they were developing their technology," he writes in his book, which has been co-authored by Suresh Gangotra, senior technical advisor to the AEC chairman. Kakodkar further said the future needs attention in terms of rapid implementation of the country's nuclear policy. "As I am retired, I have that sense of satisfaction that at least I did not leave any legacy issue," he said. "There is capacity, there is technology and now there is material and resources, both of which one can get from abroad. But thanks to the aggressive exploration work that was taken up, today the domestic Uranium availability is also four times of what it used to be. There is potential to expand."

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He added that since the Indian economy is only slowing down gradually, the demand for electricity is not decelerating. "If you go by India's aspiration to be amongst the advanced countries in the world and quality of life of Indians to be comparable with that of the best in the world, then it is clear we need to expand our per capita income at least four to five times than what it is now," he added.

Source: Nayanima Basu, https://theprint.in/india/indias-clean-energy-future-depends-on-rapid-growth-of-its-nuclear-power-anil-kakodkar/360926/, The Print, 06 February 2020.

IRAN

Arak Reactor Redesign Going as Planned

The project of redesigning and upgrading the heavy water reactor facility in Arak, Markazi Province, in cooperation with China and Britain is going as planned, according to a Chinese diplomat. China's Ambassador in Tehran Chang Hua also said in an interview with ISNA that Beijing has fulfilled all its commitments, but the future of the project also depends on the other countries involved. "We hope that with the support of the international community, we will be able to complete the project," he said. Under the 2015 nuclear deal between Iran and six world powers, Iran agreed to redesign the Arak research reactor to cut its potential output of plutonium. China and the United States initially formed a working group to assist Iran in modernizing the facility, but Britain later replaced the US after Washington pulled out of the deal in 2018.

The US recently renewed its waivers on Iran's nuclear work, allowing Russian, Chinese and European companies to continue their work at several Iranian nuclear sites. The 60-day exemptions allow nonproliferation work to continue at the Arak heavy-water research reactor as well as the Bushehr Nuclear Power Plant, Tehran Research Reactor and other nuclear cooperation initiatives. The Chinese diplomat described the waivers as "meaningless" because the US has already exited the nuclear pact. He, however, said the exemptions might be of help to the other countries involved. "This project does not need China alone, but Britain also plays an important

role and some equipment need to be purchased from European countries," he said.

Source: https://financialtribune.com/articles/national/102096/arak-reactor-redesign-going-as-planned, Financial Tribune, 09 February 2020.

UAE

Excerpts from "How Barakah Nuclear Plant Promises a Sustainable Future"

By making the UAE the first Arab country to deliver safe, commercial and peaceful nuclear power, Barakah will be the first major national achievement this year. Nawah Energy Company, the entity responsible for the deployment, ownership and operation of nuclear energy plants in the UAE, has confirmed that Unit 1 of Barakah is ready to generate energy.

After it is fully operational, Barakah nuclear power plant's four units will reduce 21 million tonnes of harmful carbon emissions every year, equivalent to getting rid of 3.2 million cars from the country's roads on an annual basis.

After it is fully operational, Barakah nuclear power plant's four units will reduce 21 million tonnes of harmful carbon emissions every year, equivalent to getting rid of 3.2 million cars from the country's roads on an annual basis. Located in Al Dhafra, approximately 53km west-southwest of the city of Ruwais, the plant's four APR-1400 design nuclear reactors will also supply up to 25 per cent of the UAE's electricity needs in compliance with the highest standards of safety, security and operational performance.

The journey started in April 2008 by issuing the policy of the UAE on the Evaluation and Potential Development of Peaceful Nuclear Energy. The policy focused on six key pillars, which were the UAE's commitment to complete operational transparency, pursuing the highest standards of non-proliferation and adhering to the highest standards of safety and security.

It also included working directly with the International Atomic Energy Agency, IAEA, and conforming to its standards in evaluating and potentially establishing a peaceful nuclear energy programme, developing any peaceful domestic nuclear power capability in partnership with the governments and firms of responsible nations, as well with the assistance of appropriate expert organisations, and lastly approaching any peaceful domestic nuclear power programme in a manner that best ensures long-term sustainability.

In 2009, the Emirates Nuclear Energy Corporation, ENEC, selected the Korea Electric Power Corporation, KEPCO, which is the largest Nuclear Power Corporation in South Korea, as the main contractor for peaceful nuclear power plants in the UAE.KEPCO is one of the leading companies in the world in terms of safety, reliability and efficiency, as classified by the International Union of Nuclear Energy Operators....

In the past decade, the UAE has welcomed the International Atomic Energy Agency, IAEA, and the World Association of Nuclear Operators, WANO, to carry out more than 40 missions, which included conducting reviews and comparisons. These missions aimed to ensure the progress of construction before starting actual operation, being in line with the best global practices and the strict regulatory requirements of FANR....

Source: https://www.utilities-me.com/news/14898-how-barakah-nuclear-plant-promises-a-sustainable-future, Utilities Middle East, 02 February 2020.

UK

Rolls Royce will Make Mini Nuclear Reactors that can become Operational by 2029

Nuclear energy is one of the cleanest ways to make electricity despite the inherent risks involved. While Japan is moving away from nuclear energy, many countries are still interested in it as it remains one of the cleanest ways to produce energy. A traditional nuclear reactor requires a large area and years to build. Luxury carmaker Rolls Royce plans on changing

this paradigm. A company has created a new model of nuclear reactors which it calls "mini" nuclear reactors or small modular reactors. These reactors will be one-sixteenth of the size of a regular nuclear reactor. They will need an area of just 1.5 acres inside a total zone of 10 acres. Rolls Royce believes this model can help provide nuclear energy at much cheaper costs.

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"Building nuclear power stations is costly, complex and takes time.... Our U.K. Small Nuclear Reactor is a low-cost alternative for a global market. With a modular design that's built-in a factory, it can improve the certainty of delivery, reduce complexity, optimize safety," the company stated on its website. The smallest nuclear plant in the U.S., the R.E. Ginna nuclear plant, with just one reactor, covers an area of 426 acres. Rolls Royce's solution would help create many mini nuclear plants in a similar area. Because of their size, regular nuclear reactors take years to build and because of the complexities involved in creating such large plants, the cost also mostly escalates from the initial estimates for constructing such plants.

Rolls Royce's plan would create nuclear reactors that can be delivered in chunks using regular trucks, according to Forbes. The company plans to make the first such plants operational in the U.K. by 2029. Most of these small modular reactors, as the company calls them are expected to be situated in Cumbria or Wales.

Rolls Royce's plan would create nuclear reactors that can be delivered in chunks using regular trucks, according to Forbes. The company plans to make the first such plants operational in the U.K. by 2029. Most of these small modular reactors, as the company calls them are expected to be situated in Cumbria or Wales. The company hopes to establish 10-15 such reactors in the U.K. When it comes to nuclear power, energy experts are divided over whether to support it or not. While it seems the only way to achieve zero emissions energy by 2050, many experts favor renewable sources of energy such as solar energy because of the risks involved and the nuclear waste generated. A big risk would be a terrorist attack on such a site such as the recent one that took place in India.

Mini reactors could make nuclear energy compete in the market with solar and wind energy and may boost their deployment in developing countries as a source of energy. Even small towns may be able to have their own source of nuclear energy. It remains to be seen how and whether nuclear energy is able to compete with renewable sources of energy or if it dies away like coal-based thermal energy, which is being phased out in many places globally.

Source: Rishabh Jain, International Business Times, https://www.ibtimes.com/rolls-royce-will-make-mini-nuclear-reactors-can-become-operational-2029-2910275, 27 January 2020.

USA

Excerpts from "Trump's Budget Continues to Boost Nuclear Energy"

Donald Trump's budget proposal for 2021 earmarks $1.2 billion for nuclear energy research and development and related programs. That's significantly more than the $824 million Trump proposed in his budget the previous year. Even with the sizable increase in requested funds, the amount is less than the $1.5 billion that Congress allocated for nuclear energy last year.

Trump sold the bump in funding as a way to promote "revitalization of the domestic industry and the ability of domestic technologies to compete abroad." His administration also wants to ramp up uranium production in the US, calling it "an issue of national security."...Keeping the nation's nuclear reactors online has been a priority for Trump since taking office. Two bills he signed

into law sped up the development of advanced nuclear reactors and streamlined the permitting processes. He's also allocated funds, including $300 million in this year's proposal, toward a Versatile Test Reactor (VTR) meant to test and develop advanced reactor fuels and materials. Nuclear power currently makes up 20 percent of the US energy mix and half of its carbon-free electricity. Nevertheless, nuclear energy has struggled to gain a larger foothold in the US. "I personally do not see nuclear power as a way around the production of greenhouse gas emissions," former executive director of Columbia University's Earth Institute Steven Cohen tells The Verge in an email. "On the other hand, scientific research on nuclear energy as well as other forms of energy and energy storage should be a high priority for our national labs and research universities."

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Among Democrats and environmentalists, scaling up nuclear power as a potential climate change fix has been a divisive, hot-button issue. Fans say the technology is now much safer than previous iterations, and that it's a necessary tool alongside wind and solar in the battle to stop climate change. Detractors focus on the high costs of nuclear energy and point out that the US still doesn't exactly know what to do with all its nuclear waste…. Trump seemingly backed away from a proposed waste site at Yucca Mountain in Nevada, which has been controversial ever since it was proposed in 1987. The proposed dump for radioactive waste is political kryptonite for someone who might want the state's votes (Trump lost Nevada in 2016). … Trump had previously asked for funds to complete the nuclear waste repository in previous budget proposals.

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While environmentalists continue to debate the pros and cons of nuclear energy, Trump does not appear to be boosting nuclear as a specifically environmental priority. His budget proposal also slashed the Environmental Protection Agency's budget by 26 percent. Trump's $4.8 trillion budget proposal still needs to make its way through Congress, where it's likely to face a fight. But there has been bipartisan support for nuclear energy in the past — last year, Congress upped the 2020 budget for nuclear energy by nearly $700 million. "This sends a strong message that the DOE is all in on new nuclear," Rita Baranwal, assistant secretary for the Office of Nuclear Energy, said in a statement after Trump signed off on the 2020 spending bill in December.

Source: Justine Calma, https://www.theverge.com/2020/2/10/21131701/trump-budget-proposal-nuclear-energy-programs-spending, The Verge, 10 February 2020.

URANIUM PRODUCTION

FINLAND

Finland Set to become EU's Sole Uranium Producer

The Finnish government has granted a uranium recovery and refinery permit to Terrafame, a 70% state-owned company. Since the Czech Republic and Romania have stopped their operations, this decision will make Finland the EU's only uranium producer. Terrafame main activities are related to nickel and zinc mining, while uranium is a by-product of the metal mining process.

In the future, the company plans to refine the uranium into exportable yellowcake, which is used as a fuel for nuclear power plants. The permit, delivered on 5 February, allows Terrafame to produce up to 250 tonnes of uranium each year, although the company estimates the actual output

to be probably slightly less.

Finland's two nuclear plants will not benefit from domestic recovery and refinery. The intention is to export yellowcake to North America or other countries in Europe. Yet, to be able to export, Terrafame needs the green light from the country's foreign ministry, as well as from the European Atomic Energy Community, Euratom.

As always when it comes to nuclear energy and uranium, the timeframes are long, and Terrafame still faces possible obstacles. Its facilities in eastern Finland have been ready since 2012 but having the actual uranium recovery plant and organisation completed will take around one year.

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Although Terrafame has obtained the chemicals and environmental permits, the government's decision is subject to appeal at the Supreme Administrative Court of Finland. It could take up to two years until the permit has legal force. Last summer, the Radiation and Nuclear Safety Authority (Stuk) released a statement according to which "the nuclear and radiation safety risks caused by the production of uranium to the environment and the residents in the area are minor". Obviously, environmentalists may see it differently, especially since Terrafame's image was tarnished by wastewater spills and other environmental issues.

The Finnish Association for Nature Conservation (FANC) will most likely appeal against the decision to the Supreme Administrative Court. FANC has argued that the permit violates the Nuclear Energy Act. The association demands impact studies on the entire production chain, including the quarrying, not just the refinery. The whole process might take a few years, a final decision is not expected to be reached before early 2022.

Source: Pekka Vanttinen, https://www.euractiv.com/section/energy/news/finland-set-to-become-eus-sole-uranium-producer/, Euractiv, 11 February 2020.

NUCLEAR COOPERATION

INDIA–RUSSIA

Russia, India may Cooperate to Build Nuclear Plants in Middle East, Africa

Russia and India could potentially form a partnership to build nuclear power plants across Africa and the Middle East. "There are also good prospects for cooperation of Russia and India in nuclear energy in third [party] countries," said Indian Ambassador to Russia Venkatesh Varma. Varma noted that Russia and India have already been working together to help Bangladesh construct its first nuclear power plant, called Rooppur. "Now Russia is also pretty active in the construction of nuclear power plants in the Middle East and Africa. That opens a new pathway of cooperation for us," Varma added. "Russia already has agreements in this field with a number of African countries. Ethiopia is one of them, and there are some countries in the Middle East. It will be Russian projects but with Indian cooperation. The discussions are still at a preliminary stage, but we hope that this will be a new area of cooperation. It is related to the success of the Indo-Russian cooperation in Bangladesh."

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The Bangladesh nuclear plant is being built by Russia's Rosatom State Atomic Energy Corp. (with help from Indian agencies) at a cost of more than $13 billion. The first two units at Rooppur are

scheduled for commissioning in 2023, while another unit is expected to begin operations the following year. The first joint India-Russia nuclear power plant was constructed in 2002 in the southern Indian state of Tamil Nadu, Kudankulam, which is now the largest nuclear power station in India. In 2008, Moscow and Delhi agreed to construct four additional units at Kudankulam and to develop new atomic sites. In addition, last September India agreed to have Russia design 20 more nuclear units in India over the next 20 years. The nuclear plant in Bangladesh is designed to provide universal electricity access for the country's 160 million people. Only half of them had electricity a mere ten years ago. ...

Both Russia and China have commissioned sodium-cooled reactors in recent years. "Russia and China are leading the way; tomorrow's nuclear plants will be sodium-cooled plants which will not melt down, and which will gradually use up existing stocks of radioactive waste.

In addressing the risks related to nuclear power, as in the well known disasters at Chernobyl and Fukushima, Hasan pointed out these facilities used water-cooled reactors and accidents were caused by "failures in the circulation of coolant, which caused the reactor core to overheat and melt down." Hasan proposes that reactors using liquid sodium as a coolant would prevent such deadly mishaps. "The use of liquid sodium as a coolant has huge advantages; reactors cooled with water must be operated under very high pressure, and overheating of the water coolant can cause a high-pressure steam explosion (which happened at Chernobyl)," he wrote. "Liquid sodium coolant does not have to be pressurized. As the reactor vessel does not have to withstand high pressure, it can be designed to expand thermally if temperature goes up." Hasan noted that both Russia and China have commissioned sodium-cooled reactors in recent years. "Russia and China are leading the way; tomorrow's nuclear plants will be sodium-cooled plants which will not melt down, and which will gradually use up existing stocks of radioactive waste," he wrote.

No decisions have been made regarding Polish-French cooperation in this respect "because negotiations are ongoing with the Americans," and there were also talks with Japan about new technology for the construction of small nuclear reactors." Therefore, it is worth discussing in such a group in order to get a good price, but also to check the technology, because it is crucial.

Source: Palash Ghosh, https://www.ibtimes.com/russia-india-may-cooperate-build-nuclear-plants-middle-east-africa-2918741, Intrnational Business Times, 09 February 2020.

POLAND–FRANCE

Poland Eyes Nuclear Power, High-Speed Rail Cooperation with France

There are several areas of potential cooperation between Poland and France, including nuclear power and high speed railways, Polish government spokesman Piotr Mueller said. Talking to a private TV broadcaster, Polsat News, about how Poland could improve relations with France after the current visit of French President Emmanuel Macron to Warsaw, Mueller said that there is cooperation potential in several areas, including the economy. "Both France and Poland have several (common - PAP) interests.

One of them is definitely the issue of building a nuclear power plant. France is a tycoon in this area, over 70 percent of energy is obtained (from the atom)," the government spokesman said. He added that no decisions have been made regarding Polish-French cooperation in this respect "because negotiations are ongoing with the Americans," and there were also talks with Japan about new technology for the construction of small nuclear reactors." Therefore, it is worth discussing in such a group in order to get a good price, but also to check the technology, because it is crucial,"

Mueller said.

Source: https://www.thefirstnews.com/article/poland-eyes-nuclear-power-high-speed-rail-cooperation-with-france-10288, The First News, 04 February 2020.

RUSSIA–SRI LANKA

Russia could Build Nuclear Power Plant in Sri Lanka

Russia could build a nuclear power plant (NPP) in Sri Lanka someday, considering the growing energy demand in the country, Russian Ambassador to Colombo Yury Materiy has said in an interview with Sputnik.

Since the Sri Lankan government favors pollution-free energy and aims at gradually replacing coal and oil with gas and alternative energy sources, the use of nuclear energy is possible only in a long-term perspective, while relevant effort is already made, the ambassador said.

The NPP would the final result of the intergovernmental cooperation on the peaceful atom. Considering the shown interest and Sri Lanka's progressive economic development, the energy consumption is increasing significantly. In this context, the idea to build an NPP may well be discussed and may be implemented in the long-term perspective.

"The NPP would the final result of the intergovernmental cooperation on the peaceful atom. Considering the shown interest and Sri Lanka's progressive economic development, the energy consumption is increasing significantly. In this context, the idea to build an NPP may well be discussed and may be implemented in the long-term perspective" Materiy said.

He recalled that Russia's nuclear corporation Rosatom and relevant Sri Lankan bodies held in 2017 their first consultations on the Russia-initiated intergovernmental agreement on cooperating on the peaceful use of the nuclear energy.

Source: https://www.tasnimnews.com/en/news/2020/02/11/2201164/russia-could-build-nuclear-power-plant-in-sri-lanka-ambassador, Tasnim News Agency, 11 February 2020.

NUCLEAR SECURITY

AZERBAIJAN

Azerbaijan Closely Follows Ongoing Worldwide Trends in Nuclear Security

Azerbaijan closely follows the ongoing worldwide trends in nuclear security, Azerbaijani Foreign Minister Elmar Mammadyarov said at the third International Conference on Nuclear Security: Sustaining and Strengthening Efforts (ICONS 2020) organized by the IAEA in Vienna, Trend reports Feb. 10. The minister noted that Azerbaijan supports existing nuclear security initiatives and pays special attention to the international multilateral mechanisms in this area. "Sharing international community's concerns about nuclear security issues, especially regarding proliferation of nuclear weapons, Azerbaijan ratified NPT after regaining its independence and actively supported extension of the Treaty indefinitely in 1995," Mammadyarov added. "We remain concerned about existing and emerging nuclear security threats and committed to addressing them." "International cooperation has always been at the center of our efforts in the field of nuclear security and safety," said the minister. "We believe that the progress achieved in this area strengthens peace and security and promotes confidence. Azerbaijan has developed a successful cooperation with IAEA on various aspects of nuclear security. We are ready to deepen existing fruitful collaboration."

Within the IAEA Technical Cooperation Program, in 2015, the Republic of Azerbaijan and IAEA signed a Country Program Framework document for 2015-2020, which establishes a basis for national projects in the area of improvement of the regulatory and legislative infrastructure, capabilities in radiation safety, security of nuclear materials, radioactive waste management, as well

as in radiation monitoring and control of border and customs check points, Mammadyarov noted. "Azerbaijan also welcomes the efforts of the United Nations for strengthening nuclear security," said the minister. "In this regard, ensuring full implementation of Security Council Resolution 1540 and subsequent resolutions plays an important role in prevention of proliferation of nuclear, chemical and biological weapons, as well as their means of delivery."

"Nuclear security is fundamental in the management of nuclear technologies and in applications where nuclear or other radioactive materials can be used or transported," Mammadyarov added. "In this regard, necessary efforts are being made in Azerbaijan to strengthen the protection and control of such materials."

"We continue working on legislation on control over radiation security," said the minister. "Azerbaijan has already adopted normative acts and regulations strictly banning import of nuclear and radiation wastes into the country. With the assistance of the IAEA, the laws and other legislative acts of Azerbaijan concerning registration and control of nuclear and radioactive materials are brought into compliance with international standards."

Azerbaijan has joined the International Convention for the Suppression of Acts of Nuclear Terrorism and Convention on CPPNM and also ratified the Amendment to this Convention, Mammadyarov noted. "Azerbaijan attaches great importance to maintaining and further strengthening nuclear security," added the minister. "Especially, in the face of persistent threat of radical extremism and terrorism in the region and due to our geographic location, we attach the utmost importance to the prevention of use of our territory as a transit route for illicit nuclear trafficking."

"However, due to the continued occupation of about twenty percent of our territory by Armenia, we are unable to provide proper control along a substantial part of our borders," Mammadyarov said. "This situation offers favorable conditions for illegal activities, including for nuclear smuggling and nuclear terrorism."

However, due to the continued occupation of about twenty percent of our territory by Armenia, we are unable to provide proper control along a substantial part of our borders," Mammadyarov said. "This situation offers favorable conditions for illegal activities, including for nuclear smuggling and nuclear terrorism.

"In conclusion, I would like to once again stress that Azerbaijan is committed to continue cooperation with international organizations and our partners in strengthening nuclear security in the region and around the world and reducing threats emanating from illicit trafficking in nuclear and radioactive materials and counts on support and cooperation of the IAEA in this matter," the minister added. "Reiterating the importance of this Conference in promoting nuclear security worldwide, Azerbaijan supports the Ministerial Declaration of International Conference on Nuclear Security: Sustaining and Strengthening Efforts," Mammadyarov noted.

Source: https://www.azernews.az/nation/161637.html, AzerNews, 12 February 2020.

NUCLEAR PROLIFERATION

IRAN

Iran's Nuclear Chief: U.S. JCPOA Move Undermining Diplomacy

"It was a dominant belief that the JCPOA could set a model in this regard …. But, unfortunately, this euphoria didn't last long. With the embedded irrationality in the U.S. administration's mindset, such optimism is fading away so quickly," Ali Akbar Salehi told the "International Conference on Nuclear Security" in Vienna, Austria, Press TV reported.Salehi urged the European Union, as a main stakeholder of the deal, to play its role in keeping the JCPOA alive by living up to its commitments without paying heed to the Trump

administration's "unjust pressures."

"Unfortunately, the U.S. administration has not yet come to its senses in recognizing the reality on grounds and keeps on inflicting harm on our people as well as the people of the entire region while creating and supporting terrorist groups such as ISIS (Daesh)," Salehi added.

The JCPOA, better known as the Iran deal, was signed between Tehran and 5+1 group — the five permanent members of the UN Security Council - and Germany - in July 2015 and went into effect in January 2016. The UN Security Council also adopted resolution 2231 in July 2015 endorsing the international agreement. However, U.S. President Donald Trump, a stern critic of the landmark deal, unilaterally pulled Washington out of the agreement in May 2018, and unleashed the "toughest ever" sanctions in history against the Islamic Republic in defiance of global criticism. The move was intended to strangulate the Iranian economy, especially through a total ban on Iran's oil exports. Under Washington's pressure, the three European signatories to the JCPOA have so far failed to protect Tehran's business interests under the deal against the American bans.

In May 2019, exactly one year after the U.S. quit the deal and imposed sanction on Iran, Tehran began to gradually reduce its commitments under the JCPOA to both retaliate for Washington's departure, and Europeans' failure to honor their commitments. On January 5, Iran took a fifth and last step in reducing its commitments, and said it would no longer observe any operational limitations on its nuclear industry, whether concerning the capacity and level of uranium enrichment, the volume of stockpiled uranium or research and development. However, Iran has insisted if the Europeans honor their obligations it will immediately reverse its decisions. EU foreign policy chief Josep Borrell has said that Europe must ensure Iran's benefits from the nuclear deal if it wants the deal to survive."If we want the Iran nuclear deal to survive, we need to ensure that Iran benefits if it returns to full compliance," he wrote in an article in the Project Syndicate published.

Borrell visited Iran on Feb. 3. He held talks with Foreign Minister Zarif, President Rouhani and Parliament speaker Ali Larijani. Elsewhere in his speech, Salehi said as a member state to the NPT, Iran maintains that in line with Article IV of the NPT, nothing "shall be interpreted as affecting the inalienable right of all the parties to the treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination."The AEOI chief emphasized that nuclear security and safety measures must be utilized to support such objectives and functions.

Late last month (Jan 2020), a group of Iranian lawmakers submitted a motion to the parliament calling for Iran's withdrawal from the NPT after the three European signatories to the JCPOA failed to meet their contractual commitments following the U.S. exit. A member of the Parliament's Presiding Board, Mahmoud Sadeqi, said that the motion had been prepared after the European trio triggered a dispute mechanism devised in the deal, which could lead to the restoration of UN Security Council sanctions against Iran.

Salehi, a nuclear physicist, further said the IAEA is expected to assist its members "upon their request and on a non-discriminatory basis, in their efforts to enhance a sustainable nuclear security regime based on their national needs and priorities. "Iran believes that "nuclear security activities of the Agency should be funded with no string attached by the donors," he added. "Iran has taken upon itself to enhance further the mechanisms of its nuclear security throughout the country, through its own resources and also by utilizing the agency (IAEA) and other member states' potentials," the Iranian nuclear chief said. He emphasized that the Islamic Republic is updating the regulations regarding the security of radioactive sources and the relevant guidance on control and combating illicit trafficking of radioactive and nuclear materials.

Source: https://www.tehrantimes.com/news/445049/Iran-s-nuclear-chief-U-S-JCPOA-move-undermining-diplomacy, Tehran Times, 11 February 2020.

NUCLEAR NON-PROLIFERATION

ARMENIA

Foreign Minister Reaffirms Armenia's Commitment to Nuclear Disarmament and Non-Proliferation Goals

Foreign Minister of Armenia Zohrab Mnatsakanyan, who is in Austria on a working visit, met on February 10 with Lassina Zerbo, the Executive Secretary of the CTBTO in Vienna, the Armenian MFA told Armenpress. The sides discussed the Organization's activity, its challenges and the actions of the international community to address these challenges. In this context they highlighted taking steps in using the potential of science, innovation and IT, also through the broad engagement of sectoral experts. The Foreign Minister reaffirmed Armenia's commitment to the disarmament and non-proliferation of nuclear weapon goals and stated that Armenia, by ratifying the Comprehensive Nuclear-Test–Ban Treaty in 2006, always acts in support of the ratification of this Treaty by all states.

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The sides also highly appreciated the active engagement of Armenian experts in the activities of the Organization's preparation commission. Both highlighted the strengthening of nuclear security at national and international levels.

Source: https://armenpress.am/eng/news/1004300/, Armen Press, 10 February 2020.

NUCLEAR DISARMAMENT

BELIZE

Belize Signs Nuclear Weapon Ban Treaty

On 6 February, Belize became the 81st country to sign the Treaty on the Prohibition of Nuclear Weapons – a landmark global agreement that outlaws nuclear weapons comprehensively and establishes a legal framework for their total elimination. Belize participated in the negotiation of the treaty at the United Nations in New York in 2017 and voted in favour of its adoption. Since then, it has supported calls in the UN General Assembly for all countries to sign, ratify, or accede to the treaty "at the earliest possible date". Belize is the 10th member of the Caribbean Community, or CARICOM, to sign the treaty, after Guyana, Jamaica, Saint Vincent and the Grenadines, Antigua and Barbuda, Saint Lucia, Dominica, Grenada, Saint Kitts and Nevis, and Trinidad and Tobago.

Of these 10 countries, six have also ratified it, meaning they have formally consented to be legally bound: Guyana, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Dominica, and Antigua and Barbuda. To become a state party, Belize will now need to deposit an instrument of ratification with the UN Secretary-General. The Caribbean has been one of the fastest regions of the world to adhere to the treaty, along with Latin America and the Pacific.

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In a statement to the United Nations in October 2019, Caribbean countries expressed alarm at "the continued reliance on and prevalence of nuclear weapons as a feature of security and military doctrines". They noted "the obvious trend towards abandoning longstanding principles that have guided the international community's approach to nuclear disarmament and non-proliferation" and said that this "overwhelming concern" had animated their active engagement in the negotiations that culminated in the adoption of the nuclear weapon ban treaty. In June 2019, 10 Caribbean countries participated in a forum in Georgetown, Guyana, to discuss the need for concerted regional efforts

to promote swift entry into force of the treaty. They described this as "a vital step towards achieving a world free of nuclear weapons".

Source: https://www.pressenza.com/2020/02/belize-signs-nuclear-weapon-ban-treaty/, Pressenza, 07 February 2020.

NUCLEAR TERRORISM

GENERAL

Radioactive Material 'A Magnet for Groups with Malicious Intent', Warns UN Nuclear Watchdog Chief

Government ministers and other high-level representatives from more than 140 countries adopted a new declaration to enhance global nuclear security and counter the threat of nuclear terrorism. More than 50 ministers and 2,000 experts in the field are attending the International Conference on Nuclear Security, hosted by the UN's nuclear watchdog, the IAEA, in Vienna. From a possible cyber-attack on a nuclear power plant to the illicit trafficking of radioactive materials, nuclear security is a growing international concern, said IAEA. The agency and its Member States have intensified their efforts to strengthen nuclear security in recent years but agree that more action is needed.

'Malicious Intent': "Nuclear and radioactive material is a magnet for groups with malicious intent that see in this material a possibility to create panic and bring distress and pain to our societies", said IAEA Director General Rafael Mariano Grossi, at the opening of the week-long conference at IAEA headquarters, shortly before the declaration was adopted. Nuclear technology and science help improve the lives of millions of people around the world in areas ranging from clean energy and cancer care to food security and pest control. But the nuclear and radioactive materials used to produce those benefits must be secured at all times to prevent them from falling into the wrong hands, said IAEA. This entails preventing, detecting and responding to any malicious acts involving nuclear material or radioactive substances.

Ministerial Declaration: In the declaration, IAEA Member States reaffirmed the common goals of nuclear non-proliferation, nuclear disarmament and the peaceful uses of nuclear energy and recognized that nuclear security contributes to international peace and security."We remain concerned about existing and emerging nuclear security threats and committed to addressing such threats", the ministerial declaration said. "We encourage Member States to implement threat mitigation and risk reduction measures that contribute to improving nuclear security, including, but not limited to, ensuring the protection of nuclear and other radioactive materials and facilities."

IAEA's Role: Nuclear security is a national responsibility, but the central role of the IAEA in facilitating and coordinating international cooperation in this area was also highlighted. "The adoption of a Declaration at ministerial level is indicative of the continuous commitment to nuclear security of IAEA Member States. It is a concise, politically driven and forward-looking document, adding value to the efforts of strengthening nuclear security worldwide," said Bogdan Aurescu, Minister of Foreign Affairs of Romania and Co-President of the conference. "In the coming years, global stocks of nuclear material are expected to continue growing, especially as we look into emerging nuclear technologies and their role in mitigating the consequences of climate change", said Federico Alfaro, Vice-Minister of Foreign Affairs of Panama and Co-President of the conference. "We cannot allow for such material to fall into the wrong hands."

Conference Agenda: The conference addresses topics such as how to secure nuclear materials from theft or sabotage during transportation, the use of nuclear forensics to assist in criminal investigations and emergency preparedness and response, in the event of a nuclear security emergency. It follows earlier IAEA nuclear security meetings held in 2013 and 2016. Since the last

conference, the IAEA's activities to strengthen nuclear security include training nearly 13,000 experts, donating radiation detection equipment to 33 countries, and providing support to 17 major public events, including World Youth Day in Panama, which was attended by Pope Francis and the presidents of seven Latin American countries.

Source: https://news.un.org/en/story/2020/02/1057031, UN News, 10 February 2020.

SAUDI ARABIA

Saudi Arabia Calls for Steps to Combat N-Terror

The Cabinet called on the international community to reinforce all measures aimed at combating nuclear terrorism. The meeting, which was chaired by King Salman in Riyadh, made this call in view of regional tensions and the rise of armed terrorist groups. Media Minister Turki Al-Shabanah, in a statement issued to the Saudi Press Agency, said the minister reviewed Arab, regional and international developments underscoring the Kingdom's firm stance on efforts aimed at achieving global security and stability. Saudi Arabia had during its recent participation at the International Conference on Nuclear Security in Vienna underlined its support for international resolutions related to nuclear terrorism. Riyadh is keen on ensuring that nuclear security will be one of the main elements of its national peaceful nuclear energy program...."

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Source: https://www.arabnews.com/node/1626441/saudi-arabia, Arabnews, 11 February 2020.

NUCLEAR SAFETY

PAKISTAN

Pak Nuclear Safety Regime as Per World Standards

Pakistan says it has established a comprehensive and effective national nuclear security regime which is on a par with international standards and guidelines. "The regime is based on an extensive legislative and regulatory framework governing the security of nuclear materials, radioactive substances, associated facilities and activities," said the Foreign Office on the occasion of third International Conference on Nuclear Security (ICONS) organized by the IAEA in Vienna.

In the conference (Feb 10-14) the launch of a booklet on "Pakistan's Nuclear Security Regime" by the Ministry of Foreign Affairs ... is the second version of "Pakistan's Nuclear Security Regime", which was first published in form of a brochure on the sidelines of the second International Conference on Nuclear Security organized by the IAEA in 2016. "This step is part of Pakistan's practice to share information on the measures taken to further strengthen nuclear security and to demonstrate the high-level attention that nuclear security continues to receive in Pakistan," adds the Foreign Office.

Pakistan says it has established a comprehensive and effective national nuclear security regime which is on a par with international standards and guidelines. "The regime is based on an extensive legislative and regulatory framework governing the security of nuclear materials, radioactive substances, associated facilities and activities," said the Foreign Office.

Copies of the booklet are being distributed among the participants of the ICONS. Pakistan, which has a clean record as far as accidents are concerned, points out that its nuclear regime is backed by strong institutions and organizations with the requisite authorities, resources and trained manpower for effective implementation. "Our affiliated institutes at

Centre of Excellence on nuclear security have transformed into an international hub for imparting training and sharing best practices in the area of nuclear security," it asserted. Pakistan takes pride in the fact that its nuclear security arrangements have been recognised at the international level by several high-ranking officials and experts.

Takahama 3 will be halted for nearly five months from 2 August to 22 December and Takahama 4 for about four months from 7 October to 10 February 2021.Stricter regulations were put in place after the 2011 Fukushima accident, requiring utilities to strengthen safety measures at nuclear plants.

Source: Mariana Baabar, The News, https://www.thenews.com.pk/print/612276-pak-nuclear-safety-regime-as-per-world-standards, 11 February 2020.

JAPAN

Japanese Reactor Restarts Delayed for Safety Upgrades

Japan's Kansai Kansai Electric Power Company intends to shut down two reactors at its Takahama nuclear plant in Fukui Prefecture for several months later this year while necessary safety upgrades are completed. Takahama 3 will be halted for nearly five months from 2 August to 22 December and Takahama 4 for about four months from 7 October to 10 February 2021.Stricter regulations were put in place after the 2011 Fukushima accident, requiring utilities to strengthen safety measures at nuclear plants. In April, the Nuclear Regulation Authority (NRA) set deadlines for meeting its requirements. These include an emergency control room, standby power supplies and reactor coolant pumps, to maintain cooling procedures via remote control and prevent the release of radioactive materials.

NRA had told Kansai Electric it would have to suspend operations of the facilities — required to be at least 100m away from the reactors and constructed within a five-year period following regulatory approval of each plant's engineering and construction work programme — were not ready a week before the August and October deadlines. The suspension is expected to cost Kansai Electric JPY33.7 billion ($309m), including expenses for alternative power generation. The company will provide the required levels of power supply through procurement from other utilities, said Yoshinori Kondo, deputy head of nuclear business operations.

Currently all four Takahama units are offline for routine maintenance and upgrades. Kansai said it plans to restart Takahama 4 'shortly'. The unit has been offline since 18 September 2019. Takahama 3, offline for refuelling and maintenance is due to restart in April or May. Takahama 1 and 2 are planned to restart in July and March 2021. Other plants facing shutdowns or delays because of necessary upgrades include Kyushu Electric Power Company's Sendai nuclear plant in Kagoshima Prefecture and Japan Atomic Power Company's (JAPC's) Tokai II in Ibaraki Prefecture. Kyushu said in October it would halt Sendai 1&2 for over eight months from March and May, respectively for the work to be done.

JAPC applied to NRA in November 2017 for a 20-year life extension of the 1060MWe Tokai II boiling water reactor that started commercial operation in 1978. NRA approved the extension but required extensive safety upgrades, including the construction of a 1.7km coastal levee, providing protection against a potential tsunami up to 17.1m high.

Tokai II Safety Upgrades: Meanwhile, the restart of Tokai II is expected to be delayed by almost two years to enable the construction of improved safety measures. JAPC applied to NRA in November 2017 for a 20-year life extension of the 1060MWe Tokai II boiling water reactor that started commercial operation in 1978. NRA approved the extension but required extensive safety upgrades, including the construction of a 1.7km coastal levee, providing protection against a potential tsunami up to 17.1m

high. Costs for safety measures at the plant are estimated at some JPY180 billion. Tokai II, which has been offline since the March 2011 Fukushima accident was originally expected to resume operation in March 2021, but JAPC has now said upgrades will take until December 2022.

Source: https://www.neimagazine.com/news/newsjapanese-reactor-restarts-delayed-for-safety-upgrades-7748324, Nuclear Engineering International, 31 January 2020.

NUCLEAR WASTE MANAGEMENT

CANADA

Indigenous Community Votes Down Proposed Nuclear Waste Bunker Near Lake Huron

An Indigenous community has overwhelmingly rejected a proposed underground storage facility for nuclear waste near Lake Huron, likely spelling the end for a multibillion-dollar, politically fraught project years in the making. After a year of consultations and days of voting, the 4,500-member Saugeen Ojibway Nation announced that 85 per cent of those casting ballots had said no to accepting a deep geologic repository at the Bruce nuclear power plant near Kincardine, Ont.

The vote showed the need for a new solution for the hazardous waste, a process he said could take many years. Ontario depends heavily on nuclear power for its electricity but a permanent storage solution for the increasing amounts of waste now stored above ground has proven elusive.

"We were not consulted when the nuclear industry was established in our territory," SON said in a statement. "Over the past 40 years, nuclear power generation in Anishnaabekiing has had many impacts on our communities, and our land and waters." The province's giant utility, Ontario Power Generation, had wanted to build the repository 680 metres underground about 1.2 kilometres from Lake Huron as permanent storage for low and intermediate-level radioactive waste. The project was tentatively approved in May 2015.While Kincardine was a "willing host," the relative proximity of the proposed bunker to the lake sparked a backlash elsewhere in Canada and the United States. Politicians, environmentalists and scores of communities expressed opposition.

Successive federal governments have withheld final approval. In August 2017, then-environment minister Catherine McKenna paused the process — the last in a string of delays for the project — to ensure buy-in from Indigenous people in the area. The generating company, which insisted the stable bedrock would safely contain the waste, items such as contaminated reactor components and mops, said it respected SON's decision. "OPG will explore other options and will engage with key stakeholders to develop an alternate site-selection process," Ken Hartwick, head of OPG, said in a statement shortly after the vote was announced. "Any new process would include engagement with Indigenous peoples as well as interested municipalities." The apparent end of the road for the project comes shortly after the federally-mandated Nuclear Waste Management Organization said it was making progress toward choosing a site for storing millions of far more toxic spent nuclear fuel bundles.

The organization, comprising several nuclear plant operators, said it had struck deals with landowners in South Bruce — about 30 minutes east of Kincardine — that will allow it to begin site tests. The only other site under consideration for high-level waste storage is in Ignace in northern Ontario. Despite the rejection of OPG's proposal, the utility said it planned to continue a relationship "based on mutual respect, collaboration and trust" with the Saugeen Ojibway Nation, which comprises the Chippewas of Saugeen First Nation and the Chippewas of Nawash Unceded First Nation. Chippewas of Saugeen Chief Lester Anoquot called the vote — 170 for and 1,058 against — a "historic milestone and momentous victory" for the community. "We worked for many years for our right to exercise jurisdiction in our territory and the free, prior and informed consent of our people to be recognized," Anoquot said. "We didn't ask for this waste to be created and stored in our territory."

At the same time, Anoquot said, the vote showed the need for a new solution for the hazardous

waste, a process he said could take many years. Ontario depends heavily on nuclear power for its electricity but a permanent storage solution for the increasing amounts of waste now stored above ground has proven elusive. The radioactive material, particular from used fuel, remains highly toxic for centuries. The utility insists exhaustive science shows a repository in stable and impermeable rock offers the best solution. "Permanent and safe disposal is the right thing to do for future generations," Hartwick said.

A high-level advisory panel has just issued a report recommending that the Japanese government dispose of the growing cache of radioactive water from the defunct nuclear plant by releasing it into the ocean. If implemented, the move will likely alarm neighbouring countries like South Korea with whom Japan already has fraught historical relations.

Source: https://theprovince.com/news/canada/indigenous-community-votes-down-proposed-nuclear-waste-bunker-near-lake-huron/wcm/695879e9-adf5-4de8-99de-5402c50cb524, The Province, 01 February 2010.

JAPAN

In the Shadows of a Nuclear Disaster

Japan is gearing up to take centre stage on the global arena as the host of the Olympic Games this summer, but it remains unable to shake off the long shadow of the Fukushima Daiichi nuclear disaster of 2011. A high-level advisory panel has just issued a report recommending that the Japanese government dispose of the growing cache of radioactive water from the defunct nuclear plant by releasing it into the ocean. If implemented, the move will likely alarm neighbouring countries like South Korea with whom Japan already has fraught historical relations. The affected region's fishing industry is also strongly opposed to the idea.

he panel's recommendation, however, is to dispose of it in the ocean as the most practical and safe option. Japan's Industry Ministry has said the health effects of ocean release will be minimal, amounting to between just 1/40,000 to 1/1,600 of the radiation levels to which humans are naturally exposed annually. But not everyone is convinced.

Since 2011, when the Fukushima nuclear reactors were crippled by an earthquake and tsunami, over 1.2 million tonnes of contaminated water have been stored in giant containers on the plant site. This is the water that has been used to cool down and keep the reactors' fuel cores from melting. About 150 tonnes of new water is added every day and storage space for it will run out by 2022. The water is treated using an advanced liquid processing system (ALPS) before being stored in the tanks, but this does not remove an element called tritium, an isotope of hydrogen. And while it is common for nuclear plants located on the coast around the world to dump "treated" water laced with tritium into the sea, Tepco, the plant operator, admitted in 2018 that the stored water in Fukushima contains other radioactive materials as well. The reason: Tepco had not changed the filters in the decontamination system frequently enough in the early years of cleaning the surge of water flowing through the reactors. The utility has since promised that the water will be treated again and all radioactive particles other than tritium removed prior to any release.

Practical Option: The government has been considering several methods to dispose of the water, including injecting it deep into the ground, solidifying and burying it, and releasing it into the atmosphere. The panel's recommendation, however, is to dispose of it in the ocean as the most practical and safe option. Japan's Industry Ministry has said the health effects of ocean release will be minimal, amounting to between just 1/40,000 to 1/1,600 of the radiation levels to which humans are naturally exposed annually. But not everyone is convinced. Fukushima's fishing sector is particularly concerned about further blows to its image, given that its annual catch is still less than 20% of pre-2011 levels. The fact is that government assurances are not always believed by consumers.

Over 20 countries still have import restrictions on Japanese seafood and other agricultural products. Neighbouring South Korea not only retains the ban on seafood imports from Fukushima, it summoned a senior Japanese Embassy official in August last year to explain how the stored contaminated water would be dealt with. South Korean athletes are planning to bring their own radiation detectors and food to the Games. Some Olympic events like baseball and softball contests will be held less than 60 km from the wrecked power plants. The Olympic torch relay will take off on March 26 from a football training centre, called J-Village, that served as a frontline operations base for workers battling the 2011 crisis. The relay will then pass through a number of areas near the damaged plant on its way to Tokyo.

In Japan, the Games have been dubbed the "Recovery Olympics". The hope is that they will help kickstart a renaissance of Fukushima where in the immediate aftermath of the disaster, more than 1,50,000 people were evacuated. Only a small percentage of these have returned to their homes despite most areas being declared safe for habitation by the government. The actual decommissioning of the affected nuclear plants will probably take upwards of 40 years. In 2016, the Japanese government calculated the total cost of plant dismantlement, decontamination of affected areas, and compensation to be 21.5 trillion yen ($195 billion) — roughly a fifth of the country's annual budget at the time. Clearly, the Olympics are only a way-stop on the path to recovery for Fukushima. But with storage space fast running out, the decision of how to dispose the contaminated water cannot wait long. The government is widely expected to follow the advice of the expert panel regarding the method of release, it is only the timing that remains uncertain.

In 2016, the Japanese government calculated the total cost of plant dismantlement, decontamination of affected areas, and compensation to be 21.5 trillion yen ($195 billion) — roughly a fifth of the country's annual budget at the time.

Source: Pallavi Aiyar, The Hindu, https://www.thehindu.com/news/international/in-the-shadows-of-a-nuclear-disaster/article30771441.ece, 08 February 2020.

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, Hina Pandey, Dr. Poonam Mann, Sreoshi Sinha, Zoya Akhter, Carl Jaison

Composed by: CAPS