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OPINION – Manpreet Sethi

Nuclear Numbers Game: What’s on China’s Mind?

On May 9, 2020, Hu Xijin, editor of *Global Times*, the mouthpiece of the Chinese Communist Party, published an article prodding his country to expand its nuclear arsenal “in a relatively short time span” to 1,000 nuclear warheads and “at least” 100 DF-41 ICBMs. Current Chinese nuclear holdings stand at 290 warheads, as per the 2019 edition of the Bulletin of Atomic Scientists. China’s ‘White paper on National Defence’, released last year, reiterated that the count the country keeps “its nuclear capabilities at the minimum level required for national security.” Since 1964, China’s nuclear deterrence has rested on the idea of sufficiency to inflict unacceptable damage.

So, should the call for a radical expansion of nuclear numbers by an individual merit attention? Expectedly, the Chinese spokesperson has described it as just one view that highlights freedom of speech in his country. But, the expression of a diversity of views on nuclear issues is not a hallmark of China. In fact, the country cleverly manipulates opacity, deception and ambiguity as part of its deterrence strategy. So, is something playing out here? After all, Xijin is a known hard-line nationalist and has been editor for over 10 years of the Chinese and English editions of

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Global Times.

China has also been in the process of expansive strategic modernisation — induction of MIRVed missiles, hypersonic delivery systems, long-range submarine-launched ballistic missiles on a new class of SSBNs, enhanced space-based ISR (intelligence, surveillance, reconnaissance), navigation and communication, etc. In this process, an increase in the warhead numbers has never figured. Rather, by not adding to its arsenal, China has actually belied American stockpile forecasts. So, why did *Global Times*, a medium that has been used in the past to launch trial balloons to gauge opinion, publish this piece now? Some decoding may be prudent.

The first purpose of the article could simply be to signal deterrence. At a time when China is under significant pressure from many countries on its role in the raging pandemic, it may be drawing attention to its nuclear capability to deter the possibility of military action in its areas of concern, such as the South China Sea. Interestingly, a 'leaked' report of China's Ministry of State Security to President Xi Jinping was recently cited by the media for emphasizing a high anti-China sentiment which could lead to an armed confrontation with the US. In such an environment, a call to expand the nuclear arsenal could be muscle-flexing of potential capabilities. Undoubtedly, China has the financial capacity and fissile material stock to accelerate warhead production, if it so decides. And, Xijin argues for it pointing to US "strategic ambitions and bullying impulse against China".

Secondly, the article may be building a narrative on a decision that has already been taken to increase the nuclear arsenal. Some surge in China's nuclear numbers is inevitable given that it now deploys MIRVs on its ICBMs. Depending on how many warheads each missile carries, varying from three to 10, there will be the need for additional warheads. But the requirement may go beyond this in case China thinks it necessary to prepare a bargaining position for nuclear arms control negotiations that it may be obliged to join in the future. China has traditionally been dismissive of such demands on the grounds that its arsenal compares poorly in size with that of the US and Russia. It may now be resizing itself to present an even match. Thirdly, China may be delivering a message that it is not scared of joining an arms race. President Trump has often expressed that he would pull Russia and China into nuclear overspending and debilitate them. China may be

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showing its own readiness to pick up the gauntlet. In fact, ironically, given the ravaging effect of Covid-19 on most economies, China may find itself in a better position than others to support ambitious military spending. Lastly, the nuclear expansion recommendation may reflect the growing influence of contemporary Western nuclear thinking that advocates nuclear war-fighting on Chinese opinion-makers. Xijin writes, "If the US initiates a nuclear war with China, it must not have any chance of winning — that's the kind of nuclear deterrent China must secure." Customarily, China's nuclear strategy has not associated the term 'winning' with nuclear war. But, with the US Nuclear Posture Review of 2018 recommending that Washington should build capability to fight limited nuclear wars with low-yield weapons against military targets, China may be succumbing to the same temptation.

It is to be expected that any move by China, or even expression of intention, to expand its nuclear arsenal would evoke concern in India. An expanding number gap would be perceived as placing India at a disadvantage. Such thinking, however, missing the basic fact that numbers in the nuclear game do not matter beyond a point. In fact, China has traditionally believed in the same dictum. Xijin's advocacy of nuclear expansion is overlooking the point that nuclear deterrence best rests on the idea of punishment and assuredness of retaliation. Chinese and Indian nuclear thought has long been rooted in this wisdom and supported credible minimum credible minimum deterrence. Nuclear weapons, by their nature, ensure mass destruction and hence even a few suffice to inflict damage that no rational State could find acceptable or even

manageable. There should be no requirement for India to follow suit or enter into a competition of nuclear bean-counting, a wasteful enterprise. Given the blow by the coronavirus to the economy, it will be imperative to rationalise spending in the coming years. Of the defence allocations that it can afford, India would be well advised to focus on nuclear forces survivability than on number additions.

Source: The Deccan Herald, 19 May 2020.

OPINION – Brad Glosserman

Nuclear Delusions Fuel North Korean Ambitions

North Korea warned that it was strengthening its “nuclear war deterrence.” Experts don’t know what that means, but they are worried. Given North Korean leader Kim Jong Un’s promise to develop a new strategic weapon if the United States did not build a new relationship with his country, concern is justified. Japan should be especially worried, not just because it has bitter, longstanding issues with North Korea, but because this country is on the top of Pyongyang’s target list.

It isn’t clear why the North wants that arsenal or what Pyongyang will do when it has it. The rhetoric above suggests two very different objectives: ensuring that North Korea isn’t threatened by the U.S. — deterrence — and righting past injustices — revenge. Nuclear experts also see an emerging North Korean strategy to use those weapons to compel other countries to act as it wishes.

Kim declared last year that U.S. President Donald Trump had until the end of 2019 to make a “bold decision” to end his country’s “hostile policy” toward North Korea. Trump made historical and unprecedented gestures to Kim but the two men proved unable, even after two summits and, according to Trump, “falling in love” as a result of Kim’s “beautiful letters,” to go beyond vague promises of denuclearization.

The new year came and went without any shift in U.S. policy — it continues to demand that North Korea give up its nuclear weapons and maintains sanctions to encourage it to do so — and security planners have been waiting for Kim’s threat to take shape. North Korea has maintained its self-imposed moratorium on nuclear and long-range missile tests, but it has conducted 18 tests of

short-range missiles and rockets since May of last year; five rounds have occurred in 2020, and the country set a record for the most tests in a single month (nine) earlier this year.

In March, a statement from the Foreign Ministry for Negotiations with the U.S. declared that “we will go our own way. We want the U.S. not to bother us. If the U.S. bothers us, it will be hurt.” An unnamed official warned that his country has “become more zealous for our important planned projects aimed to repay the U.S. with actual horror and unrest for the sufferings it has inflicted upon our people.”

... At a meeting of the ruling Workers’ Party’s Central Military Commission, Kim promised to implement “new policies for further increasing the nuclear war deterrence of the country and putting the strategic armed forces on a high alert operation,” reported the official Korean Central News Agency (KCNA). The CMC discussed “crucial measures for considerably increasing the firepower strike ability of the artillery pieces of the Korean People’s Army” along with ways to “reliably contain the persistent big or small military threats from the hostile forces.”

Experts believe that North Korea is developing a solid-fueled, mobile intercontinental ballistic missile that can deliver nuclear weapons anywhere in the world, specifically to threaten the U.S. homeland during a crisis. With enough fissile material to build over 50 weapons, an ever more modern — and threatening — nuclear capability is emerging.

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compel other countries to act as it wishes; the ultimate expression of that thinking is to unify the Korean Peninsula by force under Pyongyang.

That sounds like a fantastic — as in “unbelievable” — ambition. But there is a logic to this approach. In a recent paper, Shane Smith, a nuclear expert at the U.S. National Defense University, points to North Korean exercises involving preemptive nuclear attacks on ports and airfields in neighboring countries as evidence of an emerging strategy to wage limited regional nuclear war while its long-range missiles keep the United States from intervening with its own nuclear weapons. In short, Pyongyang is betting that a U.S. president won't be willing to sacrifice Seattle for Seoul or New York City for Tokyo.

At first glance, that might seem plausible. The U.S. has been relatively restrained in the face of North Korean provocations, such as the sinking of the Cheonan, a Korean Navy ship, in 2010 or the shelling of Yeonpyeong Island several months later, which resulted in several deaths. In subsequent meetings with nuclear experts and officials from Japan and South Korea, that restraint was criticized as a failure of deterrence and likely to encourage more North Korean adventurism, a concern that has grown as Trump dismissed the short-range tests and derided the value of U.S. alliances.

The U.S. nuclear deterrent is not intended to prevent those attacks, however. A nuclear response to such a provocation is wildly disproportionate and to think that it would be used to respond to or prevent them is irresponsible. That doesn't mean that the U.S. nuclear arsenal is useless or that the U.S. would be deterred by the prospect of retaliation.

The history of the Cold War shows that such thinking is wrong — the U.S. honored its alliance commitments despite a much larger and more credible Soviet nuclear capability — but Smith notes that “the types of weapons Pyongyang is

building, the way it exercises and its public pronouncements about using them make it hard to dismiss that possibility out of hand.” The danger, then, is the prospect that North Korea takes its own rhetoric seriously and will misjudge the U.S. readiness to protect its allies and its interests.

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that is critical to dealing with a contingency. An attack would make plain to the Tokyo government the cost of allowing the U.S. to use facilities in the country to help defend South Korea. There is also probably a suspicion in Pyongyang that a substantial number of

people in the region might secretly applaud, happy to see Tokyo pay again for past misdeeds.

For Japan, the U.S. and South Korea, the most important objective then is ensuring that the North Korean leadership harbors no illusions about the strength of U.S. alliances in Northeast Asia and Washington's commitment to the defense of its allies. That means preparing — and demonstrating — a strong defense so that Pyongyang sees an adversary that is ready to fight if provoked. While that risks sending a message that the U.S. and South Korea (and Japan as it too prepares) are “hostile” to the North, it is intended to deter North Korea from picking a fight in the first place.

There are doubts about whether both U.S. alliances have been keeping pace with developments and are ready to fight in a nuclear environment. Looking at the U.S.-South Korea alliance, Smith sees little evidence of combined measures that would discourage Kim and his generals from thinking that they could deter the U.S. from intervening.

Smith provides a menu of ways to show U.S. and

alliance resolve. The best way to discourage adventurism by the North, or any adversary for that matter, is for all three countries to be united in purpose and perspective and to demonstrate they will work together to address shared threats. ("Work together" includes sticks and carrots.)

Today, such coordination is problematic. There are tensions in every leg of the Japan-U.S.-South Korea triangle and while they are not yet sufficient to break those partnerships, they complicate and undermine needed preparations and allow adversaries to think that they have room to maneuver. Acting on that belief would be a tragic mistake, not just for Pyongyang, but for Japan, South Korea and the U.S. as well.

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Source: *Japan Times*, 27 May 2020.

OPINION – Raj Chengappa

Radiating Change

India's mammoth DAE has played a seminal role in enhancing the country's security by fortifying our armed forces with atom bombs to deter any enemy planning a nuclear strike against us. However, in more recent years, it is for its work on peaceful uses of atomic energy that the department has gained prominence, especially after the Indo-US civilian nuclear deal was signed in 2008. India now has 22 nuclear power plants operating across the country with an installed capacity of 6,780 MW, which accounts for 2 per cent of the country's total capacity. What is little known, though, is its contribution to the rapidly growing

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radiopharmaceutical industry. Simply put, this sector uses radio isotopes produced by atomic research reactors and cyclotrons for both diagnosis and treatment of cancer, heart diseases and a host of other ailments.

India, though a significant nuclear power, still imports a substantial amount of medical isotopes. A similar tale bedevils the medical and food irradiation business in which the DAE had developed the capability as far back as 1974. Though over 20 establishments, both public and private, have come up since then, the sector has barely reached half its potential. Clearly, there was a need for radical reforms to boost these two sectors.

The Reforms: The central government has decided to establish a reactor on a PPP (public-private partnership) basis for producing medical isotopes and ensure affordable treatment for cancer and other diseases. The government will set up facilities, again in PPP mode, to use irradiation technology for food preservation. These could also be used in the farm sector for grain storage.

The Rationale: Though the DAE had set up the Board of Radiation and Isotope Technology (BRIT) for radiopharmaceutical production as early as 1989, it found it difficult to keep pace with market requirements. That was because production was dependent on the availability of Dhruva, India's research reactor located in Trombay, which had to service multiple uses. India's private sector was so far not allowed to run research reactors because apart from the strategic uses, the safeguards and accountability of such nuclear material are a major concern and best handled by state-run establishments like the DAE. With the reactor costing around Rs 450 crore, very few private companies would want to invest in it.

So, the government, as a via media, has proposed a PPP model that will allow, for the first time, the private sector to hold equity in a nuclear research reactor dedicated to enhancing nuclear medicine and radiopharmaceuticals. The private entity would then be the commercial wing of the venture while DAE would run the reactor. Atomic Energy Commission (AEC) chairman K.N. Vyas told *India Today*, "It is a significant decision because while we will be able to produce radiopharmaceuticals required by the market, we have a strong private pharmaceutical set-up that can boost its use for diagnosing and treating the growing number of cancer cases and other diseases in the country. It could even export these isotopes to other countries."

The Scope: The global radiopharmaceutical business was estimated to be a \$4.1 billion market in 2019, and growing. The gamma radiation business for food preservation and grain storage is also expanding. Already, India was able to reduce the cost of treatment for eye cancer by over 70 per cent by making these isotopes in the country. Former AEC chairman Anil Kakodkar believes the reforms have come at the right time. "This is a really good idea," he says. "We now have a fair bit of experience in both public and private sectors to deliver widespread use of radiopharmaceuticals in a timely manner to meet the growing medical demand for them in the country. We could combine to develop many more products that would have use in the country and even market them abroad." Having a PPP reactor gives pharma companies the flexibility to produce the right kind of isotopes when they need it and to find the appropriate buyers for it. It also opens the door for greater private sector

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partnership and ownership in India's nuclear sector, a crucial first step.

The Gap: In the initial years, DAE would have to hand-hold the private sector till it gains confidence in conducting research and running the business independently. The pharmaceutical industry needs assured continuity of policy and availability of isotopes to make it a success. The fine print of the government's policy will be critical in this regard.

Only a consortium of private companies will initially have the expertise and scale to make use of a dedicated research reactor.

Source: <https://www.indiatoday.in/magazine/special-report/story/20200601-radiating-change-1680800-2020-05-23>, 23 May 2020.

OPINION – M.K. Bhadrakumar

Russia, China Won't Accept US Nuclear Superiority

Geopolitics has returned with a bang although Covid-19 is still very much around and a 'second wave' is also expected. The US President Donald Trump's arms control negotiator, Special Presidential Envoy Marshall Billingslea said in an online presentation to a Washington think tank that the United States is prepared to spend Russia and China "into oblivion" in order to win a new nuclear arms race.

As he put it, "The president has made clear that we have a tried and true practice here. We know how to win these races and we know how to spend the adversary into oblivion. If we have to, we will, but we sure would like to avoid it."

We are back to the era of the Manhattan Project. The US is rebooting its 75-year old moribund chase of nuclear superiority over its adversaries. Its corollary also appeared when the Trump administration announced that it will withdraw from the Open Skies Treaty of 1992 (which was first proposed by US President Dwight Eisenhower in 1955 and was ultimately pushed forward by President George H.W. Bush as a way of promoting stability in Europe after the Cold War ended.)

The treaty retained many benefits for all sides and has a wider context insofar as it was a unique confidence-building measure that doubled up as critical underpinning to arms control agreements. Washington is resorting to the by-now-familiar plea that it is withdrawing from the treaty due to repeated Russian violations of its terms.

The Open Skies Treaty came into effect in 2002 with some 34 countries joining it, including Russia of course, which permits each party state to conduct unarmed reconnaissance flights over the others' entire territories to collect data on military forces and activities under clearly defined rules of conduct as regards the type of monitoring equipment to be used, the procedures and so on.

The reconnaissance / surveillance flights could often be at short-notice so that the spying missions could be mounted faster than a satellite can be moved into position. Equally, the aircraft used are highly specialised and would have on-board observers of the states spied upon. The treaty retained many benefits for all sides and has a wider context insofar as it was a unique confidence-building measure that doubled up as critical underpinning to arms control agreements.

Washington is resorting to the by-now-familiar plea that it is withdrawing from the treaty due to repeated Russian violations of its terms, an argument the Trump administration had advanced last year also while scuttling the INF Treaty of

1987, which banned all of the US and Russia's land-based ballistic missiles, cruise missiles, and missile launchers with ranges of 500–1,000 kilometers (short medium-range) and 1,000–5,500 km (intermediate-range).

The US will formally withdraw from the Open Skies accord in six months, American officials have said. The news was confirmed by Trump himself midday, followed by a special briefing by the US State Department, kicking off a six-month clock before a formal exit occurs. The move was not a surprise, as

Washington had signalled to its European allies toward the end of last year that the US would consider withdrawing.

The Russian Foreign Ministry has reacted that it had not violated the treaty and that a US withdrawal would be "very regrettable", adding that the Trump administration was working to "derail all agreements on arms control". The statement said,

Indeed, this is not the first arms control agreement that the Trump administration has abandoned. What we are witnessing is the Trump administration dismantling systematically the entire fabric of arms control inherited from the Cold War era.

"This decision is a deplorable development for European security. This US-initiated treaty is a major component of European security... US security concerns will not improve either and its international prestige is bound to be hurt. The policy to discard the

Open Skies Treaty calls into question Washington's negotiability and consistency. This is a source of serious concern even for US allies. Russia's policy on the treaty will be based on its national security interests and in close cooperation with its allies and partners."

Indeed, this is not the first arms control agreement that the Trump administration has abandoned. What we are witnessing is the Trump administration dismantling systematically the

entire fabric of arms control inherited from the Cold War era. The keystone of arms control, the New Strategic Arms Reduction Treaty or START agreement, expires in 2021, and there is little enthusiasm in the US for its extension.

The US' dreams of attaining nuclear superiority over the former Soviet Union proved a chimera. The Trump administration's enterprise can only meet a similar fate. In the Russian defence doctrine, global stability is riveted on strategic balance and there is no question of Moscow conceding nuclear superiority to the US, no matter what it takes.

A new dimension has no[w] appeared in the pointed reference in the Russian statement to Moscow formulating its policy apropos the US decision on the Open Skies Treaty "in close cooperation with its allies and partners". It hints at a Russian policy response in coordination with

China. If so, the Russian-Chinese entente is being elevated to a qualitatively new level. It may be recalled that on the sidelines of an international affairs conference in Moscow last year, President Vladimir Putin had revealed that Russia is helping China build a system to warn of ballistic missile launches.

Putin added that "this is a very serious thing that will radically enhance China's defence capability". The seemingly inadvertent remark was calibrated to signal a new degree of defence cooperation between Russia and China at a juncture when Washington branded both as revisionist powers that challenged US interests globally and must be countered.

The period since October 2019 is characterised by growing belligerence in the US force projection toward Russia and China. The Chief of Staff of Russia's North-Eastern Joint Command Mikhail Bilichenko said in December that US was boosting its activity near the Chukotka Peninsula,

"increasing the grouping and practicing, among other things, the landing of an amphibious assault force."

Earlier in May 2020, a US Navy strike force of the 6th Fleet began operating in the Barents Sea, north of Russia, for the first time since the Cold War, further expanding its portfolio of Arctic operations by aircraft carriers and surface combatants in the past two years. Three Arleigh Burke-class Aegis destroyers – USS Donald Cook, USS Porter and USS Roosevelt along with fast combat support ship USNS Supply (T-AOE-6) are in the Barents Sea to "assert freedom of navigation and demonstrate seamless

integration among allies," according to a U.S. Navy news release.

Similarly, a longer-term struggle between the US and China is at a turning point, as the former rolls out new weapons and strategy in a bid to close a wide missile gap with China. Having got rid of the constraints under the INF Treaty, the Trump

administration is planning to deploy long-range, ground-launched cruise missiles in the Asia-Pacific region. according to the White House budget requests for 2021 and Congressional testimony in March of senior U.S. military commanders, the Pentagon intends to arm its Marines with versions of the Tomahawk cruise missile now carried on US warships, It is also accelerating deliveries of its first new long-range anti-ship missiles in decades.

And, in a radical shift in tactics, the U.S. moves are aimed at countering China's overwhelming advantage in land-based cruise and ballistic missiles. The US Navy maintains a powerful presence off the Chinese coast. The guided-missile destroyer USS Barry passed through the Taiwan Strait twice in April. And the amphibious assault ship USS America last month (April 2020) exercised in the East China Sea and South China Sea. A Reuters Special Report this month (May 2020) quoted a former senior Australian government defense official as estimating, "The Americans are

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coming back strongly. By 2024 or 2025 there is a serious risk for the PLA that their military developments will be obsolete."

The guided-missile destroyer USS McCampbell made a transit through the Taiwan Strait, May 14, 2020. Beijing has been repeatedly warning that it will not stand by idly if the provocative US force projections continued. In an article in the Chinese Communist Party tabloid *Global Times*, the daily's editor-in-chief Hu Xijin wrote that China should increase its nuclear warheads to 1,000 "in a relatively short time span", and to procure at least 100 DF-41 strategic missiles, the country's fourth-generation and latest solid-fuelled road-mobile ICBM with an operation range upto 15000 kilometres.

Hu, a hugely influential opinion maker, argued that it is no more sufficient for China to develop adequate nuclear deterrent, since the US government has identified China as its largest strategic competitor, and Washington is "more likely to exert all its power at its disposal to suppress and intimidate China...it is highly likely that it could even take similar risks that led to the Cuban missile crisis." Therefore, China needs to possess such power that prevents the US politicians from "gambling with its nuclear armament and harming China."

In plain terms, Hu said, if the US tries to subdue China in the Taiwan Straits or the South China Sea, which are its core interests, to considers that defeating China is necessary for perpetuation of its global hegemony, then "China must fix its nuclear gap with the US." At a time when Washington sharply increases its investment in nuclear arsenal armament as the "cornerstone of American politics and psychology," China needs a bigger depot of nuclear weapons.

The post-Covid era is destined to see an

acceleration of strategic competition between the big powers. The existing strategic conventions are being jettisoned and new weapons systems are being developed, such as very high-speed, hypersonic missiles. Also undermining deterrence is Artificial Intelligence. To tamp down the intensifying geopolitical contestations, a bolstering of the old arms control order would have helped but the opposite is happening.

Source:<https://www.newsclick.in/US-China-Russia-Wont-Accept-Nuclear-Superiority>, 23 May 2020.

NUCLEAR STRATEGY

USA

Debate to Relocate US Nuclear Weapons to Poland Irks Russia

Beijing has been repeatedly warning that it will not stand by idly if the provocative US force projections continued. In an article in the Chinese Communist Party tabloid *Global Times*, the daily's editor-in-chief Hu Xijin wrote that China should increase its nuclear warheads to 1,000 "in a relatively short time span", and to procure at least 100 DF-41 strategic missiles, the country's fourth-generation and latest solid-fuelled road-mobile ICBM.

Some US officials are eyeing Poland as a new home to the US nuclear arsenal in Europe, after German Social Democrats reopened the debate about whether the country should remain under Washington's protective nuclear umbrella. And the latest twist has already displeased Russia, Poland's mighty eastern neighbour.

Germany should "exclude the stationing of US nuclear weapons in the future," demanded in early May Rolf Mützenich, Social Democrat leader in the German Bundestag,... Mützenich's plea was largely supported by party leaders, who saw the pacifist drive as a possible trump card for next year's parliamentary elections, as the party is also opposing the purchase of US-made F-18 fighter planes capable of transporting nuclear warheads, one of the conditions for Germany to maintain its nuclear capacity after 2030.

Germany should "exclude the stationing of US nuclear weapons in the future," Rolf Mützenich, the leader of the Social Democrats (SPD) in the Bundestag, has demanded. Foreign minister Heiko

Maas has hit back, but other Socialist politicians intend to question Germany's role in NATO's nuclear strategy.

Richard Grenell, US Ambassador to Germany, accused the German government of not doing its part for NATO's policy of nuclear deterrence, and the US Embassy issued a statement reminding Berlin that it had pledged to contribute to NATO capabilities and suggesting that "if Germany seeks to be a true power for peace, now is the time for solidarity". Will Germany bear this responsibility, or will it sit back and simply enjoy the economic benefits of security provided by its other Allies?" the statement read.

It was also a reminder of the 2016 Warsaw Declaration in which NATO leaders stated that "the fundamental purpose of NATO's nuclear capability is to preserve peace, prevent coercion, and deter aggression." During the latest debate, German security experts have described the domino effect of the withdrawal of nuclear weapons from Germany.

"Germany can abandon nuclear deterrence. This forces Poland to rethink the issue of nuclear deterrence. And this motivates Russia to intensify its strategy of influence in Central and Eastern Europe. The result: more conflict in the East, Europe weakened," Ulrich Speck, Senior Visiting Fellow at the German Marshall Fund, commented on Twitter.

Poland as a Substitute? US Ambassador to Poland, Georgette Mosbacher, upped the ante and suggested that in the event that Germany should attempt to "reduce its nuclear potential and weaken NATO", "perhaps Poland, which pays its fair share, understands the risks and is on NATO's

Eastern Flank, could house the capabilities".

Although Warsaw has not officially sought such a solution, the possibility has been discussed since December 2015 by the then deputy defence minister and Poland's current Ambassador to NATO, Tomasz Szatkowski.

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However, the relocation of US nuclear weapons to Poland would be "expensive, militarily unwise because it would make the weapons more vulnerable to preemptive attack, unduly provocative, and divisive within NATO,"

warned Steven Pifer, former US diplomat in Poland and a current non-resident fellow at Brookings' Arms Control and Non-Proliferation Initiative.

According to him, such a move would require the construction of a special infrastructure that would ensure the security of the equipment and specially isolated air bunkers that would have to be built in Poland. It also would make Poland more vulnerable to being targeted and could divide NATO allies, as some members may not agree to transfer nuclear weapons to Poland.

...Mosbacher's statement about the possibility of deploying US nuclear weapons in Poland drew a

Germany can abandon nuclear deterrence. This forces Poland to rethink the issue of nuclear deterrence. And this motivates Russia to intensify its strategy of influence in Central and Eastern Europe.

harsh rebuke from Russia's Ministry of Foreign Affairs. Russian MFA spokeswoman Maria Zakharova said Mosbacher wants to "talk about the possibility of bringing nuclear weapons and their infrastructure

closer to the Russian borders." This would constitute "a violation of one of the key provisions" of the 1997 Russia-NATO Founding Act.

The act – a political agreement, not a legally binding treaty— committed NATO to carry out its collective defence and other missions by "ensuring the necessary interoperability, integration, and capability for reinforcement

rather than by additional permanent stationing of substantial combat forces” on the territories of the former Warsaw Pact states.

“We hope Washington and Warsaw are aware of the dangerous nature of this kind of expression,” Zakharova said, adding that such declarations “are still exacerbating relations between Russia and NATO, which are already going through a bad time” and “threaten the material basis of European security.” Instead, security could be strengthened by “taking American warheads back to US territory.”

Source: Author Alexandra Brzozowski, edited by Zoran Radosavljevi, <https://www.euractiv.com/section/defence-and-security/news/debate-to-relocate-us-nuclear-weapons-to-poland-irks-russia/>, 20 May 2020.

In December 2017, Japanese PM Abe approved plans to install two US-made Aegis Ashore missile defense units, each costing approximately \$900 million, in response to ballistic missile tests conducted by North Korea.

Japanese authorities had previously planned to install one of the systems at the Araya Ground Self-Defence Force training complex in the northern city of Akita, although these plans were reportedly shelved after fierce pushback from local residents. The government later denied that it had scrapped proposals to deploy the system in Akita prefecture.

According to media reports, the government hopes to deploy the second of the two Aegis Ashore units in the southern Yamaguchi prefecture. Russian Deputy Foreign Minister Sergei Ryabkov in January 2020 expressed doubts as to whether the Aegis Ashore missile defense systems would solely serve to protect Japan from the threat of ballistic missiles from North Korea.

Source: Sputnik News, 28 May 2020.

BALLISTIC MISSILE DEFENCE

JAPAN

Japanese Study to Find Site for Missile Defence System Delayed Due to COVID-19 - Reports

An ongoing study in northern Japan to find a suitable site for the deployment of a US-made Aegis Ashore ground-based missile system has been delayed due to the ongoing coronavirus disease outbreak, the NHK broadcaster reported citing a source involved in the investigation.

In December 2017, Japanese PM Abe approved plans to install two US-made Aegis Ashore missile defense units, each costing approximately \$900 million, in response to ballistic missile tests conducted by North Korea. Studies have been ongoing to find a suitable site in northern Japan for the deployment of the missile defense system. The second investigation was set to be completed in May 2020, although the broadcaster cited a source inside the study who stated that work had been delayed due to the ongoing coronavirus disease outbreak.

The delay is estimated to last a month, the broadcaster cited the source as saying. The

NUCLEAR ENERGY

CANADA

Canadian Partnership to Provide Low Cost Nuclear Power to Remote Areas

StarCore Nuclear Canada utilises technology similar to that which has long been used aboard nuclear submarines or large warships. In 50 years, it has seen no major incidents, making this a safe and clean choice of, the company said.

For remote towns, such as those in Canada currently relying on damaging diesel generators to power their communities, using this technology is a highly beneficial, more sustainable option. StarCore Nuclear Canada is a Generation IV High Temperature Gas Reactor technology that has been designed, optimised and patented for the purpose of providing small-scale, safe, low cost and low CO2-emission power production in remote locations.

The StarCore says its nuclear technology can significantly reduce reliance on diesel to produce power and by doing so reduce greenhouse gases and lower the cost of energy production, which is critical for remote communities, mines, island

communities and large industry. Compared with usual nuclear reactor costs of around £18 billion – StarCore’s reactors will cost considerably less, with only few members of staff required to maintain the reactors.

StarCore Nuclear Canada has engaged RWT Growth as the exclusive corporate and capital advisor for its global operations and StarCore’s imminent small modular nuclear reactor power project(s) in Canada. RWT Growth is a boutique corporate advisory and investment banking advisory banking firm with offices in Canada and London UK. StarCore and RWT have been working together since June 2019. “StarCore represents a technology that can change the way we provide power to some of the world’s most remote locations and provide economic power solutions while dramatically lowering CO2,” said RWT Growth CEO Reece Tomlinson. ...

Source: Nuclear Engineering International, 20 May 2020.

EGYPT

Pandemic won’t Halt Construction on Egypt’s First Nuclear Power Plant

Amid the coronavirus pandemic that has delayed mega projects scheduled for this year in Egypt, such as the New Administrative Capital and the Grand Egyptian Museum, work on Egypt’s first nuclear project continues around the clock. “The work is currently underway despite the coronavirus and there is no amendment to the timetable for the Dabaa nuclear plant project,”

Ayman Hamza, spokesperson for the Electricity and Renewable Energy Ministry, told Al-Monitor.

Russian-Egyptian cooperation on the NPP started in 2015 when both countries signed an agreement for Russia to construct Egypt’s first nuclear power plant. According to the agreement, Russia would provide a \$25 billion loan to Egypt to cover 85% of the construction cost, while Egypt would fund the remaining amount through private investors.

The Dabaa nuclear power plant (NPP), located along the northern west coast of Egypt on the Mediterranean Sea in Dabaa city in Matrouh governorate, is designed to diversify the country’s energy sources. Russian-Egyptian cooperation on the NPP started in 2015 when both countries signed an agreement for Russia to construct Egypt’s first nuclear power plant. According to the agreement, Russia would provide a \$25 billion loan to Egypt to cover 85% of the

construction cost, while Egypt would fund the remaining amount through private investors.

The Russian State Atomic Energy Corporation (Rosatom) will be responsible for building the four VVER-1200 pressurized water reactors, which are capable of producing 1,200 MW each for a total of 4,800 MW. The project will be owned and operated by the Nuclear Power Plant Authority under the Egyptian Ministry of Electricity and Renewable Energy. The first unit is expected to begin operations in 2026 and the three remaining reactors in 2028-2029.

...“Egyptian workers and Russian experts who are present at the Dabaa site or other foreign experts at all the sites affiliated with the ministry have a

Nuclear technology can significantly reduce reliance on diesel to produce power and by doing so reduce greenhouse gasses and lower the cost of energy production, which is critical for remote communities, mines, island communities and large industry. Compared with usual nuclear reactor costs of around £18 billion – StarCore’s reactors will cost considerably less, with only few members of staff required to maintain the reactors.

medical examination every 14 days,” he explained. Hamza said that the work at the site is taking place in three stages that started in 2017. “The first one was to prepare the site, and this was started in December 2017 and lasted 30 months. The second stage will start after obtaining the construction permit. This includes all works related to construction, training and preparations to

commence the operational tests. The last one includes pre-operation tests and the official

opening of the unit," he explained.

The site selection approval permit, issued in March last year 2019, verifies that the project site and its specific conditions comply with national and international requirements. ...Meanwhile, three Egyptian contractors won the tender for constructing the first nuclear unit at the Dabaa plant, Rosatom subsidiary Atomstroyexport announced in February 2020. The three winning contractors are Petrojet, Hassan Allam Holding and the Arab Contractors construction company.

According to Atomstroyexport's vice president, Grigory Sosnin, the company's top priority in the Dabaa project is to have 20% participation by Egyptian companies in the first phase. He added that a number of other tenders are due to be held this year for the rest of construction work and the goal is for Egyptian participation to reach 35% by the end of work.

Experts hailed the Dabaa project for its great potential impact on the country's economy as well as a guarantee to prevent future crises resulting from shortages in electricity. Yousry Abushady, a former senior inspector at the International Atomic Energy Agency, said that the electricity generated by the plant will adequately meet the growing demand for electricity in Egypt.

He added that the Dabaa project will increase the gross domestic product of Egypt, not only by increasing the revenues of local contractors, but also by stimulating growth in related industries such as building materials, equipment, machinery, facilities and other services as well as over 50,000 job opportunities. ... "The plant contains a safe and error-resistant design for human factors. It can work over 60 years and it has an unprecedented ability to resist damage." ...It could withstand the impact of a 400-ton plane

with a speed of 150 meters per second or earthquakes up to an intensity of nine on the Richter scale.

The plant contains a safe and error-resistant design for human factors. It can work over 60 years and it has an unprecedented ability to resist damage." ...It could withstand the impact of a 400-ton plane with a speed of 150 meters per second or earthquakes up to an intensity of nine on the Richter scale.

"The nuclear reactors are also characterized by safe operation without any negative effects on the surrounding environment. These reactors also prevent radiological leakage through filters, multiple barriers and automatic failsafe systems," he added.

The Dabaa plant is not the only mega project between Russia and Egypt. There are a number of other important projects underway between the two countries, including the establishment of the Russian industrial zone in the Suez Canal Economic Zone, which is expected to attract investments worth \$7 billion.

Acting Russian trade representative in Cairo Nikolai Aslanov said in an April 12 interview with Egyptian business newspaper Almal that Russian companies are planning to invest another \$1.5 billion in Egypt during this year. He added that the value of Russian

investments in Egypt at the end of last year reached \$7.5 billion, 60% of it in the oil and gas sector. Aslanov stressed that Egypt is one of Russia's strategic partners in Africa and the Middle East. He pointed out that last year Egypt received more than 130 business delegations from Russian

companies to discuss joint projects and job opportunities. ...

Source: Salwa Samir, <https://www.al-monitor.com/pulse/originals/2020/05/egypt-nuclear-power-plant-russia-work-coronavirus.html>, 18 May 2020.

FRANCE

France's EDF Suffers Second Setback over Nuclear Supply Contracts

A French court ruling ... ordered state-controlled utility EDF to accept Gazel Energy's suspension of

supply contracts under a force majeure clause prompted by the coronavirus pandemic.

In the decision, seen by Reuters, the president of the Paris commercial court said conditions for force majeure in ARENH nuclear power contracts between the two companies were "evidently met". The verdict followed a similar ruling that ordered EDF to accept Total's suspension of supply contracts. Total and Gazel Energy have sought to invoke the force majeure clause in contracts after the pandemic cut electricity demand by around 20% and pushed prices far below that specified in their existing agreements.

Source: Reporting by Benjamin Mallet; writing by Matthieu Protard; editing by Jason Neely Reuters, 27 May 2020.

GENERAL

L&T Delivers Critical Nuclear Power Plant Equipment to Global Customers during Lockdown

Engineering and construction firm Larsen & Toubro...said it has delivered critical nuclear power plant equipment to its global clients during the lockdown. The company's heavy Engineering arm delivered these equipment to global clients in Abu Dhabi, France and other places, Larsen & Toubro said in a statement. "The Heavy Engineering arm of Larsen & Toubro ensured dispatch of critical reactors, coke drums and sub-assemblies of nuclear fusion reactor for their global clients during the lockdown period in India from beginning of last week of March 2020" the company said.

During this period, a final consignment of four out of a total package of 16 ARDS reactors for refinery modernisation project for clean, environment friendly fuels to ADNOC, Abu Dhabi were delivered by the company, it said. The sub-assemblies for International Thermonuclear Experimental Reactor (ITER) France were

delivered on an urgent basis during the lockdown to ensure uninterrupted assembly of Cryostat in reactor pit in southern France, it added.

The company said it is noteworthy to mention that L&T Heavy Engineering has delivered key assemblies towards realising full fusion power by manufacturing the world's largest high-vacuum pressure chamber Cryostat and in wall shields for \$25 billion multinational ITER project. All these significant orders for process plant and nuclear power mega projects were secured against global competition with stiff delivery requirements....

L&T Heavy Engineering has delivered key assemblies towards realising full fusion power by manufacturing the world's largest high-vacuum pressure chamber Cryostat and in wall shields for \$25 billion multinational ITER project. All these significant orders for process plant and nuclear power mega projects were secured against global competition with stiff delivery requirements.

Source: <https://www.moneycontrol.com/news/india/lt-delivers-critical-nuclear-power-plant-equipment-to-global-customers-during-lockdown-5321911.html>, 27 May 2020.

Nuclear Regulators Examine Response to Pandemic

The nuclear sector has reacted quickly and effectively to the unprecedented challenges presented by the COVID-19 pandemic without compromising safety, security or non-proliferation, panellists in a webinar hosted by the UAE Federal Authority for Nuclear Regulation (FANR) said.... They also considered how to apply lessons learned in the post-pandemic era.

The webinar, Impact of COVID-19 Pandemic on the Nuclear Energy Sector and the Need for Innovation, included Canadian Nuclear Safety Commission (CNSC) President and CEO Rumina Velshi, FANR Director General Christer Viktorsson, World Nuclear Association Director General Agneta Rising and IAEA Deputy Director General for Nuclear Safety and Security Juan Carlos Lentijo, who examined how their own organisations had responded to the situation.

The pandemic was an unprecedented event in terms of the speed with which it happened, its global reach and the length of time it has lasted, Velshi said. The world's nuclear regulators have

taken similar approaches to the pandemic, but this was not a surprise, she added, given that the nuclear industry is “good at planning for emergencies and adding a layer for contingencies”.

The CNSC triggered its emergency management business continuity plan on 15 March 2020, from which point all staff were required to work remotely, and physical inspections and Commission proceedings ceased. Velshi said the business continuity plan has now been shut down, but physical inspections have resumed and other CNSC activities are “slowly” restarting. “We have not missed a beat in carrying out our mandate,” she said. Some of CNSC’s licensees - notably nuclear power plants - were declared essential services and continued operating, but others – such as mines – have been closed.

FANR already had an advanced IT infrastructure and business continuity plan in place and activated this immediately in response to the pandemic, Viktorsson said. This was adapted in some respects, but the regulator ensured safety, security and non-proliferation activities were not compromised, he said. FANR’s already established “Smart” licensing system for medical and non-power users of radiation has continued working without interruption, he said.

Emphasis has been placed on ensuring the Barakah nuclear power plant site remains free of the coronavirus. This has so far been achieved, he said, and resident inspectors have been essential to ensuring seamless regulation at the site. The initial focus was on unit 1, which is expected to start up within weeks, but work on units 2-4 has now resumed fully, he said.

...The measures implemented by governments to

protect life and health - social distancing and confinement - have impacted both organisations and their staff, Lentijo said, adding they had affected supply chains as well as the mobility of individuals. Nuclear operators and regulators have shown flexibility and this has so far been effective in ensuring nuclear power plants have remain operational, safe and secure whilst ensuring the safety of workers.

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No IAEA Member State has yet reported having to shut down a plant due to effects of the pandemic on the workforce, Lentijo said, but safety and security challenges must be recognised. For example, there may be a need to increase the number of staff certified for certain functions, increase working hours and amend refuelling outages to comply with distancing requirements and supply chain issues. Postponement of refuelling outages, which

would necessitate extending operating cycles in some circumstances, would require regulatory licensing actions, he said.

...Rising said the pandemic had been a wake-up call on the importance of nuclear energy for continued, reliable electricity generation.

“Throughout this pandemic we have been able to rely on nuclear reactors and the people who operate them,” she said. As well as the challenge of working during the pandemic, nuclear operators have had to cope with the added challenge in many parts of the world of an electricity system where flexibility has been jeopardised by intermittent generation sources, as well as falls in demand. This has meant nuclear reactors have had to be flexible and agile in operation, she said.

Some refuelling outages are now being extended whilst electricity demand is lower, but earlier in the pandemic refuelling outages had to be

Many innovations, both technical and organisational, had already been applied in the nuclear industry’s response to the pandemic, and she called for sharing of good practices and lessons learned, but the most important lessons from COVID-19 would be on the “human” side.

shortened to enable a quick return to service, she said.

The pandemic has demonstrated how critical safety culture is, Velshi said, adding that strong safety culture starts with leadership. The nuclear sector is very good at being open and learning from best practices, she said, and this should be underpinned by building trust and confidence in stakeholders to assure them that this is a well-regulated sector that is managed safely, securely and transparently.

Post-Pandemic Planning: Nuclear safety and security are national responsibilities, Lentijo said, but the IAEA has been assisting its Member States in maintaining high levels of safety and security. It has also provided channels for operators and regulators to communicate and share experience for the benefit of the wider nuclear community, both through its existing reporting systems and tools and through newly established networks.

The IAEA also oversees non-power operations, such as medical operations, and it has been providing special training and advice, including by webinar, on diagnostic procedures, the protection of workers and the management of radioactive substances during the pandemic. It is also working with other agencies to facilitate the distribution of radiopharmaceuticals, which has been impacted by transport issues brought about by the pandemic.

Rising said the nuclear industry can rely on its procedures and routines to ensure it continues to function well going forward, but the supply chain must also be protected. This means considering the possible impacts of cash flow on suppliers and being aware of possible knock-on effects on the nuclear sector from industries, such as the construction and aerospace industries, she added.

Many innovations, both technical and organisational, had already been applied in the nuclear industry's response to the pandemic, and she called for sharing of good practices and lessons learned, but the most important lessons from COVID-19 would be on the "human" side.

She called on governments to consider nuclear power in relation to society. "When governments are looking towards economic recovery, nuclear has a very big role to play," she said, with investment in nuclear stimulating economic growth and creating jobs.

Source: World Nuclear News, 20 May 2020.

Making Nuclear Energy Cost-Competitive

Nuclear energy is a low-carbon energy source that is vital to decreasing carbon emissions. A critical factor in its continued viability as a future energy source is finding novel and innovative ways to improve operations and maintenance (O&M) costs in the next generation of advanced reactors. The U.S. Department of Energy's Advanced

Research Projects Agency-Energy (ARPA-E) established the Generating Electricity Managed by Intelligent Nuclear Assets (GEMINA) program to do exactly this. Through \$27 million in funding, GEMINA is accelerating research, discovery, and

development of new digital technologies that would produce effective and sustainable reductions in O&M costs.

Three MIT research teams have received APRA-E GEMINA awards to generate critical data and strategies to reduce O&M costs for the next generation of nuclear power plants to make them more economical, flexible, and efficient. The MIT teams include researchers from Department of Nuclear Science and Engineering (NSE), the Department of Civil and Environmental Engineering, and the MIT Nuclear Reactor Laboratory. By leveraging state-of-art in high-fidelity simulations and unique MIT research reactor capabilities, the MIT-led teams will collaborate with leading industry partners with practical O&M experience and automation to support the development of digital twins. Digital twins are virtual replicas of physical systems that are programmed to have the same properties, specifications, and behavioral characteristics as

BWRX-300 is a promising small modular reactor concept that aims to be competitive with natural gas to realize market penetration in the United States. The team will assemble, validate, and exercise high-fidelity digital twins of the BWRX-300 systems.

actual systems. The goal is to apply artificial intelligence, advanced control systems, predictive maintenance, and model-based fault detection within the digital twins to inform the design of O&M frameworks for advanced nuclear power plants.

In a project focused on developing high-fidelity digital twins for the critical systems in advanced nuclear reactors, NSE professors Emilio Baglietto and Koroush Shirvan will collaborate with researchers from GE Research and GE Hitachi. The GE Hitachi BWRX-300, a small modular reactor designed to provide flexible energy generation, will serve as a reference design. BWRX-300 is a promising small modular reactor concept that aims to be competitive with natural gas to realize market penetration in the United States. The team will assemble, validate, and exercise high-fidelity digital twins of the BWRX-300 systems. Digital twins address mechanical and thermal fatigue failure modes that drive O&M activities well beyond selected BWRX-300 components and extend to all advanced reactors where a flowing fluid is present. The role of high-fidelity resolution is central to the approach, as it addresses the unique challenges of the nuclear industry.

NSE will leverage the tremendous advancements they have achieved in recent years to accelerate the transition of the nuclear industry toward high-fidelity simulations in the form of computational fluid dynamics. The high spatial and time resolution accuracy of the simulations, combined with the AI-enabled digital twins, offer the opportunity to deliver predictive maintenance approaches that can greatly reduce the operating cost of nuclear stations. GE Research represents an ideal partner, given their tremendous experience in developing digital twins and close link to GE Hitachi and BWRX-300 design team. This team is particularly well positioned to tackle

regulatory challenges of applying digital twins to safety-grade components through explicit characterization of uncertainties. This three-year MIT-led project is supported by an award of \$1,787,065.

MIT Principal Research Engineer and Interim Director of the Nuclear Reactor Lab Gordon Kohse will lead a collaboration with MPR Associates to generate critical irradiation data to be used in digital twinning of molten-salt reactors (MSRs). MSRs produce radioactive materials when nuclear fuel is dissolved in a molten salt at high temperature and undergoes fission as it flows through the reactor core. Understanding the behavior of these radioactive materials is important for MSR design and for predicting and

reducing O&M costs — a vital step in bringing safe, clean, next-generation nuclear power to market. The MIT-led team will use the MIT nuclear research reactor's unique capability to provide data to determine how radioactive materials are generated and transported in MSR components. Digital twins of MSRs will require this

critical data, which is currently unavailable. The MIT team will monitor radioactivity during and after irradiation of molten salts containing fuel in materials that will be used in MSR construction. Along with Kohse, the MIT research team includes David Carpenter and Kaichao Sun from the MIT Nuclear Reactor Laboratory, and Charles Forsberg and Professor Mingda Li from NSE. Storm Kauffman and the MPR Associates team bring a wealth of nuclear industry experience to the project and will ensure that the data generated aligns with the needs of reactor developers. This two-year project is supported by an award of \$899,825.

In addition to these two MIT-led projects, a third MIT team will work closely with the Electric Power Research Institute (EPRI) on a new paradigm for reducing advanced reactor O&M. This is a proof-of-concept study that will explore how to move

This is a proof-of-concept study that will explore how to move away from the traditional maintenance and repair approach. The EPRI-led project will examine a “replace and refurbish” model in which components are intentionally designed and tested for shorter and more predictable lifetimes with the potential for game-changing O&M cost savings.

away from the traditional maintenance and repair approach. The EPRI-led project will examine a “replace and refurbish” model in which components are intentionally designed and tested for shorter and more predictable lifetimes with the potential for game-changing O&M cost savings. This approach is similar to that adopted by the commercial airline industry, in which multiple refurbishments — including engine replacement — can keep a jet aircraft flying economically over many decades. The study will evaluate several advanced reactor designs with respect to cost savings and other important economic benefits, such as increased sustainability for suppliers. The MIT team brings together Jeremy Gregory from the Department of Civil and Environmental Engineering, Lance Snead from the Nuclear Reactor Laboratory, and professors Jacopo Buongiorno and Koroush Shirvan from NSE.

... The advances by these three MIT teams, along with the six other awardees in the GEMINA program, will provide a framework for more streamlined O&M costs for next-generation advanced nuclear reactors — a critical factor to being competitive with alternative energy sources.

Source: Department of Nuclear Science and Engineering, MIT, <http://news.mit.edu/2020/making-nuclear-energy-cost-competitive-0527>, 27 May 2020.

Puerto Rico

Puerto Rico Considers Nuclear

A Preliminary Feasibility Study for Small Modular Reactors and Microreactors for Puerto Rico was published on 20 May by the Nuclear Alternative Project (NAP). It was prepared for the US DOE under Contract No 226818. The study began in October 2019 after it received a “notice to proceed” from DOE’s Idaho National Laboratory.

NAP, a non-profit organisation comprised of Puerto Rican engineers, set up in 2015 to inform the people of Puerto Rico about advanced nuclear reactors, received further incentive as a result of the 2017 hurricane. “In the aftermath of Hurricane Maria, where more than 3000 deaths were attributed to the lack of electricity and basic services, our educational effort evolved into one of need – to evaluate the feasibility of advanced

nuclear reactors for Puerto Rico,” said NAP.

Currently, Puerto Rico generates 98% of its electricity from imported fossil fuels, and its ageing power plants, built in the late 1960s, suffer frequent blackouts. Within ten years, Puerto Rico proposes a transition from a fossil fuel-dependent centralised system to a distributed system based on clean energy. In 2018 the country’s legislature passed a bill calling for an investigation into the possibility of building nuclear power plants.

The Integrated Resource Plan (IRP) proposed by the Puerto Rico Electric Power Authority (PREPA) calls for Puerto Rico to have new solar, storage and natural gas capacity totalling 3000MWe by 2025. The Puerto Rico Renewable Portfolio Standard mandates 40% renewable energy generation by 2025, 60% renewables by 2040 and 100% renewables by 2050.

The challenges identified by the study for deployment of advanced reactors in Puerto Rico are policy, engineering and public engagement related. A site suitability analysis indicated that development of advanced nuclear reactors in Puerto Rico is feasible. NAP said a follow-up second phase study would evaluate the general site suitability for SMRs and microreactors for specific regions. The results of the study will be formally submitted to the Puerto Rico Energy Bureau (PREB) as part of the public comment for the ongoing IRP revision process.

Key Findings of the Study Were: Puerto Rico’s daily electricity demand (or load profile) peaks at approximately 10% from average and utilisation rates (load factors) in the range of 75%. Thus, power demands require steady baseload plants such as fossil or nuclear plants rather than intermittent renewable sources like solar and wind.

PREPA’s plants are 28 years older and experience outage rates 12 times higher than the US average due to old equipment and high daily and seasonal power demands aggravated by damage from recent hurricanes and earthquakes. PREPA expects to retire 74% of its generation fleet in the next decade.

...Due to its tropical climate and isolated grid

structure, Puerto Rico's daily power demand and utilisation rates are not expected to change appreciably. Therefore, the proposed high reliance on renewables necessitates sufficient baseload capacity to support the power demand. However, only nuclear reactors can complement the intermittency of renewable power sources with zero-emission baseload power generation. A survey of more than 3000 residents of all ages and educational backgrounds found 94% of residents are interested in a nuclear option.

Advanced nuclear reactors combine reduced electricity costs, zero-emission baseload electricity and minimal dependency on fuel imports that can lead to a strong degree of energy security. SMRs and microreactors can support the required retirement of 74% of the ageing generation fleet and installation of new capacity.

There is an urgent need to provide the population and industrial sector with lower electricity costs. The overall net costs of electricity could increase by 50% by FY2024 through a Transition Charge levied to pay PREPA's outstanding legacy debt, making Puerto Rico's electricity prices among the highest in all USA jurisdictions.

Puerto Rico's fossil fuelled power plants produce more emissions than other mainland US states with a similar population. Advanced nuclear reactors combine reduced electricity costs, zero-emission baseload electricity and minimal dependency on fuel imports that can lead to a strong degree of energy security. SMRs and microreactors can support the required retirement of 74% of the ageing generation fleet and installation of new capacity. Given the recent hurricane and earthquake events in Puerto Rico, the need for enhancing the overall resiliency of the energy generating system is urgent.

In 2017, oil and gas imports to Puerto Rico were disrupted after Hurricane Maria's landfall. The need to maintain a high frequency of fuel imports to the Island would leave Puerto Rico vulnerable to future supply disruptions in case of natural events. However, the shipment for nuclear fuel for each SMR would be only every two years and

10-15 years for microreactors.

Advanced nuclear reactors can promote smaller and more distributed future generation plants, which makes them suitable for Puerto Rico's decentralised grid vision, particularly minigrids. Fuelled by job creation during construction and operation of the reactor and research funding for local universities, a local nuclear project could develop a nuclear workforce that could secure a global leadership position.

...There is a public misconception that nuclear power is prohibited in Puerto Rico. A 1990 Executive Order stated nuclear power was not a viable alternate energy source at that time, but not that nuclear power plants were prohibited.

It is expected that the Puerto Rico nuclear plant's low-level waste will be shipped to a US licensed low-level waste disposal facility and used fuel would be stored on site and later shipped to a long-term high-level waste storage facility in the mainland US. Among the mandates in Act 120-2018, new energy generation producers would be contracting with

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a T&D concessionaire instead of PREPA. The suitability of sites for advanced nuclear reactors in Puerto Rico will be in accordance with US Nuclear Regulatory Commission (NRC) regulations.

Source: Nuclear Engineering International, 27 May 2020.

NUCLEAR COOPERATION

ROMANIA-CHINA

Romania Cancels Deal with China to Build Nuclear Reactors

The Romanian government... asked the state company Nuclearelectrica, which runs the nuclear

power plant in Cernavoda, to terminate negotiations with its Chinese partner China General Nuclear Power Corporation, GCNPC, on the construction of nuclear reactors 3 and 4 at Cernavoda. The government said Nuclearelectrica needs to find new partners for the project. A Memorandum of Understanding was signed between Nuclearelectrica and GCNPC in November 2015 to build the two reactors.

According to the document, the two parties were to set up a joint venture project company in which the Chinese company would hold a stake of at least 51 per cent of the shares. The new joint venture was planned to take over the value of Nuclearelectrica's investment in its subsidiary EnergoNuclear SA, the former company that had been due to handle the project for reactors 3 and 4 at the Cernavoda plant.

In May 2019, the Energy Ministry under the former Social Democratic PM Viorica Dancila signed another document with the Chinese company, concerning a 200-million-euros a year investment from GCNPC. But the current Prime Minister, Ludovic Orban, condemned the deal in January 2020. "It is clear to me that it will not work with the Chinese.... We will see with which partner [the reactors will be built]. It is about partners and funding," Orban said in an interview for Hotnews. Economy Minister Virgil Popescu said in January 2020 that Nuclearelectrica could build reactor 3 at Cernavoda by itself, and added that a new joint project with a NATO partner was a more viable scenario.

Romania is a close ally of the US and its movement away from key deals with Beijing has likely been affected by the dramatic cooling in US-China ties

since Donald Trump took office in Washington. In April 2016, the US Justice Department accused China General Nuclear Power Corporation along with Energy Technology International of nuclear espionage. The US justified its accusation, citing "conspiracy to unlawfully engage and participate in the production and development of special nuclear material outside the United States, without the required authorization from the US Department of Energy".

The Romanian Energy Ministry holds the majority share capital of 82.49 per cent of Nuclearelectrica, while Property Fund owns 7.05 per cent and other shareholders have 10.45 per cent. Nuclearelectrica shares registered an increase of 34.4 per cent on the Bucharest Stock Exchange since the beginning of 2020. The rise was linked to transactions worth 168.3 million lei [about 35 million euros].

Source: <https://balkaninsight.com/2020/05/27/romania-cancels-deal-with-china-to-build-nuclear-reactors/>, 27 May 2020..

Romania is a close ally of the US and its movement away from key deals with Beijing has likely been affected by the dramatic cooling in US-China ties since Donald Trump took office in Washington.

The State Department announced ... that it would begin imposing economic penalties on foreign businesses working at Iranian nuclear facilities, the latest effort by the Trump administration to dismantle an Obama-era accord with Tehran. Companies from Russia, China and Europe will have 60 days to wind down their operations converting nuclear plants for peaceful purposes, as allowed under the 2015 deal between Iran and world powers.

NUCLEAR NON-PROLIFERATION

IRAN

U.S. to Penalize Work at Iranian Facilities in Latest Blow to Nuclear Accord

The State Department announced ... that it would begin imposing economic penalties on foreign businesses working at Iranian nuclear facilities, the latest effort by the Trump administration to dismantle an Obama-era accord with Tehran. Companies from Russia, China and Europe will have 60 days to wind down their operations converting nuclear plants for peaceful purposes, as allowed under the 2015 deal between Iran and

world powers.

American officials described it as a necessary step in President Trump's pressure campaign to keep Iran from building a nuclear weapon and to limit Tehran's aggressions in the Middle East. But the decision also abandons the last part of the 2015 nuclear agreement that Mr. Trump had allowed to remain in place. It no longer allows international workers to help convert reactors, and prevent production of weapons-grade fuel, nor can they keep a watchful eye on the nuclear programs to ensure Iran could not secretly violate the deal.

In a statement, Secretary of State Mike Pompeo said he could not justify extending a waiver on sanctions that permitted the companies to work at the nuclear reactors, given what he described as Iran's "expanding proliferation sensitive activities." ... "A regime that just days ago invoked 'the Final Solution' and which regularly threatens to wipe Israel off the map must never obtain a nuclear weapon," Mr. Pompeo said in the statement. He was referring to a recent cartoon supporting Palestinian rights that was issued by the office of Iran's supreme leader, Ayatollah Ali Khamenei, and that invoked a Nazi slogan to eradicate Jews.

The Iranian government's "nuclear extortion will lead to increased pressure on Iran and further isolate the regime from the international community," Mr. Pompeo said. The United States withdrew from the nuclear accord two years ago this month (May 2020). Since then, the administration has deployed a mix of diplomacy, economic sanctions and military threats to pressure Iran into negotiating a new agreement that the president and his advisers hope would go further: not only limiting its nuclear program but also curbing its ballistic missiles systems and halting support to proxy militias in Iraq, Syria, Lebanon and Yemen.

Robert Malley, who helped negotiate the nuclear agreement as a senior White House official during the Obama administration, said Wednesday's step could backfire if Iran reverts to a more aggressive enrichment program than what would exceed the limits under the 2015 deal.

"Removing the waivers has nothing to do with tightening the noose on Iran's nuclear program," said Mr. Malley, now the president and chief executive of the International Crisis Group in Washington. "If anything, it's prompting them to loosen the noose." But, he said, that may be precisely what the Trump administration hopes will happen: By goading Iran into violating the nuclear deal, European leaders may finally side with the United States in declaring it defunct.

"They would not view a collapse of the deal as a loss — they would view that as a gain," Mr. Malley said of the Trump administration. He predicted the new penalties would "further frustrate the Europeans. They've seen the writing on the wall, that the administration is trying to undo the deal."

The State Department's special representative for Iran policy, Brian H. Hook, declined to detail discussions with European officials on the issue and maintained that the 2015 accord "did not moderate the regime's behavior." In a briefing to reporters... State Department officials played down any security risks that might result from effectively prohibiting international workers from acting as watchdogs at the Iranian nuclear sites.

Christopher Ford, an acting assistant secretary of state, called that a "quite negligible" risk. He said the United States would continue to insist that IAEA inspectors had access to the sites — what he described as a far more critical level of oversight.

Source: Lara Jakes, New York Times, 27 May 2020.

NUCLEAR SAFETY

NORWAY

Faked-Data Scandal Might Jeopardize Safety at Unknown Number of Nuclear Power Plants

An investigation at Norway's now-closed Halden research reactor reveals that results from a number of nuclear fuel experiments were tampered with in an effort that was "planned and well hidden," according to the facility's operator — a discovery that could have consequences for numerous nuclear power utilities around the world.

Many of Halden's former customers are foreign governments and nuclear utilities that relied on Halden's data to make decisions about how to fuel their own nuclear reactors. The purpose of research facilities like Halden is to simulate how various nuclear fuels behave under different circumstances, thus allowing nuclear power companies a greater margin of safety in their operations.

While officials have not revealed which nuclear operators might have been impacted by the falsifications, they say the report casts doubt on seven fuel experiments that took place between 1990 and 2005. "What scares us is that companies around the world operating nuclear reactors may have relied on data from the Halden reactor," says Frederic Hauge, Bellona's president. "If data has been manipulated, security can be jeopardized, because the research is used to make decisions about how the reactors are operated."

The Halden reactor, which is one of four research reactors run in Norway, began operations in 1955 and was shuttered in 2018 after a long period of financial difficulties and technical problems. Kvamme Associates, an Oslo-based anti-corruption research group, led the investigation into the suspect data. The group provided its results to the Institute of Energy Technology, or IFE, Halden's operator, earlier.

According to investigators, the IFE's suspicions about data manipulation arose last summer. The ensuing inquiry revealed fraud so serious that the IFE reported it to Norway's economic crimes unit. The investigation report, which IFE released to Bellona, shows that a number of fuel tests were fabricated either because researchers failed to meet test requirements, or because they ran up against deadlines they were unable to meet.

"We have found that data was changed," IFE director Nils Morten Huseby, told Norway's

national broadcaster, NRK. "What was reported to customers is not what the tests actually showed. It can potentially be serious, but we need to know more about how the customers used the data."

Huseby told NRK that at least one person is behind the data-cooking scheme. But according to the report from Kvamme Associates, Huseby said, it was still unclear whether the culprit worked for IFE or for an outside contractor. While Huseby would not publicly identify specific customers who may have been impacted by the fabrications, Kristin Elise Frogg of the Norwegian Protection and Nuclear Safety Authority told NRK, Norway's national broadcaster, that at least four have received falsified results on tests they commissioned at Halden.

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She told NRK that the Authority had been informed of the investigation's development since September and that the affected customers had been notified of falsifications. The initial allegations of possibly cooked data were brought to IFE's attention by internal whistleblowers. The investigation began in

August 2019. "At that time, IFE presented the issue as a research fraud," Frogg told NRK. "Later it has emerged that it had been planned, manipulated and well hidden."

According to NRK, the Kvamme Associates report states that four international projects conducted at the Halden reactor were found to contain fabricated data. Independent experts found that two of the cases involved no security or safety risks, the broadcaster reported, while two other cases have not been fully evaluated.

Three other projects carried out at Halden are also under suspicion and are currently under review, NRK said. Bellona's Hauge questioned the IFE's oversight of the experiments in question, and called for a broader investigation into the institute's management practices. ... "The IFE's

routines have failed, and an unnamed individual can only take part of the blame. This is a breach by IFE's management and it should be investigated."

The revelations come as a blow to the IFE, which until Halden's closure had struggled with criticism that the reactor was too costly to the Norwegian public and had battled allegations that it was unsafe following a 2016 iodine leak. "The fact that IFE's reputation as a research institution is at stake here is one thing," said Hauge. "But that it may have affected the safety of an unknown number of nuclear power plants in an unknown number of countries – that's very, very serious."

The Halden reactor is the fourth of Norway's research reactors, the first three of which operated in Kjeller, near Oslo, which began operations in 1951. For decades, Bellona questioned the Halden reactor's sometimes-hazardous operations, and demanded that the government stop subsidizing its continued use. Over the course of its operation, Halden contributed some 10 tons of spent nuclear fuel to the 17 tons the country has amassed since the middle of the last century.

Source: <https://bellona.org/news/nuclear-issues/2020-05-faked-data-scandal-might-jeopardize-safety-at-unknown-number-of-nuclear-power-plants>, 15 May 2020.

NUCLEAR WASTE MANAGEMENT

CANADA

Canada's Nuclear Waste Disposal Policy Found Deficient

Organizing for a cause goes on in the reality of COVID-19, and a coalition of groups opposed to Canada's current radioactive waste policy got additional impetus back in February when the International Atomic Energy Agency ruled our nation's Radioactive Waste Management Policy Framework was missing vital policy elements.

The over one hundred civil society organizations and scientific experts are calling on Federal minister of Natural Resources (Seamus O'Regan) to suspend all decision-making involving radioactive waste disposal until Canada has a sufficient radioactive waste policy in place. Other commitments requested by signees included that Canada establish underlying objectives and principles for a nuclear waste policy and strategy, and that Canada identify the problems and issues posed by existing and accumulating radioactive waste.

Source: <https://www.renfrewtoday.ca/2020/05/22/canadas-nuclear-waste-disposal-policy-found-deficient/#>, 22 May 2020.

FRANCE

IAEA Commends French Nuclear Waste Programme

The IAEA has released the final report from its January 2018 mission to France to review radioactive waste management and decommissioning in the country. The review team said it had been "impressed with the nature and implementation of the French national programme". At the request of the French government, the IAEA has conducted an integrated review service for radioactive waste and used fuel management, decommissioning and remediation programmes, referred to as Artemis. Artemis missions provide independent expert opinion and advice, drawn from an international team of specialists convened by the IAEA. Reviews are based on the IAEA safety standards and technical guidance, as well as international good practices.

The 11-day mission concluded on 24 January, 2018 and comprised 13 experts from Belgium, Canada, Cuba, Finland, Germany, the Netherlands, Spain and the UK, as well as three IAEA staff members. The mission was hosted by the Directorate General of Energy and Climate with the

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participation of officials from several organisations, including the French National Radioactive Waste Agency (Andra) and the Nuclear Safety Authority.

...These assessments must be carried out every 10 years at least. It was the second Artemis carried out to meet EU obligations, following a mission to Poland in October 2017. "The team consensus is the French national programme is comprehensive and coherent in fostering safety across the spectrum of laws, regulations, and decrees, and their effective implementation by the pertinent waste management organisations," the report says. "Consequently, there are no recommendations made by the team, though a number of suggestions and best practices are noted."

The mission Artemis team said the combination of the Programme Act 2006-739, the Environment Code and the National Plan establishes policies

for the safe management of all France's radioactive waste, as well as the main strategic management directions, actions and responsibilities for their implementation. The National Plan is based upon a current and projected National Inventory of radioactive waste updated every three years. In addition, the efforts at capacity building for human resources and transparency with stakeholders was noted for its proactive approach.

"The French radioactive waste and spent fuel management programme is one of the older and larger programmes in the world, with commensurate resources to ensure effectiveness in fostering safety and programme implementation,"..."Regardless, all programmes should maintain a certain vigilance in assuring effective practices are maintained or enhanced, and remain open to opportunities for improvement."

Source: World Nuclear News, 19 May 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).

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