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**OPINION – Manpreet Sethi**

**15 Years of Indo-US Nuclear Deal: Benefits Transcend Nuclear**

This month marks the 15th anniversary of the start of the journey that led to the civilian nuclear cooperation agreement between India and the United States, popularly called the Indo-US nuclear deal. A landmark Joint Statement of 18 July 2005 was the origin of a transformation of bilateral relations. It envisioned a multifaceted relationship on issues as diverse as terrorism, science and technology, agriculture, infrastructure, health, commerce, energy and defence.

The nuclear dimension of the cooperation, however, monopolised the next three years as both sides worked hard and braved critics to enable amendment of national laws and international rules to facilitate India's accommodation into the nuclear regime. This was not easy since the nuclear positions and policies of both countries had drifted apart substantively since 1974. Three decades of estrangement had to be redressed. A revolutionary initiative was called for to not only accommodate India into the nuclear regime despite its strategic programme, but also effectuate an overall modernisation of the bilateral relationship. The Indo-US nuclear deal was crafted in this spirit.

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Two regional developments around this time came in handy for pushing India's case. The first was the manifestation of Pakistan's irresponsible behaviour—first in Kargil in 1999, and then in its role in the nuclear proliferation network revealed in 2003. While Pakistan tried to frame the second episode as a private enterprise run by A.Q. Khan, enough archival evidence surfaced to prove State involvement. Both these events exposed Pakistan's dangerous mis-adventurism and enabled a de-hyphenation of American policy towards the region. The nuclear cooperation agreement with India, only India, thus became possible.

The second development that went in India's favour was the rise of China. Though Beijing was

yet to bare its fangs in the early 2000s, the fact that it had them was beginning to become clear even then. The American worldview of the time envisaged the need to counterbalance China and nuclear India was perceived as being able to provide the right strategic weight for the purpose. India's democracy, liberalism and heterogeneity added greater heft to its appeal against the authoritarian, Communist and monochromatic China. The Indo-US nuclear deal illustrated American preference for policies supportive of India's rise. The US spokesperson in 2005 described this as "a global partnership with India which encourages India's emergence as a positive force on the world scene".

Basically of course, the Indo-US nuclear agreement was about enabling a rapid expansion of India's nuclear energy programme. Given India's increasing electricity requirements and the need to fulfil them using environmentally friendly technologies made nuclear energy a natural choice. But, to effectively exploit this, India needed more uranium and larger capacity reactors, which was only possible through participation in international nuclear commerce. The deal enabled this by rehabilitating India into the narrowly straitjacketed NSG. This final step was preceded by many others that included the conclusion of a Separation Plan and signing of an Additional Protocol with the IAEA by India, and amendment of the US Nuclear Non-proliferation Act by the American administration.

With the conclusion of all steps by 2008, India had signed cooperation agreements with a dozen countries within the next three years. But, nearly a decade hence, India has limited tangible benefits to show by way of an enhanced nuclear capacity built through imported reactors. This is because of many factors, such as, the blow dealt to public

acceptance of nuclear power by the Fukushima nuclear accident in 2011, contentious land acquisition issues, circumstances that led to India's nuclear liability legislation which inhibited private participation and complicated price calculations. Nonetheless, domestic reactor construction has accelerated with availability of imported fuel. India is also now a part of the global nuclear supply chain.

But then, the Indo-US nuclear agreement was about more than just the nuclear element. The deal pulled the relationship out of a fractious gridlock and laid the foundation for greater trust and friendship. This has withstood changes in administrations on both sides. Indo-US relations today traverse myriad

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dimensions: enhanced counter-terrorism cooperation since the 2008 Mumbai attack; a Strategic Dialogue institutionalised in 2010; fillip to military cooperation with the pivot to Asia in 2012 leading to expanded defence trade; increased energy cooperation, including on renewables technology since 2014; India's designation as a major defence partner in 2016 opening new possibilities for defence acquisitions; conclusion of COMCASA in 2018 enabling Indian access to advanced communication technology for defence.

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Moreover, India's membership of export control groups such as the MTCR, Wassenaar Agreement and Australia Group assured access to earlier denied high technologies. All these steps have added new pillars of cooperation to the foundation laid in 2005. Interestingly, this broad-based cooperation particularly in areas of intelligence sharing, defence, energy and technology acquires a new relevance in the current military face-off with China. It should not be lost on Beijing that India had generally been mindful of China's

sensitivities on its closeness to Washington, including since the conclusion of the nuclear deal. But, Beijing's recent military assertiveness leading to the loss of lives at the Line of Actual control is likely to change India's calculus. Fortunately for India, its military, diplomatic and economic options today are many more than in 1962. The role of the Indo-US nuclear deal in opening these possibilities for India should not be overlooked.

Source: <https://www.sundayguardianlive.com/opinion/15-years-indo-us-nuclear-deal-benefits-transcend-nuclear>, 04 July 2020.

**OPINION – Alexandra Brzozowski**

**Arms Control Tit-for-tat Continues as Treaty Deadlines Loom**

The world's only remaining nuclear arms control treaty is set to expire in less than a year unless Russia and the US agree to roll it over. While Washington has repeatedly called on China to take part in negotiations to extend it, the overall tone between the three nuclear powers is becoming rough. New START treaty, which limits the number of strategic nuclear warheads held by Russia and the US, comes to an end in February 2021, and the two nuclear powers have agreed to start nuclear arms negotiations in June.

After their first round of talks, the US and Russia hope to meet for the second round of nuclear disarmament talks as soon as possible, perhaps as already in late July or early August.

China, which has not been party to any past agreement to limit nuclear arsenals, has been invited to join the talks but never sent its delegation to Vienna. US Special Representative for Arms Control, Marshall Billingslea, condemned the Chinese absence from the talks on Wednesday (8 July) but said he sees a positive evolution in Beijing's position and aims to continue efforts to bring it to the negotiations table.

"We... stand ready to meet bilaterally with China

in Vienna as a way of settling the stage in due course for a trilateral discussion," Billingslea said, adding that in his understanding Russia would also welcome China's participation in the new global arms control architecture. Despite the positive tone, however, he accused Beijing of seeking to catch up with the nuclear arms capability of Russia and the US.

"China is in fact pursuing a dangerous and destabilising nuclear weapons build-up with the intent ultimately of seeking nuclear parity – either qualitatively or quantitatively – with the US and Russia" Billingslea told an online EU Defense Washington Forum event. According to him, Beijing has abandoned its minimal deterrent nuclear strategy. "The world deserves to know what China is doing," Billingslea said, suggesting Beijing should disclose what is behind its "secretive and non-transparent" programme.

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A senior Chinese diplomat quoted by *Reuters* said on 8 July China would be happy to participate in trilateral arms control negotiations with the US and Russia, but only if Washington were willing to reduce its nuclear

arsenal to China's level. Fu Cong, head of the arms control department of Chinese foreign ministry, reiterated to reporters in Beijing that China has no interest in joining the negotiation with former Cold War-era superpowers, given that the US nuclear arsenal is about 20 times the size of China's.

"I can assure you, if the US says that they are ready to come down to the Chinese level, China would be happy to participate the next day," he said. "But actually, we know that's not going to happen." Fu said Washington's invitation to China was "nothing but a ploy to divert attention" and an excuse for the United States to walk away from the New START extension.

"The real purpose is to get rid of all restrictions and have a free hand in seeking military superiority over any adversary, real or imagined," said Fu. Fu maintained China is not "shying away from the

international nuclear disarmament process” and is prepared to discuss within the framework of the United Nations Security Council’s five permanent members all issues related to the reduction of nuclear risks.

**Open Skies Solution Still Far Off:** At the same time, countries in another landmark nuclear accord, the Open Skies Treaty, met to decide whether to preserve the treaty without US participation but failed to bring closer their positions. On 22 May, Washington notified the remaining parties that the US would withdraw from the Open Skies Treaty, allowing unarmed surveillance flights over signatory states, in a move to pull the country out of yet another major global landmark accord. The move came after months of accusations that Russia had failed to offer full benefits to members. Most parties to the conference regretted the US withdrawal decision, expressing hope that it would be reversed, while some countries aligned themselves with Washington and called on Russia to “return to full compliance”.

Russia does not regard the US as a partner who is able to negotiate and has lost trust in Washington as a contractor, but there is the need to start restoring it by small steps, Russian Deputy Foreign Minister Sergei Ryabkov told Izvestiya TV after the talks. Meanwhile, Russia’s defence ministry and other relevant government agencies will take all the necessary measures over the US withdrawal from the Open Skies Treaty, Russia’s Ambassador to US, Anatoly Antonov said according to *TASS news agency*. Observers have suggested that the failure of reaching an agreement on Open Skies Treaty could lead to a stalemate in the talks over a

continuation of New START.

*Source: <https://www.euractiv.com/section/defence-and-security/news/arms-control-tit-for-tat-continues-as-treaty-deadlines-loom/>, 09 July 2020.*

**OPINION – Marcello Losasso**

**Nuclear Power has a Big Role to Play in the Energy Transition. Here’s Why**

Our planet needs a new energy system able to sustainably provide a reliable and incessant supply of electricity. Nuclear is among the energy technologies available today with the lowest GHG emissions, producing only 15 grams CO<sub>2</sub>-equivalent per kWh, when considered over a plant’s entire lifecycle.

According to the International Energy Authority (IEA), between 1970-2013 the use of low-carbon energy sources meant we avoided 163 Gt of CO<sub>2</sub> emissions. Nuclear power contributed 41%, while solar and wind accounted for 6%. Nuclear energy represents one of the lowest sources of GHG in the combined lifecycle of power-generating technologies, as shown in many independent analyses.

Nuclear plants today provide 10% of the world’s electricity, all of it carbon-free – that’s almost twice the combined contribution of solar and wind. To meet the key energy goals of the UN SDG, the Paris Agreement has set a specific ambition for nuclear, targeting the doubling of present installed capacity by 2050. For the nuclear industry the challenge is double; it is about progressively replacing plants reaching the end of their lives, and adding new plants to the existing fleet. However, there is need for

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**Challenges and Cost of the Energy Mix:**

Decarbonization requires a realistic proposal to substitute, by 2050, the 81% share of energy produced today from fossil fuels. Picking the right energy portfolio mix is a difficult matter, and technologies that not yet mature enough to make an impact before 2050, such as fusion power or carbon capture and storage, should not be relied upon. The low-carbon technologies that are currently adoptable are wind, solar, hydroelectric and nuclear. Excluding, limiting or restricting any of these technologies undermines the cost mitigation and delays the reduction of emissions. But the possibilities for growth are singularly limited.

The technical advances of solar and wind cannot overcome their intermittency, nor the physical laws that impose limits to their efficiencies. Mitigating the intermittence of wind and solar with energy storage systems is improbable; only small amounts of cost-efficient electricity storage will presumably be available at reasonable cost in near future. The most promising batteries are based on metals such as lithium, cobalt and magnesium that require energy-intensive energetic mining and whose reserves cannot fulfil theoretical global demand.

The contribution nuclear power can make to the energy transition lies in its ability to follow and assume the system costs generated by the intermittency of renewables. Ensuring a permanent balance between demand and supply, the nuclear baseload can offer “load tracking”, adapting swiftly to seasonal, daily, and hourly variations in demand. These requirements become increasingly important, the higher the penetration of renewables into the market.

Nuclear sceptics point to its cost: there are many examples of cost and time overruns in nuclear plants, and it’s true that the costs for wind and

solar are ever-decreasing. But when all factors are considered and the level of market penetration of a particular technology is measured, a cost analysis presents contrasting figures. Power plants do not exist in isolation; they interact with each other and their customers through the grid and within the surrounding economic, social and natural environment. That is why the assessment of total costs should include not only the capital costs, but also the costs for grid connection, extension and reinforcement, the technical and financial costs of intermittency, the cost of security of supply and its impacts, and the local and global environmental impacts.

An analysis has been carried out in different countries to quantify these costs in respect to the

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penetration level of renewables in an energy mix, including nuclear, solar and wind. Introducing variable renewables up to 10% of the total electricity supply will increase the cost per MWh by between 5% and 50%, depending on

the country, whereas satisfying 30% of demand could increase costs by anything between 16% and 180%. Country-by-country differences are more important than technology-by-technology differences.

The increases in electricity costs linked with an increasing share of renewables results from a combination of higher investment costs, balancing and adequacy costs, and additional expenses for transmission and distribution. Balancing costs are those necessary to guarantee the system performance on a minute-by-minute basis of demand and supply, in the presence of uncertainty in demand and supply. Adequacy costs are incurred in satisfying demand at all times, taking fluctuations in demand and supply into account. These are the costs required to supply hospitals with electricity in the midst of a pandemic – even on cloudy or windless days.

Today, in countries where dispatchable technologies are present, these costs are zero;

but introducing renewables while retiring old dispatchable capacity and adding new dispatchable capacity to produce when variable renewables are not available, makes for substantial adequacy costs. The integration of significant amounts of variable renewables is a complex issue that affects the structure, financing and operational mode of electricity systems. In most OECD countries, wind and solar power receive fixed tariffs for every MWh fed into the electricity system regardless of market prices. Such asymmetric treatment isolates variable renewables from the impacts they inflict on the market price. This is not to undermine renewables, but to highlight the fact that in the absence of a nuclear contribution, the energy transition will be slower, costly, and at risk of failure. Making these system costs transparent is meaningful to investors, customers and decision-makers.

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***The Future of Nuclear:***

Many countries have committed to increase the share of power from nuclear energy in order to meet the Paris Agreement targets. But the political and economic environment, and the public lack of support, make the prospect of accomplish these ambitious objectives extremely difficult. As detailed above, the cost of nuclear – once all parameters are included – is not barrier. But waste, safety and nuclear proliferation are still roadblocks that should be tackled in order to enable deployment of this technology.

Today, some enterprises are proposing a new technological approach, built on a different type of fission energy production based on the coupling of particle accelerators and subcritical reactors. This technology – termed the ‘accelerator driven system, pioneered in CERN in the 1990s – aims to reduce the lifetime of existing radiotoxic nuclear waste and to produce carbon-free energy at an affordable price of less than 5 cents per kWh. This technology is safer, scalable, sustainable and resistant to proliferation. The key

innovation is the use of a proton accelerator to generate a high-intensity neutron source which induces fission reactions in the core. Yet as soon as the accelerator stops, the fission reaction also stops. The sub-criticality of the core implies an intrinsic safety; runaway accidents of the Chernobyl type are impossible. As the system proposed is equipped with passive heat removal, a meltdown accident of the Fukushima or Three-Mile Island types would also be impossible. The reduced waste produced from such a plant will have shorter lifetimes (around 500 years vs. 300,000 years) because the reaction uses thorium-based rather than uranium-based fuel.

The system also provides the possibility of using present nuclear waste as fuel, therefore reducing the amount and radioactive profile of today’s large waste inventory. With thorium fuel, plutonium production is negligible, eliminating the most common element for

nuclear bombs. The IAEA states that the thorium fuel cycle would be “intrinsically proliferation-resistant”.

**Conclusion:** This innovative but demonstrated nuclear technology could sustain the deployment of renewables, providing a stable and secure baseload and allowing the planet to meet the necessary carbon-free targets set by the Paris Agreement.

*Source: <https://www.weforum.org/agenda/2020/07/nuclear-power-energy-transition/>, 10 July 2020.*

**OPINION – Darrin Qualman, Glenn Wright**

**Small Modular Nuclear Reactors Distract from Real Climate Solutions**

Last fall, the premiers of Saskatchewan, Ontario and New Brunswick pledged their support for small modular reactors (SMRs). Saskatchewan’s government announced a Nuclear Secretariat to oversee development of those reactors. Many in

Saskatchewan took these announcements at face value and began questioning the cost, feasibility and safety of these units. To do so, however, is to misunderstand what's really happening. The reality is that three premiers lacking adequate emission-reduction plans pledged themselves to speculative technologies that will take a decade or two to get up and running, if ever. SMRs are another distraction to shift the focus away from provincial records of increasing emissions. The SMR announcement follows a pattern of past policy declarations that serve to distract the public and delay effective policies.

In the mid-2000s, Saskatchewan's government had a plan to solve the emissions and climate problems: Ethanol and biodiesel. With much fanfare, the premier announced an "E85 highway," referring to a blend of 85-per-cent ethanol that would be made available along the Trans-Canada Highway. Fast forward a decade and few experts mention ethanol or biodiesel as leading emission-reduction technologies.

As the lustre was fading from biofuels, Saskatchewan's government trotted out a new fix: Carbon capture and storage (CCS). That technology has now been revealed to be costly and, in Saskatchewan, used principally to produce CO2 for enhanced oil recovery, with attendant emissions. CCS may be a part of the solution to our emissions problem, perhaps used at fertilizer or cement plants or in limited bioenergy production, but our government was focused on preserving jobs in high-emission energy sources: Coal and oil. As a political tactic, CCS did what it was supposed to do: Delay action on emissions reduction and paper over a huge policy gap. Rather than admitting it had no climate plan, the Saskatchewan government spent years pretending CCS would be an emissions fix.

SMRs are the third chapter in the government's use of distracting technologies to kick the climate change down the road. Thoughtful, informed people can disagree over nuclear energy, but

even those who support nuclear power should be angered by what the government is doing: Not supporting nuclear power, but rather using it cynically as a fig leaf to cover up the government's ideologically driven foot-dragging on climate solutions.

The government's stalling tactics are irresponsible. There are numerous proven technologies, policies, and strategies to address climate change and reduce emissions being implemented worldwide. Our government is delaying because it chooses to, not because it has to. In the best case, SMRs are 2030s or 2040s technologies. But solar and wind power can provide low-emission electricity today. In fact, our province has among the best

solar and wind resources in the world and those power supplies can be deployed at less cost, lower risk and much more quickly. It's strange that the sunniest province in Canada has not developed this world class renewable resource. Real leadership would focus on wind and solar.

Instead, the government dealt a body blow to solar

installers when it rolled back the net metering program. Canada has committed to cut emissions by 30 per cent (below 2005 levels) by 2030 and to make the country carbon neutral by 2050. We have lots of work to do. And the sooner we start, the smoother the transition will be. We must begin ramping up employment to support this transition: Residential solar installation, utility-scale wind turbine construction, battery and power-storage installation, new net zero buildings, energy-conserving building retrofits and adding capacity to the electrical grid for automobile charging and building heating and interprovincial electricity transfers. Solutions are within reach. Jobs await. SMRs are a distraction. Let's not be fooled again. Let's demand rapid, effective emissions reduction now as part of a revitalized Saskatchewan economy.

Source: <https://leaderpost.com/opinion/columnists/opinion-small-modular-nuclear-reactors-distract-from-real-climate-solutions>, 03 July 2020.

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OPINION – Robert Dodge

Time to Abolish Nuclear Weapons

At this moment, our nation finds itself in a time of crisis. Reeling from the pain and violence inflicted by long-standing institutionalized racism disproportionately against African Americans and other communities of color, we also are grappling with a global COVID-19 pandemic with no end in sight. On July 15, we will fund our nation's priorities. During this time of awakening we must step back and ask what are the people's priorities?

Of note, it is also the time we fund the nuclear arms race that is spiraling out of control. Nuclear weapons represent the greatest imminent existential threat to our very existence every moment of every day. Our country must reassess our priorities through the lens of caring for one another in order to bring forth racial, social, environmental and economic justice for all. Each year, Physicians for Social Responsibility Los Angeles publishes our Nuclear Weapons Community Costs Project. Now in its 32nd year, having started in Ventura County, the project is used around the country to highlight the fiscal inequities in our communities and build support for nuclear weapons abolition work and divestment from nuclear weapons similar to what was done in South Africa to end apartheid.

As our nation grapples with the health and economic impacts of COVID-19 and racial injustice, we continue to fund nuclear weapons programs in the amount of \$67.6 billion for fiscal year 2020. This deprives cities, counties and states across the nation of critical funds in the midst of this crisis. In Ventura County alone we will, through our tax dollars, contribute in excess of \$197 million for fiscal year 2020 toward nuclear weapons programs. Large states like New

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York are spending in excess of \$4.5 billion and California is spending over \$8.7 billion on nuclear weapons programs, robbing our treasuries of critical funds necessary at this time. This is immoral. Where is the sanity?

As physicians and health practitioners we are first responders addressing all public health crises. Tragically, in many of our nation's communities skin color is also a public health threat to oneself. Responding to this injustice,

it is time to redirect funding to address the grave inequities we see in our country. The coronavirus pandemic with all of its global devastation pales by comparison with any nuclear conflict. There is no adequate response to a nuclear attack. The outcome is predictable and must be prevented. The only way to prevent nuclear war is by the complete and verifiable abolition of nuclear weapons. As with COVID-19, we must prevent that which we cannot cure.

Source: <https://www.vcstar.com/story/opinion/editorials/2020/07/11/guest-column-time-abolish-nuclear-weapons/5402640002/>, 11 July 2020.

OPINION – Jun Arima

Indonesia and Philippines are Smart to Make Nuclear Power Plants

Even though critics say building nuclear power plants is an expensive and environmentally unfriendly strategy, at least two nations in Southeast Asia are keen on it: both Indonesia and the Philippines have recently proposed reviving plans for nuclear energy. From now to 2040, the ASEAN region will encounter daunting energy and climate challenges. While ASEAN will increase its total primary energy supply by more than 140% from 2015 to 2040 under current plans, its electricity demand will almost triple during this period, driven by economic and population growth.

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To generate this power, the share of fossil fuels will grow from 83% to 88%, including using much more coal. Carbon dioxide emissions will almost quadruple along with all the harmful environmental effects. Nuclear, together with large-scale hydroelectric power generated by water, is the only technology which can supply a vast amount of stable and carbon dioxide-free power, which is why Indonesia's and the Philippines' plans make good sense. It is of utmost importance that ASEAN countries work toward securing a sustainable energy future by improving energy efficiency and expanding the share of non-fossil energy.

Current plans, based on fossil fuels, will inevitably increase ASEAN's dependence on imported coal, oil and gas, which will make it further vulnerable to external shocks. In addition, increasing carbon dioxide emissions is contradictory to the pathway to decarbonization envisaged under the Paris Agreement on Climate Change signed in 2016.

Nor can renewables entirely fill the gap. The rapidly declining costs of variable renewable energy, or VRE, in the form of solar and wind, will make it more competitive with conventional power sources, and almost all ASEAN countries are promoting renewable energy. Solar and wind could offer exciting opportunities for electrification in rural areas not yet connected to the grid system.

However, VRE has its own unique challenges. Due to the intermittent generation of solar and wind power thanks to natural conditions, installing VRE in energy systems calls for costly balancing measures like adjusting existing fossil power plants, expanding grid systems and investing in batteries. Those costs will increase with the higher share of VRE and need to be considered on top of the cost of generation.

All of this helps make the case for nuclear power. Nuclear plants also need less space compared to other power plants to produce the same amount of power. For example, one gigawatt of nuclear

power requires a space of 0.67 sq. kilometers. To generate the same amount of power, solar photovoltaic technology needs 58 sq. kilometers. Of course, nuclear has its own challenges, not least safety, waste and cost, all of which the public must be reassured about. Globally, concerns about its safety have risen since the Fukushima nuclear power accident in 2011 when a tsunami overwhelmed the power plant there and caused a meltdown. The establishment of robust nuclear safety standards and their implementation by an independent, transparent and capable nuclear regulatory authority are the prerequisite here. These require strong human and institutional capacity.

Public acceptance is the biggest challenge. Trust between the operator and the local communities hosting the nuclear power plants is crucial. Concerns

about nuclear safety and treatment of radioactive waste tend to lower public acceptance. This would make the approval process uncertain, leading to costlier and riskier investment.

In order to improve public acceptance, the national government, regulators and operators must define basic nuclear energy policy and comprehensive rules for safety, emergency preparedness and long-term radioactive waste management. Governments need to be responsible for a predictable and transparent decision-making process and for the steady progress of operation, actively inviting stakeholders into the schemes. Raising public literacy on energy security, risk and global warming issues is also crucial. And while nuclear power is cheaper to run, the initial costs for building nuclear power plants are very high. They require long approval and commissioning times too.

Nuclear technologies are evolving. To address some of these challenges, modular reactors have advantages such as a relatively small size, reduced capital investment, the ability to be sited in locations not possible for larger nuclear plants, provisions for incremental power additions and

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distinct safeguards, security and nonproliferation advantages.

The discovery of fossil fuel fields could further delay government decisions. Many environmentalists advocate only renewables as forms of zero-emission power, totally rejecting nuclear. However, it is not appropriate to regard nuclear and renewables as an either-or choice. In fact, nuclear could work in synergy with renewable energy sources by adjusting its operation in response to VRE's intermittent production. There are many challenges with the nuclear power option and even though Indonesia and the Philippines are considering nuclear power as an arrow in their quiver, they still have a long way to go.

Source: <https://asia.nikkei.com/Opinion/Indonesia-and-Philippines-are-smart-to-make-nuclear-power-plans>, 12 July 2020.

## NUCLEAR STRATEGY

### RUSSIA

#### Russia Names New Circumstances for Deploying Nuclear Weapons

In mid-June 2020, Russian President Vladimir Putin approved the "Fundamentals of Russia's Nuclear Deterrence State Policy." The document identifies all cases permitting the use of nuclear weapons. Notably, this is the first time that the text of Russia's nuclear doctrine has been made publicly available.

#### **When would Russia Push the Button:**

Moscow is keen to stress that its nuclear policy remains defensive. "Russia sees nuclear weapons solely as a deterrent and an emergency measure. The country is striving to

reduce the nuclear threat and prevent the aggravation of international relations that could provoke military conflicts, including nuclear ones," reads the doctrine. At the same time, a number of scenarios have been identified in which Russia could deploy nuclear weapons.

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First, this pertains to the "build-up of general forces, including nuclear weapons delivery vehicles, in territories adjacent to the Russian Federation and its allies, and in adjacent offshore areas."

Second, the "deployment of anti-ballistic missile defense systems and facilities, medium- and

shorter-range cruise and ballistic missiles, precision non-nuclear and hypersonic weapons, strike drones, and directed-energy weapons by states that consider the Russian Federation to be a potential adversary."

Third, the "creation and deployment in space of anti-ballistic missile defense facilities and strike systems."

Fourth, the "possession by countries of nuclear weapons and (or) other types of weapons of mass destruction able to be used against the Russian Federation and (or) its allies, as well as the means to deliver them."

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Fifth, the "uncontrolled proliferation of nuclear weapons, their means of delivery, and technologies and equipment for their manufacture." And sixth, the "deployment of nuclear weapons and their delivery vehicles in non-nuclear states." Moscow

also sets forth additional situations in which it is ready to take "extreme measures."

Among them is the "receipt of reliable information about the launch of ballistic missiles attacking

the territory of Russia and (or) its allies," as well as the "enemy deployment of nuclear or other weapons of mass destruction against Russia and (or) its allies."

Furthermore, the command to deploy nuclear weapons will be given in the event of an "enemy attack on critical state and military facilities of the Russian Federation which, if incapacitated, would disrupt a nuclear response," as well as "aggression using conventional weapons that threatens the existence of the Russian state."

The new document is the quintessence of everything that President Putin and the country's military leadership have spoken about in recent years.

"Everything contained in fragments from isolated speeches is now reflected in the national security strategy. We are openly talking about our intentions so that the West doesn't hit on the idea that Russia is 'escalating [the international conflict] in order to de-escalate it,'" Viktor Murakhovsky, editor-in-chief of Arsenal of the Fatherland magazine, told Russia Beyond.

According to Murakhovsky, Russia's publication of its nuclear policy is an attempt to nudge its partners into extending the Strategic Arms Reduction Treaty (START-3), which expires in a year, whereupon Russia and the United States will be free to expand their nuclear arsenals without restriction.

Currently, both Russia and the United States have limited their nuclear arsenals to 1,550 nuclear warheads and 700 carriers (intercontinental ballistic missiles, submarine ballistic missiles, heavy bombers).

**What Nuclear Missiles does Russia Have:** According to the website "Strategic Nuclear Weapons of Russia," the following missiles are currently in service:

- 46 R-36M2 (SS-18) heavy missiles

- 2 Avangard complexes (UR-100NUTTH, SS-19 Mod 4 missiles)
- 45 Topol (SS-25) mobile ground complexes
- 60 Topol-M (SS-27) silo-based complexes
- 18 Topol-M (SS-27) mobile complexes
- 135 mobile and 14 silo-based complexes with RS-24 Yars missiles

Of these, the R-36M2 and Topol are due to be decommissioned and replaced by the latest Yars (to be sited in the silos of the previous occupants and on trucks) and by the heavy Sarmat ICBM.

Source: Nikolai Litovkin, <https://www.rbth.com/science-and-tech/332429-russia-circumstances-for-nuclear-weapons-usage>, 13 July 2020.

**We are particularly concerned about the two-year-old refusal of the Americans to reassert the fundamental principle, the postulate that there can be no winners in a nuclear war, and, accordingly, it can never be unleashed," Sergey Lavrov .**

### **Russia Warns of Growing Nuclear War Threat**

The risk of a nuclear war has risen significantly in recent years because of the US unwillingness to reaffirm its impossibility, the Russian foreign minister said on 10 July. "We are particularly concerned about the two-year-old refusal of the Americans to reassert the fundamental principle, the postulate that there can be no winners in a nuclear war, and, accordingly, it can never be unleashed," Sergey Lavrov said during his speech at the video conference of Primakov Readings Forum in Moscow.

He argued that Washington is destroying the international arms control mechanism to have "hands free in choosing means of pressure, including force, at any point of the globe — don't matter what the price is" with the ultimate goal of getting the global dominance and win "in what they call the rivalry of major powers." "This is particularly disturbing against the background of doctrinal shifts in the attitudes of the American political leadership, which now allow limited use of nuclear weapons," Lavrov said.

Washington takes practical steps to support the

doctrinal shifts, developing and increasing the low-yield nuclear arsenal, he added. Lavrov said the US used "Russian threat" to make necessary amendments, saying Russia has a secret part of its military doctrine, which the minister denied.

For Moscow's requests to reaffirm the impossibility of a nuclear war, handed in written, Washington responds that it is still examining the document, but by their comment the Russian side perceive that it would like to weaken the categoricalness of this axiom, he said.

In the recent years, the US called off its sign under a number of arms control treaties, including the Intermediate-Range Nuclear Forces, Open Skies, Anti-Ballistic Missile treaties, considered as pillars of international security. The last existing agreement — Strategic Arms Reduction Treaty — will expire in 2021 and Lavrov predicts that the US will not agree to expand it.

Source: Elena Teslova, <https://www.aa.com.tr/en/europe/russia-warns-of-growing-nuclear-war-threat/1905898>, 10 July 2020.

## **BALLISTIC MISSILE DEFENCE**

### **INDIA**

#### **India Develops Indigenous Attack, Defence Systems**

India in the recent past has developed several indigenous missiles, attack and defence systems to counter threats from China, Pakistan and other such countries. India's indigenously developed surface-to-air missile Akash is one of the most marvellous missiles in India's attack and defence system. The missile developed by DRDO is capable of targeting aircraft up to 30 km away and at an altitude of 18,000 metres and neutralise aerial targets like fighter jets, cruise missiles, air-to-surface missiles and even ballistic missiles.

At the heart of the missile is the Indian Rajendra PESA radar system which is used for 3D target

detection, multi-target tracking and to launch multiple guided missiles even in extremely hostile environments. Akash can fly at twice the speed of sound and can maintain the speed at all altitudes. The missile system is designed in such a way that it can be manoeuvred at all altitudes and speeds. Another feather in the Indian defence artillery section is the indigenously developed Indian Ballistic Missile Defence System. This has been primarily developed by India to intercept and thwart a ballistic missile threat from China and Pakistan....

Source: <https://www.sundayguardianlive.com/news/india-develops-indigenous-attack-defence-systems>, 04 July 2020.

**The ABM defense system deployed around Moscow and Russia's Central Industrial District will soon get new radars and missile interceptors, Aerospace Force Commander-in-Chief Colonel-General Sergei Surovikin said.**

### **RUSSIA**

#### **Moscow's Anti-ballistic Missile Defense System to Get New Radars and Missile Interceptors**

The ABM defense system deployed around Moscow

and Russia's Central Industrial District will soon get new radars and missile interceptors, Aerospace Force Commander-in-Chief Colonel-General Sergei Surovikin said. "The trials of the capabilities of the system (A-135) are currently underway and the Aerospace Force will soon get an upgraded multi-purpose radar station and modernized missile interceptors of the ABM system," he said in an interview with the Defense Ministry's Krasnaya Zvezda newspaper. Active work is currently underway to upgrade the ABM system. Several test-launches of the upgraded missile interceptor have already been conducted, the colonel-general said.

"No doubt, the upgrade of the existing A-135 ABM system that is on combat duty in the city of Moscow is a major task for defense enterprises," Surovikin stressed. "The trials of the system's capabilities are underway and the Aerospace Force will soon get a renewed multi-purpose radar station and modernized missile interceptors of the ABM system," he said. The system's firepower capabilities for the defense of Moscow and the

Moscow Industrial District will be boosted twofold, which has been numerously confirmed by the interceptor's preliminary trials, he said.

Source: <https://tass.com/defense/1174391>, 03 July 2020.

**NUCLEAR ENERGY**

**CANADA**

**Candu Unit Sets North American Operating Record**

Darlington unit 1 has set a new Canadian and North American nuclear record with 895 consecutive days of unbroken operation. Ontario Power Generation's (OPG) Candu reactor has now been online since 26 January 2018 without needing to be taken out of service for maintenance or repair.

"Unit 1's remarkable run is a reflection of the strong dedication and commitment of our employees to drive efficient and robust performance from our generating units for the benefit of all Ontarians," OPG Chief Nuclear Officer Sean Granville said. "This success story is a testament to the reliability of the Darlington station, which produces clean electricity 24 hours a day, seven days a week." The previous record of 894 days was held by unit 7 at OPG's Pickering plant.

Candus are PHWRs. Both PHWRs and advanced gas-cooled reactors (AGRs) are designed to be refuelled without being shut down. The world record for continuous operation of a nuclear plant is currently held by Kaiga unit 1 in India - also a PHWR - which was taken offline on 31 December 2019 after 962 days of operation, breaking the previous record of 940 days set by the UK's Heysham II AGR plant in September 2016. Darlington's four reactors are soon to produce

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**EU Strategy for Energy System Integration and EU Hydrogen Strategy present a new clean energy investment agenda, in line with the Commission's Next Generation EU recovery package and the European Green Deal.**

the medical isotopes cobalt-60, which is used to sterilise single-use medical devices, and molybdenum-99, used in medical diagnostics and imaging.

Source: <https://world-nuclear-news.org/Articles/Candu-unit-sets-North-American-operating-record>, 10 July 2020.

**EU**

**EU Green Strategies Pay 'Insufficient Attention' to Nuclear, Says Foratom**

To become climate-neutral by 2050, Europe needs to transform its energy system, which accounts for 75% of the EU's greenhouse gas emissions. The

EU strategies for energy system integration and hydrogen aim to pave the way towards a more efficient and interconnected energy sector, driven by the twin goals of a cleaner planet and a stronger economy. EU Strategy for Energy System Integration and EU Hydrogen Strategy present a

new clean energy investment agenda, in line with the Commission's Next Generation EU recovery package and the European Green Deal. Foratom Director General Yves Desbazeille said: "Nuclear is a very versatile and proven technology, providing low-carbon electricity that can be used for the production of clean hydrogen and heat for industrial processes or district heating. For example, in 2018, around 350 GWh of electrical equivalent heat of district heating and process heat was generated in the EU and Switzerland.

"Given the huge challenge which Europe will face over

the next 30 years, it is essential that policymakers do not focus only on variable renewables. Transforming our energy system is going to require ALL low-carbon solutions currently available. And EU policy must reflect this."

..."In terms of smart sector integration, low-carbon

hydrogen is an important solution for hard to decarbonise sectors, such as industry and transport,” Desbazeille said. “But these sectors are going to depend on a significant amount of affordable hydrogen, 24/7. Therefore, it is essential that these EU strategies recognise ALL sources of low-carbon hydrogen, including nuclear.”

**Foratom believes that it is essential for the EU to adopt a technology neutral approach based on the impact of each technology on the CO2 emission reduction targets. We therefore urge the EU to acknowledge the important role that the nuclear energy sector will play alongside renewables.**

In order to produce affordable hydrogen, electrolyzers will need to run constantly on low-carbon electricity, Foratom says. With nuclear complementing variable renewables (wind and solar) in supplying power for low-carbon hydrogen production, this will ensure a quasi-baseload electrolyser which will trigger decreasing production costs, it says.

“This is why Foratom believes that it is essential for the EU to adopt a technology neutral approach based on the impact of each technology on the CO2 emission reduction targets. We therefore urge the EU to acknowledge the important role that the nuclear energy sector will play alongside renewables,” the trade body said. The Commission says the EU Strategy for Energy System Integration will provide the framework for the green energy transition.

“The current model where energy consumption in transport, industry, gas and buildings is happening in ‘silos’ - each with separate value chains, rules, infrastructure, planning and operations - cannot deliver climate neutrality by 2050 in a cost efficient way; the changing costs of innovative solutions have to be integrated in the way we operate our energy system. New links between sectors must be created and technological progress exploited,” the Commission said on unveiling the two new strategies.

“Energy system integration means that the

system is planned and operated as a whole, linking different energy carriers, infrastructures, and consumption sectors. This connected and flexible system will be more efficient, and reduce costs for society. For example, this means a system where the electricity that fuels Europe’s cars could come from the solar panels on our roofs, while our buildings are kept warm with heat from a nearby factory, and the factory is fuelled by clean hydrogen produced from off-shore wind energy,” it added. In an integrated energy system, hydrogen can support the decarbonisation of industry, transport, power generation and buildings across Europe, it says. The EU Hydrogen Strategy addresses “how to transform this potential into reality”, through investments, regulation, market creation and research and innovation.

“Hydrogen can power sectors that are not suitable for electrification and provide storage to balance variable renewable energy flows, but this can only be achieved with coordinated action between the public and private sector, at EU level,” the Commission said. “The priority is to develop renewable hydrogen, produced using mainly wind and solar energy. However, in the short and medium term other forms of low-carbon hydrogen are needed to rapidly reduce emissions and support the development of a viable market,” it added.

Source: <https://www.world-nuclear-news.org/Articles/EU-green-strategies-pay-insufficient-attention-t>, 09 July 2020.

## GENERAL

### Focus Fusion is the Hottest Idea in Nuclear Energy

Realizing nuclear fusion as a practical energy source poses enormous challenges owing to the extreme physical conditions required by the known

fusion reactions. These include temperatures of 100 million degrees Celsius or more and astronomically high pressures, which must be maintained long enough to reach a net energy output.

Efforts to achieve this goal are dominated today by expensive, large-scale experimental facilities utilizing ultra-high power lasers and microwave generators, particle beams, giant superconducting magnet systems and other advanced technologies. One might conclude that fusion, if and when it becomes a reality, will be a complex, highly capital-intensive way to produce energy. But what if there were a much easier approach, one that would not require such elaborate technical means to achieve the extreme temperatures and pressures required? A method in which nature would do most of the work for us?

Amazingly, there does exist such an approach. It is based on a device called the dense plasma focus (DPF). The DPF generates an electric discharge that evolves rapidly in time and space, concentrating its energy into an array of filamentary structures and finally into a tiny knot-like entity called a plasmoid (see below). Inside the plasmoid, the conditions are reached for fusion to take place. Part 2 of this series will describe in detail how it works.

The DPF has existed in various forms since the 1960s and has been utilized in dozens of university and government laboratories all over the world for experimental research in the field of plasma physics. It is also used as a source of X-rays and neutrons. Apart from such applications, the phenomena observed in DPF discharges provide a model for a variety of self-organizing processes in nature, from the laboratory scale all the way up to the scale of galaxies and galactic clusters.

**Fusion Power with a Plasma Focus:** It has long since been experimentally demonstrated that the DPF can generate large numbers of fusion reactions when operated in a chamber filled with deuterium gas. Strangely, until recently the possibility of using

the DPF for commercial power production has never been pursued with the necessary commitment and – most importantly – the financial support needed to succeed.

Nearly all investment into fusion power research today goes into funding large, expensive projects – topped off by the giant ITER now under construction in southern France, with a total price-tag estimated at over \$40 billion.

Smaller, more innovative but less prestigious projects have been starved for funds. This situation, paradoxical to an outsider, is sadly familiar to those who have observed the behavior

of funding agencies in recent decades. The good news is that one laboratory in the United States – New Jersey’s private Lawrenceville Plasma Physics, Inc, doing business as LPPFusion – has seriously taken up the challenge to develop the

dense plasma focus into a practical source of fusion energy.

There is still a way to go, but the project evidently has a real chance of success. The founder and head of LPPFusion, physicist Eric Lerner, is one of the world’s leading experts on the plasma focus and related areas of plasma physics and astrophysics. Running on a shoestring budget with a handful of dedicated collaborators, LPPFusion has raised the performance of its DPF technology step by step, coming within striking distance of the conditions sufficient for net energy generation.

A landmark was reached in 2016 when Lerner’s device achieved an ion temperature of 2.8 billion degrees – by far the highest such temperature achieved in any fusion experiment to date. This is over 200 times hotter than the center of the sun and more than 15 times the projected maximum temperature for the ITER.

In other respects, LPP Fusion has matched or come near results obtained with devices costing

**Nearly all investment into fusion power research today goes into funding large, expensive projects – topped off by the giant ITER now under construction in southern France, with a total price-tag estimated at over \$40 billion.**

hundreds of times more than the total of \$7 million that LPP Fusion has spent over the last 10 years. (Here the reader can find a detailed description and comparison of the large and small fusion energy projects now underway.) Most exciting, LPP Fusion intends to utilize hydrogen-boron instead of the standard deuterium-tritium fuel. The world-record temperatures already achieved provide an important precondition for taking this step. If the plan works out it will be extremely good news.

The hydrogen-boron fusion reaction is the dream of nuclear energy, because it generates no radioactive waste, taps a virtually unlimited supply of fuel and provides the possibility of direct conversion of fusion energy to electricity. A single gram of hydrogen-boron mixture would produce very roughly as much energy as is released by the combustion of three tons of coal. Fusion experiments at LPP Fusion have so far been done with deuterium. The first experiments with hydrogen-boron fuel are planned for around the end of this year.

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Lerner's project is currently in the advanced research phase. The chief task now is to move from merely producing large numbers of fusion reactions – a capability already well-demonstrated – to achieving a net energy output from the device. That will be followed by the engineering phase. Success can never be guaranteed, of course. But the payoff would be enormous.

**A Low Cost Fusion Future:** DPF-based hydrogen-boron fusion power plants would combine simplicity of construction and operation with small unit size, low investment cost, low fuel cost and intrinsic safety. For commercial power production, the DPF device is to be combined with a patented system for direct conversion of the fusion energy into electricity. Pulsed at a rate of 200 discharges per second, the system will provide an electric power output of 5 megawatts.

A complete DPF power unit would be only a few meters across, making it easy and economical to

reach any desired power by simply adding more of them. The technology lends itself well to mass production of standardized units. Plausible estimates suggest that DPF technology could reduce the cost of producing electricity by ten times or more compared with existing conventional and alternative energy technology.

*Source: Jonathan Tennenbaum, <https://asiatimes.com/2020/07/focus-fusion-is-the-hottest-idea-in-nuclear-energy/>, 13 July 2022.*

### **IAEA's Grossi Says Nuclear Power Contributes a Great Deal to Clean Energy Transition**

IAEA Director General Rafael Mariano Grossi said nuclear power is playing an important role in the world's production of clean energy, "contributing massively" to avoiding GHG emissions in many countries and providing innovative solutions that could be very useful to emerging economies.

Grossi spoke as part of a panel discussion on electricity security and sustainability at the International Energy Agency's Clean Energy Transitions Summit. The

virtual event brought together ministers and senior figures from around the world to discuss "measures to boost economies, create jobs, reduce global emissions and make energy systems more resilient" amid the economic slowdown during the global pandemic, according to the Paris-based IEA.

"Nuclear power has a great deal to contribute as part of clean, resilient, inclusive energy systems, which are of course indispensable drivers of economic development, especially at this hard time of pandemic recession all over the world," Mr Grossi said. "Nuclear energy is not a promise in terms of low carbon energy, it is already now contributing massively to a low carbon economy and a green grid" by avoiding the equivalent of 55 gigatonnes of carbon dioxide emissions over the last 50 years, he added. Nuclear power, which emits no carbon dioxide during operation, currently provides about 10% of the world's electricity, which amounts to around one third of all low carbon

electricity. Some 54 nuclear power reactors are under construction around the world, two thirds of them in Asia.

"We believe that there is no one-size-fits-all solution to the complexities of the energy markets and the challenges we are facing," Mr Grossi said. "What we say is that nuclear (power) has indisputably a place at the table." The IAEA

Director General emphasized that nuclear power helps to provide stability to electrical grids, particularly those with high shares of variable renewable sources that depend on sunshine or wind. He noted that nuclear power plants can operate flexibly by following demand and limiting the impact of seasonal fluctuations in renewable output and can also bolster

energy security by lessening reliance on imported fuels. When it comes to electricity security and sustainability, Mr Grossi said technological innovation is key.

"Nuclear energy is at the forefront, at the vanguard, with development of solutions like small and medium sized reactors, which will be very useful for evolving, emerging economies in the near future," he said. Nuclear power can also contribute to the future production of hydrogen without GHG emissions, for use in energy storage, transportation, industry and other applications, he added.

Recalling his participation in last year's COP25 climate conference in Madrid, Mr Grossi said the Agency will continue to take part in major global energy and climate discussions including COP26 next year in Glasgow, United Kingdom. The IAEA welcomes an open, constructive dialogue "based on facts and not ideological or simply aspirational ideas," he

said. "We have to be ambitious and nuclear energy has a lot to contribute."

Source: <https://www.iaea.org/newscenter/news/iaeas-grossi-says-nuclear-power-contributes-a-great-deal-to-clean-energy-transition>, 09 July 2020.

## UAE

### **Mohammed bin Rashid Appoints Members of Dubai Nuclear Energy Committee**

His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, issued Decision No. (6) of 2020 appointing members of the Dubai Nuclear Energy Committee. According to the Decision, Saeed Mohammed Al Tayer

chairs the Committee and Engineer Waleed Ali Salman is the Vice Chairman. Members of the Committee include Dr. Riad Belhoul, Dr. Abdul Kader Al Khayat, Dr. Ali Mohammed Shaheen Ahmed and Engineer Youssef Ahmed Nasrallah. The Decision is valid from the date of issuance and will be published in the Official Gazette.

Source: <https://gulfnews.com/uae/government/mohammed-bin-rashid-appoints-members-of-dubai-nuclear-energy-committee-1.72551762>, 12 July 2020.

## NUCLEAR DISARMAMENT

### CHINA

**China rejected joining the nuclear arms limitations talks with the US declaring that the Trump administration was "neither serious nor sincere". "China's objection to the so-called trilateral arms negotiation is very clear, and the US knows it very well. However, the US is persistent with the issue and even distorted China's position.**

### **'Neither Serious nor Sincere': China Rejects Joining Nuclear Arms Limitation Talks with US**

China rejected joining the nuclear arms limitations talks with the US declaring that the Trump administration was "neither serious nor sincere". "China's objection to the so-

called trilateral arms negotiation is very clear, and the US knows it very well. However, the US is persistent with the issue and even distorted China's position" foreign ministry spokesman Zhao Lijian said at a press briefing. Zhao, however, said that the US needed to "create conditions for other nuclear-weapon states to participate in nuclear disarmament negotiations."

The New START nuclear pact is between Russia and the United States, but the Trump administration has insisted on China joining the talks. The treaty was signed between Russia and the United States in 2010 and came into force in February 2011. The treaty expires in February next year. The New START treaty had replaced the Treaty of Moscow (SORT), which was to expire in 2012. Zhao pointed out that the United States should respond to Russia's call to extend the New START treaty.

"The international community sees it clearly. The US can fool no one. We are urging the US to respond to Russian appeal to renew the New START Treaty and on that basis continue the further reduction of its large nuclear arsenal in order to create conditions for other nuclear powers to take part in the nuclear disarmament talks," Zhao asserted. Earlier, Fu Cong, the head of China's foreign ministry's department of arms control had said that his country was ready to join the disarmament talks only if the US reduced its nuclear arsenal to match China level.

Source: <https://www.wionews.com/world/neither-serious-nor-sincere-china-rejects-joining-nuclear-arms-limitation-talks-with-us-312344>, 10 July 2020.

## JAPAN

### Does Japan Support Nuclear Disarmament?

Japanese opinion polls consistently show strong opposition to nuclear weapons. This opposition is rooted in the pacifist national identity that

emerged after the Second World War. That identity is codified in Article 9 of the Japanese constitution, which renounces the sovereign right to resort to war, or the threat of the use of force, to resolve international disputes. The United States imposed Article 9 on Japan's post-war government and, ironically, has been trying to change it ever since. But the Japanese people embraced their pacifist constitution and continue to defend it against the predators of overbearing US officials and nationalist politicians, like their current prime minister.

Popular opposition to nuclear weapons is also enshrined in Japan's Three Non-Nuclear Principles: a legislative resolution that prohibits

**Popular opposition to nuclear weapons is also enshrined in Japan's Three Non-Nuclear Principles: a legislative resolution that prohibits Japan from manufacturing and possessing nuclear weapons as well as prohibiting the entry of foreign nuclear weapons. Japanese leaders, under tremendous US pressure, violated the last principle repeatedly.**

Japan from manufacturing and possessing nuclear weapons as well as prohibiting the entry of foreign nuclear weapons. Japanese leaders, under tremendous US pressure, violated the last principle repeatedly. Fear of public opposition forced them to lie about it for more than 50 years.

That's a pretty successful record of public intervention to curtail the role of nuclear weapons in Japan's national security policy. The people responsible for it, led by the survivors of the atomic bombings of Hiroshima and Nagasaki, deserve our gratitude and support as the 75th anniversaries of the bombings approach.

**Official Indifference:** The Japanese government nominally supports international nuclear arms control agreements like the NPT and the CTBT. The Disarmament, Nonproliferation and Science department of the Ministry of Foreign Affairs labors earnestly to advocate for nuclear disarmament. But its efforts are eclipsed by the North American Affairs Bureau, which, together with the US military, maintains US nuclear weapons are the core of Japan's national security policy.

Perhaps that's why Prime Minister Abe and his

Liberal Democratic Party (LDP) remained silent while the Trump administration undermined international nuclear arms control norms and agreements. They did not protest when the United States announced it was withdrawing from the INF Treaty. They did not object to the US decision to quit the Open Skies Treaty. They have not attempted to save New START or criticized US preparations to subvert the CTBT and resume nuclear testing.

In his new book, John Bolton, Trump's former national security advisor, includes 199 references to Japan. They describe aggressive Japanese efforts to influence the Trump administration's defense and foreign policies. Bolton noted Abe "conferred frequently with Trump" because the prime minister felt his US counterpart "needed continual reminders" of Abe's concerns about Japan's security. His account leaves little doubt Trump's assault on nuclear arms control was not one of those concerns.

**Future Prospects:** There are signs at least some LDP voters and officials may have doubts about Abe's hard-line approach to security issues and his willingness to accommodate Trump. In July 2019 an LDP stronghold in Akita prefecture elected opposition candidate Shizuka Terata because she pledged to block the deployment of a new, expensive and potentially hazardous missile defense system called Aegis Ashore. Abe, under pressure from President Trump to spend more on defense, agreed to purchase and deploy the controversial system several years earlier. In June 2020 LDP Defense Minister Taro Kono apologized for Abe's mistake and abruptly scrapped what the government previously described as an essential defense program.

**Abe "conferred frequently with Trump" because the prime minister felt his US counterpart "needed continual reminders" of Abe's concerns about Japan's security. His account leaves little doubt Trump's assault on nuclear arms control was not one of those concerns.**

**Holding that line against this extraordinarily successful Japanese politician bodes well for the future of the Japanese public's ongoing efforts to advance the cause of nuclear disarmament. Those efforts are currently focused on getting Japan to join the Treaty on the Prohibition of Nuclear Weapons (TPNW).**

Kono – rumored to be a contender to succeed Abe as the leader of the LDP – recently held a press conference where he mentioned that responding to the pandemic and adapting to climate change were important security concerns. He said Japan's fiscal situation made increases in defense spending highly unlikely. He batted down US claims Japan was discussing deploying intermediate-range ground-based missiles in Japan. And most importantly, Kono affirmed that any adjustments to Japanese defense policy made necessary by the cancellation of Aegis Ashore would be consistent with the Japanese constitution.

That last point suggests Mr. Abe, the longest-serving prime minister in Japanese history, will fail to realize his life-long ambition to change Japan's pacifist constitution. Holding that line against this extraordinarily successful Japanese politician bodes well for the future of the Japanese public's ongoing efforts to advance the cause of nuclear disarmament. Those efforts are currently focused on getting Japan to join the Treaty on the Prohibition of Nuclear Weapons (TPNW).

Source: <https://allthingsnuclear.org/gkulacki/does-japan-support-nuclear-disarmament>, 07 July 2020.

## **NUCLEAR NON-PROLIFERATION**

### **NORTH KOREA**

#### **Japan, U.S. Vow Cooperation on North Korea as Nuclear Talks Snubbed**

Japan and the United States confirmed their cooperation on North Korea as the reclusive state rebuffed calls to resume denuclearization negotiations, while Washington conveyed its

continued readiness for dialogue with Pyongyang. In a meeting in Tokyo, Foreign Minister Toshimitsu Motegi stressed on visiting the U.S. Deputy Secretary of State Stephen Biegun the need to strengthen the Japan-U.S. alliance in an ever-changing security environment.

"It is crucial that Japan and the United States work together to maintain and bolster a free and open Indo-Pacific region," Motegi said. Biegun, who was on a two-day visit to Tokyo after making a stop in Seoul to speak with South Korean officials, replied, "As we face new challenges in this era, it is ever more important for us to work closely together."

In separate meetings with Motegi and Defense Minister Taro Kono among other Japanese officials, Biegun "emphasized continued U.S. readiness to engage in dialogue with the DPRK," the State Department said, referring to the acronym for Democratic People's Republic of Korea, North Korea's official name.

Biegun also discussed with the Japanese officials "the importance of continued close cooperation with Japan and other like-minded partners on promoting a free and open Indo-Pacific and countering efforts by those who seek to undermine good governance and the rules-based international order," in an apparent reference to China, which has been flexing its muscles in territorial disputes in the South and East China seas. The U.S. special representative for North Korea also met separately with Shigeru Kitamura, national security adviser to Prime Minister Shinzo Abe.

Relations between the two Koreas have sunk to their lowest level in years following the North's demolition of an inter-Korean liaison office on its side of the border in mid-June. Senior North Korean officials have also lashed out at the United States in recent days, rejecting the possibility of resuming negotiations that have been deadlocked since a summit between the U.S. President Donald

Trump and the North's leader Kim Jong Un collapsed in early 2019 over disagreements on sanctions relief. Kim's sister and close aide, Kim Yo Jong, issued a statement Friday (10 July) saying Pyongyang is not willing to arrange another summit this year unless Washington changes its stance.

The United States and its allies in Asia are facing security challenges including China's growing assertiveness, seen both in its actions in surrounding waters and the enactment of a new national security law in Hong Kong, a move that has drawn criticism for undermining the "one country, two systems" principle.

"In the time of coronavirus and COVID-19, we still have to worry about some country trying to change the status quo with force," Kono said in his meeting with Biegun. Biegun is the highest-ranking U.S. official to visit Japan since travel restrictions were imposed to curb the spread of the novel coronavirus. He and his staff were exempted from the entry ban on people traveling from the United States and South Korea on condition that they be tested for COVID-19, the respiratory disease caused by the virus, and avoid contact with members of the public.

Source: <https://english.kyodonews.net/news/2020/07/e75d4b6b195a-update3-japan-us-vow-cooperation-on-n-korea.html>, 11 July 2020.

**Iranian Foreign Ministry Spokesman Seyed Abbas Mousavi warned that any country that is deemed responsible for the explosion at the Natanz nuclear enrichment center should expect a strong Iranian retaliation.**

## NUCLEAR PROLIFERATION

### IRAN

#### Iran Vows 'Firm' Response to Alleged Israeli Sabotage of Nuclear Site

Iranian Foreign Ministry Spokesman Seyed Abbas Mousavi warned that any country that is deemed responsible for the explosion at the Natanz nuclear enrichment center should expect a strong Iranian retaliation.

According to the *New York Times*, the string of explosions in Iran in recent weeks is part of an "evolving" Israeli-American strategy of "short-of-

war clandestine strikes, aimed at taking out the most prominent generals of the Islamic Revolutionary Guards Corps and setting back Iran's nuclear facilities." Iran confirmed that a damaged building at the Natanz nuclear site was a new centrifuge assembly center, Iran's state-run IRNA news agency reported.

Iranian officials had previously sought to downplay the fire, which erupted, calling it only an "incident" that affected an "industrial shed." However, a released photo and video of the site broadcasted by Iranian state television showed a two-story brick building with scorch marks and its roof apparently destroyed. Iranian officials have said they suspect "enemies of Iran" were responsible for the attack on Natanz but have yet to officially blame Israel.

"After summarizing, a full report will be presented in this regard and then, we will take the necessary actions in accordance with the findings that will be made after the investigation," Mousavi warned, without mentioning the Jewish state or the United States. "If a regime or a government is involved in the Natanz incident, Iran will react decisively," Mousavi stressed. ...

Source: <https://www.israelhayom.com/2020/07/13/iran-vows-firm-response-to-alleged-israeli-sabotage-of-nuclear-site/>, 13 July 2020.

## **NUCLEAR SAFETY**

### **IRAN**

#### **Iran Nuclear: Natanz Fire Caused 'Significant' Damage**

A fire that broke out on Thursday (2 July) at a key Iranian nuclear facility has caused "significant damage", a spokesman for Iran's nuclear energy body has said. He said the cause of the blaze at the Natanz enrichment site had been determined, but gave no details. The spokesman added that the destroyed machinery would eventually be replaced by more advanced equipment.

The fire hit a centrifuge assembly workshop. Some Iranian officials have blamed possible cyber-sabotage. Centrifuges are needed to produce enriched uranium, which can be used to make reactor fuel but also nuclear weapons.

What is behind mysterious 'attacks' at key sites? Behrouz Kamalvandi, a spokesman for Iran's Atomic Energy Organisation, said that security officials were not talking about what caused the Natanz fire "because of security reasons". The incident, he said, had "caused significant damage, but there were no casualties". Other fires and explosions have also occurred in the past week in Iran.

**The incident could slow down the development and production of advanced centrifuges in the medium term... Iran will replace the damaged building with a bigger one that has more advanced equipment.**

Why do the limits on Iran's uranium enrichment matter? Mr Kamalvandi added: "The incident could slow down the development and production of advanced centrifuges in the medium term... Iran will replace the

damaged building with a bigger one that has more advanced equipment."

What happened on Thursday (2 July)? The fire occurred at "one of the industrial sheds under construction" at Natanz, Mr Kamalvandi said at the time. The AEOI later published a photo showing a partly burned building, which US-based analysts identified as a new centrifuge assembly workshop. Reuters news agency quoted unnamed Iranian officials as saying they believed the fire was the result of a cyber attack, but did not cite any evidence.

The IAEA, which monitors Iran's compliance with a 2015 nuclear deal struck with world powers, said it anticipated no impact on its verification activities. What other incidents have occurred? The Natanz fire comes six days after an explosion near the Parchin military complex.

Iranian authorities said the blast was caused by "leaking gas tanks" at the site, but analysts said satellite photographs showed it happened at a nearby missile production facility. Parchin, near Tehran, is where Western powers suspect Iran

carried out tests related to nuclear warhead detonations more than a decade ago. Iran insists its nuclear programme is peaceful and denies that it sought to develop nuclear weapons. Officials said there had been a fire at a power plant near the south-western city of Ahvaz. They said the blaze had been put out and electricity restored.

Source: <https://www.bbc.com/news/world-middle-east-53300579>, 05 July 2020.

## RUSSIA

### Russian Village in 'Danger Zone' of Possible Nuclear Missile Test

A tiny village in northern Russia is back in the global spotlight again after its residents were warned they were in the "danger zone" for an upcoming military activity.

The Russian government is offering to temporarily evacuate the 500 or so residents of the village of Nenoksa for the duration of the activity. The village became famous in 2019 after an incident involving a nuclear-powered cruise missile killed five and released radioactivity.

Nenoksa lies just south of the Arctic Circle, in Arkhangelsk Oblast, Russia. According to the Barents Observer, the nearby city of Severodvinsk posted a warning on its website that Nenoksa is "inside the danger zone during work by the 1st scientific center of military unit 09703." The advisory runs from 6 a.m. July 7 to 6 p.m. July 8th.

The Russian government is providing five buses for those that wish to evacuate, and evacuation is voluntary. Considering the village has a population of 500, it obviously expects not everyone to want to leave. The village has been evacuated several times in the last few years, each time due to military activity. In 2015, an errant cruise missile crashed into a building in Nenoksa housing a kindergarten. No casualties were reported.

Four years later, an accident off the coast of Nenoksa killed five and resulted in a brief spike of radiation levels. Russian state energy company Rosatom said the accident took place during testing of a "isotopic sources of fuel on a liquid propulsion unit," while the research institute the five workers belonged to later said they had been working on "the creation of small-scale sources of energy using radioactive fissile materials." Two of those killed reportedly died of radiation poisoning and Russia's state nuclear agency said that the two explosions at the accident site released four different radioactive isotopes.

Western sources believe the accident involved the Burevestnik ("Storm Petrel") nuclear-powered cruise missile. Known to NATO as the SSC-X-9 "Skyfall," Burevestnik is a first-of- its-kind very

long range cruise missile powered by a miniature nuclear reactor. The use of nuclear power instead of a turbine engine should give Burevestnik the ability to fly thousands of miles—and perhaps even for days—to skirt U.S. missile defense systems. Although nuclear-powered missiles were first proposed in the 1960s, work on them never advanced

beyond the early stages due to the radioactive contamination such a missile would spew during testing.

The missile test comes just days after Scandinavian countries bordering Russia detected a mysterious release of radiation. An investigation pointed to northern Russia as a source, but Moscow insisted that nearby nuclear plants were running normally. An alternate theory was that there had been a second accident involving the new nuclear cruise missile, but with what looks like a Burevestnik test coming up that too now seems unlikely.

Source: Kyle Mizokami, <https://www.popularmechanics.com/military/research/a33219749/nenoksa-nuclear-missile/>, 06 July 2020.

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**SOUTH KOREA**

**Nuclear Commission Recommends Minor Safety Improvements for Reactors**

South Korea's nuclear safety agency on Friday (10 July) recommended minor safety improvements for eight older reactors in service following stress tests carried out by its operator. The recommendation came after Korea Hydro & Nuclear Power Co. (KHNP), which runs the country's atomic power plants, conducted extensive safety inspections on such units as the Kori 2 and Wolsong 2 reactors from October 2016 through December 2018, the Nuclear Safety and Security Commission said. "Stress tests that reflect the worst possible accidents that can occur were all conducted following guidelines set by the government, with 47 areas requiring some improvements," the commission said in a press release.

Minor improvements were called for in such areas as emergency communication links in case of serious problems and the need to carry out more detailed tests on the effectiveness of mobile power generators at atomic power plants. Currently, South Korea has 24 operational reactors, generating around 30 percent of its electric power. Seoul is currently moving to reduce its dependence on nuclear energy and building up its capability in renewable sources, such as solar and wind power. The agency said the KHNP will reflect the latest recommendations when it conducts stress tests on 14 newer reactors in the future.

The country's two newest reactors, the Shin-Kori 3 and 5 units, along with four nuclear reactors being built, do not have to be checked at present because their designs incorporated all the latest

safety systems. Besides reviewing stress tests on reactors, the agency called for an update of the radiation detection alert systems used on the Hanbit 1 and 2 reactors on the country's south western coast.

Source: <https://en.yna.co.kr/view/AEN20200710010100320>, 10 July 2020.

**UAE**

**Nuclear Gulf: Experts Sound the Alarm over UAE Nuclear Reactors**

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finished loading fuel rods into one of four brand-new nuclear reactors at the Barakah nuclear power station - the first on the Arabian Peninsula.

Years behind schedule and billions of dollars over budget, Barakah - Arabic for "divine blessing" - has been hampered by construction problems that were not disclosed in a timely fashion, and a paucity of properly trained staff to run the plant. The UAE is adamant its intentions are peaceful. It has agreed not to enrich its own uranium or reprocess spent fuel, and has signed up to the IAEA's Additional Protocol, significantly enhancing the agency's inspection capabilities.

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It has also secured a coveted 123 Agreement with the United States - a seal of approval from Washington that paves the way for bilateral civilian nuclear cooperation including the transfer of nuclear material, equipment and components.

Still, nuclear energy specialists are sounding the alarm over the potential fallout the UAE reactors

could visit upon the Gulf, an ecologically fragile and geopolitically volatile patch of planet Earth. What they describe is not one potential risk, but layers of them - from an environmental disaster, to theft of radioactive materials, to a nuclear arms race between regional rivals. Among the concerned is Paul Dorfman, Honorary Senior Research Fellow at the Energy Institute, University College London and founder and chair of the Nuclear Consulting Group.

Dorfman advises governments on nuclear radiation risks. And governments take his advice. His verdict on Barakah: "This is the wrong reactor, in the wrong place at the wrong time."

**Vulnerable to Attack:** Nuclear weapons are designed to kill. Nuclear power plants are designed to produce power for society at large. But talk to a nuclear specialist, and the line separating a military weapon from a civilian-use reactor can quickly blur. "There's an old saying, which is a nuclear power plant in a country is like a pre-deployed nuclear weapon for the enemy,"

Mykle Schneider, convening lead author and the publisher of the World Nuclear Industry Status Report (WNISR), told Al Jazeera. "People don't realise, but the radioactive inventory in a nuclear power plant is much, much larger than what is in a nuclear weapon."

The accident at Chernobyl, for instance, released 400 times more radioactive material into the planet's atmosphere than the atomic bomb dropped on Hiroshima by the US, according to the IAEA. But a radioactive release does not have to stem from human error. It could also result from a deliberate attack on a nuclear reactor. And the Middle East has witnessed more of those than any other region on Earth.

... Those reactors were located in Iraq, Iran and Israel, and include a suspected one under construction in Syria that Israel bombed. Iraq's reactors were destroyed. Israel has two reactors

in operation and Iran operates a nuclear power plant at Bushehr. Located in the Dhafra region of Abu Dhabi, the Barakah nuclear power plant has four reactors, the first of which is fully constructed and had fuel rods loaded in March this year.

Emirates Nuclear Energy Corp (ENEC), which is building and operating the plant, says it will provide 25 percent of the UAE's energy needs when all four reactors are fired up and plugged into the grid. This spring, ENEC's CEO said the first reactor would reach "criticality" - the point of a sustained chain-reaction (nuclear fission) - "very soon". It has been a long time coming. Barakah is three years behind schedule and has been plagued by problems stemming from what experts describe as a cut-rate design and poor construction that would not fly in safety-conscious Europe.

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The Barakah reactors are the first and only export order secured by KEPCO, which won the UAE contract with a bid that was reportedly about 30 percent lower than the next-cheapest one. "It's

concerning that in a volatile area, these reactors are being built in what seems to be a relatively cheap and cheerful kind of way," said Dorfman. "The Barakah reactor, although it is a relatively modern reactor, it does not have what is known as 'Generation III+ [three plus] defense in-depth'. In other words, it doesn't have added-on protection from an airplane crash or missile attack."

Those missing defence features include what Dorfman describes as "a load of concrete with a load of reinforced steel" for extra protection from an aerial attack and a "core catcher" that literally catches the reactor core if it melts down. "Both of these engineering groups would normally be expected in any new nuclear reactor in Europe," he said.

And Europe is not nearly as volatile as the Gulf, where as recently as September, Saudi Arabia's

oil facilities at Abqaiq and Khurais were attacked by 18 drones and seven cruise missiles - an assault that temporarily knocked out more than half of the kingdom's oil production. "I would say that they [Barakah reactors] are as vulnerable as Saudi Arabia's Abqaiq facility was, which was protected by three layers of missile defence," said Sokolski. Aerial assaults are just one potential avenue of attack. The UAE has pledged not to enrich its own uranium, so it has to import it. The UAE plans to cool spent fuel rods on site in pools, but according to ENEC's website, it has no long-term storage policy in place yet.

"What you'll see is nuclear fuel rods and fuel coming in and high-level waste going out," said Dorfman. "Now accidents and incidents on this high-level stuff could prove deeply problematic. And we know even into the Arabian Sea there's questions about piracy."

**Ripe for Human Error:**

Beyond the spectre of a deliberate attack or theft of radioactive materials, experts also worry that Barakah could witness an

accident caused by human error. Every country needs a nuclear regulatory body to ensure the safe operations of reactors. In the UAE, that job falls to the Federal Authority for Nuclear Regulation (FANR). Established in 2009, FANR boasts on its website that it has "achieved remarkable success in the UAE's peaceful nuclear programme through transparency in its operations".

But Barakah has a troubling record of less-than-timely disclosures of problems. Cracks in Barakah's number-three containment building were detected in 2017, but the Director General of FANR, Christer Viktorsson, only publicly disclosed this in November 2018, during an interview with the publication Energy Intelligence.

Cracks are a serious issue because containment buildings are supposed to prevent a radiological release into the atmosphere should an accident happen. ENEC did not release a statement about the cracks in the number-three unit until December

2018, when it further admitted that cracks had also been found in Barakah's number-two containment building. "ENEC's reluctance to reveal any details speaks volumes about the transparency of the Barakah new build," said Dorfman.

Cracks were eventually detected in all four Barakah containment buildings. "I can definitely say that in most cases, there's more information available on the progress of construction than is the case in the UAE," said Schneider. "It seems to be particularly problematic to access information in this country [the UAE], which is somewhat worrying when it comes to high-risk technologies." When proper oversight is lacking at nuclear facilities, the impact on people and the planet can be devastating.

**Beyond the spectre of a deliberate attack or theft of radioactive materials, experts also worry that Barakah could witness an accident caused by human error. Every country needs a nuclear regulatory body to ensure the safe operations of reactors.**

The independent investigation committee appointed by Japan's national legislature to look into the disaster at the Fukushima Daiichi Nuclear Power Plant concluded that it was not the result of the earthquake and tsunami

that shook Japan on March 11, 2011, but "a profoundly manmade disaster - that could and should have been foreseen and prevented".

But it is not only nuclear regulators who can drop the ball. Nuclear workers need to be properly trained in their jobs and steeped in a culture that promotes public safety above all other considerations. Here too, experts find Barakah wanting.

FANR did not issue an operating licence to Barakah in 2017 - the year it was originally scheduled to go online. At the time, ENEC said the start-up date had been pushed back to allow more time to ensure safety standards and reinforce "operational proficiency" for plant workers. ...

**What Spills in the Gulf Hangs around in the Gulf:**

Attack or human snafu, the question then becomes, what happens to the UAE and its neighbours if radiation from Barakah is released

into the surrounding environment? There are so many variables to consider, the disaster scenarios are boundless. But past nuclear incidents can offer a window into the public health problems that can arise, from elevated levels of certain kinds of cancers, DNA damage and death, to social disruptions, community breakdowns and anguishing social stigmas suffered by survivors.

One variable attached to Barakah that troubles nuclear specialists and other scientists is the unique ecosystem of the Gulf. Most of the radiation released during the Fukushima accident ended up in the Pacific Ocean - which is vast, cold and deep - enabling it to disperse over a wide area. The Gulf, by comparison, is far smaller, warmer and shallower. Roughly 600 miles (965km) long, the Gulf's width varies from just over 200 miles (322km), narrowing to around 35 miles (56km) at the Strait of Hormuz, where during the spring, the tidal range is only 1.2 metres.

"It's a very stressed water body in terms of the ecosystem," said Roger A Falconer, emeritus professor of Water Engineering at Cardiff University. Falconer has studied three-dimensional computer models of the Gulf, mapping so-called "residence times" - the average time a parcel of water or a spillage, like oil, hangs around in the Gulf before it is flushed out via the Strait of Hormuz. "To get from Abu Dhabi to the Strait of Hormuz, it would typically take two years, which is a long time," Falconer told Al Jazeera. "I would have thought it was better to put the nuclear power station on the other side of the Strait of Hormuz outside the basin," he added.

The prospect of radioactive material polluting the Gulf is even more worrisome, say experts, when you consider that it has the highest concentration of water desalination plants on Earth, and no

liability regime in place to determine who pays for what if a radiation incident happens. "It would be enormously helpful if the GCC states got together and started thinking about a liability regime, a liability structure to think through what if something happens" said Dorfman.

The financial toll of a nuclear accident can be staggering. Japan's government estimated in 2016 that the final price tag for cleaning up Fukushima will be north of \$200bn, while the Japan Center for Economic Research reckons it could cost more than three times that amount. And most of the radioactive contamination from Fukushima blew out to sea - not toward heavily populated areas like Tokyo. When the UAE launched its nuclear programme back in 2009, nuclear energy was sold as a "significant contribution" to the country's economy as well as its future energy security.

The initial projected cost for the plant was \$20bn. But thanks to delays, that figure had ballooned to more than \$24bn by 2016. Some estimates put the total cost of the Barakah

build at around \$28bn to \$30bn. While the bill for Barakah was climbing, the price of greener, renewable energy started plummeting dramatically. Between 2009 and 2019, utility-scale average solar photovoltaic costs fell 89 percent and wind fell 43 percent, while nuclear skyrocketed 26 percent, according to an analysis by the financial advisory and asset manager Lazard.

According to the forthcoming 2020 edition of the WNISR, the latest contracted solar photovoltaic power purchase agreement for the fifth-phase Dubai solar park came in under two cents (\$0.02) per kWh. Barakah's projected levelized cost of energy (lifetime costs divided by energy production) back in 2012 was a little over seven cents (\$0.07) per kWh.

Meanwhile, Lazard's 2019 global estimate for the

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average global levelized cost of nuclear energy came in at \$0.118- \$0.192 per kWh. "Renewable costs have plummeted to such an extent that the market just says 'no' to nuclear," said Dorfman. "The only way you can build nuclear these days is with massive, massive state subsidies." Not surprisingly, free markets have started to give a thumbs-down to nuclear energy. The number of nuclear power units under construction around the world fell from 68 at the end of 2013 to 46 by mid-2019.

One reason construction is still moving forward with many of these, says Schneider, is nuclear power's momentum. "This technology is a lock-in technology," he said. "Once you do the first step, it's very difficult to walk back the decision-making processes." When the UAE established its programme in 2009, nuclear was more cost effective for generating electricity than solar and wind. But Barakah did not break ground until 2012 - after Fukushima had led many countries to either scrap or postpone nuclear projects, and by which time solar costs were closing in on nuclear and wind had become an even cheaper option. "There was definitely a lost opportunity, you know, [for the UAE] to get out of this project," said Schneider.

**Proliferation Concerns:** Whenever the words "nuclear" and "Middle East" are uttered in the same sentence, a discussion about proliferation risks is almost surely bound to follow because nuclear technology is dual-use.

"The tense geopolitical environment in the Gulf makes nuclear a more controversial issue in this region than elsewhere, as all new nuclear power provides the capability to develop and make nuclear weapons," Dorfman notes. This has long been a concern in the Middle East - a region wracked by armed conflict, civil unrest and superpower agendas.

A cold war between Saudi Arabia and Iran has opened multiple faultlines. The air, land and sea blockade of Qatar by Saudi Arabia, the UAE, Bahrain and Egypt just entered its fourth year. The civil wars in Syria and Libya are also regional and international proxy wars. Anti-government demonstrations erupted last year in Lebanon, Iraq, Iran, Algeria, Egypt, Jordan, Morocco, Palestine and Tunisia. There has been no progress in resolving the more than half-century-old Palestinian-Israeli conflict. And the COVID-19 pandemic is causing painful economic disruptions that are already fuelling more discontent.

**Understandably, the UAE has tried to distance itself from bad behaviour - real or perceived - of its regional cohorts. Most recently, the UAE's ambassador to the US, Yousef Al Otaiba, wrote reminding the world that the UAE had opted to "forgo domestic enrichment and reprocessing of nuclear material", and has agreed to let the IAEA inspect its nuclear facilities on short notice.**

For years, the lightning rod for Middle East nuclear proliferation discourse has been Iran and the slowly unravelling deal with world powers to keep Tehran's nuclear programme in check. The Middle East is not a region where trust on matters nuclear is easily extended by the international community. And for good reason Israel

has never admitted to possessing nuclear weapons even though it is widely believed to have them. Iraq had a covert nuclear weapons programme that was gutted after the 1991 Gulf War. Libya admitted in 2003 that it had a clandestine nuclear programme that was subsequently dismantled. Algeria admitted in the early 1990s that it had constructed a nuclear research reactor with China's help. And though Iran insists its nuclear programme has never been military in nature, it did admit in 2002 that it had built nuclear facilities that were not declared to the IAEA.

Understandably, the UAE has tried to distance itself from bad behaviour - real or perceived - of its regional cohorts. Most recently, the UAE's ambassador to the US, Yousef Al Otaiba, wrote an op-ed published in the *Wall Street Journal* reminding the world that the UAE had opted to "forgo domestic enrichment and reprocessing of nuclear material", and has agreed to let the IAEA

inspect its nuclear facilities on short notice.

“New and better rules have delivered a new huge source of clean power and reduced the risk of nuclear proliferation,” Otaiba wrote. But concerns still linger. “Since new nuclear makes little apparent sense in the Gulf, which has some of the best solar energy resources in the world, the nature of the interest in nuclear may lie hidden in plain sight,” Dorfman noted in a report he authored on Barakah.

Sokolski also has questions. “If they want electricity, this is a very poor way to do it,” he said, noting the abundance of alternative energy sources the UAE could harness including natural gas, sun and wind. “Building a nuclear power plant would be like number 58 on your top five things to do, and that they’ve chosen to focus on this [nuclear] is suspect.” And though being suspect is not the same as engaging in prohibited activities, the possibilities for something to go horribly wrong in connection with Barakah are too profuse to ignore, say experts. Because when nuclear risks become nuclear reality, it may simply be too late. ...

*Source: Excerpted from article by Patricia Sabga, <https://www.aljazeera.com/ajimpact/nuclear-gulf-experts-sound-alarm-uae-nuclear-reactors-200628194524692.html>, 14 July 2020.*

**NUCLEAR WASTE MANAGEMENT**

**JAPAN**

**8 Cases of Inappropriately Stored Nuclear Waste Found at Northern Japan Reprocessing Plant**

Japan Nuclear Fuel Ltd. (JNFL) had been inappropriately storing nuclear waste at a nuclear fuel reprocessing plant in Rokkasho, Aomori Prefecture, in northern Japan, including keeping waste in undesignated areas, the country’s nuclear regulatory body has revealed.

The Nuclear Regulation Authority (NRA) had instructed JNFL to make improvements in its practices in 2017, but the company had left some of its nuclear waste in places where they were not supposed to be. There has been no confirmation that any of the radioactive substances leaked. There have been a series of shoddy practices uncovered at JNFL, which is likely to call into question the company’s attitude.

At the fuel reprocessing plant, uranium and plutonium are extracted from spent nuclear fuel for reuse in nuclear reactors. Highly radioactive waste liquid that is generated in the process becomes nuclear waste when it is solidified in glass. According to the NRA and others, JNFL had been keeping nuclear waste in a building different from the one the waste is meant to be stored in. As for the approximately 160 kilograms of shards of

**As for the approximately 160 kilograms of shards of radioactive waste liquid solidified in glass, an appropriate storage method had not been stipulated. There were eight cases of inappropriate storage, some of them spanning the past 19 years.**

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Inspectors from the NRA Secretariat confirmed inappropriate storage of nuclear waste in August 2017. The regulatory body asked that JNFL correct its practices by August 2019, but only two of the eight cases had been remedied by the end of June 2020.

At a meeting concerning the safety inspection of the nuclear fuel reprocessing plant this past May, the NRA had determined that the plant had effectively met the government’s new criteria. JNFL explained that it had intended to consult with the NRA Secretariat once the inspections had taken place. The NRA, meanwhile, says that the situation is exempt from safety inspections under the government’s new criteria.

*Source: <https://mainichi.jp/english/articles/20200715/p2a/00m/0na/002000c>, 15 July 2020.*

## SLOVENIA–CROATIA

### **Slovenia, Croatia Confirm Plans to Decommission Krško Nuclear Power Plant, Radioactive Waste to be Stored in Vrbinja**

Slovenia and Croatia confirmed on Tuesday (14 July) revised programmes for the decommissioning of the Krško nuclear power station and the storage of radioactive waste, as the ministers in charge of energy chaired a session of the intergovernmental commission on the management of the jointly-owned power station.

The revised programmes had previously been confirmed by the Slovenian government and the Croatian parliament and reflect the decision to extend operation of the plant by 20 years beyond its originally planned shutdown in 2023, and the decision that each country will build its own radwaste repository. ...

Croatian Energy Minister Tomislav Ćorić likewise expressed satisfaction. "I'm glad we have successfully brought this long process to a conclusion," he said according to the Slovenian Infrastructure Ministry. The next session of the intergovernmental commission is scheduled to take place in Slovenia in the first half of 2021.

Slovenia plans to store its portion of nuclear waste in Vrbinja, close to the power station, a project which is already well under way. Croatia plans to build a repository in Ćerkezovac, close to the border with Bosnia-Herzegovina, by 2024.

Source: <https://www.total-slovenia-news.com/politics/6606-slovenia-croatia-confirm-plans-to-decommission-krsko-nuclear-power-plant-radioactive-waste-to-be-stored-in-vrbinja>, 15 July 2020.

## USA

### **West Texas Nuclear Waste Facility could Face Delay amid COVID-19 Pandemic**

Environmental groups sought to postpone the

federal licensing process for a project to build and operate a facility to temporarily hold spent nuclear fuel in West Texas, contending public participation in the process could be limited by health concerns associated with the COVID-19 pandemic.

The move came about two months after the NRC issued an environmental impact statement (EIS) for the project that recommended it be licensed by the federal government. The initial phase of the project would allow the facility to hold 5,000 metric tons of spent nuclear fuel, but the applicant anticipated seven additional license amendments for 5,000 more metric tons each for the next 20 years. When at full capacity, the facility would hold 40,000 metric tons of uranium.

The NRC released the EIS May for the first phase of the project, but the document was also intended to consider the subsequent phases. Waste Control Specialists LLC (WCS) applied for a license in 2016 with the federal Nuclear Regulatory Commission (NRC), but suspended the application the following year.

In 2018, WCS formed a joint venture with nuclear power company Orano USA and resumed the licensing process under the name Interim Storage Partners (ISP). If approved, the license would allow ISP to build the facility near Andrews, Texas about half a mile from the Texas-New Mexico border to hold high-level nuclear waste for a 40-year period while a permanent repository is developed.

The U.S. does not currently have a permanent repository for high-level nuclear waste after a proposal at Yucca Mountain, Nevada was halted due to widespread opposition from state lawmakers.

***New Mexico Nuke Site also Delayed by COVID-19:*** ISP's project moved through the licensing process simultaneously with a similar proposal from Holtec International to hold spent nuclear

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fuel rods at a location near the Eddy-Lea county line in southeast New Mexico. That project also received preliminary approval in its EIS from the NRC but faced backlash from environmental groups across the country while receiving support from some local leaders in Carlsbad and Hobbs and Republican state lawmakers. The public comment period on the Holtec facility was extended by the NRC until September.

In its opposition to the Texas facility, the groups sent a letter to the NRC on July 9 demanding the public comment period be extended by 180 days after the pandemic and global health crisis was deemed over to allow for in-person public meeting they said were needed for adequate participation.

In total, 60 groups from across the U.S. signed on to the letter that contended online public meetings were inadequate. A public meeting was held in Andrews, Texas, with a second in Hobbs and a third was online. The NRC held two such meetings on the Holtec project this year, but opponents continued to argue that project should also be postponed until in-person meetings can be held safely. ...

*Source: Adrian Hedden, <https://www.currentargus.com/story/news/local/2020/07/15/west-texas-nuclear-waste-facility-near-could-face-delay-amid-covid-19/5434041002/>, 15 July 2020.*



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