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**STATEMENT – Rafael Mariano Grossi, DG, IAEA**

### **Ten-Year Anniversary of the Fukushima Daiichi Nuclear Power Plant Accident**

Ten years ago today, the Great East Japan Earthquake shook Asia's seabed. Its tremors were powerful enough to shift the earth on its axis. At the Fukushima Daiichi Nuclear Power Plant, the equipment reacted just as it was designed to do. It stopped, the control rods were inserted into the reactor core, and the cooling system kicked in. About an hour later, however, a giant tsunami swept across the mainland, overwhelming Japan's coastal defences and Daiichi's safety perimeter.

Though the ensuing damage caused nuclides to be released into the environment, scientists have found no evidence that this caused radiation-induced health effects.

The accident galvanised the international community. A few days after the tsunami, a team of IAEA experts flew to Japan to help engineers assess the damage, and the Agency has continued to assist Japan over the past decade. Today we are helping tackle the ongoing challenge of the water.

As we mark this solemn occasion, I would like to take stock of all that the IAEA and its Member States have done since that fateful day in 2011. We have put in thousands of manhours and compiled thousands of pages of data and

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knowledge. This represents the findings of the first four years.

Within just a few months of the accident, the IAEA had developed a comprehensive action plan to strengthen the global nuclear safety framework and Member States had endorsed it.

Around the world, operators' engineers analysed their nuclear reactors and made upgrades where necessary. Today, virtually all Member States with nuclear power plants have completed 'stress tests' and many make

use of the IAEA's expert peer-review missions.

We have built a single platform that promotes clear nuclear safety practices for existing sites and those being developed and constructed. Our

work has not only led to concrete improvements in the safety of nuclear sites; it has created a sustained and robust global safety culture.

We have developed and improved Safety Standards, norms and guidance. The adoption of the Vienna Declaration brought together all parties of the Convention on Nuclear Safety to reinforce its principles.

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An important lesson of Fukushima is that regulators must be strong, independent and adequately resourced.

A robust, normative safety framework with the IAEA at its centre is critically important. Because nuclear safety is not an end in itself; it is the means to an end. It is the key to nuclear power's expansion. And thus it is the key to nuclear meeting its biggest promise of all – the ability to help stabilize the climate while allowing economies and societies to thrive, fuelled by safe, stable and sustainable carbon-free energy.

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I like to say the IAEA does not stop for a single minute. And it is true. The job we have is simply too important to rest.

Source: <https://www.iaea.org/newscenter/statements/ten-year-anniversary-of-the-fukushima-daiichi-nuclear-power-plant-accident-a-decade-of-improving-nuclear-safety>, 10 March 2021.

**OPINION – Manpreet Sethi**

**Repositioning Nuclear Power: From Fukushima to COP 26**

An unprecedented, high-intensity earthquake followed by a tsunami on 11 March 2011 led to disruption of operations at the nuclear reactors at

Fukushima Daiichi, Japan. But even more significantly, the accident cast a shadow on the entire nuclear sector as public scepticism on nuclear safety grew across the world.

In order to arrest the downslide, governments in all countries operating nuclear power plants ordered safety audits and took additional measures. Japan, which was most severely hit, temporarily shut down its entire nuclear fleet; only a handful of nuclear plants have since returned to operation. Meanwhile, some countries like Germany, Switzerland, Belgium, Taiwan, and South Korea announced a gradual phase-out of nuclear energy. Some others, especially in South-east Asia, that had been contemplating an initiation into nuclear power, announced a deferral or abandonment of plans. Consequent to these reactions, the

perceptible upsurge in interest in nuclear energy that had been visible around 2009-2010, the so-called nuclear renaissance, seemed to have disappeared.

What does the nuclear power landscape look like in 2021, a decade since the accident? Currently there are 440 operational nuclear reactors in 31 countries that are contributing 10% of the total global electricity production. 50 more are under construction. Amongst the countries generating nuclear electricity, France draws nearly 70% of its electricity from nuclear energy, while USA, UK and Russia get about one-fifth of theirs from nuclear. China stands at 5% and India at just about 3%.

While each country makes its choices on sources of electricity based on its unique circumstances, a global concern, namely climate change, is likely to influence future energy preferences of all. There

is today a widespread acknowledgement of the adverse consequences of increasing greenhouse gas emissions and resultant global warming. And the kind of sources used for electricity generation have tremendous significance. As leaders in electricity deficit nations rush to build power plants, and in others to replace ageing ones, their preferences would impact the future.

A growing focus on the imperative of utilising carbon-free energy sources is bringing back the limelight to nuclear energy. In his recent book, *How to Avoid a Climate Disaster*, Bill Gates endorses nuclear power as “the only carbon-free energy source that can reliably deliver power day and night, through every season, almost anywhere on earth, that has been proven to work on a large scale.” Indeed, the base-load availability of electricity from nuclear power generation offers an advantage over renewable sources such as solar and wind. While the latter are developing well with strong governmental support, the intermittency of electricity thus produced does not allow countries to let go of fossil fuel plants as back-up. This, among other reasons, keeps the share of fossil fuels for power generation at a high 65%.

Such a high usage of fossil fuels makes decarbonisation of the electricity sector practically impossible. Independent studies conducted by the Inter-Governmental Panel on Climate Change, OECD International Energy Agency, as well as the World Nuclear Association have concluded that significant cuts in GHG emissions require moving to scenarios where a quarter or more of world’s electricity is generated from nuclear power. In its 2020 Energy White Paper, the UK, which will be

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**In its 2020 Energy White Paper, the UK, which will be hosting the next UN Climate Change Conference of Parties (COP 26) in November this year, has identified nuclear power as one of the constituents of its plan to achieve a four-fold increase in clean electricity generation to meet its target of net zero emissions by 2050. President Joe Biden too envisages nuclear as part of his route to the goal of carbon-free electricity by 2035.**

hosting the next UN Climate Change Conference of Parties (COP 26) in November this year, has identified nuclear power as one of the constituents of its plan to achieve a four-fold increase in clean electricity generation to meet its target of net zero emissions by 2050. President Joe Biden too envisages nuclear as part of his route to the goal of carbon-free electricity by 2035. Fortunately, the two countries with largest population and high electricity requirement are also committed to nuclear power. Both China and India, despite Fukushima, continue to consider nuclear plants as essential to their energy baskets and climate change commitments.

Meanwhile, studies have also highlighted another interesting development in the context of nuclear power plants. Not only do these emit the least greenhouse gases, they also produce more energy for each pound of material such as cement, steel and glass that goes into constructing the plant. This is a significant consideration given that a large share of greenhouse gases is emitted in the production of these materials themselves.

While nuclear power could be a solution for climate concerns, it nevertheless, suffers from its own set of problems. High capital cost, safety issues, and spent fuel management remain the three main issues. Fortunately, human ingenuity can drive innovations that can resolve these, provided there is a broad understanding of the need to retain nuclear as part of energy baskets to mitigate global environmental concerns. Unfortunately, though, tendencies to play up risks associated with nuclear fission and to play down the risk of climate change continue to distract from the focus that should be

placed on reducing construction costs, increasing safe operations and researching on better management of nuclear waste.

Climate action and affordable and safe energy are two of the sustainable development goals identified by the United Nations. At COP 26, where governments will be required to ratchet up their climate commitments to reach net zero by 2050, serious choices will have to be made on how to produce more electricity to power socio-economic growth, but to do so in an environmentally sustainable manner. Introduction of newer, safer and proliferation-resistant nuclear technologies currently being developed, faster construction rates, greater transparency on safety, and proactive public outreach could help nuclear power reposition itself in popular perception as one important solution to climate change.

Source: <https://www.sundayguardianlive.com/opinion/repositioning-nuclear-power-fukushima-cop-26>, 06 March 2021.

**OPINION – Bennett Ramberg**

**Is Nuclear Peace with North Korea Possible?**

North Korea's recent public displays of new intercontinental and submarine-launched ballistic missiles have raised fresh concerns about the risks the regime in Pyongyang poses to the US mainland. As President Joe Biden's administration reviews US policy toward the DPRK over the past four years and draws what lessons it can from Donald Trump's nuclear summitry with North Korean leader Kim Jong-un, it should consider a new arms-control approach.

**The failure of Trump's efforts should surprise no one. After all, prior US administrations' initiatives to stop North Korea's nuclear-arms program – including Bill Clinton's "Agreed Framework," the six-party talks during George W. Bush's administration, and Barack Obama's "Leap Day" agreement – came to naught.**

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All this diplomatic activity leading nowhere raises a fundamental question: Does nuclear-arms control

have a future on the peninsula? It does, but not as currently practiced. It should be clear by now that Kim will not abolish his nuclear arsenal, or permit a verifiable nuclear freeze, as some have called for. The reason is simple: as with all nuclear-armed countries today, nuclear weapons remain the regime's ultimate security blanket. The bomb also provides Kim with leverage over South Korea. The challenge, then, is to ensure that North Korea never uses its nuclear arsenal.

Realizing this aim will require a combination of classic deterrence and new diplomatic thinking – specifically, a normalization of US-North Korea ties. America currently provides deterrence on the Korean Peninsula through its offshore air- and sea-based nuclear umbrella over South Korea, while nearly 30,000 US ground and air troops in the country supplement more than three million active and reserve South Korean troops.

But relying on deterrence alone against North Korea cannot assuredly prevent or manage missteps, because the country's isolation from the

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rest of the world breeds unique perils. Seclusion promotes pathological insecurities that could fuel misunderstanding and miscalculation. To complicate matters further, Kim is prone to grandiosity, military posturing, and bullying.

Normal diplomatic ties buttressed by deterrence have provided a path to nuclear peace in other bilateral relationships, including between China and the United States. As menacing as North Korea is today, Cold War-era China under Mao Zedong's leadership posed a far greater threat to American interests. Mao intervened in the Korean War against the US, fomented the Taiwan Strait crises later in the 1950s, and encouraged wars of national liberation against Western powers. When President John F. Kennedy's administration entered office in 1961, it regarded China as a rising nuclear bête noire and considered military action against it.

But America did not bomb away, and Richard Nixon's subsequent opening to China and the normalization of relations during Jimmy Carter's presidency neutralized US concerns. Despite the absence of a bilateral nuclear-arms limitation treaty, China's arsenal remains largely a low-level issue amid current Sino-American tensions.

Similarly, US diplomatic ties with the Soviet Union dating back to the 1930s proved their worth in the 1962 Cuban missile crisis. As the US ramped up its military readiness to compel the Soviet Union to withdraw its nuclear missiles, the interaction between Washington-based Soviet diplomats and US officials proved pivotal in ending the standoff. Likewise, US diplomatic influence over Pakistan, and its ties with India, helped slow the momentum toward nuclear war during the 1999 Kargil conflict and in the aftermath of the 2001 Jaish-e-Mohammed terrorist attack on the

Indian parliament.

To be sure, the centrality of North Korea's nuclear enterprise to the survival of Kim's regime would complicate any effort to normalize diplomatic relations. Then there are questions about how to build a diplomatic relationship. Can or should the process begin with the opening of embassies, in the hope that this will engender confidence and enable the two countries to address substantive issues? Or can negotiators get down to details immediately?

Either way, two priorities stand out. North Korea needs relief from international economic sanctions, and the US needs to eliminate North Korea's capability to strike it with ICBMs.

Sanctions, domestic mismanagement, natural disasters, and COVID-19 have left North Korea's economy – by Kim's own admission – in desperate need of repair. For America, which currently lacks effective ballistic-missile defenses, the prospect of being in North Korea's nuclear crosshairs is unacceptable. Could this point to a possible trade-off, namely the lifting of sanctions in exchange for the elimination of rockets?

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Such a deal would leave North Korea's theater nuclear force untouched and help mend the country's economy while reducing the risk of a preemptive American strike. It would also immunize the US against a possible North Korean ICBM attack, leaving it better placed to meet South Korean and Japanese security needs. And with diplomatic representation in each other's countries, both sides would have reliable channels to address disputes and manage relations generally.

To determine whether Kim's regime would be open to serious negotiation, the Biden administration could initially endorse so-called

Track II diplomacy – former US government and non-government interlocutors meeting informally with North Korean officials in third-party countries. If the outreach sparked interest in Pyongyang, the door to formal talks would open. America's default option is to return to tried-and-failed efforts to persuade North Korea to disarm. The challenge will be to convince leaders on both sides that diplomatic normalization leading to an ICBM-sanctions trade-off is the best path forward

Source: <https://www.project-syndicate.org/commentary/us-north-korea-nuclear-peace-deterrence-diplomacy-by-bennett-ramberg-2021-03>, 09 March 2021.

**OPINION – James Jay Carafano**

Biden vs. Iran – Can President Avoid Nuclear Deal *Deja vu?*

Tehran just rejected President Biden's offer for direct nuclear talks—pretty clear evidence that the mullahs want Uncle Sam to grovel more before they'll deign to come back to the table. This really ups the stakes hinging on the question: What does Team Biden do now?

It's not clear anyone—including the president—really knows how he will try to handle Iran. All we can say for sure is: If the president gets Iran policy wrong, it will be a catastrophic setback for America's vital global interests. Consider what's at stake. Over the last four years, the United States made great progress establishing a sustainable footprint in the Middle East—one small enough that the U.S. is not expected or obliged to solve every problem in the region, but big enough to secure our major goals there.

Those goals are important: preventing nuclear

proliferation; combating violent extremism and terrorism that threatens regional and global security, and blocking Iran's destabilizing influence in the Middle East.

Accomplishing these goals will not only make the world a safer place, it will make the region a better security, energy and economic partner.

For once, the U.S. has a middle way forward between heavy-handed intervention and walking away and watching the place burn. Of particular import was the signing of the Abraham Accords. This agreement established a foundation for collective security and economic cooperation among Israel and several Arab nations,

cooperation that can lead to a more peaceful, prosperous and secure Middle East.

All that now seems at risk. The Biden administration appears to be entertaining thoughts of dropping the sanctions imposed on Tehran by the Trump administration and jumping back into something like the fatuous Iran deal negotiated by the Obama administration. That would be a mistake. The sanctions have visibly weakened Iran's ability to make mischief. Were the U.S. to reverse course, other Arab nations might quickly lose confidence that America will be there to support a constructive Middle East framework. Instead of the region taking more responsibility for its own future, solidarity will quickly fragment.

Countries that have suffered mightily from Iran's past troublemaking will quickly start to hedge their bets on the U.S., looking for new partners to protect their interests. That will open the door for more influence from Russia and China, increasing and accelerating competition and the potential for future conflicts.

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An emboldened Iran with an influx of cash and investment will only make the world worse. Tehran would be able to plow more resources into the proxy wars it has ginned up in Syria, Lebanon, Yemen, Iraq and Gaza. And they will remain the world's most significant state sponsor of terrorism.

The greatest danger, of course, is of Iran going nuclear. That would make other Arab nations and Turkey feel compelled to follow suit to reestablish a balance of power in the region. A proliferated Middle East in combination with an empowered and ever-destabilizing Iran is recipe for World War III.

So far, the administration has said "no sanctions relief" until Iran stops enriching uranium and returns to the negotiating table. Yet they've already floated "sweeteners" to get Iran back to the table. Removing the designation of the Houthis as terrorists and pulling support from Saudi Arabia, has less to do with the war in Yemen and more with taking the pressure off one of Iran's proxies to please Tehran. Likewise, the Biden administration has already abandoned efforts to impose "snapback" U.N. sanctions. Bribing Iran to behave failed miserably under Obama. By all odds, it will fail again.

Another worrisome sign: the Biden administration has committed to a "multilateral" approach to dealing with Iran. That's not promising. The Trump team tried to get the Europeans to press Tehran for a better deal. They refused. The Europeans also failed to agree to snapback sanctions, even though Iran had violated the existing deal more than enough to warrant punishment. Bringing the Europeans into negotiations will likely trigger a race to "consensus" on how the West should capitulate to Tehran.

President Biden acknowledges the Iran deal

wasn't good enough. Yet he says he wants to re-enter the deal so he can negotiate a better one. The odds of Tehran agreeing to that are zero. It's like letting the bank be robbed and then negotiating with the bank robber to return the money.

The administration argues that by reviving the Iran deal they will put Iran "back in the box." But as Middle East expert Jim Phillips has said, the deal "was a weak box that will become even weaker as key restrictions sunset. If the administration doesn't stick to its guns, it will end up reviving the deal while being sucked into endless negotiations with Iran that go nowhere."

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*Source: <https://www.heritage.org/middle-east/commentary/biden-vs-iran-can-president-avoid-nuclear-deal-deja-vu>. 08 March 2021.*

**OPINION – Stephen Greene, Jennifer Gordon**

**Why the U.S.-South Korea Nuclear Partnership Matters**

Nuclear energy is a key tool in decarbonizing the global power system, and it also has the potential to address hard-to-abate sectors, such as desalination and industrial heat. However, it is critical that—as countries without nuclear energy work to build new nuclear energy programs, and as countries with existing programs seek to acquire the next generation of nuclear reactors—the United States and its allies are the leading vendors of the international nuclear market, rather than Russia and China. The United States and South Korea have an established record of success in civil nuclear cooperation, and the continuation and evolution of that cooperation will be critical to the international expansion of nuclear power.

Although the domestic nuclear industry in each country faces different challenges—an aging fleet and competition against cheap natural gas in the United States, and social and political opposition

in much of South Korea—a renewed emphasis on fighting climate change in both countries may lead each to recognize the value of nuclear power in that effort. This recognition should, in turn, provide the opportunity for bilateral cooperation to strengthen domestic civil nuclear industries in the United States and South Korea, while bolstering what both countries can do together as they support the growth of nuclear power internationally.

Suppliers in both the United States and South Korea have strong capabilities in nuclear components and services. South Korean suppliers provided key components to the only traditional nuclear power plant currently under construction in the United States—which will soon begin operations in Georgia—and U.S. suppliers have historically provided components and services for South Korean reactors, though future prospects may not be as strong. The mutual supply chains are valuable for both countries and policies should encourage their continuation and expansion.

Both countries have extensive nuclear research programs and interest in developing the next generation of advanced nuclear energy capabilities. The United States has increased its commitment to nuclear research and demonstration, but the opportunities may stretch the appetite for funding. For example, the Department of Energy plans to build the Versatile Test Reactor to help support the development of advanced reactors, but doing so would be costly. Funding from other nations, including South

Korea, in exchange for research opportunities, could help bring the effort to fruition.

Interest in the commercial development of advanced nuclear reactors may provide further opportunities for bilateral cooperation. South Korean suppliers

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Both the United States and South Korean suppliers have strong capabilities to offer internationally; South Korean suppliers recently built the Barakah nuclear power plant in the United Arab Emirates while achieving schedule and budget objectives,

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and with U.S. suppliers as key partners in the project. Cooperation between the United States and South Korea to support projects in third countries would enhance the capabilities and success of suppliers from both countries. Furthermore, cooperation to provide export financing could help compete with the state-supported offerings from Russia and China that could threaten

U.S. and OECD non-proliferation and safety objectives.

With the international nuclear energy market expected to triple by 2050, it is clear that countries that wish to acquire nuclear power will do so. Whether the United States and its allies lead in providing civil nuclear technology, or Russia and China succeed in achieving leadership, will likely



depend on the strength of U.S. civil nuclear partnerships with allied countries. US-South Korean cooperation will play a crucial role in nuclear innovation and in the development of new nuclear capacity in the international arena.

Source: <https://nationalinterest.org/feature/why-us-south-korea-nuclear-partnership-matters-179339>, 07 March 2021.

## NUCLEAR STRATEGY

### CHINA

#### **China Builds System to Launch its Newer Nuclear Missiles from Underground Silos**

China appears to be moving faster toward a capability to launch its newer nuclear missiles from underground silos, possibly to improve its ability to respond promptly to a nuclear attack, according to an American expert who analysed satellite images of recent construction at a missile training area.

Hans Kristensen, a longtime watcher of US, Russian and Chinese nuclear forces, said the imagery suggests that China is seeking to counter what it may view as a growing threat from the United States. The US in recent years has pointed to China's nuclear modernisation as a key justification for investing hundreds of billions of dollars in the coming two decades to build an all-new US nuclear arsenal.

There's no indication the United States and China are headed toward armed conflict, let alone a nuclear one. But the Kristensen report comes at a time of heightened US-China tensions across a broad spectrum, from trade to national security. A stronger Chinese nuclear force could factor into US calculations for a military response to aggressive Chinese actions, such as in Taiwan or the South China Sea.

The Pentagon declined to comment on Kristensen's analysis of the satellite imagery, but it said last

summer in its annual report on Chinese military developments that Beijing intends to increase the peacetime readiness of its nuclear forces by putting more of them in underground silos and operating on a higher level of alert in which it could launch missiles upon warning of being under attack.

"The PRC's nuclear weapons policy prioritises the maintenance of a nuclear force able to survive a first strike and respond with sufficient strength to inflict unacceptable damage on an enemy," the Pentagon report said. More broadly, the Pentagon asserts that China is modernising its nuclear forces as part of a wider effort to build a military by mid-century that is equal to, and in some respects superior to, the US military.

China's nuclear arsenal, estimated by the US government to number in the low 200s, is dwarfed by those of the United States and Russia, which have thousands. The Pentagon predicts that the People's Liberation Army Rocket Forces will at least double the size of its nuclear arsenal over the next 10 years, still leaving it with far fewer than the United States.

China does not publicly discuss the size or preparedness of its nuclear force beyond saying it would be used only in response to an attack. The United States, by contrast, does not rule out striking first, although President Joe Biden in the past has embraced removing that ambiguity by adopting a "no first use" policy.

Kristensen, an analyst with the Federation of American Scientists, said the commercial satellite photos he acquired appear to show China late last year began construction of 11 underground silos at a vast missile training range near Jilantai in north-central China. Construction of five other silos began there earlier. In its public reports the Pentagon has not cited any specific number of missile silos at that training range.

These 16 silos identified by Kristensen would be

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in addition to the 18-20 that China now operates with an older intercontinental ballistic missile, the DF-5. "It should be pointed out that even if China doubles or triples the number of ICBM silos, it would only constitute a fraction of the number of ICBM silos operated by the United States and Russia" Kristensen wrote on his Federation of American Scientists' blog. "The U.S. Air Force has 450 silos, of which 400 are loaded. Russia has about 130 operational silos."

Nearly all of the new silos detected by Kristensen appear designed to accommodate China's newer-generation DF-41 ICBM, which is built with a solid-fuel component that allows the operator to more quickly prepare the missile for launch, compared to the DF-5's more time-consuming liquid-fuel system. The DF-41 can target Alaska and much of the continental United States.

China already has a rail- and road-mobile version of the DF-41 missile. "They're trying to build up the survivability of their force," by developing silo basing for their advanced missiles, Kristensen said in an interview. "It raises some questions about this fine line in nuclear strategy," between deterring a U.S. adversary by threatening its highly valued nuclear forces and pushing the adversary into taking countermeasures that makes its force more capable and dangerous. ...

Source: <https://www.hindustantimes.com/world-news/china-developing-tech-to-launch-newer-nuclear-missiles-from-underground-silos-101614587119488.html>, 01 March 2021.

## INDIA

### Eye on China, India's Plan for 6 Nuclear-Powered Attack Submarines Back on Track

On March 8, the DRDO successfully carried out the final test of the land based prototype of the Air Independent Propulsion (AIP) system in Mumbai. The AIP system, retrofitted by expanding the hull area, ensures that diesel attack submarines can remain under surface for a longer period and become more silent than a nuclear-powered submarine. The AIP system will be retrofitted into Kalvari class submarines, the third of which (INS Karanj) will be commissioned on Wednesday March 10.

But analysts say that rather than being seen in isolation, the significant test should be seen as part of the navy's overall capability-building plans, ranging from the ongoing plan to build six nuclear-powered attack submarines or SSNs – the project is back on track and was discussed at the Combined Commanders' Conference in Kevadia, Gujarat — to the commissioning of its second aircraft carrier, INS Vikrant, later this year.

Overall, they add, the plans should also be seen as a concerted bid by the Indian Navy to counter the rise of China's navy – now larger than the US navy in terms of number of ships, although the US is still ahead in terms of tonnage and capability. In submarines for instance, India currently has only one Akula class SSN on lease from Russia; one more is expected to come on lease before 2025.

The analysts said the Indian Navy is all set to acquire big teeth and long legs this year. While

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South Block remains tight-lipped about the country's increasing naval capabilities, HT learns that the Chinese interlocutors during WMCC (working mechanism for consultation and coordination) meetings on disengagement in East Ladakh complained about Indian Navy warships being aggressive against the PLA Navy in the Indian Ocean. Thanks to Indian Navy full deployment in Indian Ocean and real time intelligence from the QUAD allies and France, the People's Liberation Army Navy's (PLAN) warships are only deployed around the Gulf of Aden as of now with no presence anywhere else in Indian Ocean.

India's national security planners are worried about the expanding PLAN and expect Chinese carrier strike force deployment in Indian Ocean by 2023 with Beijing expected to commission a third aircraft carrier this year. That's one reason the Indian Navy has embarked on its own capability-building drive. India will commission its second aircraft carrier INS Vikrant and second nuclear powered SSBN INS Arighat this year. While INS Vikramaditya, the other carrier, will be home-based on the western seaboard of India, INS Vikrant will be on the eastern seaboard. Each will have one SSBN and SSN as part of its strike force.

Although the Indian Navy wants a third aircraft carrier with more tonnage than the two existing ones, the strategic planners of the Modi government are still to be convinced of the idea given the massive expenditure involved. The Vikramaditya's tonnage is 45,000 and the Vikrant's 37,500. There's long been talk of a third carrier, INS Vishal, with a tonnage of 65,000, but this could set India back by at least \$15 billion.

Adding teeth to the Indian Navy are also its two leased Predator drones, which provide maritime domain awareness from Gulf of Aden to Sunda Straits with the unmanned aerial platform having endurance upwards of 30 hours and acquiring attitude of over 30,000 feet. Once the Indian

military is trained to handle the Predator drones, currently based in the Arakkonam base in Tamil Nadu, the plan is to buy 10 armed Predator drones for each of the three services. ...

Source: Shishir Gupta, <https://www.hindustantimes.com/india-news/eye-on-china-india-s-plan-for-6-nuclear-powered-attack-submarines-back-on-track-101615327826084.html>, 10 March 2021.

## **ISRAEL**

### **Secretive Israeli Nuclear Facility Witnesses Biggest Construction Project**

A secretive Israeli nuclear facility at the center of the nation's undeclared atomic weapons programme is undergoing what appears to be its biggest construction project in decades, satellite photos analysed by The Associated Press show. A dig about the size of a soccer field and likely several stories deep now sits just meters (yards) from the aging reactor at the Shimon Peres Negev Nuclear Research Center near the city of Dimona. The facility is already home to decades-old underground laboratories that reprocess the reactor's spent rods to obtain weapons-grade plutonium for Israel's nuclear bomb programme.

What the construction is for, however, remains unclear. The Israeli government did not respond to detailed questions from the AP about the work. Under its policy of nuclear ambiguity, Israel neither confirms nor denies having atomic weapons. It is among just four countries that have never joined the NPT, a landmark international accord meant to stop the spread of nuclear arms.

The construction comes as Israel under Prime Minister Benjamin Netanyahu maintains its scathing criticism of Iran's nuclear program, which remains under the watch of United Nations inspectors unlike its own. That has renewed calls among experts for Israel to publicly declare details

**The Indian Navy has embarked on its own capability-building drive. India will commission its second aircraft carrier INS Vikrant and second nuclear powered SSBN INS Arighat this year. While INS Vikramaditya, the other carrier, will be home-based on the western seaboard of India, INS Vikrant will be on the eastern seaboard. Each will have one SSBN and SSN as part of its strike force.**

of its programme.

For decades, the Dimona facility's layout has remained the same. However, the IPFM at Princeton University noted it had seen significant new construction at the site via commercially available satellite photos, though few details could be made out. Satellite images captured by Planet Labs Inc. after a request from the AP provide the clearest view yet of the activity. Just southwest of the reactor, workers have dug a hole some 150 meters (165 yards) long and 60 meters (65 yards) wide. Tailings from the dig can be seen next to the site. A trench some 330 meters (360 yards) runs near the dig.

Some 2 kilometers (1.25 miles) west of the reactor, boxes are stacked in two rectangular holes that appear to have concrete bases. Tailings from the dig can be seen nearby. Similar concrete pads are often used to entomb nuclear waste. Other images from Planet Labs suggest the dig near the reactor began in early 2019 and has progressed slowly since then. Analysts who spoke to the AP offered several suggestions about what could be happening there. ...

Source: [https://www.business-standard.com/article/international/secretive-israeli-nuclear-facility-witnesses-biggest-construction-project-121022500397\\_1.html](https://www.business-standard.com/article/international/secretive-israeli-nuclear-facility-witnesses-biggest-construction-project-121022500397_1.html), 25 February 2021.

## **BALLISTIC MISSILE DEFENCE**

### **CHINA**

#### **Chinese HQ-19 Anti-Ballistic Missile Interceptor Presumably Operational**

A vastly upgraded version of HQ-9 to counter ballistic missile and satellites (ASAT) on the lower

end of Low Earth orbits, HQ-19 is the Chinese equivalent of the U.S. THAAD. HQ-19 is armed with a dual-purpose exosphere kinetic kill vehicle (kkv) warhead designed by a team led by Professor Zhou Jun, which can be used against ballistic missile warheads or satellites. Using its HQ-19 Anti-Ballistic Missile Interceptor, China carried out a 4th land-based mid-course missile interception test within its territory on 5 February 2018 and "achieved the desired test objective". As usual, the government announced that the "test is defensive in nature and not targeted against any country".

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The Chinese HQ-19 missile is a project launched in the late 1990s. In 1995 the Chinese started serious studies of a kinetic kill vehicle KKV under Program 863, Global Security reports. In 1986, to meet the global challenges of the new technology revolution and competition, four Chinese scientists jointly proposed to accelerate China's high-tech development. With strategic vision and resolution, the late Chinese leader Deng Xiaoping personally approved the National High-tech R&D Program, namely the 863 Program. Implemented during three successive

**A vastly upgraded version of HQ-9 to counter ballistic missile and satellites (ASAT) on the lower end of Low Earth orbits, HQ-19 is the Chinese equivalent of the U.S. THAAD. HQ-19 is armed with a dual-purpose exosphere kinetic kill vehicle (kkv) warhead designed by a team led by Professor Zhou Jun, which can be used against ballistic missile warheads or satellites.**

Five-year Plans, the program has boosted China's overall high-tech development, R&D capacity, socio-economic development, and national security. In April 2001, the Chinese State Council approved the continued implementation of the program in the 10th Five-year Plan. As one of the national S&T program trilogy in the 10th Five-year Plan, 863 Program continues to play its important role.

In 1999, the first Chinese KKV made the suspension tests successfully flight, China became the second country in the world to have mastered the technology. The first test of V & V



was held in 2003 with success. It was in final certification. HQ-19 has a KKV of about 35kg, the system performance would be similar to the US THAAD. Another R & D document mentions a technology demonstration at the HQ-19 engines in 2000, led by the Academy 4 CCAC group. The demonstration also validated “hull carbon fiber” and “rocket N-15B”.

The HQ-9B, HQ-19 [THAAD counterpart], HQ-26 [SM-3 counterpart] and HQ-29 [PAC-3 counterpart] are designed primarily for Anti Ballistic Missile capabilities. While the HQ-9A air defense variant of the HQ-9 series is very well attested, the remaining theater missile defense interceptors are poorly attested, and verge on being little more than rumors.

The Red Flag-19 system also includes a multi-purpose solid phased array radar for early warning. It is reported that the X band phased array radar can detect targets at a distance of 4,000 km, covering the northern fringe of the South Asian subcontinent to the vast areas of the hinterland of the Qinghai-Tibet Plateau. The information is provided to the Red Flag-19 interception system via the command-and-control system.

During the 2013 and 2014 interception tests, the Red Flag-19 missile successfully reproduced the situation of USA Standard 3 intercepting the USA-193 at that time. At a height of over 200 km, it approached a relative speed of 10,000 m / Intercept simulation of intercontinental missiles hit the target.

According to another judgment, the red flag -19 kinetic energy interceptor uses a side-window infrared seeker similar to U.S. THAAD's one. The window design can reduce the impact of atmospheric friction and heat on the infrared sensor detection, giving the missile the interception capability in the atmosphere. Side-window infrared seeker gives the red flag-19 in the atmosphere a high attack accuracy and can use a lighter kinetic energy interceptor to increase the interceptor's shot height and range.

Source: [https://www.armyrecognition.com/defense\\_news\\_march\\_2021\\_global\\_security\\_army\\_industry/chinese\\_hq-19\\_anti-ballistic\\_missile\\_interceptor\\_presumably\\_operational.html](https://www.armyrecognition.com/defense_news_march_2021_global_security_army_industry/chinese_hq-19_anti-ballistic_missile_interceptor_presumably_operational.html), 10 March 2021.

## **RUSSIA**

### **Russia's Kalibr Missile Puts US on the Back-Heel**

Russia is arming naval forces in the Pacific region with a new advanced cruise missile that will give its submarines and ships the ability to sink other ships and for the first time execute long-range strikes against land targets according to a report in InsideDefense.com. The development has been noticed at the Pentagon. Admiral Phil Davidson, head of US Indo-Pacific Command, told Congress in written testimony that Russia will begin fielding the Kalibr cruise missile across its Pacific fleet this year — a weapon that other Pentagon officials have warned could be used to offset US military power-projection advantages and limit US diplomatic options in a crisis.

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... In a January report, the Defense Intelligence Ballistic Missile Analysis Committee assessed the range of the ship- and sub-launched variant of the new Russian cruise missile — the 3M-14 Kalibr — to be at least 2,500 kilometers. Ouch! This kind of capability is prompting North American Aerospace Defense Command to think anew about domestic air defense, advancing the concept for a Strategic Homeland Integrated Ecosystems for Layered Defense (SHIELD), Inside Defense reported.

A recent Congressional Budget Office study, “National Cruise Missile Defense: Issues and Alternatives,” examined the threat and determined “a homeland [cruise missile defense] would be feasible but expensive, with costs ranging from roughly \$75 billion to \$465 billion over 20 years to cover the contiguous United States.” The CBO noted that a domestic cruise missile defense umbrella could be overwhelmed by advanced threats like the Kalibr: “A raid consisting of many [land-attack cruise missiles] could overwhelm

them. For example, a Yasen-class guided missile submarine in the Russian Navy can reportedly carry up to 32 LACM (3M-14 Kalibr) in its eight vertical launchers.”

Davidson said Russia is also modernizing forces in the Pacific region “with air defense and land-based anti-ship cruise missiles, advanced fighters, and upgraded bombers capable of delivering improved and longer-range strikes, Inside Defense reported. “These improvements are designed to restrict access to regions of the Pacific Ocean near Russia’s coast, while simultaneously expanding Russia’s ability to project power across the Region and into the Arctic.”

According to The National Interest, there are well over a dozen different variants in the Kalibr missile family, varying in launch platform, range, target profile and speed, varying in length from six to nine meters, but all packing a 990-pound warhead or a nuclear payload. The antiship variants — designated the SS-N-27 Sizzler by NATO, or the 3M54T or 3M54K for the ship- and submarine-launched versions respectively — have shorter range, estimated between 270 and 410 miles, and are designed to skim low over the sea to avoid detection.

Benefitting from vector-thrust nozzles on the ship-launched versions, the active-radar homing Kalibr missiles are also designed to perform evasive maneuvers instead of making a straight-line approach. As they close within short range of an enemy ship, the missiles accelerate from their cruising speed of Mach 0.8 to Mach 3, and descend to just 4.6 meters in altitudes — making them extremely difficult for a ship’s

antimissile defenses to shoot down.

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The land attack variants, the 3M14T and 3M14K (NATO designation SS-N-30A), appear to lack the boost to Mach 3 on terminal approach. In compensation, the inertia-guided missiles have a range of between one thousand and 1,500 miles. A third class of Kalibr missiles — the 91RT and 91RE — is

used to deploy antisubmarine torpedoes to ranges of around thirty miles. The Kalibr is also battle tested — and the results proved lethal.

The Russian Navy has hit various Daesh targets, using Kalibr cruise missiles at militant hideouts on east of Palmyra that had housed heavy equipment and militant manpower, DefenseWorld.net reported. The militant hideouts had housed heavy equipment transferred from Raqqa, the Daesh stronghold in northern Syria, the Russian Defense Ministry said.

Anton Lavrov, an independent military expert, said in an interview with “Izvestia” that high-precision cruise missiles are only owned by a few countries in the world, so the emergence of new “Kalibrs” is a landmark in the development. ...

*Source: Dave Makichuk, <https://asiatimes.com/2021/03/russias-kalibr-missile-puts-us-on-the-back-heel/>, 11 March 2021.*

**Gen. Robert Abrams said that the United States will deploy two “specific” anti-ballistic missile capabilities in South Korea this year in addition to one that is already in place. His remarks raised speculation that the US might be considering bringing in an additional THAAD system or other advanced anti-missile assets to the peninsula.**

#### USA–South Korea

#### No Plan to Deploy New Anti-Missile Assets in S. Korea: USFK

The US Forces Korea (USFK) said its commander’s recent remark on a plan to build new missile defense capabilities on the Korean Peninsula does not involve the introduction of new equipment or units. Gen. Robert Abrams said that the United

States will deploy two “specific” anti-ballistic missile capabilities in South Korea this year in addition to one that is already in place. His remarks raised speculation that the US might be considering bringing in an additional THAAD system or other advanced anti-missile assets to the peninsula. “The new capabilities mentioned by Gen. Abrams do not involve introduction of new equipment or units to Korea,” USFK spokesperson Col. Lee Peters said. The colonel declined to elaborate on what the capabilities refer to, citing “operational security,” but said they will ensure the USFK can “maintain a high ‘Fight Tonight’ readiness level and provide a robust combined defense posture to protect” South Korea from “any threat or adversary.”

Seoul’s defense ministry also said the two countries did not have discussions on deploying additional anti-missile assets on the peninsula. “The USFK commander’s remarks appear to be an explanation on the process of continuously supplementing and developing its missile defense system to better respond to North Korea’s evolving threats,” the ministry said in a statement.

Abrams’ remark was made at a US House Armed Services Committee hearing when asked to comment on his assessment on missile defense priorities amid threats from North Korea. Referring to the US Missile Defense Agency (MDA)’s push to build “three specific capabilities,” the commander said, “One is already here. The other two will come on board this year that will significantly enhance our ballistic missile defense.”

Source: <http://www.koreaherald.com/view.php?ud=20210312000193>, 12 March 2021.

## **NUCLEAR ENERGY**

### **CHINA**

#### **China’s “Two Sessions” Meeting Hears Calls to Speed Up Nuclear Programme**

The “Two Sessions” meeting of China’s National People’s Congress has been told that the country

has to build six nuclear reactors a year if it hopes to meet its 2060 deadline to become carbon neutral. The meeting also heard a call from Tibetan delegates to begin construction work on the controversial Brahmaputra dam by the end of the year. China’s five-year plan for 2021-25 envisages the raising of the nuclear generation to 70GW by the end of 2025, compared with 51GW at present. However, Luo Qi, a member of China’s second chamber and a design expert with Nuclear Power Institute of China, warned that this would not be sufficient to meet the 2060 deadline.

**China’s five-year plan for 2021-25 envisages the raising of the nuclear generation to 70GW by the end of 2025, compared with 51GW at present. However, Luo Qi, a member of China’s second chamber and a design expert with Nuclear Power Institute of China, warned that this would not be sufficient to meet the 2060 deadline.**

“By 2035, nuclear plants in operation should reach around 180GW, amounting to 5% of total capacity,” he said in a proposal published by the state-owned China National Nuclear Corporation (CNNC) and reported by the Reuters news agency.

Gu Jun, CNNC’s president and a member of the National People’s Congress, said the company was pushing for the “accelerated development” of the sector and the “bulk construction” of China’s generation III Hualong One design, which is set to become the country’s default reactor choice

CNNC announced at the end of January that Unit 5 of the Fuqing Nuclear Power Plant, its first commercial Hualong One reactor, had begun generating electricity on 30 January. The company commented: “The success marks a milestone for the development of China’s nuclear power, making China the fourth country to master its indigenous generation III nuclear power technology following the US, France and Russia.” Reuters comments that China’s energy regulator warned in January that “quality management” issues had to be addressed, and that some reactor projects had been launched without adequate preparation.

Also at the legislative session, delegates from the Tibetan Autonomous Region said planning and environmental impact assessments for

China's planned Brahmaputra dam should be completed as soon as possible. The Yarlung Tsangpo project was listed in the five-year plan, but no date was given for the start of construction. According to Global Times, the English-language newspaper of the Chinese Communist Party, the "unparalleled" construction programme could generate as much as 60GW of electricity. This would make it the largest hydropower project in history, almost three times bigger than the current record holder, the 22GW Three Gorges Dam in Hubei. As GCR reported in December, the Chinese plan has prompted Indian officials to announce that they were considering their own hydroelectric megaproject to make up for any shortages caused by the Yarlung Zangbo scheme.

*Source: <https://www.globalconstructionreview.com/news/chinas-two-sessions-meeting-hears-calls-speed-nucl/>, 08 March 2021.*

## **CZECH REPUBLIC**

### **Czech Regulator Awards Site Licence for Dukovany Units**

The Czech Republic's State Office for Nuclear Safety (SÚJB) issued a site licence for two new reactor units at the existing Dukovany nuclear power plant site. ĚEZ said obtaining a site licence means preparation for an announcement on tenders for suppliers to the expansion project can start.

A team of SÚJB inspectors, specialists from the State Institute of Radiation Protection, and other experts, cooperated on the examination of the application for the permit, SÚJB said. This procedure, which took almost 12 months, evaluated the procurement safety report and other documents that are annexed to the application under the country's Atomic Energy Act. When assessing the application, SÚJB said it was able to rely on its longstanding knowledge of the site and its characteristics because it supervises the safety of the four existing units of the Dukovany plant.

"No facts preventing the issuance of the permit were revealed during the evaluation," SÚJB President Dana Drábová said. The SÚJB issued the

licence at the request of Elektrárna Dukovany II, which filed its application on 25 March 2020. It has been published on the SÚJB website following its entry into force. Elektrárna Dukovany II, a subsidiary of Czech utility ĚEZ, said receipt of the site licence was one of the most important preparatory steps before the start of construction and the selection of a supplier. The preparation and processing of the documentation for the licensing procedure took five years, ĚEZ said, and included more 200 professional studies and analyses. All the main materials produced for this work are publicly available, it added.

Three dozen experts from Elektrárna Dukovany II, ĚEZ and other institutions, such as the Research Institute of Water Management, Masaryk University or ÚJV Āež, processed the documentation, which comprises more than 1600 pages. ...

The documentation describes and evaluates, inter alia, whether the site is suitable for the location of a new nuclear facility. It deals, for example, with natural conditions, including water provision, describes and evaluates the design of the project, quality assurance issues and also addresses the preliminary impact of operation on the population and the environment, and of the future decommissioning of the plant.

...Elektrárna Dukovany II was established in 2015 to manage the preparation for construction of the new units. The company obtained an environmental impact assessment report for the project in 2019. This was followed by the signing of contracts between Elektrárna Dukovany II, ĚEZ and the government, represented by the Ministry of Industry and Trade, in July last year. The government signed a framework agreement on the construction of the new unit with utility ĚEZ and project company Elektrárna Dukovany II in July. That agreement aims for ĚEZ to hold a tender for the reactor supplier, negotiate a contract and receive all the required licences by 2024, so that the unit can be put into operation in 2036. The government has agreed to provide guarantees for any political or legislative risks the project may face.



Source: <https://world-nuclear-news.org/Articles/Czech-regulator-awards-site-licence-for-Dukovany-u>, 09 March 2021.

GENERAL

Excerpts from “Bill Gates’s Next-Gen Nuclear Plant Packs in Grid-Scale Energy Storage”

Wind, solar, geothermal, hydro, wave energy ... Renewable sources are a crucial pillar of any plan to decarbonize the world’s energy generation industries and eliminate fossil fuel use. But for many reasons – intermittency, location dependency, land requirements, and others – they can’t do it alone.

To fully remove greenhouse gases from the world’s energy sectors, there needs to be a cheap, scalable form of zero-emissions energy that can reliably produce power 24/7/365. All the better if it can rapidly ramp its output up and down to help the power grid cope with load spikes and interruptions in renewable energy supplies. The best candidate to fill this role right now is advanced nuclear power.

While nobody wants their back yard to become synonymous with Chernobyl or Fukushima, nuclear is demonstrably one of the safest forms of energy generation. Where coal and oil-derived energy cause 24.6 and 18.4 fatalities per terawatt of energy supplied, nuclear power has caused just 0.07 – and that includes the high-profile disasters that have led to its sullied reputation.

Considering the projected death toll of a 2°C temperature rise – somewhere between 300 million and 3 billion premature deaths spread over

one to two centuries – the fourth generation of nuclear power is well and truly back on the table, and with many decades of development, advanced modeling and materials technology on its side, it’s likely set to improve its already excellent safety record.

One promising initiative that has been backed by heavy private investment as well as the US Department of Energy is a collaboration between Bill Gates’s Terrapower and GE Hitachi Nuclear Energy. Sodium (Latin for sodium) is getting the chance to demonstrate its “cost-competitive, sodium fast reactor with a molten salt energy storage system” at proper commercial scale thanks in part to a US\$80 million DoE grant announced in October.

Natrium’s demonstration plant will be fully operational and connected to the power grid in its as-yet-unknown location by the mid to late 2020s. Its fast-neutron reactor will use high-temperature liquid sodium as its reactor coolant instead of water. One of sodium’s key advantages is the huge 785-degree temperature range between its solid and gaseous states; water offers only a 100-Kelvin range, so it needs to be pressurized in order to handle higher amounts of heat energy. High levels of pressure can have explosive consequences, and they also greatly increase the cost of the plant, as nuclear-grade high pressure components are not cheap.

Liquid sodium will transfer an impressive amount of heat away from the reactor at normal atmospheric pressures, with the added bonus that it won’t dissociate into hydrogen and oxygen, so

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Fukushima-style hydrogen explosions are out of the question. It's also non-corrosive, sidestepping an issue that puts a question mark over molten salt reactors.

Like many of the next-generation nuclear reactors under development, the Natrium design will use High-Assay, Low Enriched Uranium (HALEU) as its nuclear fuel. Where natural uranium comes out of the ground containing around 0.7 percent of the U-235 isotope that's split to generate nuclear energy, and traditional LEU nuclear reactor fuel is enriched by centrifugal processes or gas diffusion to contain 3-5 percent U-235, HALEU is further enriched, between 5 and 20 percent. For comparison, nuclear weapons need uranium enriched to more than 90 percent.

HALEU fuel can be produced by reprocessing the spent fuel from traditional nuclear power plants, and its higher grade improves reactor performance and efficiency to the point where it allows advanced reactors to be much smaller than LEU plants. Natrium says it should be four times more fuel efficient than light water reactors. In terms of safety, the control rods will drop by themselves due to gravity in the event of a power outage, and the natural circulation of the air will function as emergency cooling. Thanks to the liquid sodium design, the plant doesn't need a huge containment shield like light water reactors do, and the design puts the reactor underground, again boosting the safety factor while cutting down costs.

The Natrium plant is designed to run at 100 percent output, 24/7, outputting a constant 345 MWe in the form of heat. This heat is transferred

out through the liquid sodium cooling system and transferred to a separate molten salt thermal energy storage system similar to what's been proven in many direct solar plants around the world. At the other end of this storage system is

a set of steam turbines that can take that constant power and generate enough electricity to power somewhere around 225,000 homes.

And here's where the Natrium design packs a massive extra punch; that

storage system means the Natrium plant can react to demand spikes or intermittent renewable energy supply drops by harnessing that stored heat and ramping its turbines up to 150 percent of the nominal reactor power, pumping out 500 MWe for as much as 5.5 or more hours.

That represents nearly a gigawatt-hour of bonus on-demand energy storage; vastly more than even the largest grid-scale battery projects under development. This is an enormous advantage,

particularly in the context of decarbonization, where load-reactive systems like this will play a critical role supporting renewable energy sources through the peaks and troughs in their less predictable generation cycles.

The DoE demo plant funding is obviously excellent news for Natrium, which now gets to develop and prove its capabilities before moving to roll

similar plants out at scale, which will be significantly larger and more efficient to boot. It's also somewhat of a payback for Terrapower, which was preparing to build an experimental nuclear reactor outside Beijing to trial and demonstrate its separate Traveling Wave Generator technology when US Government sanctions on

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technology deals with China forced it to abandon the project in 2019.

If it all works out well, the Natrium design promises to be fast to build and commission, and to use far less nuclear-grade concrete than traditional designs – a huge factor in keeping the cost down and reducing the “green premium” on emissions-free energy. Will designs like these help put some shine back on nuclear power? Opportunities for these companies will be enormous as fossil fuels are scaled down. Time will tell.

Source: Loz Blain, <https://newatlas.com/energy/natrium-molten-salt-nuclear-reactor-storage/>, 08 March 2021.

## **GERMANY**

### **Germany to Compensate Energy Firms 2.4 Bn Euros for Nuclear Exit**

Germany will pay top energy companies a total of 2.4 billion euros (\$2.9 billion) in compensation for its decision to exit nuclear energy in the wake of the 2011 Fukushima disaster, Berlin said. By the end of 2022, Germany will have achieved its goal of completely phasing out nuclear power, set by Chancellor Angela Merkel after a deadly earthquake and tsunami caused a devastating meltdown at Japan’s Fukushima plant.

“The government has reached an agreement with EnBW, E.ON/PreussenElektra, RWE and Vattenfall,” Germany’s environment, finance and economy ministries said in a joint statement. They said Berlin would pay 2.43 billion euros compensation to the four companies, all of which operate

nuclear power plants in Germany. The companies welcomed the agreement, with RWE saying it was “a step towards legal certainty for all parties”.

The payments, agreed after a long legal battle with the government, will cover both the cost of electricity the companies would otherwise have produced and investments they had made before Germany decided on its nuclear departure in 2011. “The agreement has no impact on the exit from nuclear power. It is still the case that the last German nuclear plant will be shut down by the end of 2022 at the latest,” the statement added.

The plan was met with widespread public support in a country with a powerful anti-nuclear movement, fuelled first by fears of a Cold War conflict and then by disasters such as Chernobyl and Fukushima. Yet it represented a dramatic change of course by Merkel’s ruling conservatives, who just a few months earlier had agreed to extend the lifespan of Germany’s oldest power stations.

Power companies dismayed by the nuclear U-turn immediately sued and won a court order for government compensation. Berlin in 2018 then set out conditions for a payout which would run to

hundreds of millions of euros but was ordered to revise it by Germany’s highest court in 2020. Ruling on a case brought by Swedish group Vattenfall, the constitutional court said the plan was “unreasonable” as it required energy companies to make changes to move away from nuclear power first before knowing how much compensation they would receive. In the statement, Berlin said the latest agreement would “put to rest” all the legal disputes and oblige the energy companies not to

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bring further cases. Vattenfall confirmed it would be dropping its case, saying that the agreement was a “conservative” but “acceptable” application of the constitutional court ruling.

Source: <https://today.rtl.lu/news/world/a/1683299.html>, 05 March 2021.

## RUSSIA

### Russia Announces Plans for First Onshore Small Reactor

The first SMR onshore nuclear power plant in Russia will be built in Yakutia from 2024, with operation scheduled for 2027. It will have two RITM-200M modules. These are derived from those now operating in the LK-60 icebreakers and are integral 175 MWt/50 MWe pressurised water reactors. Operational lifetime is 60 years, with 5-7 year refuelling cycle. This will be a reference plant for export sales. It will provide power for mining operations in the remote region. Several floating nuclear power plants with these reactors are planned for the northern Siberian coast, to service mining and oil production.

Source: WNN, 11 November 2021.

### Rosatom Targets 24 New Reactor Units in Russia by 2045

Rosatom has announced that implementation of Russian President Vladimir Putin’s decision to increase the share of nuclear power in the country’s energy mix to 25% by 2045 will require, according to preliminary estimates, the construction of 24 new reactor units, including in new regions. ...At the end of 2020, nuclear power’s share of Russia’s energy mix stood at 20.28%. The country has 11 nuclear power plants in operation, including the floating nuclear power

plant Akademik Lomonosov. These comprise 37 units with a total installed capacity of about 29.4 GWe. Nuclear power generated a record amount of electricity for Russia last year, of almost 215.8 TWh.

...The company’s strategy, Rosatom Vision-2030, which its supervisory board updated last year, targets an increase in revenue to RUB4 trillion (USD54 billion) “with a significant expansion in the share of new products and foreign orders, new technologies with mandatory export potential and qualitative changes in Rosatom itself:

erasing internal boundaries between enterprises and divisions, as well as the creation of an industry environment for the development of employees”, he added.

Revenue from new products will need to increase by about 20% annually to reach the 2030 target.

“This requires qualitative changes, we can say, a quantum leap,” he said. “Wind power, nuclear medicine, digital products, composite materials - these areas have already grown stronger and come out of the ‘kindergarten age’, and now we expect them to make a real economic return.” On the launch of its programme Development

of technology and research in the use of nuclear energy, Likhachov highlighted “presidential support” for the so-called Big Sarov project, with the opening of a branch of Moscow State University and the construction of an academic city.

Source: <https://www.world-nuclear-news.org/Articles/Rosatom-targets-24-new-reactor-units-in-Russia-by>, 10 March 2021.

**Operational lifetime is 60 years, with 5-7 year refuelling cycle. This will be a reference plant for export sales. It will provide power for mining operations in the remote region. Several floating nuclear power plants with these reactors are planned for the northern Siberian coast, to service mining and oil production.**

**Rosatom has announced that implementation of Russian President Vladimir Putin’s decision to increase the share of nuclear power in the country’s energy mix to 25% by 2045 will require, according to preliminary estimates, the construction of 24 new reactor units, including in new regions. ...At the end of 2020, nuclear power’s share of Russia’s energy mix stood at 20.28%.**



**UAE**

**UAE Licenses Second Unit of Barakah Nuclear Power Plant**

The Federal Authority for Nuclear Regulation (FANR), the UAE's independent nuclear regulator, has issued the operating license for unit 2 of the Barakah Nuclear Power Plant to Nawah Energy Company (Nawah), the Emirates Nuclear Energy Corporation's (ENEC) subsidiary, responsible for the operation of the nuclear power plant located in the Al Dhafra region of Abu Dhabi. The operating license, with an estimated duration of 60 years, authorizes Nawah to commission and operate the unit 2 of the Barakah Nuclear Power Plant.

The decision to issue the operating license is a culmination of efforts made by FANR since it received the operating license application from ENEC, on behalf of Nawah, in 2015 for units 1 and 2. FANR followed a systematic review process that included a thorough assessment of the application documentation, conducting robust regulatory oversight and inspections.

The assessment included reviewing the plant's layout design and the analysis of the site's location in terms of geography and demography. The assessment also included the reactor design, cooling systems, security arrangements, emergency preparedness, radioactive waste management and other technical aspects. FANR also assessed Nawah's organizational and manpower readiness with all the required processes and procedures to ensure

the safety and security of nuclear power plant.

FANR reviewed the 14,000 page operating license application for units 1 & 2, conducted more than 220 inspections and requested approximately 59 additional pieces of information for Unit 2 on

**FANR reviewed the 14,000 page operating license application for units 1 & 2, conducted more than 220 inspections and requested approximately 59 additional pieces of information for Unit 2 on various matters related to reactor design, safety and other issues to ensure the Barakah Nuclear Energy Plant's complete compliance with all regulatory requirements.**

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... "The UAE Nuclear Energy Program, including the nuclear law and regulations, conforms to the safety standards of the IAEA and the international

best practices, where FANR has ensured its implementation during the construction of the Barakah Nuclear Power Plant.

... Following the issuance of the operating license for unit 2, Nawah will undertake a period of commissioning to prepare for the commercial operation where FANR will conduct around-the-clock inspections, using its resident inspectors located at the Barakah Nuclear Energy Plant in addition to deploying other inspectors, to ensure

**To ensure implementing the highest international standards of nuclear safety, security and non-proliferation, the UAE received in the past decade 11 major peer review missions from the IAEA to review and assess various aspects from nuclear infrastructure, the legal and regulatory system, nuclear safety, nuclear security, emergency preparedness and non-proliferation.**

the Fuel Load and Power Accession processes are completed according to regulatory requirements.

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aspects from nuclear infrastructure, the legal and regulatory system, nuclear safety, nuclear security, emergency preparedness and non-proliferation. The reports from the missions of the IAEA are publicly available. In February 2020, FANR

issued the operating license for the unit 1 of Barakah Nuclear Power Plant and maintained its regulatory oversight during the commissioning phase where it delivered 100 percent power. It is expected that the unit 1 will start the commercial operation during the first quarter of 2021.

One of the principles of the nuclear policy is transparency to which the Government of the UAE has been committed to by adhering to international conventions and agreements such as the IAEA's Safeguard Agreement and its Additional Protocol and the Convention on Nuclear Safety and other instruments. Such commitments ensure the programme is designed for peaceful purposes and in line with national and international laws. The UAE is currently building four units at the Barakah Nuclear Power Plant, and the project's overall construction rate is 95 percent as follows: Unit 1: operational; Unit 2: completed; Unit 3: 94 percent; Unit 4: 88 percent.

Source: <https://saudigazette.com.sa/article/604254/World/Mena/UAE-licenses-second-unit-of-Barakah-nuclear-power-plant,09March2021>.

## **NUCLEAR COOPERATION**

### **CHINA–PAKISTAN**

#### **New Large Chinese Reactor in Pakistan Starts Up**

The 1100 MWe Karachi unit 2 is the first in a pair of Chinese Hualong One reactors to be completed and to start up in Pakistan. The country has four smaller Chinese reactors inland at Chashma and a very small 50-year old Canadian reactor at Karachi. Pakistan is the first export country to build the new Hualong reactor. *When it is grid-connected about the end of March it will almost double Pakistan's nuclear power capacity.*

Source: *world-nuclear-news*, 03 March 2019.

### **RUSSIA–TURKEY**

#### **First Concrete Poured for Akkuyu Unit 3**

Rosatom announced that first concrete has been poured for the third unit of the Akkuyu nuclear power plant under construction in the Mersin province of Turkey. The Russian and Turkish heads of state joined the ceremony held to mark the event by video link. The Akkuyu nuclear power plant project is based on an intergovernmental agreement the two countries signed in 2010.

“Three years ago we poured first concrete at Akkuyu NPP unit 1 and today we did it at unit 3,” the Russian state nuclear corporation said on Twitter, adding that the construction licence for unit 4 is expected to be granted by the Turkish regulator later this year. “Four VVER-1200 NPPs will secure 10% of Turkey’s power needs. This success is proof that nuclear can and should be deployed efficiently around the world,” Rosatom said.

According to a statement from the Kremlin, Vladimir Putin said: “First of all, I congratulate all of you on the beginning of a new important stage in the implementation of a large-scale joint Russian-Turkish project - the construction of the Akkuyu nuclear power plant in Turkey. In a few minutes, President [Recep Tayyip] Erdoğan and I will start pouring concrete into the base of the third nuclear power unit. In total, the Akkuyu site envisages the construction of four reactor units with a total capacity of 4800 megawatts, which will be able to produce up to 37 billion kilowatt-hours of electricity annually.”

The two leaders had also taken part in the ceremony to mark the start of the construction of the first power unit, in April 2018, he noted. Construction of unit 2 began in April 2020. “The consistent implementation of the Akkuyu project has not been prevented even by the known difficulties associated with the coronavirus pandemic,” Putin said. “I would like to note that at

**The construction licence for unit 4 is expected to be granted by the Turkish regulator later this year. “Four VVER-1200 NPPs will secure 10% of Turkey’s power needs. This success is proof that nuclear can and should be deployed efficiently around the world,” Rosatom said.**

the highest level, health and epidemic safety is ensured, and the health of the employees directly employed in the project is protected. We are convinced that [the plant's] implementation will make a serious contribution to strengthening the energy security of the Republic of Turkey and help stimulate further growth of its economy. It will provide Turkish consumers with affordable and environmentally friendly electricity."

The development of a "fundamentally new industry" in Turkey, nuclear power, is strengthening the scientific and economic potential of the country, he said, adding that the number of personnel at the Akkuyu site now exceeds 8000 people, and that most of them are Turkish citizens. Turkey's first Akkuyu nuclear power unit is due to start operations in 2023, which is the centenary of the founding of the Turkish Republic.

According to a statement from the Turkish President's office, Erdoğan said that "investment in energy is an investment in the future". He noted that, despite the pandemic, Turkey's economy "continues to grow steadily", reaching a growth rate of 1.8% in 2020, while 4900 MWe of new power plant capacity "almost entirely from renewables" was installed.

"Our discovery of 405 billion cubic meters of natural gas in the Black Sea was one of the most important steps in our determination of 'Independent Energy, Strong Turkey'. We hope to receive good news from our drilling and seismic exploration efforts in the Eastern Mediterranean," he said. Emphasising that nuclear energy "has a special place" in Turkey's energy policy, he said the goal is "to add nuclear energy, which runs on zero emissions while generating energy and does no harm to the environment, to Turkey's energy basket".

"As our economy grows, our need for reliable,

uninterrupted and affordable energy grows as well. We have been working to diversify our energy projects with the understanding that investing in energy means investing in the future. In this regard, we attach great importance to energy efficiency and renewable energy," he said. The first Akkuyu unit will be operational in 2023, he noted, further stressing that "no efforts are being spared in order for the other three reactors of this plant to be operational one after another", according to the statement.

Referring to the graduation of Turkish students from Russian university programmes, he said: "As a matter of fact, 186 of our students selected to be trained within the scope of the project returned to our country after completing their 6.5 years of

challenging studies. These young people will take part in all the processes of our nuclear power plant, from engineering to management. Thus, Turkey's nuclear energy think tank will be formed and our national energy mobilisation will gain new generations."

The Akkuyu plant is equipped with the most advanced safety systems in

compliance with International Atomic Energy Agency standards, he said. After Erdoğan's speech, he and Putin instructed Turkish Energy and Natural Resources Minister Fatih Dönmez and Rosatom Director General Alexey Likhachov to launch the start of construction on unit 3.

*Source: <https://www.world-nuclear-news.org/Articles/First-concrete-poured-for-Akkuyu-unit-3>, 10 March 2021.*

## **USA-POLAND**

### **Poland Set to Draw on US Nuclear Power Support**

An intergovernmental agreement signed last year has now come into force, giving the USA 18 months to prepare both technology and finance offers to build nuclear power plants in Poland. The

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country plans to commission six nuclear units from 2033 to 2043, providing 6 to 9 GWe of new reliable capacity to supply at least one third of the country's demand. They are expected to be built near the Baltic Sea coast and at Belchatow in central Poland.

The USA envisaged that Poland would spend \$18 billion on US nuclear technology and services from companies such as Westinghouse, Bechtel and Southern Company, though the total bill for six units was estimated to be \$40 billion. Poland wants to choose a partner to provide the reactor technology and to finance a 49% stake in the project by the end of this year, leaving a controlling share with Poland.

Coal provided 74% of Poland's electricity in 2019, and the government plans to reduce this to less than one third by 2040. Nuclear power is seen to be essential to achieve this. Poland also aims to become independent of Russian gas supplies, replacing them from Norway and the USA.

Deployment of high-temperature reactors (HTRs) for industrial heat production was included in the government's July 2016 draft strategy for development and has been pursued since. Poland has 13 large chemical plants that need 6500 MWt at 400-550°C. The government plans to build a cogeneration HTR of 200-350 MWt for process heat, and before this a 10 MWt experimental HTR. There has been close cooperation with the Japan Atomic Energy Agency on HTRs, partly with a view to hydrogen production.

Source: <https://www.world-nuclear.org/our-association/publications/weekly-digest/latest-world-nuclear-association-weekly-digests.aspx>, 05 March 2021.

## **USA–RUSSIA**

### **Russia Says Ready to Engage With US in Reviving Iran Deal**

Moscow says it is prepared to engage with the United States and other parties to the 2015 nuclear deal with Iran in restoring full compliance with the JCPOA in the shortest time possible. "Welcome, dear US colleagues! Russia is ready to engage with you and all other JCPOA participants in order to restore full compliance with the nuclear deal as soon as possible," said Russia's Permanent Representative to the International Organizations in Vienna Mikhail Ulyanov in a tweet on Sunday evening.

And this voluntary restrictions are temporary. According to JCPOA they are aimed at restoration of confidence in exclusively peaceful nature of the Iranian nuclear programme. But in real life-you are right-this aim can be misinterpreted. The Russian envoy made the remarks in reaction to a tweet by the US mission to Vienna-based international organizations, in which it said, "The United States, in close coordination with our allies and partners, is ready to reengage in meaningful diplomacy to achieve a mutual return to compliance with the JCPOA, a key achievement of multilateral diplomacy."

The United States, in close coordination with our allies and partners, is ready to reengage in meaningful diplomacy to achieve a mutual return to compliance with the JCPOA, a key achievement of multilateral diplomacy. In his Sunday tweet, Ulyanov underlined that the "voluntary restrictions" imposed against Iran's peaceful nuclear program in the JCPOA "are temporary". "According to JCPOA they [restrictions] are aimed at restoration of confidence in exclusively

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peaceful nature of the Iranian nuclear program. But in real life-you are right- this aim can be misinterpreted," he added.

Earlier in the day, Ulyanov had hailed the move by the three European signatories to the JCPOA to drop their previous decision to adopt a "strange" resolution against Iran at the IAEA's Board of Governors as a sign of "common sense". "A lot of negative information is floating around. But the reality isn't as bad as one can think," Mikhail Ulyanov, the Russian ambassador to international organizations in Vienna, said in a post on his Twitter account. In comments on Sunday, the foreign minister of China, another party to the JCPOA, urged the United States to demonstrate good faith and remove 'unjustifiable' sanctions it has imposed on Iran as quickly as possible in order to save the multilateral nuclear deal of 2015.

Wang Yi criticized the US for its unilateral withdrawal in 2018 from the nuclear agreement signed between Iran and the five permanent members of the UN Security Council – officially known as the Joint Comprehensive Plan of Action (JCPOA) – and its so-called 'maximum pressure' campaign against Iran.

The Chinese foreign minister also called on Iran to resume full compliance with the JCPOA and take up its responsibilities of nuclear non-proliferation. He said both Tehran and Washington can "move forward according to the principle of synchronized and reciprocal steps."

Under his signature "maximum pressure" policy against Iran, former US President Donald Trump withdrew Washington from the landmark accord and restored the economic sanctions that the deal had lifted. The US also began threatening third-party countries with "secondary sanctions" if they did business with Iran in defiance of the bans.

Trump abandoned the deal despite its multilateral nature and the fact that it had been endorsed by the United Nations Security Council in the form of Resolution 2231. Washington's allies in the deal – London, Paris, and Berlin – also bowed to the US pressure, abiding by the sanctions and stopping their trade with Tehran.

Iran, in turn, began confronting the sanctions under the Resistive Economy directive by Leader of the Islamic Revolution Ayatollah Seyyed Ali Khamenei. It also started a number of nuclear countermeasures on the first anniversary of the US's withdrawal in line with its rights under the deal to retaliate for the other side's non-commitment. The Islamic Republic has been gradually increasing its counteractions as Washington and the European trio continues to violate their obligations under the JCPOA.

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Source: <https://www.presstv.com/Detail/2021/3/7/646780/Russia-Iran-JCPOA-US-sanctions>, 07 March 2021.

## **NUCLEAR SECURITY**

### **NEPAL**

#### **Four Arrested for Possessing 2.5 kg of Unprocessed Uranium in Nepal**

Metropolitan Police Office, Ranipokhari said it has seized what it called a highly radioactive material, around 2.5 kg, from Boudha. Four people have been arrested. According to Senior Superintendent Sushil Singh Rathour, spokesperson for the Metropolitan Police Office, Ranipokhari, the arrest was made on a tip-off.

... Police claim the seized radioactive material to be uranium-238. ...Police said they were yet to ascertain the worth of the confiscated material. According to preliminary investigation, said police, one of the arrestees had the material at her home in Boudha "for a very long time." "Her

father-in-law used to work in uranium mines in India some two decades ago. The man brought home some uranium with him and had kept it at his home," said Senior Superintendent Ashok Singh, chief of Kathmandu Metropolitan Police Range. Her father-in-law is now 86 years old and currently lives in the United States, according to Singh. ...

Dr Suresh Kumar Dhungel, spokesperson for the Nepal Academy of Science and Technology, however, said they were yet to verify if the confiscated material is uranium-238. "From the sample, we found out that the substance contains highly radioactive material, but we are yet to ascertain what exactly it is," Dhungel told the Post over the phone. ... Police said that this is the first of its kind arrest in the country, where people were trying to sell uranium.

Source: Shuvam Dhungana, <https://tkpo.st/3qBQSBThhttps://kathmandupost.com/national/2021/03/12/four-people-arrested-for-possessing-2-5-kg-of-what-police-say-is-radioactive-material,12March2021>.

## UK

### Labour Renews Vow to Keep Nuclear Weapons

Labour's support for keeping the UK's nuclear weapons is "non-negotiable," the shadow defence secretary has said. But in a speech, John Healey also promised to "lead efforts to secure multilateral disarmament" if the party wins power. Labour dropped its policy of unilaterally getting rid of the UK's nuclear weapons after then-leader Neil Kinnock lost the 1987 general election. Many on the party's left remain vehemently opposed to that decision. Former Labour leader Jeremy Corbyn - a long-time opponent of the UK's Trident submarine-based missile system and a vice president of the Campaign for Nuclear Disarmament (CND) - said in 2015 that he would

never use it if he became prime minister. Yet maintaining nuclear weapons remained a pledge in the party's 2019 election manifesto.

In a speech to the Royal United Services Institute think tank, Mr Healey emphasised that the party leadership under Sir Keir Starmer is far clearer in its backing of this than Mr Corbyn was. "Labour's

**Labour's support for the UK's nuclear deterrent is non-negotiable. The matter is settled," he said. He added that Labour wanted to see the UK "doing more to lead efforts to secure strategic arms limitation and multilateral disarmament". Mr Healey also said the party's commitment to the NATO military alliance - which Mr Corbyn said in 2012 should be disbanded, but later argued should focus on reducing "tensions around the world" - is "unshakeable". This isn't a change in policy, but it's a distinct change in tone.**

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"unshakeable". This isn't a change in policy, but it's a distinct change in tone.

Labour wants to make sure it gets a serious hearing on defence. It knows that it needs its own position to be clear to be able to most effectively challenge the government's decisions (which is particularly important with the Integrated Review due soon). That means definitively answering some of the questions which have been raised over recent years, especially around NATO and nuclear weapons.

Keeping Britain's nuclear weapons system has always been a divisive issue within Labour, but it is party policy. That didn't change under Jeremy Corbyn, but his lifelong personal opposition to nuclear weapons - and his statement in 2015 that he would never use them - allowed Labour's commitment to be questioned. Stating that it is "non-negotiable" ends that speculation, although it is unlikely to go down well with everyone in the party.

The government launched its Integrated Review last year, looking at the UK's long-term

foreign policy and defence priorities. Mr Healey said the review should “refocus our defence efforts on where the threats are, not where the business opportunities might be”.

He also called for the review - which ministers have promised this month - to be published now, to end “confusion and speculation” about its contents.

He added that unless the review confirmed a reduction in potential threats to the UK, it would be “very hard to accept the case for reducing the strength of our full-time forces”.

And he also urged the government to “set a higher bar” when deciding to buy military equipment from abroad. Responding to Mr Healey’s speech, the Campaign for Nuclear Disarmament accused Labour’s leadership of being “stuck in a 20th Century rut”. Its general secretary Kate Hudson said the UK today was facing “new and different threats,” including climate change, pandemics, artificial intelligence and cyber warfare.

“This is where investment urgently needs to go, not on massively expensive nuclear weapons,” she added. “Labour has to stop pandering to an old agenda and give the people the sensible, forward-looking thinking that today’s reality demands.” The government has promised an increase in spending on defence of 2.6% above the rate of inflation between 2019/20 and 2020/21. It expects the overall figure to rise to £41.5bn during this time.

Margaret Thatcher’s Conservative government first acquired Trident - using submarines to carry up to eight missiles each - in the early 1980s, replacing the previous Polaris system. Opponents

say the maintenance and update costs - running into billions of pounds - are excessive and that the deterrent effect of such weapons is questionable, and that is not truly independent as it relies on US technology. But supporters argue that there is no alternative, and that Russia and China already have nuclear missiles, with several others attempting to develop them. Prime Minister Boris Johnson has described Trident as “vital” to protecting the UK.

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Source: Helen Catt, <https://www.bbc.com/news/uk-politics-56198972>, 26 February 2021.

## **NUCLEAR PROLIFERATION**

### **IRAN**

#### **UK Urges Tehran to Cease Flouting Nuclear Deal**

While the UK remains committed to making the Iran nuclear deal a success, Tehran must stop all activity that breaches the terms of the Joint Comprehensive Plan of Action (JCPOA), and come back into compliance, British Prime Minister Boris Johnson told Iranian President Hassan Rouhani during their telephone call. Meanwhile, US Secretary of State Antony Blinken reportedly said the Biden Administration is unwilling to compromise further on efforts to encourage Tehran to hold talks with the USA.

**According Downing Street, Johnson stressed the importance of Iran “seizing the opportunity” presented by the USA’s willingness to return to the deal if Iran comes back into compliance. Johnson also “underlined the need for Iran to cease wider destabilising activity and be a positive force in the Gulf region”, the statement added.**

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Iran’s Fars news agency reported that Rouhani

had told Johnson the USA has no option but to lift its economic sanctions against Tehran. "If we are after diplomacy, the path is clear ... It's the lifting of sanctions and the US fulfilling of its commitments, and there is no other option," Rouhani said. Although the new US administration has expressed its willingness to rejoin the JCPoA, it has "failed to take any practical measure whatsoever", he added.

Rouhani pointed to the fact that the US withdrawal was a unilateral action, saying they did not negotiate their way out of the JCPoA, and therefore, do not need to negotiate their way into the deal. Earlier, Tehran dismissed media reports about contact between Iran and Washington, saying that "very close talks" are being held, but with other parties to the nuclear deal and none with the USA.

*The New York Times* reported that, although many senior US administration officials had negotiated the nuclear deal while working for former president Barack Obama, and still support it, they also say they are unwilling to compromise further. "Can you assure us that we're not going to make concessions just to get a meeting?" Representative Brad Sherman, Democrat of California, asked Blinken during a House hearing, according to the US newspaper. "I can," Blinken responded. "Do we expect that before we give them sanctions relief that they will verifiably either be in full compliance with the JCPoA or be on a negotiated path toward full compliance?" Sherman asked. "Yes," Blinken said.

On 4 March, Rafael Mariano Grossi, director general of the International Atomic Energy Agency, announced a new agreement with Tehran for a face-to-face meeting between technical experts to take place early next month. Grossi said the aim of the agreement is for the agency and

Iran to stop "talking past each other".

Source: <https://www.world-nuclear-news.org/Articles/UK-urges-Tehran-to-cess-flouting-nuclear-deal>, 11 March 2021.

#### **NORTH KOREA**

**The 38 North website, which specializes in North Korea studies, cited the imagery as indicating that a coal-fired steam plant at the North's Yongbyon nuclear complex is in operation after about a two-year hiatus. Smoke was observed emanating from the plant's smokestack at various times from late February and early March.**

#### **North Korea May be Trying to Extract Plutonium to Make More Nuclear Weapons**

North Korea may be trying to extract plutonium to make more nuclear weapons at its main atomic complex, recent satellite photos indicated, weeks after leader Kim Jong Un vowed to expand his nuclear arsenal. The 38

North website, which specializes in North Korea studies, cited the imagery as indicating that a coal-fired steam plant at the North's Yongbyon nuclear complex is in operation after about a two-year hiatus. Smoke was observed emanating from the plant's smokestack at various times from late February and early March.

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the operation of the steam plant that serves the radiochemical laboratory at Yongbyon. The laboratory is a facility where plutonium is extracted by reprocessing spent fuel rods removed from reactors.

Source: <https://www.hindustantimes.com/world-news/north-korea-may-be-trying-to-extract-plutonium-to-make-more-nuclear-weapons-101614839972312.html>, 04 March 2021.



**NUCLEAR NON-PROLIFERATION**

**FRANCE**

**France to Coordinate P5 Process**

France intends to use its tenure as coordinator of a consultative process on nuclear weapons issues involving senior officials from five nuclear-armed states—China, France, Russia, the United Kingdom, and the United States—to advance progress on the group’s workplan, which was last updated in 2019.

In a Feb. 23 interview with Arms Control Today, a French official said that Paris hopes to build on past achievements and produce deliverables for each of the group’s five action items. The official indicated that

France intends to convene a formal meeting of the group in the coming months and is eager to drive the group’s continued implementation of its workplan and contribute to a successful and substantive nuclear Nonproliferation Treaty (NPT) review conference, which is expected later this year.

The P5 process, as it is commonly known, was first established in 2007. Its current agenda involves discussions on a glossary of terms, to ensure common understanding; nuclear doctrines and strategic risk reduction; a prospective fissile material cutoff treaty; peaceful nuclear uses; and the signing of the annexed protocol to the 1997 Bangkok Treaty, which establishes a nuclear weapons-free zone in Southeast Asia.

The upcoming, rescheduled 10th NPT review conference offers an important opportunity for the P5 process to converge positions of the five

countries, but France also intends to focus the agenda as coordinator of the group on achievements that can be sustained well beyond the NPT meeting. For instance, work within the P5 process to increase transparency about one another’s nuclear doctrines can contribute to long-term risk reduction that will significantly support the group’s future work.

The P5 process coordinator position rotates on a yearly basis, and the state occupying that seat is charged with organizing a formal conference and coordinating other agenda items during that period. Although collaborative multilateral work has ultimately decelerated as a result of the ongoing COVID-19 pandemic, France plans to soon initiate a series of P5 process meetings at the Geneva-based ambassadorial level and the expert level.

Some observers note that the group’s work has slowed in recent years due in part to tensions among key members of the group, as well as a hesitancy by the previous U.S. administration to commit fully to the agenda of the P5 process. In 2020, the United States balked on a proposal for a joint declaration that “a nuclear war can never be won and must never be fought.”

The inauguration of U.S. President Joe Biden and a Feb. 22 speech by Secretary of State Antony Blinken professing support for a multilateral agenda at the Conference on Disarmament suggest that Washington will engage more fully with the group’s work in the coming months.

*Source: Julia Masterson, <https://www.armscontrol.org/act/2021-03/news-briefs/france-coordinate-p5-process>, March 2021.*

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**NUCLEAR SAFETY**

**INDIA**

**‘Kalpakkam Power Plant is Safe’**

The Madras Atomic Power Station (MAPS) functioning at Kalpakkam was safe and there was no threat of any nuclear leak, sources at the institution said. The clarification comes in the wake of reports that appeared in a section of the media. A spokesperson for the Kalpakkam nuclear plant said the news being circulated by a section of television media, linking the Kalpakkam Nuclear Installation Local Authority (NILA) writing to the Registration Department on regulating sale of lands in 14 villages to the threat of a leak, was false. The spokesperson pointed out that the land mafia was engaged in converting agricultural lands around the nuclear plants into housing plots, which was not permissible.

The official said as per the guidelines, urbanisation around the nuclear plant would not be allowed, and hence, the NILA committee was engaged in controlling the land usage pattern by issuing guidelines to the local authority. The spokesperson of the Kalpakkam nuclear complex said the land cartel was trying to divert the attention of the people by spreading rumours.

Source: <https://www.thehindu.com/news/cities/chennai/kalpakkam-plant-is-safe/article33957617.ece>, 01 March 2021.

**Govt. Allays Uranium Tank Leakage Fears**

The Opposition Congress once again flagged the much-debated reports of leakage from uranium

effluent tank at Nongbah Jynrin, South West Khasi Hills, which was denied by the state government, this time in the House. Moving the short duration discussion, Congress MLA, Ampareen Lyngdoh, enquired about the findings of the study done by the NEHU on the allegations of leakage. “What were the findings of the six-member team led by Prof B Marboh from the Department of Chemistry, NEHU? The public is getting bits and pieces of information through media. Is the radiation scare true?” he asked.

In his reply, Chief Minister Conrad Sangma said that

most of the reports of the study suggest that there is no leakage and the radiation level is well within safety level. He recalled that the government had, immediately after taking cognizance of the alleged reports of explosion and leakage in the uranium tanks, sent a team of police and magistrates who, after inspection, informed that those reports were false. The government had

even sought the views from Atomic Mineral Directorate, North East Region, regarding the matter. The Directorate too, in its report, denied any such explosion or leakage, he informed.

The chief minister, however, informed the House that two small holes were found in one of the tanks during inspection,

which seemed to be intentionally dug. According to Conrad, during an inspection conducted by an expert team from NEHU, it was discerned that the radiation level at the source is well within the safety level. However, it was found that radiation level at a nearby rivulet of Phud Syngkai stream was higher than the source and a separate study on rocks and sediments have been taken up by

**The news being circulated by a section of television media, linking the Kalpakkam Nuclear Installation Local Authority (NILA) writing to the Registration Department on regulating sale of lands in 14 villages to the threat of a leak, was false. The spokesperson pointed out that the land mafia was engaged in converting agricultural lands around the nuclear plants into housing plots, which was not permissible.**

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the government to probe the matter. "A joint team of official's geologist representative of NEHU visited the site and samples have been collected and chemical analysis is being undertaken by the Directorate of Mineral Resources, and the report will be submitted shortly," he said. The chief minister further said that police patrols are conducted regularly in the area while the State Pollution Board has taken up the matter with the Central Pollution Board.

Source: <https://theshillongtimes.com/2021/03/13/govt-allays-uranium-tank-leakage-fears/>, 13 March 2021.

## **JAPAN**

### **Nuclear Safety Bolstered Since Fukushima Accident, Says Grossi**

The March 2011 accident at Japan's Fukushima Daiichi nuclear power plant "galvanised the international community," IAEA Director General Rafael Mariano Grossi said. He outlined the work the IAEA and its Member States have done to strengthen nuclear safety in the ten years since the accident.

Grossi noted that, within a few days of the accident, the IAEA sent a team of experts to Japan to help engineers assess the damage, and it has continued to assist the country over the past decade. He said the IAEA is currently assisting Japan tackle the ongoing challenge of the vast amounts of contaminated water stored on the Fukushima Daiichi site.

The IAEA has put in thousands of man-hours and compiled thousands of pages of data and knowledge about the accident, Grossi said in the video statement. "Within just a few months

of the accident, the IAEA had developed a comprehensive action plan to strengthen the global nuclear safety framework and Member States had endorsed it. Around the world, operators' engineers analysed their nuclear reactors and made upgrades where necessary.

Today, virtually all Member States with nuclear power plants have completed 'stress tests' and many make use of the IAEA's expert peer-review missions."

Grossi said the IAEA has built a single platform that promotes clear nuclear safety practices for existing sites and those being developed and constructed. "Our work has not only led to concrete improvements

in the safety of nuclear sites; it has created a sustained and robust global safety culture. "We have developed and improved Safety Standards, norms and guidance. The adoption of the Vienna Declaration brought together all parties of the

Convention on Nuclear Safety to reinforce its principles." An important lesson of the Fukushima Daiichi accident, Grossi said, is that regulators must be "strong, independent and adequately resourced".

"A robust, normative safety framework with the IAEA at its centre is critically important. Because nuclear safety is not an end in itself; it is the means to an end. It

is the key to nuclear power's expansion. And thus it is the key to nuclear meeting its biggest promise of all - the ability to help stabilise the climate while allowing economies and societies to thrive, fuelled by safe, stable and sustainable carbon-free energy."

Source: <https://www.world-nuclear-news.org/>

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*Articles/Nuclear-safety-bolstered-since-Fukushima-accident, 10 March 2021.*

### **Fukushima Daiichi 3 Fuel Removal Completed**

The removal of fuel from unit 3's storage fuel pool began on 15 April 2019 after several years of work to remove debris from the reactor building service floor and prepare for this work to reduce the hazard at the accident site. Tepco's aim was to complete the fuel removal during fiscal year 2020 (ending March 2021), in accordance with its mid and long-term roadmap.

The company announced that the final six fuel assemblies from the used fuel pool had been removed from their transport containers and placed into the fuel rack in the common storage pool, thereby completing this project. The section of the reactor building that sheltered the service floor of unit 3 was wrecked by a hydrogen explosion three days after the earthquake and tsunami of 11 March 2011 - leaving the fuel pond exposed and covered with debris, including many twisted steel beams.

Tepco said the removal of fuel from unit 3's storage pool consisted of a series of preparatory tasks that were completed one by one, such as: the removal of rubble from, and decontamination of, the uppermost floors of the reactor building; the construction of a fuel removal cover; and, the installation of a fuel handling machine. Since all of these tasks had to be performed in a high-dose environment, remotely operated equipment was used to remove debris whilst removing fuel.

"This was the first time such methods were attempted and there were various problems that had to be overcome," Tepco said. Tepco constructed a separate structure to facilitate the removal of fuel from unit 3's storage pool by a

remotely-operated crane. This 54-metre-tall structure includes a steel frame, filtered ventilation and an arched section at its top to accommodate the crane. Measuring 57m long and 19m wide, it is not fixed to the reactor building itself, but is supported on the ground on one side, and against the turbine building on the other.

The company completed the removal of 1331 used assemblies from the storage pool at unit 4, which

had suffered much worse structural damage, by the end of 2014. Tepco said the "knowledge and lessons learned" from the removal of fuel at unit 3 "will be leveraged during the upcoming fuel removal from the unit 1 and unit 2 used fuel pools as we continue to steadily move forward with decommissioning whilst prioritising safety."

*Source: <https://www.world-nuclear-news.org/Articles/Fuel-removal-completed-at-Fukushima-Daiichi-3>, 01 March 2021.*

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### **UAE**

#### **UAE to Host IAEA's Most Complex Nuclear Crisis Drill**

The UAE said it will this year host the IAEA's most complex nuclear emergency exercise, a 36-hour drill that takes place every three to five years. The exercise, which will involve more than 170 countries, will be held at the UAE's Barakah nuclear power plant on the Gulf coast west of the capital Abu Dhabi, which lies some 340 kilometers (210 miles) from Iranian shores. The drill is designed to test international responses and capabilities in the event of a severe nuclear emergency. ...

Known as the Level 3 Convention Exercise, it is the IAEA's highest level emergency exercise. The UAE, the fourth largest crude producer in the OPEC cartel, was built on oil. Nevertheless, it is spending billions to develop enough renewable



energy to cover half of its needs by 2050. The Barakah plant, a first for the Arab world, started up in August when authorities pushed the button on the first of four reactors, with the second reactor receiving its operating license. When fully operational, the four reactors will generate 5,600 megawatts, around 25 percent of the UAE's electricity needs. But the region is grappling with conflicts. ... Asked whether the plant is "immune" to outside threats, the Emirati official told AFP that "when we gave the license, we took into consideration all these elements including physical security, cybersecurity, and protection against sabotage and any potential threat." "It continues to be updated, based on any additional information," he said.

Source: <https://arab.news/n3s2p>, 10 March 2021.

## **NUCLEAR WASTE MANAGEMENT**

### **JAPAN**

#### **This is why Japan might Release Radioactive Waste Water into the Ocean**

For one minute, workers at the Fukushima nuclear station fell silent to mark the 10-year anniversary of a natural disaster that triggered the worst nuclear accident since Chernobyl. Then they went back to work tearing down the reactors melted down in the days after a tsunami on March 11, 2011.

The job ranks as the most expensive and dangerous nuclear clean-up ever attempted. A decade in, an army of engineers, scientists and 5,000 workers are still mapping out a project many expect will not be completed in their lifetime. Naoaki Okuzumi, the head of research at Japan's lead research institute on decommissioning, compares the work ahead to climbing a mountain range – without a map. ... Okuzumi and others need to find a way to remove and safely store 880 tonnes of highly radioactive uranium fuel along with a larger mass of concrete and metal

into which fuel melted a decade ago during the accident.

The robotic tools to do the job don't yet exist.

**The delivery of a robotic arm to start removing fuel, developed in a \$16 million program with the UK's Nuclear Decommissioning Authority, has been delayed until 2022. Tepco plans to use it to grab some debris from inside reactor 2 for testing and to help plan the main operation. The project has had some successes.**

There is no plan for where to put the radioactive material when it is removed. Japan's government says the job could run 40 years. Outside experts say it could take twice as long, pushing completion near the close of the century. Tepco's Fukushima Daiichi nuclear plant, which once had six reactors, was plunged into

crisis by the tsunami that followed a magnitude 9.0 quake off the shore of northern Japan on March 11, 2011.

... It wasn't until 2017 that engineers understood how complicated the clean-up would become. By that point, five specially designed robots had been dispatched through the dark, contaminated waters pumped in to cool the uranium. But radiation zapped their electronics. One robot developed by Toshiba Corp, nicknamed the "little sunfish," a device about the size of a loaf of bread, provided an early glimpse of the chaotic damage around the cores.

Kenji Matsuzaki, a robot technician at Toshiba who led development of the "sunfish," had assumed that they would find melted fuel at the bottom of the reactors. But the sunfish's first video images showed a tumult of destruction, with overturned structures inside the reactor, clumps of unrecognizable brown debris and dangerously radioactive metal.

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giant frames and cranes were erected over the buildings.

Radiation has been reduced in most of the Fukushima work site, about the size of New York's Central Park. In most areas of the plant, the 5,000 workers no longer need special protective equipment that had slowed work during Japan's hot, humid summers. But the cleanup has been delayed by the buildup of contaminated water in tanks that crowd the site.

The melted cores are kept cool by pumping water into damaged reactor vessels.

The water is pumped out and treated. Storage tanks now hold enough radioactive water to fill more than 500 Olympic-sized swimming pools. Tepco expects it will max out its storage space next year. Most analysts expect the government to release the water into the ocean after further treatment. Fishing communities have lobbied against that and South Korea and China have objected to such a move. There still is no plan for where to put the radioactive debris from the reactors. ...

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*Source: Sakura Murakami and Aaron Sheldrick, <https://gcaptain.com/japan-release-radioactive-waste-ocean/>, 12 March 2021.*



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Centre for Air Power Studies

P-284

Arjan Path, Subroto Park,

New Delhi - 110010

Tel.: +91 - 11 - 25699131/32

Fax: +91 - 11 - 25682533

Email: capsnetdroff@gmail.com

Website: [www.capsindia.org](http://www.capsindia.org)

**Edited by: Director General, CAPS**

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

**Composed by: CAPS**

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