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OPINION – Manpreet Sethi

Five Nuclear Issues for Incoming Biden Administration

Two of these, extension of the New START with Russia, and revival of JCPOA with Iran will need immediate attention. As we step into the last month of what has been a harrowing year, there is a sense of renewed hope. News on the availability of vaccines against Covid-19 has brought cheer to nations and their economies. Meanwhile, the impending change in US administration has also generated optimism. Amongst the many domestic and global issues that will vie for the attention of the incoming US administration, five specific nuclear issues stand out.

Two of these—extension of the New START with Russia; and revival of the Joint Comprehensive Plan of Action (JCPOA) with Iran—will need immediate attention. The former is due to expire in February 2021 and reviving it before that happens will be a scramble. While the President-elect has expressed keenness for this, it is possible that the new START may not immediately receive a five-year extension. After all, irrespective of the leaders at the helm, US-Russia relations do suffer from certain deeper issues. Therefore, a modest expectation in the near-term should be for a one-year extension of

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The second issue requiring quick action will be the JCPOA. Biden supports revival of the agreement. But he cannot be sure of political backing from the Senate. He has also mentioned changes in JCPOA to address American concerns of Iranian missiles and support for terrorism. This will obviously not be acceptable to Tehran. In fact, with presidential elections due in Iran in June 2021, the reformist, moderate administration of President Rouhani

that finalised the JCPOA, could find itself compelled to take a hard position on such issues. The recent assassination of an Iranian nuclear scientist adds to the pressure. Already, the hard-line Iranian Parliament has asked for withdrawal from IAEA safeguards regime in response. Any such move would make return to JCPOA difficult. Also problematic would be Tehran's insistence on compensation for economic losses suffered due to US withdrawal. So, while both sides are keen on return to the agreement, finding the middle ground will not be that easy. Elections in Iran, and prospects of a hard-line administration replacing the current moderate dispensation, imposes a pressure on the United States to get things in order before such an eventuality occurs.

A little later in 2021, the Biden administration will have to decide on its participation in the NPT Review Conference (RevCon), now scheduled for August 2021. Joe Biden, who played a role in the outcome of RevCon 2010, understands the value of this forum, especially as it marks 50 years of NPT's existence. He can also be expected to understand the challenges confronting the treaty, such as fissures between the nuclear weapons states and non-nuclear weapon states on their unequal obligations on non-proliferation and disarmament. The mood set by the US will reverberate through the conference. Biden's guidance to his team at the RevCon, therefore, will impact the spirit of negotiations and raise the level of overall commitment to nuclear non-proliferation and disarmament.

The fourth nuclear issue that will need attention of Joe Biden is the US nuclear posture review (NPR). The document brought out in 2018 under President Donald Trump grants a high salience to nuclear weapons—by expanding the role of the weapons to include deterrence against cyber, space or large-scale conventional attacks; and by

its explicit inclination towards use of low-yield nuclear weapons for fighting limited nuclear wars. Such a posture, however, threatens to create many instabilities. It fuels tendencies towards arms racing, maintaining nuclear weapons on low alert levels, striving for escalation dominance, and "conventionalising" nuclear weapons. With nine nuclear armed states in the world today, widespread acceptance of such trends would significantly raise risks of inadvertent escalation, or stumbling into a nuclear war.

Reversing this trend is, therefore, in the interest of all, and US leadership matters. President Biden could do so through a multi-pronged approach—resetting relations with Russia and China to prioritise strategic stability and arms control; reassessment of own nuclear deterrence requirements; acceptance of no first use and sole deterrence nuclear strategies, among others. Biden's NPR could reflect these changes. Possibly, some of them may elicit reciprocal responses, if leaders of Russia and China could be motivated to transcend their search for security through "invincible weapons" to security through peace.

The fifth nuclear issue that will vie for Biden's attention will be North Korea. Much of where this appears on his agenda will depend on Pyongyang's attention-seeking tactics. For instance, a nuclear/missile test may demand focus on the country faster than may happen otherwise. But such an action is also likely to beget a harder US position. Biden has criticised President Trump for having legitimised the North Korean dictator with his personal meetings while getting nothing in return. He has also indicated that he would pressurize China into handling the issue. Whether this would work remains unclear. Of course, the larger US-China relationship will have a bearing on Chinese willingness to engage on the issue.

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All in all then, the new US President will be served a nuclear-rich menu. The agility of his team to build domestic consensus, and its diplomatic acumen with foreign interlocutors, will be severely tested. Biden's own political experience will give him a head start. Meanwhile, courage and conviction may enable him to tread new ground.

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Source: <https://www.sundayguardianlive.com/opinion/five-nuclear-issues-incoming-biden-administration>, 05 December 2020.

OPINION – Sitakanta Mishra

Nuclear Energy as Enabler in India's Sustainable Development Goals

Off late, India has managed to deliver universal access to electricity, but still faces the dual challenge of ensuring sustainable per capita energy consumption growth while ensuring reduction in emissions and pollution. If it succeeds in providing green cooking fuel to all (staggered now at around 61 percent of household) and pick up rapid economic growth in next decade, its total primary energy demand (TEPD) is expected to grow by 63 percent. Meanwhile, India's contribution to world's energy-related total CO2 emission is expected to rise from 6.7 percent to 10.6 percent; therefore, achieving low-carbon energy security is critical for India.

India's attempts to improve energy efficiency and increase the share of renewable energy up to 40 percent in its energy mix by 2022 (current installed capacity is around 38 percent), as endorsed in its National Energy Policy, are undoubtedly prudent. But fetching abundant renewable energy is not devoid of challenges; its intermittent nature, equipment imports dependency, especially given

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Given the wide application of nuclear and related technologies already in various sectors including food and agriculture, medicine, water resources management, etc., along with electricity generation, "the nuclear field highlights the breadth of opportunities for science and technology to add value on a micro-economic level—and thus to support development writ large", as asserted by the Director General of IAEA Yukiya Amano in November 2015. For India, nuclear energy and related technology contribute towards achieving all Sustainable Development Goals (SDGs), and most directly Goal-7 that aims to ensure universal access to affordable, reliable and modern energy services by the year 2030.

Though India will be able to achieve major targets of SDG-7 by 2030, its national determined contribution (NDC) under the Paris Agreement of reducing CO2 emission intensity by 33-35 percent would be difficult to meet. Given the inevitability of exponential growth of India's energy consumption and production in the years ahead and consequent increase in greenhouse gas emission (currently energy sector alone accounts for 74 percent of India's greenhouse gas emission), decarbonising electricity generation, therefore remains a key priority. More importantly, in the COVID-19 era, reducing pollution and emissions assumes even greater importance for India.

Realistically, to attain rapid economic growth and achieve the five-trillion-economy target, India has to heavily industrialise for which the availability of baseload electricity/energy is a prerequisite. As

less dependency on fossil fuel is compelling to curb emission levels, nuclear energy seems to be the most favourable alternative, viable, and green option for baseload electricity generation. Although energy use in India has almost tripled since 2000, energy consumption per capita is one third of the global average still. An average American citizen consumes on average 11 times more than an Indian citizen.

To ensure a reasonable standard of living (if not American standard) to all following the SDGs prescriptions, the per capita consumption of energy has to increase sharp which will in turn give rise to per capita CO2 emissions as well. India is already the fourth largest greenhouse gas emitter after China, USA, and the EU. Nuclear energy, again, can be the key to break out of the vicious circle.

Considering India's rapid economic growth aspirations, rise in per capita energy consumption and increase in the coverage of villages with access to energy, the total energy demand is likely to rise sharply over the next few years. As per NITI Aayog estimate, the electricity component of the entire consumption itself is likely to rise 2.3 times. Can India meet the growing energy demand by heavily relying on renewables and conventional sources only? In almost all forward-looking normative scenarios, nuclear energy's positive contribution in India's energy mix, thereby meeting development goals and climate change obligations, is promising. Without doubt, nuclear energy brings multiple sustainability advantages over available alternatives.

Moreover, the SDGs-7 also prescribes to "enhance international co-operation to facilitate access to clean energy research and technology ... and promote investment in energy infrastructure and

clean energy technology by 2030." India's expanding nuclear energy network ever since the Indo-US nuclear deal, its time-tested cooperation with Russia, and own efforts to develop indigenous technology, provides ample scope to scale up the nuclear energy component in its energy mix. Besides, India can also be a partner in third countries' nuclear energy projects in collaboration with Russia.

Currently, with 22 operational reactors India's total nuclear power plant capacity is 6780 MWe

(around 3 percent of total electricity generation) which is likely to increase to around 13,000 MWe with the completion of 8 reactors under construction around 2023. An additional 12 reactors (10 PHWRs and 2 LWRs) have been approved for construction, and 16 more are planned based on cooperation with foreign partners. India is pursuing development of nuclear power plants by using a mix of indigenous PHWRs, FBRs, and LWRs based on foreign technical cooperation and imported enriched uranium.

While India's collaboration with other foreign partners have faced with numerous challenges, its dealings with Russia, especially for LWRs, have been proved sturdy, reliable, and economic. Within the framework of 'Make in India' and *Atmanirbhar Bharat* (self-reliant India), there is an enormous possibility of localisation of LWR systems with Russia's help to bring sustainability to Indian nuclear industry, which in turn can enable India to meet its sustainable development goals.

Source: Sitakanta Mishra is an Associate Professor in School of Liberal Studies of Pandit Deendayal Petroleum University (PDPU), Gujarat, India. <https://www.cnbctv18.com/energy/nuclear-energy-as-enabler-in-indias-sustainable-development-goals-7717081.htm>, 13 December 2020.

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OPINION – Kaveh L. Afrasiabi

The European Mirage of ‘Iran Nuclear Agreement Plus’

Today, objective observers maybe excused if they detect traces of “nuclear orientalism,” that is, neo-colonial discourse, in the recent announcement of various European officials favoring a new nuclear agreement with Iran, dubbed as “nuclear agreement plus,” when they have failed to live up to their commitments under the existing one. But, sadly, there is no other viable explanation for this utterly indefensible narrative, championed by among others, Heiko Maas, Germany’s foreign minister, who ought to know better than to throw monkey wrench on the path of incoming Biden administration and its planned reembrace of the nuclear agreement, known as the JCPOA.

Sadly, instead of echoing Biden’s sentiment and providing a fresh European support for an American U-turn on a verifiably failed Iran policy under the Trump administration, Maas and a number of other German and European officials are, in fact, doing the exact opposite, by threatening new sanctions on Iran and thus threading the perverse pattern of Iran isolation promoted by Iran’s regional rivals, namely, Israel and Saudi Arabia. This is reflected in a recent joint statement by the trio of Germany, France, and England, rebuking Iran over the country’s decision to upgrade its enrichment centrifuges.

What is quite remarkable about this trio and their foreign ministers is that they can actually dispense with any sense of irony, let alone embarrassment, by falsely claiming that Europe is in good standing with the nuclear agreement and that the European parties to the JCPOA, that includes the EU in addition to the trio, have fulfilled their own obligations under the

agreement. Yet, nothing could be further from the reality and, indeed, a simple comparison of the litany of European commitments and their actual non-performance with respect to the terms of the JCPOA leaves little doubt as to the fundamental European hypocrisy run amok.

As Iran’s Foreign Minister Javad Zarif has repeatedly stated, the Europeans have not even abided by 2 percent of their JCPOA obligations, which includes a commitment to normalize trade with Iran and to lift barriers to Iran’s export of oil and gas to Europe. Yet, under the American pressure, Europe has failed to live up to its obligations, which is a failure of political will and European sovereignty, polished over by the untenable disguise of a faithful Europe, contrary to all the empirical evidence.

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Consequently, it is little surprise, then, that even the International Crisis Group, often parroting the European position, contradicts itself in the latest report on Iran, by

(a) justifying “some” of the post-JCPOA sanctions on Iran without bothering to elaborate, and (b) calling for the return of US to the JCPOA while, in the same breath, falling short of asking Biden to remove the Trump-era sanctions on Iran. The incoherent report ends in the snares of its own contradiction, undercutting its own analysis, by also failing to elaborate on the concrete meanings and implications of a party re-committing itself to an international agreement abandoned by its former skipper.

Again, per the terms of JCPOA, this means the agreement by the US to undertake more than a dozen specific steps, such as with respect to Iran’s oil exports, access to foreign banks and airplane spare parts, etc., reneged on by the Trump administration.

Indeed, a close reading of both the JCPOA and the UN Security Council Resolution 2231 leads but to one conclusion, that is, the necessity of a full

and comprehensive adoption and implementation of the JCPOA by all the parties, which is incumbent on both Europe and US as member states of the UN.

Another problem with the European approach is that they tend to endorse the Biden team's position that Iran must first comply with their demands before there is any movement on the Iran sanctions. This projected sequencing of actions/reactions is, however, untenable, due to the sheer and legitimate Iranian mistrust of the US, which has reneged on its obligations with impunity. There is as a result a huge sea of mistrust between US and Iran that in effect precludes the option of Iran taking the first steps in the hope of seeing reciprocal action by the US.

On the contrary, for a breakthrough in the nuclear negotiations to occur, there needs to be an initial US evidence of good will, above all with respect to Iran's access to humanitarian goods in order to combat the Covid-19 pandemic, before there is any expectation of an Iranian reciprocal action. US is, after all, the guilty party here by imposing illegal and unjust sanctions on Iran, victimizing an entire population.

Neither Biden nor the Europeans ought to overlook the important fact that Iran is the aggrieved party, victimized by the Western superpower and, indirectly, by the European complicity, and it is now time to address Iran's legitimate grievance, instead of adding salt to the injury with the talks of more punishing sanctions reserved for Iran. In a word, this is a recipe for disaster and, quite clearly, a non-starter.

Source: <https://www.eurasiareview.com/11122020-the-european-mirage-of-iran-nuclear-agreement-plus-oped/>, 11 December 2020.

OPINION – Udi Evental, Raz Zimmt

Forget a Comprehensive Iran Deal. It's an Illusion

Two major events have recently put the Iranian nuclear project back into international focus. First is the assassination of Iranian nuclear scientist Mohsen Fakhrizadeh, who was considered the dominant figure in the Iranian nuclear program. Second is the interview given by U.S. President-elect Joe Biden to *The New York Times*, in which he reiterated his intent to rejoin the nuclear

agreement with Iran and remove the sanctions imposed on it by President Donald Trump.

Prime Minister Benjamin Netanyahu hastened to warn that returning to a flawed agreement, as he put it, would be a mistake. Netanyahu reiterated

that not only does the agreement not block Iran's path to a bomb, but it enables Tehran to finance a campaign of terror, occupation and destruction throughout the Middle East.

Various experts in Israel and the U.S. say that any agreement with Iran that focuses solely on nukes but doesn't also deal with the other threats Iran posed

would be unstable and doomed to failure. Foreign Minister Gabi Ashkenazi said Israel must persuade the Biden administration to create a link between the nuclear issue and Iran's missile program and support of terror. Trump's special envoy Elliot Abrams also said that including more components of the threat during negotiations with Tehran would result in "a better deal."

Despite these assessments, it's highly doubtful that seeking a "comprehensive deal" with Iran that would address all the components of the multidimensional threat it poses actually serves Israel's deeper interests. The demand to link

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It's highly doubtful that seeking a "comprehensive deal" with Iran that would address all the components of the multidimensional threat it poses actually serves Israel's deeper interests. The demand to link together all the issues strengthens the notion that Israel has in recent years diverted its emphasis on the nuclear issue to halting Iran's moves in the region, with a stress on Hezbollah's precision missile project. This is a mistaken order of priorities.

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There's no doubt that the arming of Israel's enemies with missiles, and certainly with precision missiles, poses a strategic threat. Nevertheless, Iran's push for nuclear weapons is far more dangerous and it must continue to be at the top of Israel's national priorities.

The nuclearization of Iran is liable to lead to a fundamental change in the regional rules of the game and invalidate the achievements of the campaign between the wars. In contrast to Israel's success in slowing, at least temporarily, Iran's military entrenchment in the region and its efforts to arm Hezbollah with advanced weaponry, Israel's ability to deal with Iran's continuing nuclearization effectively and at lower cost has significantly lessened over time.

Iran is expected to categorically refuse what it perceives not just as giving up on vital national interests, like its continued support of regional allies, first and foremost Hezbollah, but also as backing down from the principles of the Islamic revolution. Even if Iran were prepared to discuss regional issues, it is expected to raise its own demands during negotiations. For example, restricting Israeli activity in Syria and Lebanon and the U.S. presence in Iraq and the Gulf. This is expected to allow Iran to advance its nuclear program in a manner that will provide it extra leverage in the talks.

Moreover, even if Iran would officially agree to restrain its regional policy, it will be extremely difficult to enforce that, particularly given its traditional preference for using proxies and low-signature activity over direct and overt actions.

More importantly, even in the event that Iranian violations in the realm of terror could be proven, it's doubtful whether the international arena, and even Israel, would see them as sufficient grounds to torpedo a future agreement if that agreement provided a reasonable solution to the nuclear challenge.

Understanding this reality, and wishing to avoid a situation where Iran demands of the West

concessions to its nuclear program in exchange for compromises on its regional policies, both Israel and the United States have for years objected to Tehran's demand to include regional issues in the negotiations, viewing that demand as "foot-dragging."

The bottom line is that decision makers in Israel will have to sober up from the illusion that a "comprehensive deal" can be imposed on Iran. Such an agreement isn't realistic, and a policy of sticking to these maximalist demands will only push Israel further away from its primary goal: stopping the Iranian nuclear program and fixing the serious deficiencies in the nuclear agreement.

Source: <https://www.haaretz.com/opinion/.premium-forget-a-comprehensive-iran-deal-it-s-an-illusion-1.9360921>, 10 December 2020.

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SPEECH – Sama León, Director General, WNA

The Business Case for Nuclear Energy

The case for nuclear as a proven source of clean, reliable and sustainable electricity supply should be clear to all, but the business case for nuclear is also becoming better understood, World Nuclear Association Director General Sama Bilbao y León told delegates at the New Nuclear Capital 2020 virtual conference. The following is an abridged version of her presentation.

"If you compare the percentage of electricity generated with low-carbon energy sources that we

had at the beginning of the century with what we have today it is more or less exactly the same - essentially about 36%. So, despite the enormous investment in renewable energy sources, it doesn't seem that we have moved forward very much.

Nuclear continues to be the second largest source of low-carbon electricity worldwide and among OECD countries nuclear is the first source of low-carbon generation. Why is that? Because nuclear energy continues to grow and to perform extremely well. In fact, in 2019, global electricity generated from nuclear grew by 95 terawatt hours despite the fact that total capacity went down by 5 gigawatts. This tells us that the average capacity factor of nuclear power units has increased. In other words, we continue to improve how well we operate and how much energy we extract from the current fleet of nuclear power plants.

Not only that, but construction has started at 10 new units since the beginning of 2019, and 10 more have been connected to the grid. Of the latter, two are small reactors aboard the first purpose-built floating nuclear power plant, which is moored at Pevek in northeast Russia and which are supplying both electricity and heating to the local community. Two weeks ago, we had the world's first unit of the Hualong One design - Fuqing 5 - was grid connected in China.

So, nuclear continues to grow and to do very well. However, when we look at the scenarios that many

organisations are putting forward in order to meet not only the decarbonisation goals of the Paris Agreement, but also the global Sustainable Development Goals that aim to ensure everyone in the world can achieve at least a reasonable standard of living, we notice that most analysts expect the contribution of nuclear energy will need to grow significantly.

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going to need the long-term operation of the existing fleet of nuclear power plants. This will ensure continuity from the current fleet to the next generation of reactors as they become available. But we will also need to build new reactors of all sizes. In this case we are focusing on electricity,

We are going to need all kinds of nuclear technology. First of all, we're going to need the long-term operation of the existing fleet of nuclear power plants. This will ensure continuity from the current fleet to the next generation of reactors as they become available. But we will also need to build new reactors of all sizes. In this case we are focusing on electricity, but nuclear energy is the only low-carbon energy source that in addition to electricity can also produce low-carbon heat.

but nuclear energy is the only low-carbon energy source that in addition to electricity can also produce low-carbon heat. That's fabulous because it can help decarbonise other sectors that are difficult to abate, including industrial applications like chemicals, hydrogen and synthetic fuel production, and also be used for residential and district heating. And, depending on the different applications, we may be able to use nuclear energy in remote locations. So, the opportunities are only growing.

Beyond the SMRs being developed in North America, that are being discussed in other sessions

For example, if you look at the projections of the IPCC in their 1.5 Degrees report released in 2018, in the Middle-of-the-Road scenario you see that nuclear energy would need to grow six-fold by 2050 in order to represent even just 25% of total electricity generation.

That means we are going to need all kinds of nuclear technology. First of all, we're

during this conference, I want to make a summary of SMR designs that are being developed elsewhere in the world. I would highlight Argentina's CAREM-25, which is a very small PWR currently under construction; China's HTR-PM, which is a high-temperature reactor currently undergoing cold testing; and Russia's launch last year of two floating reactors that have been connected to the grid in Pevek, where they are supplying electricity and heat; also in China, there is the Yanlong DHR, which is a pool reactor specifically for district heating, that is under development; in France, we have the Nuward, a PWR currently under development; in South Korea we have SMART, which is a PWR that has already received design approval from the Korean regulator; in the UK there is Rolls-Royce's small PWR under development; and the Seaborg molten salt reactor in Denmark, the main application of which being considered is as floating units that can be deployed almost anywhere.

The pandemic has shown the important role of reliable electricity supply and not only that, but also that the post-COVID economic recovery that many governments are preparing along with stimulus packages is going to give us a once-in-a-lifetime opportunity to improve our economies in a way that at the same time accelerates the transition to a low-carbon energy future. Nuclear is well-positioned for this because, as was shown in a joint report published by the International Energy Agency and the OECD Nuclear Energy Agency on the projected costs of electricity between 2020 and 2025, nuclear has significantly reduced its levelised cost of electricity.

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Nuclear provides many socio-economic benefits throughout the wider economy. This is not only the jobs that are directly created by nuclear projects during construction, or the jobs created during the operation of a new power plant over 80 years, and then afterwards throughout the decommissioning, nuclear used fuel and waste management phase, but also that nuclear projects produce a significant economic trickle-down effect throughout the entire economy.

The long-term operation of nuclear power plants is currently the lowest cost option of all forms of low-carbon energy resources. We have also seen that the levelised cost of electricity of new nuclear plants is expected to become competitive with all other energy sources, including renewables. This tells us that nuclear energy provides a great opportunity, not only to contribute to continued decarbonisation and to help all countries to meet their SDGs, but also in the short term to help stimulate economic growth.

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Nuclear, like most other low-carbon energy sources, is a high capital cost investment, but the largest part of this is actually the cost of finance. This means that if nuclear projects had access to affordable financing, the overall levelised cost of

electricity that we can generate with nuclear energy would be even more cost competitive. We have identified that governments can have a key role in creating the appropriate frameworks so that they can incentivise investment in public-private partnerships, but also lower risk situations in which the cost of financing nuclear projects would be significantly lower. Again, this would result in a lower levelised cost of electricity.

There are several ways that governments can do this. There is direct finance support that can take various forms, such as equity and debt. It could be transitional and doesn't have to be a long-term process. It could be an initial quick start process to incentivise private investment. And then there are other mechanisms for indirect financial support, such as contracts-for-difference used in the UK or the Mankala model in Finland. And finally there is another way under consideration in the UK, which is the regulated asset base.

The issue of affordable financing is key for new nuclear and this is particularly important when we talk about nuclear newcomer countries, for whom access to cost-effective financing is going to be very important for their deployment of new nuclear. We need to have consistent messages from governments to instill confidence and trust in the overall system which will support long-term planning and investment.

It's also important that multi-lateral banks and export credit agencies consider nuclear energy and what they can do to help newcomer countries start their plans to use nuclear energy for sustainable development and to decarbonise their electricity systems. There is a need to develop technology neutral criteria for financial support. In that way countries will be able to make their own choices. I can't emphasise this enough. As we move forward, multi-lateral development

banks, national credit export agencies and financial institutions looking into environmental social and governance (ESG) criteria must have criteria that are technology neutral. Only with a level playing field can we determine which technologies are sustainable and which are not.

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Policymakers must incentivise investment and facilitate low-cost financing for all kinds of nuclear projects - long-term operation is a no-brainer as the lowest cost low-carbon energy that we have, but also new build projects for large, small and micro-reactors."

Source: World Nuclear News, <https://world-nuclear-news.org/Articles/Speech-The-business-case-for-nuclear-energy>, 11 December 2020.

NUCLEAR STRATEGY

FRANCE

France to Build New Nuclear-Powered Aircraft Carrier

France will build a new, nuclear-powered aircraft carrier to replace its Charles de Gaulle carrier by 2038, French President Emmanuel Macron announced... Macron framed the decision to use nuclear reactors to propel the future warship as part of France's climate strategy, stressing its lower emissions compared to diesel fuel.

Speaking at a nuclear facility in the Burgundy town of Le Creusot, he called France's nuclear weapons and atomic energy industry "the cornerstone of our strategic autonomy," and said the nuclear sector plays a role in France's "status as a great power." One of his advisers noted that having an aircraft carrier also helps France project its global influence. Only a few countries in the world maintain the huge, costly vessels.

The new French aircraft carrier will be about 70,000 tons and 300 meters long, roughly 1.5

times the size of the Charles de Gaulle, which has been deployed for international military operations in Iraq and Syria in recent years, according to French presidential advisers. Its catapults will be electro-magnetic, and American-made, and the ship will be designed to accommodate next-generation warplanes and serve until around 2080, the advisers said. They didn't provide a price tag but French media estimate it will cost around 7 billion euros (\$8.5 billion).

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Macron also pledged 500 million euros in investment in the nuclear industry and a separate fund to modernize it, and promised "progress" on the persistent problem of how to permanently get rid of nuclear waste. Nuclear reactors provide the majority of France's electricity, but many reactors are aging and delays have dogged new-generation reactors.

Macron, who is co-hosting a global video summit to mark the fifth anniversary of the Paris climate accord, said France also must do more to develop wind, solar, hydrogen and other renewable energies.

Source: <https://apnews.com/article/energy-industry-paris-emmanuel-macron-france->, 08 December 2020.

RUSSIA

Russian Submarine Tests Intercontinental Missiles

A Russian nuclear submarine has tested four intercontinental missiles in the Sea of Okhotsk on the Pacific Ocean, DPA quoted the Defense Ministry... The missiles were fired from the Vladimir Monomakh and hit targets more than 5,500 kilometers away at a firing range in northwestern Russia, according to the ministry.

The test completes large-scale nuclear exercises, according to Defense Minister Sergei Shoigu, who notified President Vladimir Putin.

Such maneuvers are seen by observers as a demonstration of strength by Russia. The test comes amid ongoing negotiations over the future of the New START nuclear arms reduction treaty, the last major nuclear disarmament agreement between Russia and the United States... Without it, there would be no agreement governing stocks of

strategic nuclear weapons for the first time in decades. According to the SIPRI, an independent think tank, the two nuclear heavyweights jointly possess about 90 percent of the world's nuclear weapons.

A Russian nuclear submarine successfully test-fired four intercontinental ballistic missiles on Saturday (12 Dec) in a show of readiness of Moscow's nuclear forces amid tension with the US. ... It was the submarine's first test of four missiles. It has a capacity for 16 Bulava missiles with nuclear warheads. The Vladimir Monomakh is one of the

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new Borei-class nuclear submarines that carry 16 Bulava missiles each and are intended to serve as the core of the naval component of the nation's nuclear forces for decades to come. Another submarine of the same type performed a similar launch of four Bulava missiles in 2018 — a costly demonstration of the efficiency of the country's nuclear deterrent mimicking the conditions of a major nuclear conflict.

Source: <https://saudigazette.com.sa/article/601355/World/Europe/Russian-submarine-tests-intercontinental-missiles>, 13 December 2020.

BALLISTIC MISSILE DEFENCE

AUSTRALIA–USA

Australia, US Partner on Air-Launched Hypersonic Missile

Australia and the US are partnering to develop and test an air-launched hypersonic cruise missile under the bilateral Southern Cross Integrated Flight Research Experiment program, or SCIFIRE, the two countries announced....

From the US perspective, the effort falls under the Allied Prototyping Initiative, which is managed by the Directorate of Advanced Capabilities within the Office of the Under Secretary of Defense for Research and Engineering. The program will be executed by the US Air Force under the auspices of the weapons program executive officer, and it will leverage more than 15 years of collaboration on research into scramjets, rocket motors, sensors and advanced manufacturing materials between the two countries.

The agreement follows discussions between former US Defense Secretary Mark Esper and Australian Defence Minister Linda Reynolds during the bilateral Australia-US Ministerial Consultation talks held in Washington in July.

“SCIFIRE is a true testament to the enduring friendship and strong partnership between the US and Australia,” Michael Kratsios, acting undersecretary of defense for research and engineering, said in a statement. “This initiative will be essential to the future of hypersonic research and development, ensuring the US and our allies lead the world in the advancement of this transformational warfighting capability. We thank the Australian Department of Defence for their shared commitment to this game-changing effort.”

The SCIFIRE program will leverage the collaborative work undertaken in partnership with the Royal Australian Air Force, the Australian

Defence Science and Technology Group, and the University of Queensland on the Hypersonic International Flight Research Experimentation program. The new weapon will be a Mach 5-class precision strike missile that is propulsion-launched and powered by an air-breathing scramjet engine. It’s expected to enter service within the next five to 10 years.

The head of Air Force capability at the RAAF Headquarters in Canberra, Air Vice Marshal Catherine Roberts, said the weapon will be capable of being carried by tactical fighter aircraft such as the F/A-18F Super Hornet, EA-18G Growler and F-35A Lightning II, as well as the P-8A Poseidon maritime surveillance aircraft.

Testing will take place in Australia, possibly at the Woomera Test Range in the remote outback of South Australia. While no funding details have been released to date, Roberts said Australia’s recent Force Structure Plan 2020 included between AU\$6.2

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billion and AU\$9.3 billion (US \$4.6 billion to US \$6.9 billion) for high-speed, long-range strike and missile defense capabilities, of which SCIFIRE is an example. Though the RAAF is not currently seeking an industry prime to assist with the program, Roberts indicated that discussions with Australian small to medium enterprises will begin soon. ...

Source: Nigel Pittaway, <https://www.defensenews.com/industry/techwatch/2020/11/30/australia-us-partner-on-air-launched-hypersonic-missile/>, 30 November 2020.

JAPAN

Japan Weighs Ships for Aegis Missile Defence System

Japan will build two ships equipped with Aegis missile interceptors after public opposition forced the government to scrap deployment of a costly land-based system, the country’s defence minister said on Dec 9.

Earlier this year, Japan decided to suspend unpopular plans to deploy the US-developed Aegis Ashore defence system in northeastern Akita and western Yamaguchi prefectures amid technical problems and swelling costs. As an alternative, Defence Minister Nobuo Kishi told a ruling party meeting, the government hopes “to build two vessels equipped with the Aegis system”. Officials aim to win Cabinet approval early, public broadcaster NHK reported.

The proposal “is aimed at establishing a system of defending the whole of Japan continuously with a ballistic missile defence system”. The Aegis Ashore purchase was approved in 2017, at an estimated cost of US\$4.2 billion over three decades.

The prime minister’s top spokesman Katsunobu Kato later said that the proposal “is aimed at establishing a system of defending the whole of Japan continuously with a ballistic missile defence system”. The Aegis Ashore purchase was approved in 2017, at an estimated cost of US\$4.2 billion over three decades. It is not immediately clear what the cost of a deployed system on ships will be.

The system’s purchase was seen both as part of attempts by Tokyo to bolster its defensive capabilities after successive North Korean missile launches but also as a way to foster closer ties with Washington under US President Donald Trump, who pushed allies to buy more American military equipment. But Aegis has long been controversial in Japan, with opposition stemming not only from its expense but also from locals concerned about the risks posed by a missile defence system in their backyard.

Kishi also announced that the ministry plans to upgrade the range of ground-to-ship guided missiles, allowing them to target threats from further distances. “This upgrading is aimed at strengthening defence capability, but not aimed at obtaining a capacity to attack enemy territory,” spokesman Kato said.

In September, outgoing prime minister Shinzo Abe urged the country to strengthen its ballistic missile defences, warning that interception systems like Aegis alone may be insufficient. But the prospect of obtaining a longer-range strike capacity is highly controversial, with a key ruling coalition political party firmly opposed.

The distinction is key in Japan, whose pacifist post-war constitution strictly limits the country’s military to self-defence, leaving it heavily dependent on the United States for security. In September, outgoing prime minister Shinzo Abe urged the country to strengthen its ballistic missile defences, warning that interception systems like Aegis alone may be insufficient. But the prospect of obtaining a longer-range strike capacity is highly controversial, with a key ruling coalition political party firmly opposed.

Source: <https://www.channelnewsasia.com/news/asia/japan-weighs-ships-for-aegis-missile-defence-system-13734006>, 09 December 2020.

SOUTH KOREA

Deliveries of PAC-3 Air-Defence Systems to RoKAF Completed

South Korea’s Defense Acquisition Program Administration (DAPA) announced on 12 December that deliveries of Patriot Advanced Capability-3 (PAC-3) interceptor missiles and upgraded ground equipment to the Republic of Korea Air Force (RoKAF) has been completed amid Seoul’s efforts to enhance the country’s air defences to counter North Korea’s growing ballistic missile capabilities.

The agency said deliveries of the upgraded air-defence systems were completed in November – 10 months ahead of schedule – under a Patriot capability enhancement programme launched in March 2015 and carried out in close co-operation with the United

States and South Korean companies. DAPA said the detection range of the PAC-3’s radar system is twice that of the RoKAF’s previously deployed PAC-2 system, adding that the PAC-3 can also track and engage more targets simultaneously.

Moreover, the PAC-3 system, which features improved information processing and communication capabilities, can, unlike the PAC-2, engage ballistic missile warheads directly using a hit-to-kill interceptor, and thus reduce potential secondary damage on the ground. The PAC-2 is designed to engage ballistic missiles with a blast/fragmentation warhead....

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Source: Gabriel Dominguez, <https://www.janes.com/defence-news/news-detail/deliveries-of-pac-3-air-defence-systems-to-rokaf-completed>, 14 December 2020.

NUCLEAR ENERGY

CHINA

Milestone for China's Nuclear Industry

The first Hualong One nuclear power reactor has been connected to the grid, 66 months after start of construction. The 1090 MWe (net) Fuqing 5 represents a significant step for China as Hualong One is the first large reactor entirely designed there, though substantially evolved and improved from French designs whose provenance goes back to Westinghouse. Several other Hualong are under construction in China, plus two in Pakistan. The twin unit Fuqing 6 is due on line in 2021.

All but 18 of China's 49 operating power reactors are essentially French 1000 MWe-class reactors built by China National Nuclear Corporation (CNNC) or China General Nuclear Corporation (CGN). From 2011, negotiations between CNNC and CGN grappled with the task of "merging" the French design with a variant

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from CNNC, as ordered by the National Energy Administration, with impetus given by the regulator. The Hualong One resulted, with a quite different core to the French-origin predecessors, and conforming to best international standards. Minor differences remain between CNNC and CGN versions. The CGN version of Hualong One will be the reference plant for the UK's planned Bradwell B and also other projects abroad, while the CNNC version is being built in Pakistan. Both are in line with China's Belt and Road Initiative.

The first export Hualong One reactor is in Pakistan – Karachi 2. Fuel loading is under way there and it is expected to start operation early next year, with a second one a year later. Pakistan has four Chinese reactors of about 300 MWe in operation at Chashma, 200 km from Islamabad, and a 49-year old Canadian reactor of 90 MWe at Karachi.

Source: *World Nuclear News*, 02 December 2020.

FRANCE

Macron Stresses Importance of Nuclear Energy for France

French President Emmanuel Macron said...that France's energy and ecological future depends on nuclear power. Speaking during a visit to Framatome's Le Creusot facility, Macron said the industry comprises 3000 companies and 220,000 jobs, with 5000 new hires planned for 2021 in spite of the crisis caused by the pandemic. "Few sectors offer as much, in particular to our young people and all across the country," Macron tweeted.

According to World Nuclear Association, France derives about 75% of its electricity from nuclear

energy thanks to a longstanding policy based on energy security. France is the world's largest net exporter of electricity due to its very low cost of generation, and gains over EUR3 billion per year from this. Government policy however is to reduce the share of nuclear in its electricity mix to 50% by 2035.

The Élysée Palace issued a statement on Macron's "three convictions" that guide the future of French nuclear power: "Our energy and ecological future depends on nuclear power; our economic and industrial future depends on nuclear power; and France's strategic future depends on nuclear power."

As the Intergovernmental Panel on Climate Change points out, nuclear energy is a non-intermittent energy source that emits the least CO₂. To produce 1 kWh, a coal-fired power plant emits 1000g of CO₂, while a nuclear power plant emits only 6g, the statement noted.

By generating more than 41% of the energy in France, "nuclear makes us autonomous", Macron said. "It also preserves French purchasing power, with a kWh on average 40% cheaper than in our European neighbours." Nuclear energy must therefore "continue to be a pillar" of the French energy mix "for decades to come", he said. French nuclear know-how is exported all over the world and has a trade surplus of EUR7 billion and this "major asset needs to be consolidated".

For that reason, the France Relance recovery plan announced on 3 September includes the government's commitment to invest nearly EUR500 million (USD606 million) in the nuclear sector. With EUR100 million by 2021, this fund will aim to

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support strategic players in the sector who would otherwise be in difficulty owing to the pandemic crisis. This fund will be supplemented by a

EUR70 million modernisation fund for companies in the sector. France Relance will also enable development of small modular reactor technology.

"Everything that makes France an independent, listened to and respected

power is based on the nuclear industry," Macron said. His statement on nuclear was issued two days before the meeting of EU leaders in Brussels to discuss further coordination on COVID-19, climate change, security and external relations....

Source: World Nuclear News, <https://www.world-nuclear-news.org/Articles/Macron-stresses-importance-of-nuclear-energy-for-F>, 09 December 2020.

POLAND

Poland Sees Cost of Building 6-9 GW of Nuclear Energy at \$30 Bln

Poland generates most of its electricity from burning coal and sees nuclear energy as a way to help it reduce emissions as required by the European Union. The country wants to build 6-9 GW of nuclear energy capacity and plans to build its first nuclear

power plant by 2033, but has not yet worked out a financing scheme.

In October 2020 Warsaw and Washington struck a nuclear power agreement which says that over the next 18 months, the US and Poland will work on a report for the programme that seeks to build six reactors, as well as potential financing arrangements. "We know the range (of costs).

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This is around \$30 billion, if we talk about the whole 20-years project, or six reactors of 6-9 GW," PAP quoted Piotr Naimski as saying. The minister added that half of the amount would be Poland's costs, suggesting a potential foreign partner would pick up the other half.

Source: <https://energy.economictimes.indiatimes.com/news/power/poland-sees-cost-of-building-6-9-gw-of-nuclear-energy-at-30-bln/79457358>, 28 November 2020.

UK

Britain Opens Talks with EDF on Funding Sizewell C Nuclear Project

Britain on 14 Dec confirmed it would enter negotiations with France's EDF to try to strike a funding deal on the 20 billion pound (\$27 billion) Sizewell C nuclear energy project in Suffolk, Eastern England. ... EDF is already building Britain's first new nuclear plant in more than two decades, Hinkley Point C, with backing from China's CGN. CGN also owns a 20% development phase stake in Sizewell C but recent media reports have suggested it could pull out. Britain said in September it was looking at funding options for the project. It said the talks would be subject to reaching a value for money deal and all other relevant approvals before any final decision was taken on whether to proceed.

Britain's nuclear power plants can supply around 20% of the country's electricity demand, but around half the plants are set to close in the next four years. The government said it would "consider options to enable investment in at least one nuclear power station by the end of this parliament". The announcement on Sizewell C was made alongside the government's white paper on

cleaning up Britain's energy system.

Source: <https://in.reuters.com/article/britain-nuclear-sizewell-idINL8N2IU1E3>, 14 November 2020.

UK Confirms Status of Nuclear as Clean Energy

Nuclear power supplies about 16% of the UK's electricity, but its existing fleet of reactors are to reach the end of their operating lives by 2030. In 2016, the government agreed contracts for the first new nuclear power plant in a generation - Hinkley Point C - which will provide 7% of the

country's current electricity needs. The industry has been waiting for more than a year for the government to decide on support for the planned Sizewell C project, as well as for sites at Wylfa Newydd and Moorside.

The White Paper, Powering our Net Zero Future, develops the Ten Point Plan for a Green Industrial Revolution Prime Minister Boris Johnson unveiled last month, by setting out specific steps the government will take over the next decade to cut emissions from industry, transport, and buildings by 230 million metric tonnes while supporting hundreds of thousands of new green jobs. It also follows Johnson's announcement two days ago, as he opened the Climate Ambition Summit, that the government will end its direct support for the fossil fuel energy sector overseas.

With the exception of Sizewell B and Hinkley Point C, which is under

construction, all of the UK's existing nuclear power plants are to be closed by the end of 2030. The government has already committed to removing coal from the electricity mix no later than 2025 and perhaps as early as 2024. Retiring capacity will need to be replaced to keep pace with existing levels of demand, but this could double

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The government has already committed to removing coal from the electricity mix no later than 2025 and perhaps as early as 2024. Retiring capacity will need to be replaced to keep pace with existing levels of demand, but this could double out to 2050, the government said. As a result, electricity could provide more than half of final energy demand in 2050, up from 17% in 2019.

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"While we are not planning for any specific technology solution, we can discern some key characteristics of the future generation mix," the White Paper says. "A low-cost, net zero consistent system is likely to be composed predominantly of wind and solar. But ensuring the system is also reliable, means intermittent renewables need to be complemented by technologies which provide power, or reduce demand, when the wind is not blowing, or the sun does not shine. Today this includes nuclear, gas with carbon capture and storage, and flexibility provided by batteries, demand side response, interconnectors and short-term dispatchable generation providing peaking capacity, which can be flexed as required."

The government targets 40 gigawatts of offshore wind by 2030, will support the deployment of at least one power carbon capture utilisation and storage project by that date, and will aim to bring at least one large-scale nuclear project to the point of Final Investment Decision (FID) by the end of this Parliament.

"We will remain open to further projects later if the nuclear industry demonstrates that it is able to reduce costs and deliver to time and budget," the White Paper says. "We expect the sector to deliver the goal it set itself in our Nuclear Sector Deal, published in 2018, to reduce the cost of nuclear new build by 30% by 2030," it adds.

"Raising enough private capital to finance a nuclear power station is challenging given the significant investment needed for a developer to reach the point of FID. In considering the financing options, we will examine the potential role of government finance during construction, provided there is clear value for money for consumers and

taxpayers."

In addition to this, the government will provide up to GBP385 million in an Advanced Nuclear Fund, of which GBP215 million will be invested in the development of a domestic small modular reactor (SMR) design, which is expected to unlock up to GBP300 million private sector match-funding. The remaining GBP170 million will go to a research and development programme for advanced modular reactors (AMR).

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To help bring AMR technologies to the market, the government will also invest an additional GBP40 million in developing the regulatory frameworks and supporting the UK's supply chain. As the first major commitment of the programme, in 2021 it will open the Generic Design Assessment to SMR technologies.

The government also wants to build a commercially viable fusion power plant by 2040 and has already committed more than GBP400 million towards new UK fusion programmes. The Spherical Tokamak for Energy Production (STEP) is expected to be the world's first compact fusion plant, to be built in the UK by 2040.

"Supporting the development of our supply chain now will increase our chances of having indigenous expertise capable of leading the world in developing the nuclear technologies of the future - SMRs and AMRs - a global market estimated by some

to be worth approximately GBP250 billion to GBP400 billion by 2035," the White Paper says. The aim is to develop an SMR design and to build an AMR demonstrator by the early 2030s.

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Source: <https://www.world-nuclear-news.org/Articles/UK-confirms-status-of-nuclear-as-clean-energy>, 14 December 2020.

NUCLEAR COOPERATION

USA-SLOVENIA

US, Slovenia Expand Civil Nuclear Energy Cooperation

The US and Slovenia signed a civil nuclear energy pact...geared at strengthening and expanding bilateral cooperation on the matter, according to the State Department. The memorandum of understanding "improves our cooperation on energy security and strengthens our diplomatic and economic relationship," the department said.

"The US and Slovenia have been partners in civil nuclear energy since 1975, when construction began on the Westinghouse nuclear power plant at Krsko that has been supplying clean energy to the region since 1983," it said. The agreement was signed by Acting Under Secretary of State for Arms Control and International Security Dr. Christopher Ford, and Jernej Vrtovec, Slovenia's minister of infrastructure.

The US and Slovenia have been partners in civil nuclear energy since 1975, when construction began on the Westinghouse nuclear power plant at Krsko that has been supplying clean energy to the region since 1983.

Source: <https://www.aa.com.tr/en/americas/us-slovenia-expand-civil-nuclear-energy-cooperation/2070141#>, 08 December 2020.

URANIUM PRODUCTION

USA

GAO Recommends Improvements to US Uranium Strategy

Actions to mitigate risks to the USA's domestic uranium supply chain could be better planned and coordinated, according to a report published...by the US Government Accountability Office (GAO). Improving cost estimates to support future funding requests for the proposed uranium reserve is one of several recommendations by the GAO to improve the strategy to address concerns expressed by domestic uranium industry and support new uranium production.

The GAO says it cannot conclude that DOE's estimate of USD150 million for setting up the uranium reserve - which it has included in its 2021 budget - is reasonable because it is unclear how the funding needs for the reserve were determined.

The GAO report is in response the strategy released earlier this year by the Nuclear Fuel Working Group (NFWG) set up in 2019 by President Donald Trump to look into national security considerations with respect to the entire nuclear fuel supply chain. The strategy outlined by the NFWG includes setting up a uranium reserve with the purchase of uranium from US mines and of US conversion services.

The report examines identified risks to the supply chain and actions to mitigate those risks, and the extent to which the NFWG's risk mitigation strategy incorporates "desirable characteristics of a national strategy". In particular, it examines the future supply of unobligated enriched uranium. This is uranium used to meet the US National Nuclear Security Administration's (NNSA's) requirements for defence needs, including the production of tritium. Uranium used for these purposes must be unobligated - that is, free of peaceful use obligations that apply to uranium and certain technologies imported into the US under international agreements. The NNSA therefore relies on the US nuclear supply chain for domestically mined and enriched unobligated material.

The GAO says it cannot conclude that DOE's estimate of USD150 million for setting up the uranium reserve - which it has included in its 2021 budget - is reasonable because it is unclear how the funding needs for the reserve were determined. "By providing a more complete analysis to support future funding requests for the reserve, DOE could better provide assurance that such requests would achieve objectives," the GAO says.

The NFWG strategy does not fully incorporate all the desirable characteristics identified by GAO for a national strategy, the report finds, citing a failure to identify the level of resources needed

to support proposed actions or an interagency coordinating mechanism. "DOE is developing an implementation plan for the strategy, but DOE officials provided conflicting statements about the extent to which the agency will coordinate interagency implementation," the GAO report notes.

The GAO has made three recommendations: that the US Secretary of Energy should ensure, that any future funding requests for the uranium reserve are based on cost estimates that have been thoroughly reviewed and deemed reasonable; that the NNSA should ensure its "analysis of alternatives" for a capability to meet future unobligated enriched uranium needs is "unbiased toward any solution"; and that the Secretary of Energy should ensure that the implementation plan addresses the "desirable characteristics" for a national strategy.

Source: World Nuclear News, <https://www.world-nuclear-news.org/Articles/GAO-recommends-improvements-to-US-uranium-strategy>, 11 December 2020.

NUCLEAR PROLIFERATION

IRAN

Some of those Involved in Killing of Iranian Nuclear Scientist Arrested, Official Says

Iran has blamed Israel for the killing of Mohsen Fakhri-zadeh, who was seen by Western intelligence services as the mastermind of a covert Iranian nuclear weapons programme. Tehran has long denied any such ambition. Israel has neither confirmed nor denied responsibility for the killing.

"The perpetrators of this assassination, some of whom have been identified and even arrested by the security services, will not escape justice," ISNA quoted adviser Hossein Amir-Abdollahian as telling Iran's Arabic-language Al Alam TV.... Iran has given contradictory details of Fakhri-zadeh's death in a daytime...ambush on his car on a

highway near the capital Tehran.

A senior Revolutionary Guards commander has said the killing was carried out remotely with artificial intelligence and a machine gun equipped with a "satellite-controlled smart system". Witnesses earlier told state television that a truck had exploded before a group of gunmen opened fire on Fakhri-zadeh's car.

Experts and officials told ... that Fakhri-zadeh's killing exposed security gaps that suggest Iran's security forces may have been infiltrated and that the Islamic Republic is

vulnerable to further attacks.

Source: Reuters, 08 December 2020.

Iran Passes New Law on Hardening Nuclear Stance, Halting UN Inspections

Under the new law, Tehran would give two months to the deal's European parties to ease sanctions on Iran's oil and financial sectors, imposed after Washington quit the pact between Tehran and six powers in 2018.

Iran's Guardian Council watchdog body has approved a law that empowers the government to halt UN inspections of its nuclear sites and step up uranium enrichment beyond the limit set under Tehran's 2015 nuclear deal. Under the new law, Tehran would give two months to the deal's European parties to ease sanctions on Iran's oil and financial sectors, imposed after Washington quit the pact between Tehran and six powers in 2018.

Iran's hardline-dominated parliament approved the bill with a strong majority that will harden Iran's nuclear stance in retaliation for the killing of Iran's top nuclear scientist, which Tehran has blamed on Israel. The Guardian Council approved the law on Wednesday (2 Dec). Under the new law, the government should resume uranium enrichment to 20% and install advanced centrifuges at its Natanz and Fordow nuclear facilities.

The deal caps the fissile purity to which Iran can refine uranium at 3.67%, far below the 20%

Under the new law, the government should resume uranium enrichment to 20% and install advanced centrifuges at its Natanz and Fordow nuclear facilities.

achieved before the deal and below the weapons-grade level of 90%. Iran breached the 3.67% cap in July 2019 and the enrichment level has remained steady at up to 4.5% since then. Britain, France and Germany, all parties to the 2015 deal, have urged Iran to fully respect it.

The Guardian Council is charged with ensuring draft laws do not contradict Shi'ite Islamic laws or Iran's constitution. However, the stance of Supreme Leader Ayatollah Ali Khamenei, who has the last word on all matters of state, is not known. In reaction to US President Donald Trump's "maximum pressure" policy on Tehran, Iran has gradually reduced its compliance with the deal. The law pushed by hardline lawmakers would make it harder for US President-elect Joe Biden, who will take office on 20 January 2020, to rejoin the agreement. Biden has said he would return to the pact and would lift sanctions if Tehran returned to "strict compliance with the nuclear deal"....

Source: <https://www.wionews.com/world/iran-passes-new-law-on-hardening-nuclear-stance-halting-un-inspections-347050>, 03 December 2020.

Iran's Efforts at Intimidation Must not be Rewarded

The United States condemns the law recently approved by Iran's Majles and Guardian Council, which is nothing more than the regime's latest ploy to use its nuclear program to try to intimidate the international community. If implemented, this law would result in Iran enriching uranium to the dangerous 20% level, while Iran is already exceeding the JCPOA's limits on enrichment levels – as well as expanding its uranium stockpile and researching, producing, and installing advanced centrifuges. Iran has provided no credible

technical rationale for why it needs to move precipitously to enrich uranium to that level for any peaceful purpose.

The deal caps the fissile purity to which Iran can refine uranium at 3.67%, far below the 20% achieved before the deal and below the weapons-grade level of 90%. Iran breached the 3.67% cap in July 2019 and the enrichment level has remained steady at up to 4.5% since then.

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The law would also obligate the Iranian government to reduce its already unacceptable levels of cooperation with the IAEA. Iran has for nearly two years stonewalled IAEA efforts to resolve questions about possible undeclared nuclear materials and activities in Iran, leading the IAEA Board to demand in June 2020 that Iran fully implement its Non-Proliferation Treaty Safeguards Agreement and obligations under the Additional Protocol. A reduction in Iran's cooperation with the IAEA or enrichment to the 20% level would constitute a serious escalation that moves Iran closer to the ability to obtain a nuclear weapon.

The international community must not reward the regime's dangerous gamesmanship with economic appeasement. If the Iranian regime seeks sanctions relief and economic opportunity, then it must first demonstrate that it is serious about fundamentally changing its behavior by ceasing its nuclear extortion and

negotiating a comprehensive deal that addresses its development of ballistic missiles and its support for terrorism, unjust detention, and other destabilizing activities in the region. The international community has been clear that Iran must begin to fully cooperate with the IAEA without further delay. Failure to do so should not be met with concessions from the international community, but rather with continued diplomatic and economic pressure and isolation of the Iranian regime.

Source: USA Press Statement on Iran, <https://www.state.gov/irans-efforts-at-intimidation-must-not-be-rewarded/>, 11 December 2020.

NORTH KOREA

North Korea has Enough Material for '45 Nukes' Says Scientist

The renowned weapons expert - a professor at Stanford University - believes North Korea could now "reach most of Japan with nuclear-tipped missiles". However, he believes Kim's terrifying nuclear arsenal still needs more testing to make it "militarily useful."

And he told *Express.co.uk* he does not believe the secretive kingdom has the ability to target the US yet but chillingly added "they continue to work in that direction." He said: "My best estimate of North Korea's nuclear program today is that it possesses sufficient fissile materials to produce approximately 45 nuclear weapons.

"The North has successfully conducted a sufficient number of short and medium-range rocket tests, when combined with the nuclear test history, makes it possible to reach all of South Korea and most of Japan with nuclear-tipped missiles." North Korea has long boasted its "game-changing" Hwasong-15 Doomsday nuke CAN flatten cities anywhere in the US. ...Kim's state media has described it as a "new-type of ICBM capable of carrying super-heavy nuclear warhead and attacking the whole mainland of the US".

However, many believe the 16-metre weapon has not been properly tested and could fail if called into action. Last month (November 2020) we reported how North Korea was believed to be building nuclear subs capable of wiping out enemy targets anywhere on the planet. Regional security experts say the rogue state is constructing two deadly underwater war machines - including one which can fire long-range nukes.

And just three weeks ago it was feared to be building new nuclear weapons after fresh activity was detected at a secret uranium enrichment facility. The IAEA confirmed that the Kangson nuclear site near the capital Pyongyang is currently active.

Kim has refused to acknowledge the existence of the secret facility - which prompted the collapse

of peace talks with Donald Trump last year, in 2019. Intelligence agencies have been studying it since 2007 and believe it may have been enriching weapons-grade uranium since 2003. ...Now the IAEA has detected fresh activity there, suggesting the regime is stockpiling yet more warheads despite promising to stop. ...

Source: *Jon Lockett, <https://www.thesun.co.uk/news/13463949/north-korea-nukes-scientist-visited-rogue-state/>, 13 December 2020.*

Trump's North Korea Envoy Urges Kim Jong Un to Resume Stalled Denuclearisation Talks

US Deputy Secretary of State has appealed to the North Korea's leader Kim Jong-Un to return to the negotiation table for denuclearisation talks as he expressed disappointment over stalled Pyongyang and Washington dialogues. Stephen Biegun, who is in Seoul...to meet officials, said at a state conference that the US would like to encourage the North Korean leader to spearhead the talks to denuclearise Pyongyang, citing the 'lack of progress'. The Deputy US Secretary of State and Special Rep. for North Korea travelled to Seoul on 09 December 2020 to strengthen US-Korean Republic cooperation and to reaffirm the bilateral alliance of the two countries....

Ahead of his meeting with Kim Yo-jong, the sister of North Korean leader Kim Jong-un, the US deputy secretary of state urged North Korea to draft diplomatic a plan for the incoming Biden administration in January

2021. Washington's top nuclear envoy stressed that the dialogue was the "best" and "only" course to North Korean nuclear talks and unfinished negotiations that have suffered setbacks, disappointments, and missed opportunities. ...Referring to next month's key session of the North's ruling Workers' Party, Biegun said that he was looking forward to seamless cooperation towards peacemaking on the Korean Peninsula.

Source: *<https://www.republicworld.com/world-news/rest-of-the-world-news/trumps-north-korea-envoy-urges-kim-jong-un-to-resume-stalled-denuclearisation-talks.html>, 11 December 2020.*

The question is how effective it is against KN-09, which has a longer range and correspondingly different ballistic arc. The Army says its Iron Dome batteries will be ready for deployment by late 2021. If and when it happens, don't be surprised if one of the batteries is sent right away to South Korea.

NUCLEAR SAFETY

JAMAICA

Jamaica Launches Independent Nuclear Safety, Security and Safeguards Regulatory Body

Jamaica has officially launched its Hazardous Substances Regulatory Authority (HSRA), becoming the first Member State of the Caribbean Community (CARICOM) to establish an independent regulatory body to ensure safety and security in the operation of facilities involving ionizing radiation and nuclear technology in the country, including the Caribbean's only nuclear reactor — the 20 kW SLOWPOKE research reactor.

The Authority is responsible for administering the Nuclear Safety and Radiation Protection Act of 2015, a comprehensive act covering nuclear safety, security and safeguards, as well as civil liability for nuclear damage. The Act provides a basis for Jamaica to implement the relevant international legal instruments adopted under the auspices of the Agency. The Act was developed with support of the IAEA through its legislative assistance programme.

HSRA is also responsible for implementing the Nuclear Safety and Radiation Protection Regulations of 2019, which were supported and reviewed by the IAEA. Together, HSRA and the legal and regulatory framework will provide assurances for the protection of workers, the public and the environment as the application of nuclear science and technology continues to broaden in areas such as nuclear medicine, radiotherapy and irradiation facilities.... The launch of HSRA constitutes the culmination of a multi-year process, starting with the Authority's establishment in December 2016, beginning operations in September 2017 and issuing regulations in 2019.

Since its establishment, HSRA has committed itself to enhancing Jamaica's infrastructure for nuclear safety, security and safeguards, engaging closely

with the IAEA's technical cooperation (TC) programme. Through a series of eight TC projects, the IAEA provided assistance to Jamaica in the area of safety, deploying nine field expert missions and training eleven regulators, including five through the Postgraduate Educational Course in Radiation Protection and the Safety of Radiation Sources. Through its TC programme, the IAEA provided the HSRA with equipment to conduct regulatory functions and to establish a new database for inventory of radiation sources.

Jamaica has helped to lead several TC regional projects dedicated to radiation safety, and the expertise it has developed over the years is now being transferred to other countries in the Caribbean. Jamaica's experts in the areas of legal drafting and nuclear safety have been deployed to other IAEA-CARICOM Member States.

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Work is ongoing with HSRA and the International Centre for Nuclear and Environmental Sciences (ICENS), as part of the IAEA partnership with the University of the West Indies (UWI), Mona Campus, to establish

education and training programmes in radiation safety for the IAEA-CARICOM Member States, based on the experiences accrued in Jamaica. ...

Source: <https://www.iaea.org/newscenter/news/jamaica-launches-independent-nuclear-safety-security-and-safeguards-regulatory-body>, 01 December 2020.

JAPAN

Japan Court Nixes Approval of Post-Fukushima Nuclear Safety Steps

A Japanese court...for the first time, revoked the government's approval of operating a nuclear plant under new safety regulations developed in the wake of the 2011 Fukushima nuclear disaster. The Osaka District Court ruled in favor of about 130 plaintiffs who claimed that the Nos. 3 and 4 reactors of Kansai Electric Power Co.'s Oi nuclear plant in Fukui Prefecture are vulnerable to a major

earthquake.

In the ruling, Presiding Judge Hajime Morikagi said the Nuclear Regulation Authority's safety screening "has errors and flaws that should not be overlooked" as its estimates needed to factor in a potentially much larger earthquake around the plant... The plaintiffs claimed the utility, known as KEPCO, had underestimated quake hazards using an insufficient formula in calculating the so-called standard ground motion, or the maximum shaking that the reactors could withstand during a quake.

The nuclear watchdog countered that the 2017 regulatory approval based on KEPCO's estimate for the maximum possible ground motion, calculated by such elements as past quake data and geographical structures, of 856 gal was appropriate, adding their claim lacked scientific rationality.

It is the first time a Japanese court has withdrawn government approval granted to a power company to operate a nuclear plant under the safety standards set in 2013 following the meltdowns at the Fukushima Daiichi power plant triggered by a major earthquake and ensuing tsunami. While the two reactors in Oi in the central Japan prefecture have been idle due to regular inspections since earlier this year, the ruling will not take effect if the NRA appeals the decision.

But the ruling may have an impact on the operations of not only the nuclear plant on the Sea of Japan coast but also other reactors in the country that went back online under the new rules. The Osaka-based power company, which was part of the lawsuit as a supporting intervenor, suggested it will appeal the ruling with the NRA, saying the decision was "extremely regrettable and totally unacceptable."

A team of lawyers for the plaintiffs, including residents in the prefecture and other parts of the

country, released a statement welcoming the ruling and the court's "sincere and serious deliberations," also demanding the immediate abolition of all "dangerous" nuclear reactors in the country. ...

Source: <https://english.kyodonews.net/news/2020/12/8c717cf8568d-urgent-japan-court-nullifies-approval-of-oi-nuclear-reactor-safety-steps.html>, 04 December 2020.

MOROCCO

Morocco Stresses the Importance it Attaches to International, African Cooperation

During a technical meeting of states parties to the CPPNM and its amendment, held on 03-04 December 2020 under his chairmanship, Mrabit highlighted key national achievements, including the creation of the "AMSSNuR" as well as the steps taken to implement a national nuclear safety system.

This meeting, held in the presence of over 130 participants, is part of the commitments taken by the Kingdom through international conventions on nuclear and radiological safety and security and the recommendations and

guidelines of the IAEA, AMSSNuR said in a statement.

Morocco intends to host on June 22-25, 2021, a regional workshop on promoting the universalization of the CPPNM and its amendment, with a view to inviting African countries that have not yet done so to join this important legal instrument. The CPPNM provides the necessary tools to protect nuclear facilities, as well as nuclear materials used, stored and transported nationally and internationally. It can also help ensure that anyone involved in criminal acts using nuclear material will be denied haven and brought to justice.

Source: <https://allafrica.com/stories/202012110390.html>, 10 December 2020.

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NUCLEAR WASTE MANAGEMENT

USA

Sandia to Put Nuclear Waste Storage Canisters to the Test

Sandia National Laboratories is outfitting three 22.5-ton, 16.5-foot-long stainless-steel storage canisters with heaters and instrumentation to simulate nuclear waste so researchers can study their durability.

The three canisters, which arrived in mid-November 2020 and have never contained any nuclear materials, will be used to study how much salt gathers on canisters over time. Sandia will also study the potential for cracks caused by salt- and stress-induced corrosion with additional canisters that will be delivered during the next stage of the project.

Currently there is not an operating geologic repository in the US for the permanent disposal of spent nuclear fuel. As a result, spent fuel is being stored at commercial nuclear power plants in both storage pools and dry storage canisters.

The storage canisters currently holding the spent nuclear fuel were designed to have a useful life of a few decades but will now likely need to be used longer than planned, said Tito Bonano, Sandia's nuclear energy fuel cycle senior manager.

Data is urgently needed to validate and guide how industry should manage storage canisters for longer than originally anticipated.... "Salt can be present in the ambient air and environment anywhere, not just near the ocean. We need to be able to plan for extended long-term storage of spent nuclear fuel at nuclear

power plants for the foreseeable future — it's a national reality," he said.

The researchers expect the project could have long-reaching implications for public health and

safety, industry practices, regulatory framework and defining future research paths, said Bonano. The three-year project is funded by the Department of Energy's Nuclear Energy office. Overall, fifteen never-used, never-irradiated DOE-owned canisters are being distributed for large scale testing to Sandia and two

other national laboratories, an industry research institute and an independent storage facility at an existing nuclear power plant.

Sandia received three canisters 13 November 2020. The research team will outfit each of them with 32 electrical heaters to simulate the decay heat, which is heat released as a result of radioactive decay, from the 32 spent fuel assemblies that would typically be stored in this type of canister. No radioactive materials will be used in the testing, Durbin said. Instruments called thermocouples, which measure

temperature, and other sensors for diagnostic testing and surface sampling also will be added, he said.

Once the outfitted canisters have been tested and repacked for transport at Sandia, the team plans to move them to a storage pad at an independent spent

fuel storage installation on the West Coast where they will experience the same real-life conditions of in-use canisters. The Sandia team, led by managers Sylvia Saltzstein and Geoff Freeze, Durbin, and chemists/corrosion scientists Charles Bryan and Rebecca Schaller, along with partners

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from other national laboratories will monitor the test canisters and record surface deposits, especially chloride-bearing salts, for three to more than 10 years, depending on how much the data varies over time. "Sodium-chloride, or salt, that settles on the surface of spent nuclear-fuel canisters can lead to chloride-induced stress corrosion cracking, and right now there is inadequate data on these surface deposits," said Durbin.

In real-life storage of nuclear waste, Durbin said the decay heat from the spent fuel creates natural convection around the storage canisters, causing outside air to be drawn over the canister surface. This process helps cool the spent fuel over time. As ambient air is drawn in, salt and other particulates in the air are drawn in as well and can settle on the canister surface. During the test, the electrical heaters installed inside the canisters at Sandia will replicate this decay heat-driven convection without using nuclear materials.

In hot, dry conditions, Durbin said salt deposits alone don't cause any issues, but over time, as the decay heat decreases and the canister cools, water can condense on the canister surface and a brine can form. "These conditions can occur

nationwide and are seen as precursors to chloride-induced, stress-corrosion cracking. Back when these canisters were being designed, people weren't thinking about this as an issue because we had a plan for permanent disposal. The current national nuclear waste situation forces canisters to be stored onsite for the foreseeable future, which could be 100 years or longer, so stress corrosion cracking becomes more of a concern," Durbin said.

In addition to the long-term heating and surface deposition test, Sandia will use up to another three canisters for laboratory-based tests to conduct fundamental research on cracking caused by salt and stress, especially on the welded seams and intersections of the canisters. Researchers will measure the effectiveness of commercially available crack repair and mitigation coatings.

To test these seams, the team will cut the canisters into small segments and test pieces with and without welded seams to study the pre-cursor conditions for salt and stress to cause the corrosion that leads to cracks, he said.

Source: <https://www.newswise.com/articles/sandia-to-put-nuclear-waste-storage-canisters-to-the-test>, 10 December 2020.



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