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OPINION – Hans Blix

**Want to Stop Climate Change? Then it's Time to Fall Back in Love with Nuclear Energy**

Exactly eight years ago, an earthquake off the east coast of Japan set a massive tsunami on a collision course with the Fukushima Daiichi nuclear power plant. The wall of water overwhelmed the reactors' cooling mechanisms and over the next four days the plant suffered three nuclear meltdowns. It became the world's worst nuclear disaster since Chernobyl. In response, Germany, Switzerland and some others around the world accelerated their plans to ditch nuclear power as an energy source.

Nuclear power is virtually free of emissions. By contrast, we burn coal and gas at industrial scale to make electricity, pumping carbon dioxide and other noxious chemicals into our atmosphere. As a result, our oceans are warming and extreme climate events are becoming more common. Our children are more aware of these changes than we adults are: ...on March 15, young people will walk out of their schools in more than 30 countries to protest the scars we are carving into their futures.

There are paths out of this mess. But on March 11, 2011, the world's course was diverted away

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from one of the most important. I am talking about nuclear energy.

Traditionally, green opposition to nuclear power has been rooted, above all, in fears of radiation let loose in a reactor accident or from waste leaking out of disposal sites. To use nuclear power and generate radioactive waste, environmentalists argued, was like taking off in an airplane without knowing where to land. However, today several countries are building deep underground disposal sites where they can safely land high level radioactive waste. What are we now to fear most: a gram of plutonium escaping from a deep underground waste disposal site, perhaps in ten thousand

years, or billions of tons of carbon-dioxide released from burnt fossil fuels in our time?

Frankly, it is not the waste from existing or expanded use of nuclear power that threatens our planet. One might even say that the nuclear waste is one of the greatest assets of nuclear power, as it is so small in volume that it can be — and is — safely taken care of in its entirety. On the other hand, the waste of fossil fuels, especially carbon dioxide, is so huge that (despite much experimenting) we do not know how to handle it.

Can we responsibly continue to rely on nuclear power after the big accidents at Three Mile Island, Chernobyl, and Fukushima? Those were three grave accidents, yes, but accidents in any industry, whether nuclear, aviation or others, lead also to new, safer designs and dedication to safety culture. Plane crashes have not stopped us from flying, because most people know it is an effective means of traveling. They know that risks are rarely zero but also that safety is very high. We must arrive at a similar acceptance of nuclear power.

There was a time, in the early atomic age, when nuclear-generated electricity was expected to be “too cheap to meter” — that it would be more effective, in other words, to provide it for free than to charge. In the end, it did not exactly turn out that way.

Nuclear power has never been cheap and today it struggles to be competitive on purely economic grounds with electricity generated by burning natural gas — especially from fracking in the United States. However, the story is very different if we see emissions of greenhouse gases as a cost in themselves. According to a 2011 study, taken on average over the lifetime of an energy plant,

the burning of coal results in 979 tons of carbon-dioxide (per gigawatt hour) entering the atmosphere. Gas gives off 550 tons. The figure for nuclear power is just 32 tons.

Some people claim we can manage the world’s great and increasing hunger for energy by using wind and solar power. The call for “renewable energy sources” excludes

fossil fuels, but it also excludes nuclear power, which is based on non-renewable uranium resources. It has been a smart but facile message, and we should be grateful that the world’s two most populous countries — China and India — are fast expanding their use of

nuclear power as well as of renewables. Solar and wind power are great in many places and have gone down in cost. However, getting rid of technically sound carbon dioxide-free nuclear power plants, to replace them with carbon dioxide-free wind and solar plants, does not make environmental sense. And to reject nuclear power because uranium is not renewable is silly. With

modern technology the global resources of uranium and thorium could fuel thousands of years of expanded use of nuclear power. Is it not enough that they are sustainable?

We accept radiation in nuclear medicine, to combat cancer for instance. We accept the radiation of spices to kill

pathogens. We lie in the sunshine hoping that the solar radiation will make us healthier. Radiation is a force that can be destructive and dangerous if not used prudently, but it can also be tamed and used to our benefit.

To satisfy the energy needs of a world demanding vastly more electricity for industry, cars and trains, desalination and digitalization, increased

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efficiency in the use of energy is valuable but not enough. We need innovation: better batteries for storage of electricity, superconductors saving energy and fusion. But before we succeed in these and other exciting projects we need to be rational and practical and make full use of nuclear power, before the world becomes uninhabitable for our children.

Source: <http://time.com>, 11 March 2019.

**OPINION – Conn Hallinan**

**Nuclear Powers Need to Disarm before it's Too Late**

The recent military clash between India and Pakistan underscores the need for the major nuclear powers — the U.S., Russia, China, Britain, and France — finally to move toward fulfilling their obligations under the 1968 NPT.

The Treaty's purpose was not simply to prevent the spread of nuclear weapons, but to serve as a temporary measure until Article VI could take effect: the "cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a Treaty on general and complete disarmament under strict and effective international control."

The 191 countries that signed the NPT — the most widely subscribed nuclear treaty on the planet — did so with the understanding that the major powers would de-nuclearize. But in the 50 years since the Treaty was negotiated, the nuclear powers have yet to seriously address eliminating weapons of mass destruction.

While over the years the Americans and the Russians have reduced the number of warheads in their arsenals, they — along with China — are currently in the midst of a major modernization of

their weapon systems. Instead of a world without nuclear weapons, it is a world of nuclear apartheid, with the great powers making no move to downsize their conventional forces. For non-nuclear armed countries, this is the worst of all worlds.

**There Are No "Local" Nuclear Wars:** The folly of this approach was all too clear in the recent India and Pakistan dustup. While both sides appear to be keeping the crisis under control, for the first time in a very long time, two nuclear powers that border one another exchanged air and artillery attacks.

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While so far things have not gotten out of hand, both countries recently introduced military policies that make the possibility of a serious escalation very real. On the New Delhi side is a doctrine called "Cold Start" that permits the Indian military to penetrate

up to 30 kilometers deep into Pakistan if it locates, or is in pursuit of, "terrorists." On the Islamabad side is a policy that gives front-line Pakistani commanders the authority to use tactical nuclear weapons.

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Pakistan reserves the right to use nuclear weapons first. India has a "no first use" policy, but with so many caveats that it is essentially meaningless. In brief, it wouldn't take much to ignite a nuclear war between them. If that happens, its effects will not be just regional. According to a study by the University of Colorado, Rutgers University, and

UCLA, if Pakistan and India exchanged 100 Hiroshima-sized nuclear warheads (15 kilotons), they would not only kill or injure 45 million people, but also generate enough smoke to plunge the world into a 25-year long nuclear winter. Both countries have between 130 and 150 warheads apiece.

Temperatures would drop to Ice Age levels and worldwide rainfall would decline by 6 percent, triggering major droughts. The Asian Monsoon could be reduced by between 20 and 80 percent, causing widespread regional starvation. Between the cold and the drought, global grain production could fall by 20 percent in the first half decade, and by 10 to 15 percent over the following half decade.

Besides cold and drought, the ozone loss would be between 20 and 50 percent, which would not only further damage crops, but harm sea life, in particular plankton. The reduction of the ozone layer would also increase the rate of skin cancers. The study estimates that “two billion people who are now only marginally fed might die from starvation and disease in the aftermath of a nuclear conflict between Pakistan and India.” In short, there is no such thing as a “local” nuclear war.

**The Ultimate Equalizer:** Article VI is the heart of the NPT, because it not only requires abolishing nuclear weapons but also addresses the fears that non-nuclear armed nations have about the major powers’ conventional forces.

A number of countries — China in particular — were stunned by the conventional firepower unleashed by the U.S. in its 2003 invasion of Iraq. Though the U.S. occupation of Iraq took a

disastrous turn, the ease with which U.S. forces initially dispatched the Iraqi army was a sobering lesson for a lot of countries.

In part, it is the conventional power of countries like the U.S. that fuels the drive by smaller nations to acquire nuclear weapons. Libya is a case in point. That country voluntarily gave up its nuclear weapons program in 2003. Less than seven years later Muammar Gaddafi was overthrown by the U.S. and NATO. At the time, the North Koreans essentially said, “we told you so.”

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The NPT has done a generally good job of halting proliferation. While Israel, Pakistan, India, and North Korea have obtained nuclear weapons — the first three never signed the Treaty and North Korea withdrew in 2003 — South Africa abandoned its program. Other nuclear-capable

nations like Japan, Brazil, Argentina, Iran, South Korea, and Saudi Arabia also haven’t joined the nuclear club — yet.

But it is hard to make a case for non-proliferation when the major nuclear powers insist on keeping their nuclear arsenals. And one can hardly blame

smaller countries for considering nuclear weapons as a counterbalance to the conventional forces of more powerful nations like the U.S. and China. If there is anything that might make Iran abandon its pledge not to build nuclear weapons, it’s all the talk in Israel, the U.S., and Saudi Arabia about regime change in Tehran.

**Regional Tinderboxes:** There are specific regional problems, the solutions to which would reduce the dangers of a nuclear clash. The U.S. has taken some steps in that direction on the Korean Peninsula by downsizing its yearly war games with

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South Korea and Japan. Declaring an end to the almost 70-year-old Korean war and withdrawing some U.S. troops from South Korea would also reduce tensions.

**Nuclear weapons threaten not only Pakistanis and Indians, but, indeed, the whole world. The major nuclear powers must begin to move toward fulfilling Article VI of the NPT, or sooner or later our luck will run out.**

Halting the eastward expansion of NATO and ending military exercises on the Russian border would reduce the chances of a nuclear war in Europe. In South Asia, the international community must become involved in a solution to the Kashmir problem. Kashmir has already led to three wars between India and Pakistan, and the 1999 Kargil incident came distressingly close to going nuclear.

This latest crisis started over a February 14 suicide bombing in Indian-occupied Kashmir that killed more than 40 Indian paramilitaries. While a horrendous act, the current government of India's brutal crackdown in Kashmir has stirred enormous anger among the locals. Kashmir is now one of the most militarized regions in the world, and India dominates it through a combination of force and extra-judicial colonial laws — the Public Safety Act and the Special Powers Act — that allows it to jail people without charge and bestows immunity on the actions of the Indian army, the paramilitaries, and the police.

Since 1989, the conflict has claimed more than 70,000 lives and seen tens of thousands of others "disappeared," injured, or imprisoned. India blames the suicide attack on Pakistan, which has a past track record of so doing.

But that might not be the case here. Even though a Pakistani-based terrorist organization, Jaish-e-Mohammad (JeM), claims credit, both sides need to investigate the incident. It is not unlikely that the attack was homegrown — the bomber was

Kashmiri — although possibly aided by JeM. It is also true that Pakistan does not have total control over the myriad of militant groups that operate within its borders. The Pakistani Army, for instance, is at war

with its homegrown Taliban. ...Nuclear weapons threaten not only Pakistanis and Indians, but, indeed, the whole world. The major nuclear powers must begin to move toward fulfilling Article VI of the NPT, or sooner or later our luck will run out.

Source: <https://www.counterpunch.org>, 13 March 2019.

#### OPINION – Borislav Boev

#### Why We Need Nuclear Power

Climate change and its effects on Earth continue to be a hot topic in the media these days. A lot of organisations, both international and governmental, claim that they are putting their best efforts into tackling the issue of greenhouse gas emissions.

**Trillions of dollars have been invested into 'clean energy' sources (mainly renewables) but global CO2 emissions are on the rise. Many governments unreasonably and unfairly have forgotten about nuclear energy as a reliable option to address the issue of carbon emissions, which reached a new high in 2018. According to a report released by the Global Carbon Project, global CO2 emissions from burning fossil fuels have increased by about 2.7%.**

**The German Lesson:** For the past two decades we've seen many plans but few results. Trillions of dollars have been invested into 'clean energy' sources (mainly renewables) but global CO2 emissions are on the rise. Many governments unreasonably and unfairly have forgotten about nuclear energy as a reliable option to address the issue of carbon emissions, which reached a new high in 2018.

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From an ecological standpoint, nuclear energy has one of the best emissions profiles of all energy

sources. CO2 emissions coming from a modern nuclear power plant are so low that they are virtually non-existent, especially when compared to baseload sources like coal plants. A lot of countries have been ignoring this great advantage of nuclear energy.

Instead of keeping their nuclear power plants as a great non-carbon baseload source, some countries have decided to reduce their share of nuclear power. However, putting renewables and nuclear in the same league, especially when we're talking about capacity factors, is totally inappropriate.

Yet some countries, like Germany for example, have been doing exactly that. Germany proudly announced its withdrawal from nuclear power and that renewables were to replace it. But instead of reducing carbon emissions and ensuring the stability of the energy mix, Germany has achieved exactly the opposite. Coal use in Germany has been gradually decreasing over last few years. Renewables now account for about 30% of Germany's power mix, but if we take a look at the emissions statistics, not much had changed for the past five years.

Carbon dioxide emitted in 2011 accounted for 761.0 million tonnes and six years later that number was 763.8 million tonnes, according to the BP Statistical Review of World Energy, published in June 2018. These numbers show an actual increase, despite the large investments that have been made in renewables. Renewables definitely have their place in the future power mix but they also need a stable, predictable and non-carbon source of baseload as backup. German winters are not that sunny. Consequently, the country has been

relying heavily on coal as backup baseload. So, the variability (and the uncertainty) of renewables makes Germany dependent on coal plants.

The economics of renewables are not looking good for German households either. In 2017, Germans were paying record high electricity tariffs - as much as 28.18-euro cents per kWh, according to

Verivox. In 2018, that number reached 30.5-euro cents per kWh, according to Eurostat data. Germany thus has the highest electricity prices in the European Union.

So why is Germany failing to achieve its own climate goals? Why are its carbon emissions on the rise, or at best in stalemate? The main reason is obvious - Germany is not considering nuclear power as an option.

Modern nuclear power technology has everything that is needed - a high-capacity factor (about 90%), almost non-existent carbon dioxide emissions and a better economic profile.

Germany's case proves that turning away from nuclear power leads to a reliance on fossil fuels to fill the gap. This in turn leads to a rise in emissions, despite all the investment in building up a renewable energy portfolio.

Let's take a look at the second biggest economy in the EU - France, which has the biggest share of nuclear power in its electricity mix -

more than 70%. As a result, the French carbon footprint is half that of Germany's. In 2017, France emitted just 320 million tonnes of CO2.

**Expansion in Asia:** In 2018, the Chinese marked three important milestones as they put the first EPR reactor, designed by France's Areva, into commercial operation at the Taishan power plant.

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Westinghouse's third generation AP1000 was connected to the grid in July at the Sanmen nuclear power plant. And the Chinese didn't stop there. They signed contracts with another major nuclear player, Russia, as the latter announced its plans to build at least four new VVER reactors in the country. But why is China going nuclear so fast? Reducing carbon emissions, diversifying its energy mix and addressing the growing demand for electricity are the main driving forces. CO2 emissions are on the rise in China, as its economy continues to grow at a fast pace. In 2017, they had reached 9,232 million tonnes, marking a 1.6% year-on-year increase.

This issue must be addressed adequately and nuclear power is part of the solution.

But China is not alone and Asia as a whole is going to be the global energy leader since energy demand is projected to double there by 2030. Nuclear power is needed to ensure the stability of energy supplies in the entire region.

Nuclear power is seen as a viable option for another major Asian country, India, which plans to add 21 new reactors to its energy mix. Last year, the country signed an agreement with France's EDF to build six new EPRs. Once built, the Jaitapur Nuclear Power Plant would be the largest nuclear power plant in the world, with a total net generation capacity of 9990 MWe. Currently, India operates 22 reactors at seven nuclear power plant sites, which have a total installed capacity of 6780 MWe. That's just 3% of India's energy mix, so why is more nuclear needed in India? The reasons are the same as for China.

India's economy is booming - last year it had become the sixth largest by nominal GDP. Its steady economic growth brings a higher demand for electricity as the industry and manufacturing sectors grow simultaneously. And, just like China,

India has a big problem with its emissions profile. In 2018, CO2 emissions rose by 6.3%. If its government's plans for nuclear expansion materialise, then the Indian energy mix will be a lot cleaner.

**Only One Conclusion:** Turning away from nuclear power is counterproductive. If we really want to address the issue of rising CO2 emissions, then we need to consider nuclear energy. If we want the future energy mix to be sustainable, then nuclear energy is a necessity. It's clear that nuclear power is going to play a major role in energy-hungry regions like Asia.

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Nuclear power projects have their challenges, of course, and cost overruns and delays in Europe and the USA have had a negative impact on the industry's reputation. And yet progress has been made in Asian countries, especially in China, which is the fastest growing nuclear nation in the world. Nuclear is also a

viable option for Western countries, but Europe and the USA are different to China and India. In order to succeed in the Western world, new nuclear power projects must be more carefully planned since much of the financial risk there comes from political uncertainty and unnecessary regulatory obstacles. If these issues can be resolved, then nuclear will be able to reach its full potential and make a comeback on a larger scale.

Source: <http://www.world-nuclear-news.org>, 04 March 2019.

**OPINION – Beatrice Fihn**

**It's Time to Disrupt Nuclear Weapons**

"Atomic bombs are primarily a means for the ruthless annihilation of cities." Those are the words of Leo Szilard, one of the scientists who pushed for the development of nuclear weapons. He wrote them as part of a petition signed by dozens of other scientists who had worked on the Manhattan

Project pleading with President Harry Truman not to use the nuclear bomb on Japan.

Mere months after its introduction in 1945, the architects of today's nuclear world feared the implications of the technology they had created. Nearly 75 years later it's time again to ask technologists, innovators, entrepreneurs and academics: will you be party to the 'ruthless annihilation of cities'? Will you expend your talents in the service of nuclear weapons? Will you use technology to create or to destroy?

**Our Moment of Choice:** Humanity is at another turning point. A new nuclear arms race has begun in earnest with the US and Russia leading the way; tearing up the promise of lasting peace in favor of a new Cold War. Russia's latest weapon is built to destroy entire coast lines with a radioactive tsunami. The US is building new nuclear weapons that are 'more likely to be used'. Meanwhile, North Korea appears to again be building its nascent nuclear weapons program. And India and Pakistan stand on the verge of open nuclear conflict, which climate modelling shows could lead to a global famine killing upwards of 2 billion people.

**How Do We Stop this March toward Oblivion?** The Treaty on the Prohibition of Nuclear Weapons has created an opening — a chance to radically change course with the power of international law and shifting norms. The nuclear ban treaty will become international law once 50 nations have ratified it. We are already at 22.

The financial world is also recognizing the risk, with some of the world's biggest pension funds divesting from nuclear weapons. But there is something even more powerful than the almighty dollar; human capital.

The nuclear weapons industrial complex relies

on the most talented scientists, engineers, physicists and technologists to build this deadly arsenal. As more of that talent moves into the tech sector, defence contractors and the Pentagon is seeking to work with major technology companies and disruptive start-ups, as well as continue their work with universities. Without those talented technologists, there would be no new nuclear arms race. It's time to divest human capital from nuclear weapons.

**A Mistake to End Humanity?** Just over one year ago Hawaiians took cover and frantically Googled, "What to do during a nuclear attack". Days later many Japanese mobile phone users also received a false alert for an inbound nuclear missile. The combination of human error and technological flaws these incidents exposed makes accidental nuclear attacks an inevitability if we don't move to end nuclear weapons before they end us.

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The development of new machine learning technologies, autonomous weapons systems, cyber threats and social media manipulation are already destabilizing the global political order and potentially increasing the risk of a nuclear cataclysm. That is why it's vital that the technology community collectively commits to using their skills and knowledge to protect us from nuclear eradication by joining the effort for global nuclear abolition.

We need to stop this foolish nuclear escalation in its tracks. Our commitment must be to a nuclear weapons-free world, by disrupting the trajectory we are currently heading on. Business as usual will likely end in nuclear war. It took innovation, technological disruption, and ingenuity to create the nuclear dawn. We will need those same forces in greater measure to bring about a nuclear dusk — the complete disarmament of nuclear-armed states and safeguards against future proliferation.

The belief that we can keep doing what we have done for seven decades for another seven decades is naive. It relies on a fanciful, misplaced faith in the illogical idea of deterrence. We are told simultaneously that nuclear weapons keep the world safe, by never being used. They bestow power, but only make certain states powerful. This fallacy has been exposed by this moment in time. Thirty years after the end of the Cold War, nuclear weapons have proliferated. Key treaties have been torn up or are under threat. And even more states are threatening to develop nuclear weapons. So, I am putting out a call to you: join us with this necessary disruption; declare that you will not have a hand in our demise; declare that you will use technology for good.

Source: <https://techcrunch.com>, 10 March 2019.

**OPINION – Stephen Kinzer**

**We're Edging Closer to Nuclear War**

Last month two nuclear-armed countries, India and Pakistan, came to the brink of war. Their border skirmish was a scary message from the future. If controls on nuclear weapons continue to weaken, more countries will probably develop those weapons. Each time one does, its rivals are likely to do the same. Local conflicts will suddenly have the potential to explode into nuclear war.

Like more than a few neighbours, India and Pakistan have a property dispute. Theirs is over Jammu and Kashmir, a former princely state nestled against the Himalayas. India is in control and Pakistan sponsors militant raids under a fig leaf of deniability. Conflicts like these exist around

the world. They are a natural consequence of geography and politics. If contending parties arm themselves with nuclear weapons, these regional quarrels will suddenly have apocalyptic potential.

That was chillingly clear along the India-Pakistan border last month. The crisis erupted after a suicide bomber drove a car packed with explosives into an Indian military convoy, killing more than 40 soldiers. India blamed Pakistan, which has a long history of supporting such attacks. In retaliation it sent a dozen planes to bomb what it said were terrorist camps inside Pakistan. One plane was shot down and its pilot captured. Then the crisis, which might have raced out of control, unexpectedly eased. It turned out that India's air raids had been just for show and may not have killed a soul. The downed pilot was released and called his captors "thorough gentlemen."

Radical voices are powerful in both India and Pakistan. The next crisis in Jammu and Kashmir, or the one after that, might come when both countries are governed by millenarian fanatics. It's easy to imagine even more dangerous faceoffs elsewhere in the world. The most terrifying new nuclear powers would be Iran and Saudi Arabia. Iran has enough scientific talent to develop a bomb, and Saudi Arabia could buy what it needs. Hearing the leaders of those countries snarl at each other is scary enough today. If both had nuclear

weapons — not a far-fetched scenario if present trends continue — war between them could be devastating. So could a war over Taiwan, if Taiwan were to build a nuclear arsenal to compete with China's. Serbia and Kosovo are in bitter conflict over disputed territory. So are Armenia and Azerbaijan.

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Once while waiting for a flight at an airport in Ecuador, I stared at a giant map of the country that was painted on the terminal wall. It looked odd. Ecuador seemed much larger than I remembered. Finally, I realized that on this map, its borders had been drawn to include territory in the Amazon that Ecuador lost to Peru in the 19th century and still claims. A banner over the map proclaimed: "Ecuador Was, Is and Will Always Be an Amazon Nation." The dispute over this territory has set off several wars between Peru and Ecuador. The last one, in 1995, led to several hundred casualties. In a world where nuclear weapons are widely spread, political passion could turn an obscure dispute like this into global catastrophe.

**That move left Russia and China free to develop a new generation of hypersonic missiles. All steps away from control of nuclear arms have effects like that. They also, however, make a stark political point. By renouncing arms control, the United States declares its wish for a world without treaties; if that frees other countries to build nuclear arsenals, so be it.**

That world is emerging. The Trump administration has been moving systematically to undermine accords that have kept nuclear proliferation within possibly manageable limits over the last half century. Most recently it announced that the United States will withdraw from the 1987 INF Treaty with Russia, which regulates several classes of nuclear missiles. Steps like this produce little if any military gain and damage the United States in the court of world opinion.

Senior policymakers around President Trump reject the very idea of arms control. They are resuming the wrecking rampage launched by President George W. Bush, who pulled the United States out of the Anti-Ballistic Missile treaty in 2001. That move left Russia and China free to develop a new generation of hypersonic missiles. All steps away from control of nuclear arms have effects like that. They also, however, make a stark political point. By renouncing arms control, the United States declares its wish for a world without

**Now the US has pulled out of the INF Treaty, China's medium-range missiles are more than capable of reaching Russia, putting the country at risk. She told Focus Moscow might have an interest in including China in "some sort of disarmament treaty" when asked if the INF could be salvaged without input from the US.**

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Giving up on arms control increases the possibility that governments with violently irredentist ambitions could build or acquire nuclear weapons. That volatile mix — a local conflict plus nuclear weapons — could one day produce the explosion

humanity fears. Last month's clash between India and Pakistan was a warning. Cooler heads prevailed, but that won't happen every time. By dismantling accords that limit nuclear weapons, we bring the explosion steadily closer.

Source: <https://www.bostonglobe.com>, 07 March 2019.

## NUCLEAR STRATEGY

### CHINA

#### Nuclear War Warning: China's Missiles could Threaten Russia, Warns Germany

Missiles from China are a threat to Russia, Germany's defence minister has warned as he said Beijing's weapons are capable of reaching Moscow. German Defence Minister Ursula von der Leyen said now the US has pulled out of the INF Treaty, China's medium-range missiles are more than capable of reaching Russia, putting the country at risk. She told Focus Moscow might have an interest in including China in "some sort of disarmament treaty" when asked if the INF could be salvaged without input from the US. She added: "Because just as the Russian rockets are a threat to Europe, so are the Chinese for Russia." A flurry of other German publications shared concerns over the collapse of the treaty, such as Frankfurter

Allgemeine, which spoke to Christian Democratic Union (CDU) member Roderich Kiesewetter and Rolf Mutzenich from the Social Democratic Party of Germany (SPD).

The pair were quoted as saying Russia's new 9M729 missiles should be moved to the "other side of the Ural Mountains so that they cannot reach Europe". Heiko Maas, Germany's Foreign Minister, said in December the country would strongly oppose new medium-range missiles in Europe should the INF treaty crumble.

Mr Maas added: "Europe must under no circumstances become a platform for an arms race debate. "The deployment of new medium-range missiles would encounter broad opposition in Germany." The news come after President Trump pulled out of the treaty last month having condemned Russia for violating its terms. Washington accused Moscow of testing 9M729 missiles at ranges banned under the INF, which Russia denied. US Secretary of State Mike Pompeo demanded Moscow destroy all their ground-based 9M729 missiles and their launchers in order for the treaty to be saved.

But the following day, Russian President Vladimir Putin announced Moscow was also pulling out of the treaty in retaliation for the US scrapping it. He added Russia would remain open to negotiations. China opposed Mr Trump scrapping the deal, with Chinese Foreign Ministry spokesman Gen Shuang calling on the US and Russia to engage in talks before adding Beijing was against adding more signatories to the treaty.

Source: Carly Read, <https://www.express.co>, 04 March 2019.

## PAKISTAN

### Horrible that Pak will Use N-Weapons to Protect Terrorists

In an attempt to protect terrorists on its soil, Pakistan is willing to bring the world to the brink

of war and even resort to the use of nuclear weapons, which should "horrify all of us", a researcher at an Amsterdam-based foundation told the UNHRC. Yoana Barakova, the researcher at the European Foundation for South Asian Studies (EFSAS), underlined that Pakistan "unscrupulously exports terrorism" and continues to use terror outfits to engage in proxy war against its neighbours, implying India and Afghanistan.

Intervening during the 40th Session of the UN Human Rights Council here, Barakova referred to the ghastly February 14 terror attack on a CRPF convoy in Pulwama district of Jammu and Kashmir and the Pakistani aerial bombing in Jammu and Kashmir on February 27, a day after Indian air strike at terror camp in Balakot.

Noting that the Pulwama terror attack, in which 40 CRPF personnel were killed, was perpetrated by Pakistan-based JeM outfit, she said the subsequent action (of aerial bombing)

by Pakistan "unveils an ugly truth, (that) the country is willing to bring the world to bring of war and threaten to use its nuclear arsenal, just in order to defend its terrorists." She went on to add, "The sheer thought of such utterly reckless behaviour should horrify all of us."

She told the UN body that Pakistan continues to use terrorist outfits to engage in proxy warfare against its neighbours. "The UN Security Council's consolidated list of terrorist individuals and entities includes 139 entries from Pakistan. Jaish-e-Mohammed, Lashkar-e-Taiba, Haqqani Network and Jamaat-ud-Dawa – are all based in Pakistan and believed to be receiving State protection" the European researcher said, slamming Pakistan.

She referred to a recent interview of Pakistan Foreign Minister Shah Mehmood Qureshi with BBC in which he accepted that the Government of Pakistan is in contact with Jaish-e-Mohammed, exposing the country's duplicitous rhetoric vis-à-vis terrorism.

"While Pakistan continues to unscrupulously

**Pakistan continues to use terrorist outfits to engage in proxy warfare against its neighbours. "The UN Security Council's consolidated list of terrorist individuals and entities includes 139 entries from Pakistan. Jaish-e-Mohammed, Lashkar-e-Taiba, Haqqani Network and Jamaat-ud-Dawa – are all based in Pakistan and believed to be receiving State protection.**

export terrorism and is the only country in this world which is willing to use nuclear weapons in order to protect its terrorists, it also remains a member state of this (UNHR) Council. Surely, a matter that warrants contemplation,” she added.

Source: <https://www.deccanchronicle.com>, 11 March 2019.

## USA

### Meet America’s Secret Weapon to Kill China’s ‘Underwater’ Nuclear Weapons

The increasing global reach of Chinese nuclear-armed ballistic missile submarines, armed with JL-2 weapons reportedly able to hit parts of the US, continues to inspire an ongoing Navy effort to accelerate production of attack submarines, prepare long-dwell drones for deployment to the Pacific and continue acquisition of torpedo-armed sub-hunting planes such as the P-8/A Poseidon.

Seeking to overcome the Pacific’s “tyranny of distance” dispersed geography, and track China’s expanding fleet of submarines, the Navy is working with Congress to produce as many as three Virginia-class submarines per year, moving beyond the current plan to build two. In the air, the Navy has been moving to place its new Triton sea drones in Guam and has recently awarded Boeing a \$2.4 billion deal to produce 19 more P-8A Poseidon surveillance and attack planes.

Given the Poseidon’s role as a high-tech surveillance aircraft, known for capturing video of Chinese phony island building in the South China Sea (land reclamation) several years ago, it takes little imagination to envision ways its advanced sensors, sonobuoys and weapons could function as part of a containment strategy against Chinese expansion – and even operate as a deterrent against China’s growing fleet of nuclear-

armed SSBN.

The PLA Navy has, in recent years, been expanding its reach beyond the Pacific as part of a visible effort to become a major-power international force. Chinese SSBNs have been sighted at great distances from Western Pacific shores, according to numerous news reports — and the existence of both JL-2s and emerging JL-3s have increased pressure on the US. According to the National Air and Space Intelligence Center, the Chinese had deployed up to 48 JL-2 launchers on submarines as of 2017. With ranges greater than 4,500 miles, JL-2s travelling well beyond China’s immediate vicinity can hold US areas at risk.

Just last year, Captain James Fanell, a former director of intelligence and information operations for the U.S. Pacific Fleet, warned Congress about the need to track and deter Chinese nuclear-armed submarines. ... The essay goes on to make the case that, given the difficulties associated with intercepting possible Chinese SLBMs, an intelligent way to address the threat might be to “hold Chinese SSBNs at risk so they can be destroyed preemptively before their SLBMs can be launched.”

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The Poseidon, alongside ISR-enabled SSN attack submarines, seems well positioned to help perform this SSBN sub-hunting mission for a number of reasons. Not only is the P-8’s 564 mph speed considerably faster than the P-3 Orion it is replacing, but its six additional fuel tanks enable it to search wider swaths of ocean and spend more dwell-time patrolling high-threat areas. Navy developers explain the Poseidon can operate on 10-hour missions at ranges out to 1,200 nautical miles. More dwell time capacity, fortified by high-speeds, seems to position the Poseidon well for covering wide areas in search of “hidden” Chinese SSBNs.

The P-8A, a militarized variant of Boeing's 737-800, includes torpedo and Harpoon weapons stations, 129 sonobuoys and an in-flight refueling station, providing longer ranges, sub-hunting depth penetration and various attack options. Given that a P-8 can conduct sonobuoy sub-hunting missions from higher altitudes than surface ships, helicopters or other lower-flying aircraft, it can operate with decreased risk from enemy surface fire and swarming small boat attacks. Unlike many drones and other ISR assets, a Poseidon can not only find and track enemy submarines, but attack and destroy them as well.

Alongside its AN/APY-10 surveillance radar and MX-series electro-optical/infrared cameras optimized to scan the ocean surface, the Poseidon's air-parachuted sonobuoys can find submarines at various depths beneath the surface. The surveillance aircraft can operate as a "node" within a broader sub-hunting network consisting of surface ships, unmanned surface vessels, aerial drone-mounted maritime sensors and submarines. As part of its contribution to interconnected sub-hunting missions, the Poseidon can draw upon an Active Electronically Scanned Array, Synthetic Aperture Radar and Ground Moving Target Indicator.

By lowering hydrophones and a magnetic compass to a pre-determined depth, connected by cable to a floating surface radio transmitter, Poseidon sonobuoys can convert acoustic energy from the water into a radio signal sent to aircraft computer processors, according to a June 2018 issue of "Physics World."

Also, Poseidon-dispatched sonobuoys can contribute to the often discussed "US Navy Fish Hook Undersea Defense Line," a seamless network of hydrophones, sensors and strategically positioned assets stretching from coastal areas off of Northern China down near the Philippines all the way to Indonesia, according

to an essay from the Carnegie Endowment...." An improved aerial sub-hunting presence offered by the Poseidon, it seems, could help reinforce this "Undersea Defense Line" effort to prevent Chinese SSBNs from leaving the region undetected.

Interestingly, Poseidons might offer a significant nuance to the Pentagon's well-cultivated nuclear deterrence posture, by introducing a technically advanced method of finding and destroying enemy SSBNs from the air. It aligns with the current "offensive power can be the best defense" approach central to the Pentagon's nuclear-triad strategic deterrence strategy. Holding Chinese SSBNs at risk, could at very least help further deter China from contemplating some kind of sub-launched nuclear strike. The Poseidon could almost function as a kind of connective tissue between the undersea and air portions of the nuclear triad.

The current air leg of the triad, consisting of platforms such as the B-2 and B-52 bombers, is not able to track or destroy submarines. A Poseidon could further fortify the air leg of the triad while also providing crucial intelligence to surface ships

and US undersea assets seeking to track Chinese SSBNs. ...

Source: Excerpted from article by Kris Osborn, <https://nationalinterest.org>, 06 March 2019.

## BALLISTIC MISSILE DEFENCE

### USA-ISRAEL

The US has deployed its THAAD anti-ballistic missile defense system in Israel as part of a joint drill between the two allies. THAAD – Terminal High Altitude Area Defense purpose is "to train the ability to rapidly deploy complex systems around the world while strengthening capabilities and cooperation with the air defense systems of the Israel Air Force," the statement said.

The system, which is considered one of the most advanced systems of its kind in the world, will be

added to the existing Israeli air defence systems which defend against long-range ballistic missiles.

Israel's air defences currently include the Iron Dome, designed to shoot down short-range rockets and the Arrow system, which intercepts ballistic missiles outside of the Earth's atmosphere and the David's Sling missile defence system, which is designed to intercept tactical ballistic missiles, medium- to long-range rockets, as well as cruise missiles fired at ranges between 40 to 300 km.

According to IDF Spokesperson Brig.-Gen. Ronen Manelis, the THAAD system will be deployed in southern Israel and some 200 American troops will take part in the drill. The drill comes shortly after the completion of Juniper Falcon 2019, which tested the level of coordination between the two countries in the event of a ballistic missile threat against Israel.

As part of Juniper Falcon 2019, some 300 Americans from the United States European Command (USEUCOM) flew into Israel and joined 400 IDF troops from various units, including the Air Défense Array, the Operations Directorate, the Navy, logistical units and medical forces.

Juniper Falcon focused on scenarios which would see the deployment of US forces in Israel under fire during conflict and saw troops train in several theatres, including Hatzor Air Force Base and the IDF headquarters and other locations across the country.

While the military contends that the drills are part of scheduled exercises and are not related to the high tensions with Iran on Israel's northern border, an Israeli intelligence assessment found that the threat posed by Iran – including its nuclear and ballistic missile program – is the number one priority for the IDF.

Iran, which possesses more than 1,000 short- and medium-range ballistic missiles, is suspected of continuing to smuggling weapons to countries and non-state actors, such as Hezbollah, which is assessed to have an arsenal of between some 100,000 and 150,000 missiles on Israel's northern border and Hamas in the Gaza Strip.

Washington and Israel have signed an agreement which would see the US come to assist Israel with missile defence in times of war and last year 3,000 American troops took part in Juniper Cobra, which

simulated a massive missile attack on the Israeli home front. "The IDF is prepared and ready to defend the skies and the home front from a variety of close and far-reaching threats and welcomes the exercise," the IDF statement said, stressing that "this is a defensive

deployment that is not related to a specific event."

Source: <https://eurasianimes.com>, 04 March 2019.

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## **NUCLEAR ENERGY**

### **BULGARIA**

#### **Bulgaria Invites Investors for its Second Nuclear Plant**

The Bulgarian government has re-opened the process of seeking investors for the country's second nuclear power plant in the city of Belene. According to a statement from the Bulgarian Energy Ministry, the government is looking for a strategic investor able to carry out the construction of the Belene plant within 10 years, at a cost of up to 10 billion euros.

"The call also allows for expressions of interest to acquire a minority shareholding in the future project, as well as and/or to purchase electricity from the future power plant," the ministry said in its statement. During his visit to Sofia, Russian Prime Minister Dmitry Medvedev said that Russia's nuclear energy firm, Rosatom, was ready to invest

in the project. Other energy giants such as the German-French consortium Framatom, US-based energy firm General Electric, Chinese national energy company CNC and Korea's Hydro and Nuclear power have also expressed their interest.

The Bulgarian government will provide in-kind contributions of assets including the licensed site, technical equipment, permits and licenses related to the project. Among those already interested in purchasing electricity are Montenegro, North Macedonia, Serbia and Rosatom. The government in Sofia stopped working on the Belene plant in 2012 due to a lack of funding. Since then, economists in the country have claimed that Bulgaria does not need another nuclear plant as the lifespan of the existing nuclear site in Kosloduy will be extended until 2049. Bulgarian environmentalists have also raised concerns over the project.

Source: Dominik Istrate, <https://emerging-europe.com>, 13 March 2019.

## CHINA

### China's Nuclear Reactor Building Spree

Chinese officials say the nation's humming economy means that no fewer than eight, million-kilowatt class nuclear reactors must enter service each year to help keep the nation's electricity supply in pace with demand, while not adding more pollutants to the already fragile environment.

China Nuclear Power Engineering Co., Ltd. General Manager Liu Wei told reporters that China will see its 2030 total power consumption reach 10.5 trillion kilowatts, of which the share of clean energy must be no less than 45%, according to the national imperative. Beijing's drive to phase out filthy coal-

**China will see its 2030 total power consumption reach 10.5 trillion kilowatts, of which the share of clean energy must be no less than 45%, according to the national imperative. Beijing's drive to phase out filthy coal-burning power generation heralds a nuclear bonanza.**

burning power generation heralds a nuclear bonanza and Liu said China will need to launch eight, million-kilowatt nuclear power units annually over the next decade to bring the share of nuclear generation in the nation's total energy mix to 10%, a level in line with the global average.

China's total nuclear power installation capacity will reach 58 gigawatts by 2020. It currently has 46 nuclear reactors in operation, all in its well-off coastal provinces, with more than 20 new reactors being built. Currently, the average construction period for each reactor is only 60 months.

The southern province of Guangdong alone has no fewer than 16 reactors in operation, making Guangdong, China's largest provincial economy as measured by annual gross domestic product, home to one of the world's largest clusters of nuclear reactors. Some observers, nonetheless, are worried that hastened safety and rushed environmental assessments, trials of

domestically-developed technologies – some of which are premature – as well as China's obsessive state control of information in the event of an incident, all mean that danger could be lurking beneath the big domes of the nation's rapidly expanding array of powerful reactors.

Source: <https://www.asiatimes.com>, 13 March 2019.

## TURKEY

### European Parliament Votes against Turkey's Upcoming Nuclear Power Plant

The European Parliament (EP) debated over the construction of Turkey's first nuclear energy

reactor, Akkuyu, and voted to call on the Turkish government to halt its building. Prior to discussing the nuclear reactor the EP's Committee on Foreign Affairs had prepared a report, in which Turkey was accused of acting against the Convention on Environmental Impact Assessment in a Transboundary Context, also known as the Espoo Convention, signed in Espoo, Finland, in 1991, and implemented in 1997.

The countries that have recognised Espoo are obliged to make an environmental impact assessment before building a nuclear power reactor. Turkey, however, did not ratify the Espoo agreement, according to the United Nations Economic Commission of Europe. The EP report is simply making assumptions about the environmental impact of Akkuyu, and asking Ankara to take Greece and Greek Cypriots on board before completing the nuclear power plant.

According to the report, the Turkish government should "involve, or at least consult, the governments of the neighbouring countries, such as Greece and Cyprus, in relation to any further developments in the Akkuyu venture." According to Sputnik new agency, the European Parliament is trying to disturb Turkish-Russian relations as the Akkuyu plant, comprising four units, each with a capacity of 1,200 megawatts, will be built by the Russian State Nuclear Energy Agency, Rosatom.

As of now, 15 European Union countries have 130 nuclear power reactors and six more reactors are under construction, according to the European Nuclear Society. France has 58 nuclear reactors with 63,130 megawatts net capacity, and the country is building one more nuclear plant.

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Slovakia and Finland are building similar nuclear plants. Turkish President Recep Tayyip Erdogan and Russian President Vladimir Putin attended the groundbreaking ceremony of the Akkuyu Nuclear Power Plant via video conference last year. The Akkuyu plant in Turkey's southern Mersin province is slated to be functional in 2023. It will produce 35

billion kilowatts of electricity at full capacity, which will meet about 10 percent of Turkey's electricity needs.

Source: <https://www.trtworld.com>, 13 March 2019.

## USA

### US DoE Budget Request Eyes Nuclear Energy, Fossil Fuel Technologies

Renewing a tug-of-war with the US Congress, the Trump administration proposed a fiscal-year 2020 budget that would reduce Department of Energy spending by 11% below FY-19 enacted levels, cutting at renewable and energy efficiency spending and again seeking to privatize power marketing administrations.

The administration's similar effort to cut DOE programs fell flat with Congress last year and was expected to face challenges with the House of Representatives, which is now under Democratic control. But the budget showcased the administration's priorities in furthering energy innovations in evolving energy markets — with investments in nuclear and fossil fuel technologies being highlighted.

House Appropriations Chairwoman Nita Lowey, Democrat-New York, said President Donald

Trump's overall budget has "no chance" of garnering the needed bipartisan backing in Congress and dismissed it as "even more untethered from reality than his past two."

Placed on the chopping block in the proposed budget were DOE's Advanced Research Projects Agency-Energy and its loan guarantee program for advanced technologies. Funding for DOE's Office of Energy Efficiency and Renewable Energy would drop to about \$696 million from \$2.38 billion appropriated for 2019, once unspent funds from the prior year were included.

**Early-Stage Investments:**

Instead, DoE said the budget sought \$1.7 billion in early-stage technology R&D, including a \$127 million increase in funding for new nuclear- and fossil-energy investments. "By supporting fossil fuel technologies and the next-generation of nuclear technologies we can better ensure affordable, reliable and efficient energy," according to DOE. A DOE official said the agency is shifting priorities away from some older technologies that have already been successful and putting money into early stage work for the next generation of resources.

Under the banner of energy dominance, the budget highlighted \$2.3 billion in spending to "secure energy independence and fund innovations for more affordable, reliable and efficient energy sources." Gaining favour was an advanced energy storage initiative, which would be funded at \$158 million, and \$59 million would go toward an initiative that "leverages activities related to advanced reactor technologies and high efficiency low emissions modular coal plants to align the R&D of novel materials, integrated sensors and manufacturing processes relevant for advanced thermoelectric power plants."

**Grid Security:** The budget sought \$156 million for electricity grid security through the recently

established Office of Cybersecurity, Energy Security and Emergency Response. That would be up from \$120 million appropriated in FY-19. The Office of Electricity would be funded at \$183 million — \$121 million above the FY-19 budget request. Among other things, that added funding would support an integrated energy resilience model under development intended to demonstrate the interdependencies of energy systems throughout North America.

The administration asked for \$562 million the Office of Fossil Energy Research and Development, up \$60 million from its year-earlier request, but still below the \$740 million appropriated for FY-19. Thomas Pyle of American Energy Alliance hailed the budget as modernizing government spending "in a manner consistent with the energy revolution taking place before our

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Source: <https://www.spglobal.com>, 11 March 2019.

**Nuclear Power Backers Push Cheaper, Smaller Plants**

At the Vogtle power plant near Augusta, Georgia, the first new large nuclear reactors to start construction in the US for more than 30 years are taking shape. Units 3 and 4 are scheduled to start up in November 2021 and November 2022, respectively, and are intended to keep the lights on in Georgia and Florida, with no carbon emissions, into the 2080s and possibly beyond. The project has been so fraught with difficulties, delays and cost overruns, however, that it seems likely to be another 30 years at least before anyone tries building another such plant in the US again.

Nuclear power appeals as being a source of reliable electricity without causing greenhouse

gas emissions. But new reactors are so expensive that in many countries they are unable to compete with cheap gas and coal or renewable energy sources. If new nuclear plants are to play any significant role in curbing future emissions in developed economies, their costs are going to have to come down a long way.

That is the argument underlying the recent upsurge in interest in new nuclear technologies, including SMRs. When Fatih Birol, executive-director of the International Energy Agency, gave evidence to the US Senate Committee on Energy and Natural Resources in February, he suggested there were two priorities facing the US nuclear industry. In the short term, it needs to find ways to keep open plants that are running well but faced economic challenges, he said. In the longer term, developing new reactor technologies “will be of crucial importance to have the US leadership continuing in the nuclear domain”.

In the broadest terms, new nuclear technologies divide into two varieties: first, there are those that use water for temperature regulation and enriched uranium fuel, like the standard reactors in use today; second, there are advanced reactors that can have a wider range of coolants including molten sodium or salt and use a wider range of fuels including depleted uranium. A recent report on breakthrough technologies from the Energy Futures Initiative, a think-tank, and IHS Markit, a research company, suggests that the light water SMRs could start coming into service in 2020-35 while the advanced reactors might be in operation from 2025-30.

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**The construction budget is \$3bn for a plant that will deliver 684MW, working out at about \$4.2m per megawatt of capacity. That might look high compared with a gas or wind plant, but is only about a third of the cost of Vogtle units 3 and 4. Nu-Scale is aiming for a levelized cost of electricity — a commonly used metric for the economics of power generation — of \$65 per megawatt-hour, which is within reach of that of a modern combined-cycle gas-fired power plant.**

Backers of both technologies advocate building new reactors in factories rather than entirely on location to improve productivity and reduce costs.

“The reactors they are building at Vogtle are enormous construction projects, with many thousands of workers on site,” says Ernest Moniz, who was energy secretary in President Barack Obama’s administration and founded the EFI think-tank. “If you have to build a workforce of many thousands, that is not a very easy labour pool to assemble.”

The company that has made the most progress with an alternative approach is Oregon-based Nu-Scale. It has designed a nuclear power module, a 75-foot steel cylinder that can produce 60 megawatts of electricity, and power plants that put one or more of those modules together, sunk mostly below ground level in pools of water. It is the only design for a small modular reactor that is in the review process with the US Nuclear Regulatory Commission. Nu-Scale has a project under development in Idaho, intended to start up by the end of 2026 and to be in full operation the following year.

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Tom Mundy, Nu-Scale's chief commercial officer, argues that its reactor design is "a near-term deployable technology", unlike some of the more radical approaches. Other companies, however, argue that the fundamental concerns about nuclear safety and cost can only be addressed with yet more innovative technologies. Terra-Power, a Washington company co-founded by Bill Gates, has designs for two reactors using technologies sometimes described as "advanced nuclear" or "Gen IV".

Based on "fast reactor" technologies pioneered in the US from the 1950s to the 1970s, they run much hotter than a light water reactor, using molten salt or sodium as a coolant, and do not need to be kept under high pressure. "That has great benefits in cost and safety," says Terra-Power's chief executive Chris Levesque. "It's a game-changer." Operating at atmospheric pressure avoids some of the demands placed on the equipment in light water reactors.

Terra-Power is looking for "several billion dollars" of government support to build its first reactor, Mr Levesque says, but he argues that the investment would be worthwhile because the end result will be a lower-cost nuclear power. ...

Source: <https://www.ft.com/content>, 12 March 2019.

### NUCLEAR COOPERATION

#### INDIA–USA

##### **India, US Agree to Build 6 American Nuclear Power Plants in India**

The United States and India agreed to strengthen security and civil nuclear cooperation, including building six US nuclear power plants in India, the two countries said in a joint statement. The agreement came after two days of talks in Washington. The United States under President Donald Trump has been looking to sell more energy products to India, the world's third-biggest buyer of oil.

The talks involved Indian Foreign Secretary Vijay Gokhale and Andrea Thompson, the US

undersecretary of state for arms control and international security. "They committed to strengthen bilateral security and civil nuclear cooperation, including the establishment of six U.S. nuclear power plants in India," the joint statement said.

It gave no further details of the nuclear plant project. The two countries have been discussing the supply of US nuclear reactors to energy-hungry India for more than a decade, but a longstanding obstacle has been the need to bring Indian liability rules in-line with international norms, which require the costs of any accident to be channelled to the operator rather than the maker of a nuclear power station.

Pittsburgh-based Westinghouse has been negotiating to build reactors in India for years, but progress has been slow, partly because of India's nuclear liability legislation, and the project was thrown into doubt when Westinghouse filed for bankruptcy in 2017 after cost overruns on US reactors. Canada's Brookfield Asset Management bought Westinghouse from Toshiba in August 2018. Last April Westinghouse received strong support from US Energy Secretary Rick Perry for its India project, which envisaged the building of six AP1000 reactors in the state of Andhra Pradesh. ...

Source: <https://www.ndtv.com>, 14 March 2019.

#### IRAN–RUSSIA

##### **Iran Nuclear Deal Aimed at Boosting Cooperation with Tehran, Russian Envoy Says**

Moscow calls on all countries to bear in mind that the JCPOA for Iran's nuclear program is aimed at boosting economic and trade ties with Tehran, Russia's Permanent Representative to the Vienna-based international organizations Mikhail Ulyanov said at a meeting of the IAEA Board of Governors.

"We are confident that the JCPOA is strong enough and the remaining members are capable of overcoming the difficulties that have emerged," he said. "The need to restore the balance of interests enshrined in the JCPOA is obvious. Russia will continue to work together with its JCPOA partners and other interested countries," Ulyanov added.

“We call on all countries committed to the UN Charter to bear in mind that, according to Resolution 2231, the JCPOA is aimed at boosting economic and trade ties and cooperation with Iran,” the Russian envoy pointed out. According to Ulyanov, this principle should be respected regardless of pressure that lacks legal basis.

**Iran Nuclear Deal Issue:** In 2015, Iran and six major powers (five member states of the United Nations Security Council - Russia, the United States, France, the United Kingdom and China - and Germany) agreed on the final JCPOA, which particularly stipulated the removal of sanctions imposed on Tehran over its nuclear program.

On May 8, 2018, US President Donald Trump announced Washington’s withdrawal from the Iran nuclear deal. He said that old sanctions on Iran would be restored and new ones would be introduced in case Tehran attempted to pursue its nuclear ambitions. The first batch of new US sanctions on Iran took effect on August 7 and the second one became effective on November 5. In the wake of Trump’s decision, the leaders of Great Britain, Germany and France called on other participants in the deal to continue fulfilling it. Iranian President Hassan Rouhani said that Tehran would not abandon the JCPOA and would continue to comply with its obligations. Russian Foreign Minister Sergey Lavrov said that Washington’s withdrawal from the JCPOA violated the United Nations Security Council’s resolution. He added that Russia would seek to maintain the agreement despite US move to resume sanctions against Iran.

Source: <http://tass.com/politics>, 05 March 2019.

## **USA–SAUDI ARABIA**

### **US Still Discussing Nuclear Technology Sales with Saudi Arabia**

The US is still in talks with Saudi Arabia about a possible deal to sell it civil nuclear technology,

as part of a strategy to boost US exports while helping to curb greenhouse gas emissions, energy secretary Rick Perry has said. Speaking at the CERAWEEK energy conference in Houston, Mr Perry told the Financial Times that the talks were making progress “closer to one mile an hour than to Mach 1.2”, but said the US was working on a deal to support the kingdom’s plan to develop a nuclear power industry.

He added that one priority for the US would be to ensure any deal did not contribute to the proliferation of nuclear weapons, saying that would be a greater risk if Saudi Arabia chose to buy its technology from Russia or China. ... The Trump administration’s moves towards a nuclear deal with Saudi Arabia raised concerns highlighted in a report from Democrats in Congress last month, which said whistleblowers had warned of “chaos,

dysfunction and backbiting” in the White House and “conflicts of interest” for some former officials. Both Republicans and Democrats have expressed concerns about allowing Saudi Arabia to buy US nuclear technology.

However, Mr Perry argued that the US interest in non-proliferation of nuclear weapons would make it a better supplier than other countries that have also made proposals for selling technology to Saudi Arabia, including Russia and China.

... He indicated that he supported a plan for Saudi Arabia similar to the programme adopted by the neighbouring United Arab Emirates, which bought reactors from Kepco of South Korea that are now under construction. The UAE is not enriching its own uranium to fuel the reactors, a process that could allow it to develop nuclear weapons, but is instead buying fuel from international suppliers.

Mr Perry said the administration’s support for nuclear exports was part of its strategy of encouraging sales of US technology and commodities that could reduce greenhouse gas emissions. ... President Donald Trump is

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withdrawing the US from the Paris climate agreement, and has frequently expressed scepticism about the science of climate change. But Mr Perry said the US was developing and selling technologies that would give the world “some real options” for cutting emissions.

... He added that US energy-related carbon dioxide emissions had fallen since 2007, in part because of the shift in power generation away from coal and towards gas unlocked by the shale revolution. “We’re less about signing agreements than we are about results,” he said. “And our results are not debatable; they’re real, they’re substantial.”

Ted Halstead of the Climate Leadership Council, a group backed by many large companies that supports a carbon tax for the US, said the widespread enthusiasm for the Green New Deal — a radical plan for tackling the threat of climate change proposed by congressional Democrats — was forcing Republicans to address the issue. ...

Source: <https://www.ft.com>, 12 March 2019.

## NUCLEAR DISARMAMENT

### NORTH KOREA

In Hanoi, Donald Trump overturned the widely held assumption he would be willing to settle for an interim agreement on North Korea’s denuclearization. But despite the breakdown of the summit and the atmosphere of scepticism that now abounds, the US president seems determined to stick with his “all or nothing” approach, betting on his personal “chemistry” with Kim Jong Un to save the day.

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Trump insisted his relationship with Kim “remains good” even as his aides attempted to paper over the collapse of the high-stakes second summit which concluded without even a modest deal on reducing Pyongyang’s nuclear program in exchange for sanctions relief. “Nobody in the administration advocates a step-by-step approach,” a senior State Department official told reporters.

In other words, Washington wants what administration officials have called a “big deal” “the complete elimination of their weapons of mass destruction program,” the State Department official said. In return, Washington would ease the pain of the crippling sanctions that have strangled the isolated North’s economy.

... It’s a position that has taken many observers by surprise given how, in the run-up to the summit, the administration dropped numerous hints it was willing to take a more incremental approach to the talks. “In no rush” was how Trump repeatedly described his stance a position echoed by his Secretary of State Mike Pompeo, who emphasized: “We’ve always known this would be a long process.”

The administration’s point man on North Korea, Stephen Biegun, said the US would be prepared to pursue commitments “simultaneously and in parallel” while suggesting there was room for maneuver when it came to sanctions. That created the impression that Washington could be willing to countenance the step-by-step disarmament and sanctions relief sought by Pyongyang.

**Trust Deficit:** But when Kim proposed dismantling the Yongbyon nuclear complex in exchange for

lifting the main sanctions, Trump refused. “It has very much been characteristic of past negotiations to take an incremental approach to this that stretches it out over a long period of time, and quite honestly, has failed on previous occasions,” the senior State Department official said.

In Washington, the new line has been interpreted as a victory for National Security Advisor John

Bolton, long a hawk on North Korea, over Pompeo and Biegun. Even as Washington increasingly turns its attention toward next year’s presidential election, the administration exhumed a goal that has long been buried and seen as unrealistic by experts: the total denuclearization of North Korea by the end of Trump’s term in 2021. For Jenny Town of the 38 North think tanks, the lack of even a partial accord has meant “we have lost that momentum” created by last year’s rapprochement. “You already see things starting to spiral downwards,” Town said.

Satellite imagery analysed by her organization revealed that Pyongyang has begun rebuilding a long-range rocket launch site it had promised to dismantle, and North Korea’s official news agency has now overtly blamed the US for the failure of the summit. The “all or nothing” approach has “always failed because (of) two mutually distrustful actors,” Town said at a recent conference.

The Kim dynasty has long seen nuclear weapons as a security guarantee against what it perceives as the hostile, bellicose intentions of the United States. “What this administration tries to do is to show that there is no hostile intent,” Joseph Yun, a former US special representative for North Korea policy, said at the USIP meeting. “But that’s a tough thing to prove

and we’re kind of stuck at that, which is why the North Koreans are asking that we go on a step-by-step approach to have a better foundation on that trust fact.”

**Washington hopes to resume working-level talks as soon as possible, and has reacted in a measured way to revelations about the rebuilding of the rocket test site. US officials say the main goal for now is to make sure the North Koreans do not resume testing in any way, including of space launch vehicles.**

**What Happens Now?** So, what next? Washington hopes to resume working-level talks as soon as possible, and has reacted in a measured way to revelations about the rebuilding of the rocket test site. US officials say the main goal for now is to make

sure the North Koreans do not resume testing in any way, including of space launch vehicles.

Trump is even ready for a third summit he is convinced, as ever, that his personal relationship with Kim will be the difference at the end of the day. For Town, this represents an “opportunity” for the North Koreans, who “are very aware that this is an unconventional president,” seeing as “they didn’t have a good track record with the conventional presidents.”

Source: <https://www.france24.com>, 09 March 2019.

### The Good and the Bad for China in a Return to US-North Korea Nuclear Tensions

**When a North Korea-US nuclear disarmament summit collapsed in Hanoi, the diplomatic debacle left China with a dilemma. On the one hand, Beijing needs things to stay as they are on the Korean peninsula to preserve its regional power; on the other, it is wary of the security risks created by a return to rising tensions between Pyongyang and Washington.**

When a North Korea-US nuclear disarmament summit collapsed in Hanoi, the diplomatic debacle left China with a dilemma. On the one hand, Beijing needs things to stay as they are on the Korean peninsula to preserve its regional power; on the other, it is wary of the security risks

created by a return to rising tensions between Pyongyang and Washington.

“While China has an interest in keeping [Pyongyang] from making further destabilising moves, it also does not want a [North Korea-US] deal that results in the curtailing of Chinese influence on the Korean peninsula,” said Adam Ni,

a China researcher at Macquarie University in Sydney. Washington and Pyongyang have been increasingly hawkish since US President Donald Trump and North Korean leader Kim Jong-un abandoned their discussions over the best way to rid the Korean peninsula of nuclear weapons.

Most recently, the two countries have been at loggerheads over the US' insistence that North Korea go beyond its offer to close its main Yongbyon reactor complex, reviving hostility that had eased with June's first Trump-Kim summit in Singapore that ended with a vaguely worded declaration on denuclearisation.

Then, just days after the ill-fated Hanoi summit, Pyongyang indicated that it intended to ramp up its nuclear programme by rebuilding its partially dismantled Sohae missile launch facility, according to satellite images taken by website 38 North and people briefed on South Korean intelligence.

On Thursday (7 March), 38 North released more satellite images that showed Pyongyang rebuilding the facility's launch pad and engine test stand, saying the site appeared to have returned to its normal operational status. The images suggest Pyongyang could be returning to its signature brinkmanship diplomacy to gain leverage against the US. Trump said he was "a little disappointed" by new evidence that North Korea was restoring the missile launch site at Sohae. He added that "we'll let you know in about a year" whether his diplomacy in North Korea had been successful, indicating the negotiations were now long term a stalemate could last months.

Earlier, Trump had said he would be "very disappointed" if reports that North Korea were

rebuilding a long-range rocket site were true. But diplomatic observers said China, which feared being overlooked in the peace process, would welcome a delay in talks. A South Korean diplomat told the South China Morning Post that the Hanoi breakdown brought Beijing a bit of relief, because it wanted time "to prepare its Korean peninsula policy", and develop a plan for increasing its influence there.

Despite minor strains in its ties with Pyongyang, China has not changed its policy on the peninsula, seeking to keep relations between the two Koreas the way they are. Ni said that while China ultimately wanted stability on the Korean peninsula, "this stability is one in which China is the key player in determining the region's fate". ... Beijing has maintained a decades-long alliance with Pyongyang aimed at securing the stability of the underdeveloped region and the survival of the Kim regime. To that end, it had supported North Korea financially despite a host of United Nations sanctions, a source familiar with the matter said.

The ties were reinforced when Kim and Chinese President Xi Jinping met in Beijing in January, at Xi's invitation, during the North Korean leader's fourth visit to China in less than a year. "Without an exception, weeks after the bilateral summit between China and North Korea, China's presents, including a range of economic aid, went into North Korea via train," a diplomatic source in Seoul said.

Ni also said the failure of the Hanoi summit highlighted the US' inability to effectively deal with North Korea, undermining America's credibility and influence in Asia and helping China retain leverage in its regional power rivalry with

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Source: <https://www.scmp.com/news>, 10 March 2019.

## NUCLEAR SECURITY

### LEBANON

#### IAEA Completes Nuclear Security Advisory Mission in Lebanon

An IAEA team of experts today completed a nuclear security advisory mission in Lebanon, which was carried out at the request of the Lebanese Government. The scope of the two-week International Physical Protection Advisory Service (IPPAS) mission included the legal and regulatory framework for the security of radioactive sources and facilities, as well as transport and computer security. As part of the review, the team visited a storage facility for radioactive sources operated by the Lebanese Atomic Energy Commission (LAEC), medical facilities in the capital Beirut, and an industrial company that uses radioactive sources.

The team observed that Lebanon has established a nuclear security regime that incorporates essential elements of the IAEA's guidance on the fundamentals of nuclear security. The team provided recommendations and suggestions to support Lebanon in further enhancing and sustaining nuclear security. Good practices were identified that can serve as examples to other IAEA Member States to help strengthen their nuclear security activities.

The team was led by Rachid Mellouki, Senior Nuclear Security Specialist at the Safety and Security Directorate of Morocco's National Centre for Nuclear Energy, Sciences and Technology, and included four other experts from Albania, the Czech Republic, the Russian Federation and the

IAEA. The team met in Beirut with officials from the CBRN National Commission, Lebanese Army, Internal Security Forces, General Security, State Security, Customs, Civil Defence, Lebanese Red Cross and LAEC.

... The mission was the 86th IPPAS mission conducted by the IAEA since the programme began in 1995. IPPAS missions are intended to assist States in strengthening their national nuclear security regime. The missions provide peer advice on implementing international instruments, along with IAEA guidance on the protection of nuclear and other radioactive material and associated facilities.

During missions, a team of international experts observes a nation's nuclear security systems and measures, compares them with IAEA Nuclear Security Series guidance and international good practices, and makes recommendations for improvement. IPPAS missions are conducted both on a nationwide and facility-specific basis.

Source: <https://www.iaea.org>, 15 February 2019.

## NUCLEAR SAFETY

### ROMANIA

#### IAEA Safety Mission Sees Significant Progress at Romania's Cernavoda NPP

An IAEA team of experts said the operator of Romania's Cernavoda NPP demonstrated strengthened operational safety by addressing the findings of an initial IAEA review in 2016. The team also encouraged the operator to pursue continuous improvement.

The OSART concluded a five-day follow-up mission on 8 March to Cernavoda NPP, whose two 706 MW(e) CANDU pressurized heavy water reactors came online in 1996 and 2007, respectively. The plant is located on the Danube-Black Sea Canal,

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about 160 km from Bucharest, the capital.

OSART missions aim to improve operational safety by objectively assessing safety performance using the IAEA's safety standards and proposing recommendations and suggestions for improvement where appropriate. The follow-up missions are standard components of the OSART programme and are typically conducted within two years of the initial mission. ...

The team observed that several findings from the 2016 review were fully addressed, including:

- Enhanced operator crew performance during simulator training.
- Better identification and reporting of deficiencies in the field.
- Improvement in maintenance work practices.
- The team noted that significant progress has been made on other issues. However, more time is required to fully implement some actions, including:
  - Further improvements in the procurement of important spare parts with relevance to safety.
  - Further enhancement in the revision and update of some operating procedures.
  - Control and labelling of some plant chemicals.

The team provided a draft report of the mission to the plant's management. The plant management and the Romanian Nuclear Safety Commission, which is responsible for nuclear safety oversight in Romania, will have the opportunity to make factual comments on the draft. These will be reviewed by the IAEA and the final report will be submitted to the Government of Romania within three months.

Source: <https://www.iaea.org/newscenter>, 11March 2019.

## USA

### New Regulations Coming for US Nuclear Plants 8 Years after Fukushima Disaster

Federal regulators are marking the eight-year anniversary of the horrendous tsunami and nuclear power plant disaster that rocked Fukushima, Japan, by issuing major new regulations this spring to harden the U.S. power plant fleet against multiple threats that could lead to similar disasters in the United States. The new

rules seek to codify individual actions taken by power plant operators at the behest of the federal Nuclear Regulatory Commission in the wake of the March 11, 2011, disaster.

Overall, the NRC has been pleased with the U.S. nuclear fleet's response to its sweeping safety review and improvement orders that came in the wake of the disaster, which left portions of Japan inhospitable for humans. Radiated wild boars have taken over abandoned towns in Fukushima prefecture, which is only around 160 miles north of Tokyo.

"The NRC remains satisfied that the overall response to what we learned from Fukushima means U.S. nuclear power plants have appropriately enhanced their already robust ability to safely withstand severe events of any kind," NRC spokesman Scott Burnell told the Washington Examiner.

The disaster in Japan sent ripple effects across the nuclear industry for nearly a decade, causing some countries such as Germany to stop using their power plants altogether after a public outcry over safety after the 2011 disaster. The March 11 tsunami that struck Japan damaged the Daiichi nuclear power station in Fukushima, causing several nuclear meltdowns and explosions that sent radioactive debris into the air and nearby ocean. Most of the area was evacuated and

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remains uninhabitable to this day.

The Obama administration, almost immediately after the plant started to meltdown and explode, ordered the NRC to do a national emergency review of all U.S. power plants, which totaled around 100 at the time. Since 2012, the NRC has ordered most of the nation's power plants to construct modifications based on that initial review, and the modifications have continued through the Trump administration.

The forthcoming post-Fukushima regulation, called the "Mitigation of Beyond-Design-Basis Events rule," is slated to go into effect this spring, giving utilities and power plant operators a little more than two years to comply with new safety procedures to guard against an incident such as an earthquake, or other event, that could cause a radiation leak and environmental disaster.

The regulation is considered a "major rule" because its cost will exceed \$100 million, according to the draft rule's impact analysis. The rule will require commercial reactors to do three things that include physically modifying the plants to protect reactor cores while adding new planning and monitoring practices.

First, power plant owners must put in place the resources and implement the procedures required to keep a reactor's core cool in the event a power plant's emergency electricity supply is knocked out. Similar procedures and resources must be adopted to keep fuel rod pools, where a power plant stores its radioactive waste, full of water, following any event that knocks out all of a plant's emergency power supplies. The inability to keep

the reactor cores cool at Daiichi, once power was knocked out and emergency power packs drained, resulted in the meltdowns in Japan.

Second, the power plants must install equipment that can reliably measure the water levels at the pools used to house and cool a power plant's spent fuel rods. Fuel rods are used to generate heat and electricity at a nuclear power plant. When they are used up, but still highly radioactive, they have to be stored underwater for several years in pools, before being dried and stored on site in giant concrete casks. There they

will stay until a permanent waste facility is built to house the fuel rods indefinitely. No national site has been built to house commercial waste from any power plant, so most of the waste is stored locally at the power plant.

Third, the rule requires the power plants to "reserve the resources" required to protect the core and spent fuel pools from external hazards that may breach the plant's walls and containment areas. Two of the five NRC commissioners voted against the measure, saying they didn't agree that the most current seismic data was used in issuing the regulation, which is meant to be the capstone on the commission's response to Fukushima. The NRC says it will continue to be proactive in examining

future risks that might become evident outside of the rulemaking process, including analyses of whether additional safety improvements are needed in response to updated seismic and flooding risk assessments.

Source: John Siciliano, <https://www.washingtonexaminer.com>, 12 March 2019.

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NUCLEAR WASTE MANAGEMENT

USA

**‘Reset’ on Nation’s Nuclear Waste Policy includes Yucca Mountain**

A panel of scientists are urging a “reset” of the nation’s stalled nuclear waste management system and recommendations to manage and store the material that include using Yucca Mountain as a potential repository. The proposals were included in a 126-page report, “Reset of America’s Nuclear Waste Management,” that addresses the build-up of highly radioactive waste from commercial power plants and military programs stranded at 75 sites around the country.

Scientists involved with the report were on Capitol Hill to discuss a way forward, or a reset of current management and policy to address the lack of safe storage for the waste. The report, released in January, includes development of a consensus-based siting process, but one that would still include Yucca Mountain as a candidate.

The inclusion of the site located 90 miles northwest of Las Vegas would continue the travesty of the 1987 decision by Congress that singled out “Yucca Mountain as the only site to be considered for development of a national nuclear waste repository,” said Steve Frishman, a technical consultant to the state of Nevada. He noted that state, local and tribal leaders, as well as business groups and environmentalists in Nevada, are staunchly opposed to permanent waste storage in Nevada, and claim that the site is unsafe despite Department of Energy studies and recommendations.

**Opposition to Yucca Mountain has Led to an Impasse on Storing Nuclear Waste:** “The site for the proposed Yucca Mountain repository was formally selected in 2002,” the reported noted. “Today, the fate of that site is in political limbo. “The report further noted that there is “no clear

path forward” to manage nuclear waste produced by commercial power plants. The report compiled by scientists at Stanford University and George Washington University recommends taking the management of nuclear waste storage away from the DOE and creating either a new single-purpose nuclear waste management organization, or a non-profit corporation owned by the nuclear utility industry to handle the waste.

The proposals would take congressional approval and new laws to transfer funds collected from nuclear power companies to build facilities to store the waste. Many of the topics covered in the reset report were also covered, with differing emphasis, by the Blue-Ribbon Commission on America’s Nuclear Future in 2012, Frishman said. The commission did not consider Yucca Mountain as a potential repository.

**Only Nevada’s rural counties, including Nye County where the site is located, favour continuation of licensing hearings to determine if the location is safe for storage. The rural counties see development at Yucca Mountain as an economic boon that would provide tax revenue for schools and local governments.**

The report comes as Sen. Lamar Alexander, R-Tenn., plans a push in the Senate to resolve the three-decade impasse that has left nuclear waste piled up at generating plants across the country. Alexander, chairman of the Senate Appropriations subcommittee on energy, had planned a bipartisan tour of Yucca Mountain, but was forced to postpone the bipartisan trip due to scheduling conflicts.

Energy Secretary Rick Perry and Nevada Sens. Catherine Cortez Masto and Jacky Rosen, both Democrats, were invited to travel with the delegation of six senators and DOE staffers to tour the tunnel bored into the geologic formation in Nye County. Cortez Masto said she had planned to educate her colleagues on how the \$19 billion that has been spent on the site with nothing to show for the money, and to emphasize the state’s objection to storing the nation’s stockpile of nuclear waste.

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development at Yucca Mountain as an economic boon that would provide tax revenue for schools and local governments.

Former Sen. Harry Reid, D-Nev., told the *Review-Journal* in an interview this month that Yucca Mountain would never be developed because of the astronomical cost to complete the facility. He suggested utility companies place the waste in dry casks and bury them on site. Reid was instrumental in swaying President Barack Obama to withdraw funding that shelved the ongoing licensing hearings on DOE's application to construct a repository at Yucca Mountain.

President Donald Trump has proposed restarting the licensing process in his past two budget proposals to Congress. The House also passed a

law to streamline the procedure, but all attempts died in the Senate, which stripped out funding in spending bills and never took up the House bill. If the licensing process restarts, Nevada has filed 218 "contentions," or objections that would have to be settled before a construction permit is issued.

Experts testified before the House in 2016 that that process could take three to five years. Meanwhile, two private groups have filed applications with the NRC for permits to build interim storage facilities in New Mexico and Texas. ...

*Source: <https://www.reviewjournal.com>, 27 February 2019.*

Centre for Air Power Studies

The Centre for Air Power Studies (CAPS) is an independent, non-profit think tank that undertakes and promotes policy-related research, study and discussion on defence and military issues, trends and developments in air power and space for civil and military purposes, as also related issues of national security. The Centre is headed by Air Marshal K.K Nohwar, PVSM VM (Retd).

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