



A FORTNIGHTLY NEWSLETTER ON NUCLEAR DEFENCE, ENERGY AND PROLIFERATION FROM
CENTRE FOR AIR POWER STUDIES

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OPINION – R.B. Grover

Powering Aspirational India

How much electricity is needed by India? To answer this, one approach is to follow a top-down econometric model whereby one examines growth in the economy, looks at the relationship between economic growth and energy requirements, and incorporates influence of technological and policy changes exogenously. The alternative is a bottom-up approach, whereby one estimates demand based on equipment saturations, efficiencies and usage.

A simple method is to look around and draw conclusions. As per data for 2014 published by the IEA, average global per capita electricity consumption is 3030 kWh. The corresponding figure for India is about 805 units, and for developed countries of the OECD, it is 8,028. A majority of the OECD countries are in the temperate climate zone. Therefore, let us examine the scene around India: the corresponding figure for Singapore is 8,844, for Malaysia 4,646 and for Thailand 2,566. The projected global average per capita consumption by the middle of the century is 7,500 units. We can use this data to set a target which India can aim at.

Generation & Projected Need: An emphasis on energy conservation and improvement in energy

Assuming India's population by the middle of century will be about 1.6 billion and transmission and distribution losses will come down to the lowest technically feasible value of about 7%, India must plan to generate about 8,600 Billion Units (BU) to provide 5,000 units per capita per annum to its citizens.

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efficiency of industry and household gadgets will help in reducing electricity consumption, but bringing it down to below 5,000 units per annum to enjoy a standard of living enjoyed by citizens

of OECD countries seems difficult. Assuming India's population by the middle of century will be about 1.6 billion and transmission and distribution losses will come down to the lowest technically feasible value of about 7%, India must plan to generate about 8,600

Billion Units (BU) to provide 5,000 units per capita per annum to its citizens.

The cumulative average growth rate of electricity generation in India for the period 2006-07 to 2015-16 was close to 6%. In 2016-17 generation by utilities was 1,242 BU. Data for generation

from non-utilities is not yet available, but one can assume it to be around the same as in 2015-16, i.e. 168 BU. The total generation was thus 1,410 BU. Assuming a population of 1.3 billion, it translates to a per capita generation of 1,100 units. Thus, electricity generation projected for 2050 is six times the total generation in 2016-17 and in terms of per capita generation, it is about 4.5 times. India has a long way to go.

The target of per capita availability of 5,000 units per annum is very modest because of several reasons. The percentage share of electricity in total energy consumption is increasing. As per estimates by the IAEA, this share was 34.8% in 2015 for Middle East and South Asia, and is projected to increase to 52% in 2050. The GoI has announced policy initiatives such as electricity and housing for all, accelerated infrastructure development, Make in India, electrification of transport, etc. which call for more electricity and on a reliable basis.

Many have opined that we should return to a frugal way of living and consume less electricity. Can one expect the young in India to do that when electricity consumption is continuously rising elsewhere in the world? Aspirational India has a desire to work and live in air-conditioned spaces, reduce the drudgery of home work by using electrical appliances, entertain itself by deploying the best theatre system, commute in comfort in non-polluting transport and so on. Once basic amenities are available, an ordinary Indian will become an aspirational Indian.

Human lives have become more productive because of electrical lighting and indoor climate control. Indoor heating for climate control increased productivity in countries in colder regions of the world and air-conditioning is doing that now in tropical countries, including India.

Using Alternative Sources: Given this backdrop, we must maximise the use of low-carbon energy

sources, i.e. hydropower, variable renewable energy (VRE), and nuclear power. In 2016 hydroelectricity generation was 122 BU; exploiting the additional potential will take time. A NITI Aayog report says India's solar and wind energy potential is greater than 750 GW and 302 GW respectively. Assuming a load factor of 20%, this could generate 1,840 BU. All these numbers are rough estimates, but make it clear that the total possible generation from hydropower and VRE can at best be about a quarter of the projected requirement of 8,600 BU.

Wherefrom will India get the rest of electricity? The share of electricity generated by nuclear power must be ramped up as soon as possible and large investments must be made in research and development in electricity storage technologies to derive full benefit from VRE sources. Until installed capacity based on low-carbon sources picks up, fossil fuels have to continue playing their role.

Recent moves such as the Cabinet nod to the construction of 10 indigenous PHWR, taking further steps for the construction of units 3-6 at Kudankulam, and completing all steps towards operationalisation of the nuclear cooperation agreement with Japan are all steps in the right direction.

Source: R.B. Grover is Homi Bhabha Chair, Department of Atomic Energy and a Member of the Atomic Energy Commission. Source: <http://www.thehindu.com/>, 31 August 2017.

OPINION – George F. Will

Will Trump Lower the Nuclear Bar?

The US Air Force "sniffer plane" was collecting air samples off Russia's Kamchatka Peninsula on Sept 3, 1949, when it gathered evidence of radioactivity, confirming that the war-shattered Soviet Union had tested a nuclear device. The Soviets' Aug 29, 1949, test had come faster than expected. Dating from the detonation at

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Alamogordo, New Mexico, on July 16, 1945, the basic science of nuclear explosions is more than 72 years old — three years older than the North Korean nation. Ballistic missile technology is more than 60 years old. The problems of miniaturizing warheads for mounting on missiles, and of ensuring the warheads' survival en route to targets, are not sufficient to stymie a nation — consider Pakistan, whose annual per capita income is less than \$2,000 — that is determined to have a nuclear arsenal.

North Korea has one and is developing ICBMs faster than expected and with ostentatious indifference to US proclamations. On Jan 2, President-elect Trump scampered up the rhetorical escalation ladder, unlimbering his heavy artillery — an exclamation point — to tweet about North Korea's promised ICBM test: "It won't happen!" It did. North Korea's most audacious act, firing a missile over Japan, came seven days after Secretary of State Rex Tillerson praised North Korea's "restraint."

Pyongyang's "signaling" does not involve abstruse semiotics: It wants a nuclear arsenal, and as *The Economist* magazine says, the world's unpalatable options are the improbable (productive negotiations), the feeble (more sanctions) and the terrifying (military pre-emption). Concerning the latter, there is no bright line, but there is a distinction to be drawn, however imprecisely, between pre-emptive war and preventive war. The former constitutes self-defense in response to a clear and present danger — repelling an act of aggression presumed with reasonable certainty to be imminent. The latter is an act of anticipation — and, to be candid, of aggression — to forestall the emergence of a clear and present danger.

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When Trump threatened North Korea with "fire and fury like the world has never seen," was he threatening to cross the nuclear weapons threshold? This has been contemplated before regarding North Korea. Former Gen. Douglas MacArthur, who had been fired by President Harry Truman for insubordination, handed President-elect Dwight Eisenhower a memorandum on how "to clear North Korea of enemy forces": "This could be accomplished through the atomic bombing of enemy military concentrations and installations in North Korea and the sowing of fields of suitable radio-active materials, the by-product of atomic manufacture, to close major lines of enemy supply and communication. ..."

MacArthur badly misjudged Eisenhower, whose biographer Jean Edward Smith says that during the Potsdam Conference (July 17-Aug 2, 1945), when Eisenhower was told of the Alamogordo test — his first knowledge of the new weapon — "he was appalled" and "was the only one at Potsdam who opposed using the bomb." Smith says: "As president, Eisenhower would twice be presented with recommendations from his National Security Council and the Joint Chiefs of Staff that the bomb be used; first, in Vietnam to protect the French at Dien Bien Phu, then against China at the time of the Formosa Strait crisis. Both times Eisenhower rejected the recommendations. As a former supreme commander, Eisenhower had the confidence to do so, where other presidents might not have. And by rejecting the use of the bomb, there is no question that Eisenhower raised the threshold at which atomic weaponry could be employed — a legacy we continue to enjoy."

But for how long? The non-proliferation regime has been remarkably successful. During the 1960 presidential campaign, John Kennedy cited "indications" that by 1964 there would be "10, 15 or 20" nuclear powers. As president, he said that by 1975 there might be 20. Now, however, North Korea, the ninth, might be joined by Japan, South Korea, Taiwan, among others, unless US leadership produces, regarding North Korea, conspicuously credible deterrence. The reservoir of presidential credibility is not brimful.

On Aug 1, Sen. Lindsey Graham said that Trump had told him that "there will be a war with North Korea" if it continues to develop ICBMs capable of reaching the US. "We'll see," said Trump on Aug. 6, responding to this shouted question: "Will you attack North Korea?" *You?* Are Congress' constitutional powers regarding war so atrophied that it supinely hopes for mere post facto notification? Ten months after Nov 8, that day's costs, until now largely aesthetic, are suddenly, although not altogether unpredictably, more serious than were perhaps contemplated by his 62,984,825 voters.

Source: <https://www.japantimes.co.jp>, 11 September 2017.

OPINION – Paul Taylor

In My View: Give a Second Look to Nuclear Energy

News reports indicate that there is only a slim chance of limiting the warming increase to 1.5 degrees C by 2100, which was set by the 2016 Paris Agreement, and that an increase of 2 degrees C will trigger "tipping points." We face a survival challenge such that we could be gifting our children a planet that is beyond repair. Without urgent collective global action at war-time speed to control global warming well before mid-century, say the experts, the lights on Earth will cease to shine on those recipients of Nature's Gift

of Life. We must stop burning fossil fuels, greatly reduce the density of atmospheric CO₂, and find suitable alternative energy solutions.

Why not choose nuclear energy as the official source of energy supplemented with solar and wind energy. Without nuclear power, it seems impossible to achieve our objective of eliminating greenhouse gas emissions. Wind and solar are doing well now, but have problems with excessive use of resources, some of which are scarce metals

difficult to locate and some production processes are toxic to the environment. Also wind changes in speed and location as circulation patterns are altered with rising earth temperatures.

Features of Modern Nuclear Reactors: Nuclear fuel has its energy contained within itself while for wind and solar devices, one has to search

for the best concentration of its energy source. They can't melt down or explode. The nuclear industry is the safest industry known. No one in the US has died from any radiation accident.

- Operationally, greenhouse gases are not emitted.
- Reliably produce power 24/7 in all locations.
- Access to weapons-grade material are close to zero probability.
- They emit low amounts of low-level radiation, which is less than for coal-fired plants and their waste dumps. Research confirms that low-level radiation has an associated health benefit.
- They solve the "nuclear waste" issue by recycling stored "waste." Newer reactors recycle fuels within the plant. This process of recycling "waste" greatly reduces the final waste volume with much lower and safer radiation levels.
- Are being designed as small modules that could power large apartment buildings, cruise liners, tug

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boats, etc. Russia and China plan to build many floating reactors on barges or boats as well as mooring some deep enough in the ocean to avoid tsunami waves.

- Uranium and thorium fuel is readily available, fully inexhaustible, and renewable.

Interest in small modular reactors is growing rapidly. One American company has filed an application for a license with the NRC. Their mission is to produce more than 1,000 Nuclear Power Modules by 2035 that are economic, factory built, shippable, assembled on site, and flexible for a variety of applications. On a grand and peaceful scale, let's support this nascent modern Nuclear Age II by preparing young children for employment in this industry. Plastic models could be available for assembly, where, by understanding nuclear fission, these children as adults could design new fuels and applications. Yes, nuclear energy will matter.

Source: <http://www.gvnews.com/>, 10 September 2017.

OPINION – Pat Buchanan

Should Japan and South Korea Go Nuclear?

By setting off a 100-kt bomb, after firing a missile over Japan, Kim Jong Un has gotten the world's attention. What else does he want? Almost surely not war with America. For no matter what damage Kim could visit on US troops and bases in South Korea, Okinawa and Guam, his country would be destroyed and the regime his grandfather built annihilated. "The supreme art of war is to subdue the enemy without fighting," wrote Sun Tzu. Kim likely has something like this in mind.

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His nuclear and missile tests have already called the bluff of George W. Bush who, in his "axis of evil" speech, declared that the world's worst regimes would not be allowed to acquire the world's worst weapons. Arguably the world's worst regime now has the world's worst weapon, an H-bomb, with ICBMs to follow.

What else does Kim want? He wants the US to halt joint military maneuvers with the South, recognize his regime, tear up the security pact with Seoul, and get our forces off the peninsula.

No Way, Says President Trump: On 4th, South Korea

was accelerating the activation of the high-altitude missile defense implanted by the US. Russia and China were talking of moving missile forces into the area. And Mattis had warned Kim he was toying with the fate of his country: As the US can only lose from a new Korean war in which thousands of Americans and millions of Koreans could perish, the first imperative is to dispense with the war talk, and to prevent the war Mattis rightly says would be "catastrophic."

China has declared that it will enter a new Korean conflict on the side of the North, but only if the North does not attack first. For this and other reasons, the US should let the North strike the

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first blow, unless we have hard evidence Kim is preparing a pre-emptive nuclear strike. But if and when we manage to tamp down this crisis, we should ask ourselves why we are in this crisis. Why are we a party to this frozen conflict from 1953 that is 8,000 miles away? The first Korean War ended months

into Ike's first term. Our security treaty with Seoul was signed in October 1953. That year, Stalin's successors had taken over a USSR that was busy testing missiles and hydrogen bombs. China was

ruled by Chairman Mao, who had sent a million “volunteers” to fight in Korea. Japan, still recovering from World War II, was disarmed and entirely dependent upon the US for its defense. The world has changed dramatically since the 1950s. But US policy failed to change commensurately.

The Basic Question That Needs Addressing:

Why do we still keep 28,000 troops in South Korea as a trip wire to bring us into a second Korean war from its first hours, a war that could bring nuclear strikes on our troops, bases, and, soon, our nation? We cannot walk away from our Korean allies in this crisis. But we should look upon the North’s drive to marry nuclear warheads to ICBMs as a wake-up call to review a policy rooted in Cold War realities that ceased to exist when Ronald Reagan went home. After this crisis, South Korea and Japan should begin to make the kind of defense effort the US does, and create their own nuclear deterrents. Already involved in land disputes with a nuclear-armed Russia and India, China’s dominance of Asia — should Japan and South Korea acquire nuclear weapons — begins to diminish. “As our case is new,” said Abraham Lincoln, “we must think anew and act anew.”

Source: <http://www.mydaytondailynews.com/>, 07 September 2017.

OPINION – Los Angeles Times

There’s No Great Answer for Nuclear Waste, but Almost Anything is Better Than Perching it on the Pacific

One of the great failures in US energy policy was that we’ve never figured out what to do with the lethally radioactive waste produced by nuclear

power plants. That’s why the owners of the decommissioned San Onofre nuclear plant have had little choice but to keep their spent fuel rods

on site, bundled up in concrete bunkers at the edge of the Pacific Ocean, dangerously close to an earthquake fault and millions of people — and hope for the best until the federal government finds a good place to put the deadly waste.

The feds don’t have one yet, but developments in court

and in the marketplace could help move San Onofre’s waste somewhere considerably less risky. As part of a legal settlement earlier this September, Southern California Edison, which is the majority owner of the shuttered nuclear power plant, promised to make a good-faith effort to find a safer home for the 3.55 million pounds of nuclear

waste at the plant. That’s a welcome shift for the company, which has been focused on moving its spent fuel rods into safer containers on-site.

And unlike in the past, it may have several choices for where to send the waste.

Although there still are no federally licensed nuclear waste dumps, despite the billions of dollars ratepayers have paid to fund them, as of 2017 there are two proposals for temporary storage sites that could conceivably be ready for business by the early 2020s.

The most promising is an underground facility in the southeast corner of New Mexico, 35 miles from any significant population center, operated by Holtec International, the nuclear storage company that makes the dry storage casks used currently by San Onofre. If there are no hitches in licensing, it could be ready to store spent nuclear fuel in about five years. That would incidentally be good timing for California’s last operating

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nuclear plant, Diablo Canyon, which is set to shut down its last reactor in 2025.

Another proposed short-term site is in Andrews, Texas, operated by Waste Control Specialists and currently storing low-level radioactive waste. But its prospects are less certain. Earlier this 2017 the company put on hold its application to expand into high-level nuclear waste, citing financial reasons. Meanwhile, public opposition to the proposed expansion had been growing.

A third option is the Palo Verde Nuclear Generating Station in the Arizona desert about 50 miles from Phoenix. At the moment, Palo Verde holds a permit to store its own waste on site, but Edison is a part owner of the plant and presumably could have some sway in the decision to seek an expanded waste storage permit. That there are real options at last for off-site storage is heartening. Although the nuclear waste at San Onofre is about as safe as it could be, the storage containers used aren't designed for long-term storage. Yet any longer-term option will require tremendous political will to achieve. Having Edison contributing to that effort certainly can't hurt.

As for truly permanent storage, the US DoE's proposed Yucca Mountain site in Nevada still appears to be the safest place in the country for a permanent nuclear repository, though even if all the stars aligned it would take decades to open. The federal government needs to renew its efforts to bring the Yucca Mountain site into operation. Doing so, however, will be a political challenge. After the federal government sunk \$11 billion into the site's development, President Obama halted work in 2010 as a favor to then-Senate Majority Leader Harry Reid (D-Nev.). And though the GOP generally seems more open to the project, Nevada Republican Sen. Dean Heller vociferously opposes it. Nevadans don't generally like the idea of having nuclear waste in their state, but even they would have to concede that the remote and dry location built

deep into a mountain is a better spot for radioactive material than in the middle of a seismically active population center.

Granted, when it comes to waste that's going to remain radioactive for tens of thousands of years, there are no great solutions. But there are certainly better ones than continuing to hold more than 70,000 tons of nuclear fuel at about 120 operating and decommissioned nuclear plants across the country in facilities never intended for long-term storage, then hoping for the best.

Source: <http://www.latimes.com/>, 11 September 2017.

OPINION – Jacob Kowalski

Keeping Iran deal is in America's Best Interest

The Iran Nuclear Agreement was one of the signature diplomatic undertakings of the Obama Administration. The deal aimed to cut off all the major pathways Iran could take towards constructing a bomb. These steps included reducing Iran's uranium stockpile by 98 %, keeping the level of enrichment for the uranium they do have below where it would need to be to create a nuclear weapon, and redesigning the only reactor they had that could produce weapons grade plutonium. When the deal was signed it was estimated that Iran was only 2-3 months from producing a bomb's worth of material.

In exchange for this, Iran primarily got two things. One, the US relaxed sanctions specifically put into place to force Iran to negotiate. Additionally Iran was able to access assets that the US had frozen. The total amount of these frozen assets is around 100 billion dollars and Iran would be able to access slightly over half of this amount. To be clear, this is Iran's own money and not US money that they will have access to. I have chosen to highlight items that our current president often leaves out in his speeches, but are nevertheless relevant to understanding and having an informed opinion on the deal.

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Trump has said since the campaign that he wants to scrap the agreement, and is currently thought to be moving more aggressively in that direction. Every three months Trump has to certify Iran's compliance with the deal, which he did reluctantly in July. He has stated he expects to find Iran in violation at the next report in October, despite the fact that the most recent international inspection yielded no evidence that Iran was violating the agreement.

Leaving the accord would create a massive security threat. North Korea is a major foreign policy issue in large part because they have nuclear capabilities. A nuclear Iran would further complicate an already unstable region, and be a greater threat to other countries like Israel. If Iran shared nuclear technology or weapons with some of the terrorist groups it has been known to support, the result could be catastrophic.

Unilaterally announcing, with no real proof, that Iran was violating the nuclear accord would be a diplomatic catastrophe. The other signatories to the agreement (Britain, France, Germany, China, and Russia) have all indicated that they agree with international inspectors and seek to keep the deal in place. If the US were to withdraw, the country would be isolated on the issue and therefore have a much weaker position on future negotiations.

UN Ambassador Nikki Haley has publicly stated that the President would be justified in scrapping the accord because Iran is in violation of the "spirit" of the arrangement. This is an extremely dangerous position to take when it comes to international diplomacy. If a country agrees to an accord or treaty, they are expected to uphold their end of the bargain. Declaring Iran noncompliant when they have thus far followed the agreement would diminish the value of America's word in the eyes of the world. Such a move would provide incredible propaganda for Iran and other countries that are distrustful of

the US. They can point to how they did everything that was asked of them and yet the US broke off the deal because they essentially didn't like it anymore.

Something that doesn't get mentioned enough is that the nuclear deal was a victory for moderates in Iran, and helped them do well in the most recent elections. The more control moderates are able to exert over Iran, the less repressive the country will become. Every new liberty moves Iran one step closer to being an open and free country once again. Killing the nuclear deal would likely set back much of the progress that has been made towards the goal.

Cancelling the Iran Nuclear Deal would be a massive mistake in regards to national security, diplomacy, and Iran's gradual movement toward a more democratic society. Unless Iran is found to have actually violated the agreement, the President should stay in the agreement.

Source: <http://dailycampus.com/>, 11 September 2017.

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NUCLEAR STRATEGY

SOUTH KOREA

South Korea Wants the US to Station Nuclear Weapons in the Country

A top South Korean official just floated the idea of having Washington return nuclear weapons to the Korean peninsula — a provocative idea at a dangerous time. There are just two problems: First, the request came hours after North Korea tested its most powerful bomb to date on September 3. The explosive was around seven times stronger than the one America dropped on Hiroshima in 1945, and experts believe it can level parts of a city. And second, it could worsen relations with China while undermining America's goal of convincing North Korea to give up its nuclear weapons.

On 4th September, South Korean Defense Minister Song Young-moo noted he talked to US Defense Secretary Jim Mattis about placing American nuclear weapons in the country for the first time in over 25 years. He also said South Korea wants “strategic assets” like US aircraft carriers, nuclear submarines, and B-52 bombers to deploy to the peninsula more frequently, though not to be permanently housed there. As for the nuclear weapons, a spokesperson for President Moon Jae-in said his government doesn’t want those bombs permanently in the country. So this is currently more of a proposal than a policy announcement.

But the idea of sending American nuclear weapons to South Korea is now out there — and it’s not so farfetched. The US had around 100 nuclear weapons in the country until September 27, 1991, when President George H.W. Bush announced he wanted to take them out. It was part of his initiative to remove and destroy all US nuclear weapons deployed in important regions, including Northeast Asia.

The US deployed nuclear weapons to South Korea in the 1950s. Back then, America didn’t have long-range and precise missiles to hit targets with nuclear weapons from far away. So it made sense to have them already placed on the peninsula to strike regional targets quickly. But that led to a few complications. “They were more trouble than they were worth,” Zachary Keck, an Asia security expert at the Non-proliferation Policy Education Center, said in an interview. “Forward deploying the missiles was expensive and required special personnel. The missiles needed to be heavily guarded from theft. And they were vulnerable to attack or sabotage by North Korea.”

Now the US has the ability to strike North Korea from much further away, either with its ICBM, submarine-launched missiles, or bomber planes.

Putting nuclear weapons on the Korean peninsula, though, cuts down the time it would take to bomb North Korea — something the administration may think is worth doing. “The US military would wipe out North Korea in a nuclear conflict, if it wanted to, in 20 minutes or so,” Harry Kazianis, a North Korea expert at the Center for the National Interest, said in an

interview, citing the time it would take US ICBMs to strike the North. “With US nuclear forces in South Korea we could do it in one to three minutes. It’s just a degree of how fast you want to destroy North Korea, and adds very little to our force posture or capabilities.”

But there’s a broader question about the wisdom of such a move. The Trump administration’s top goal is for Pyongyang to give up its nuclear weapons. If the White House sends more nukes to the region, it undermines that initiative. The move would also anger China, which wouldn’t want those weapons near it. So it doesn’t look like it’s to America’s benefit to deploy nuclear weapons to the country, even if some South Korean officials may continue to ask for them. But Trump bluntly said he didn’t think Moon is tough enough to push back on North Korea, claiming he was actually appeasing Pyongyang. That view doesn’t seem to fit with Moon’s drive to arm South Korea with more weapons.

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South Korea Is Preparing To Defend Itself: “We cannot rely only on our ally for our security,” Moon said in a nationally televised speech on August 15. “When it comes to matters related to the Korean Peninsula, our country has to take the

initiative in resolving them.” And he’s made moves to do just that. On 4th September, Moon told Trump that South Korea wants to build a nuclear submarine. Seoul also wants to increase the payload on its missiles so it can do more damage, and it will also temporarily deploy four THAAD missile-defense systems that it bought from the US, Reuters reports.

And this morning, it looks like Trump agreed to sell more military equipment to South Korea (and Japan) to defend itself. That would be in keeping with Trump’s earlier, and often deeply controversial, views. In March 2016, he told the *New York Times* he wanted South Korea to build its own nuclear weapons so it didn’t have to rely so much on the US. He also stated in April 2017 that he wanted Seoul to pay \$1 billion for the THAAD missile defense system, a comment National Security Adviser H.R. McMaster later had to walk back. Instead of sending nuclear weapons, then, Trump may prefer to continue arming South Korea. And it looks like South Korea has no problem with that approach — for now.

Source: <https://www.vox.com/>, 05 September 2017.

USA

Trump Panel Said to be Pushing for ‘Mini Nukes’ to Make Nuclear Strikes Easier

President Trump is reportedly reviewing proposals to add smaller, less powerful “mini nukes” to the United State’s nuclear arsenal. The proposal stems from Mr Trump’s NPR, which he ordered in January to assess the country’s nuclear arsenal. Sources tell *Politico* that the high-level panel is pushing for the development of these low-yield bombs. Such bombs – which carry far less power than those the US used in the Second World War – would give military commanders more options. But detractors say they could also increase the appeal of using nuclear weapons. Some worry that

the use of smaller, more “palatable” nuclear bombs could quickly escalate into all-out nuclear war.

The plan would also be a stark reversal from the policies of former President Obama, who had prohibited the development of new nuclear weapons. The US has not conducted a nuclear test in 25 years. The US already possesses some smaller nuclear weapons, as holdovers from the Cold War Era. One third of the nuclear arsenal is already considered low-yield, or can be “dialled back” for a smaller effect, according to defence analysts. But any plan to increase the nuclear arsenal would have to be approved by Congress, likely sparking a heated debate. The Pentagon proposed modifying a weapon for smaller targets during the George W Bush administration, but was thwarted by Congress.

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“There’s one role – and only one role – for nuclear weapons, and that’s deterrence. We cannot, must not, will not ever countenance their actual use,” Democratic Senator Dianne Feinstein told *Roll Call* when a Pentagon advisory board floated the idea in February. She added: “I’ve fought against such reckless efforts in the past and will do so again, with every tool at my disposal.” Still, the idea has had sticking power in the Trump administration. The Defence Science Board first suggested developing low-yield bombs in February. Six months later, the Vice Chairman of the Joint Chiefs of Staff indicated that the military were also pushing for their development.

“Whether we do it with a ballistic missile or re-entry vehicle or other tool in the arsenal, it’s important to have variable-yield nukes,” said Air Force General Paul Selva, the second-most powerful military official in the US. Advocates say the plan would give the US more flexibility in pursuing nuclear options. While North Korea has been dominating nuclear news, experts say these weapons could also help deter Russia, which has

already threatened to use mini-nukes in the conflict in Ukraine. "If the only options we have are to go with high-yield weapons that create a level of indiscriminate killing that the President can't accept, then we haven't presented him with an option with an option to respond to a nuclear attack in kind," General Selva said.

Source: <http://www.independent.co.uk>, 09 September 2017.

BALLISTIC MISSILE DEFENCE

IRAN

Iran Tests First Ever Long-Range Missile Defence System

Iran has tested its first ever long-range missile defence system amid tensions with the US over its weapons programme, Iranian state media has said. Work on the new Bavar 373 system is underway, Farzad Esmaili, head of the Revolutionary Guards' air defences, told IRIB in an interview. It is expected to be fully functional by March 2018, he added. Iran already has an S-300 Russian-made defence system, designed to defend against aircraft and cruise missiles. While Tehran purchased it in 2010, international sanctions meant the import of parts was suspended for years. The system went online in March 2017 after the 2015 nuclear deal with world powers, which saw the measures which had crippled the Iranian economy lifted in return for curbs on Iran's nuclear programme.

The Bavar 373 – which translates as "faith" – was created after construction on the S-300 was brought to a halt. It is designed to intercept long range, or ballistic weaponry. "The system is made completely in Iran and some of its parts are different from the S-300. All of its sub-systems have been completed and its missile tests have been conducted," Mr Esmaili said. Also, Amir Hatami, Iran's new Defence Minister, said the country has "a specific plan to boost missile power", which he hoped would increase "the combat capabilities of Iran's ballistic and cruise

missiles" over the next four years.

In August the Iranian parliament voted to shore up its ballistic missile programme and the international reach of its paramilitary Revolutionary Guard with extra spending in retaliation to new ballistics-related sanctions slapped on Iran by the Trump administration. While the US has admitted more than once that Iran is complying with the terms of the historic 2015 nuclear deal, the White House has insisted that Tehran will face consequences for the recent ballistics tests, which it says breach the "spirit" of the agreement reached under Obama.

The wording of the UN resolution that endorsed the nuclear deal called upon Iran not to "undertake any activity related to ballistic missiles designed to be capable of delivering nuclear weapons, including launches using such ballistic missile technology". Relations between Tehran and Washington have soured quickly since US President Trump took office in January. The new President immediately set about imposing new financial penalties on individuals related to terror-related offences, and imposed a travel ban for citizens of Iran and six other Muslim countries, which has since become the subject of intense legal battles.

Iran, in return, temporarily banned US citizens from travelling to the country, and conducted a ballistic missiles test in January, and another in July. On the campaign trail, Mr Trump proposed scrapping the nuclear deal altogether, a move widely criticised for endangering an agreement which former Secretary of State John Kerry said "made the world a safer place". Iranian President Hassan Rouhani recently warned that his country's abandoned nuclear programme could be restarted "within hours" if US "threats and sanctions" continue. The US president is yet to communicate his administration's broader Iran policy.

Source: <http://www.independent.co.uk/>, 04 September 2017.

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JAPAN

Japan Wants a New US Missile Defense System Amid Fears of North Korea

Japan is worried the US has so far declined to arm it with a powerful new radar, arguing the decision makes the US missile defense system it plans to install much less capable of countering a growing North Korean threat, three sources said. Japan wants to have a land-based version of the Aegis BMD system operational by 2023 as a new layer of defense to help counter North Korea's missile advances. Yet, without the new powerful radar, known as Spy-6, Japan will have to field the system with existing radar technology that has less range than a new generation of BMD interceptor missiles, the sources who have knowledge of the discussion told Reuters.

That could mean that while the interceptor has enough range to strike a missile lofted high into space, the targeting radar may not be able to detect the threat until it is much closer. Japanese officials have witnessed a demonstration of Spy-6 technology, which boosts the range of BMD radars dozens of times, but efforts to secure the equipment from their ally have come to naught. "So far all we have got to do is smell the eel," said one of the officials, referring to a savory fried eel dish popular in Japan. The military threat to Japan deepened when Pyongyang fired an IRBM over Japan's northern Hokkaido island. Japanese PM Shinzo Abe slammed the action as "reckless" and "unprecedented." Japan's Defence Ministry and the Pentagon did not immediately respond to requests for comment.

Ironclad: Washington's reluctance to share the

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Tokyo will need permission to use Spy-6 well ahead of that roll out date to give the maker, Raytheon Co and Aegis system integrator Lockheed Martin Corp time to build and test the system. Any decision to hold back Spy-6 could therefore add significantly to Japan's already rising bill for missile defense by forcing it to pay to upgrade or replace Aegis Ashore systems after deployment.

radar may make Tokyo feel more vulnerable to North Korean attack and blunt US efforts to assure its Japan about its commitment to defend its East Asian ally to as tensions in the region intensify. The new US Ambassador to Japan, William Hagerty, dubbed their security partnership as the "greatest on earth" in his first meeting with Abe on Aug 18. The US's top

general, Joint Chiefs Chairman Gen. Joseph Dunford described that alliance as "ironclad" in talks with the Chief of Staff of JSDF, Admiral Katsutoshi Kawano the same day.

Still, a pledge to let Japan have Spy-6 has not been forthcoming. Japan has not yet placed an order for Aegis Ashore, but has informally asked Washington to let it have the new radar technology. "There is no guarantee that Japan is going to get it," said another of the sources. The US Navy supports giving Japan the new radar, the source said, but may be thwarted by reluctance from the MDA, which is responsible for developing BMD technology.

Officials there are wary to release advanced technology, even to a close ally, before the US has fielded the technology. The US' first Spy-6 equipped Aegis warship is not slated to begin operations before 2022, one of the sources said. Tokyo will need permission to use Spy-6 well ahead of that roll out date to give the maker, Raytheon Co and Aegis system integrator Lockheed Martin Corp time to build and test the system. Any decision to hold back Spy-6 could therefore add significantly to Japan's already rising bill for missile defense by forcing it to pay to upgrade or replace Aegis Ashore systems after deployment.

Tokyo plans to build two Aegis Ashore batteries, costing around \$700 million each without missiles, the sources said. That would mean its south-western Okinawa island chain would likely be protected by one of Japan's existing BMD warships. The Aegis system's new SM-3 Block IIA defensive missiles, designed to hit warheads Pyongyang may try to fire over its missile shield, can fly more than 2,000 km - about twice the distance of the current SM-3 missiles. The interceptor missiles will cost around \$30 million each, the sources added.

Source: <http://www.businessinsider.com/>, 30 August 2017.

USA

America's Missile Defenses at Sea are Getting a Big Upgrade

The US Navy has successfully tested its potent new Raytheon AN/SPY-6(V) AMDR against simultaneous air and ballistic missile threats. The powerful Gn-based AESA radar will replace the Lockheed Martin AN/SPY-1D PAR on future Block III Arleigh Burke-class destroyers as the core of the Aegis combat system. According to NAVSEA, the AMDR performed exactly as expected during the September 7 test event, which was designated Vigilant Talon. During the test, at 13:38 local time — or 19:38 Eastern Daylight Time — the Navy simultaneously launched a short-range ballistic missile target and multiple air-to-surface cruise missile targets off the west coast of Hawaii to put the new radar through its paces. The AN/SPY-6(V) searched for, detected and maintained track on all targets throughout their trajectories, according to NAVSEA. It was the third ballistic missile defense test for the new radar.

"This radar was specifically designed to handle ballistic missiles and cruise missiles

simultaneously, and it's doing just that," Capt. Seiko Okano, NAVSEA's major program manager for Above Water Sensors, PEO IWS, said in a statement. "AMDR is successfully demonstrating performance in a series of increasingly difficult test events and is on track to deliver advanced capability to the Navy's first Flight III Destroyer."

According to NAVSEA, the Navy's test successfully met its "primary objectives" against a "complex short range ballistic missile" and "multiple air-to-surface cruise missile" targets simultaneously based on preliminary data. NAVSEA will have to take a more detailed look at the data to fully evaluate the SPY-6 radar's performance based upon telemetry and other data obtained during the test. With its GN technology, the SPY-6 is

roughly 30 times more powerful than the current 12-foot SPY-1 array with an antenna that is just two feet larger at 14 feet. The new radar also has much greater dynamic range compared to the SPY-1—particularly in areas with lots of interference from other emitters, jammers and clutter. The SPY-6 also has digital beam-forming capability, which enables rapid horizon-to-horizon surveillance of air targets while simultaneously devoting much more energy toward

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Huntington Ingalls Industries will start building the first Flight III Arleigh Burke-class destroyer—the future USS *Jack H. Lucas*—in fiscal year 2019. The new destroyers will form the core of the Navy's surface fleet until the service eventually develops a future surface combatant that will eventually replace both the Ticonderoga-class cruisers and the *Arleigh Burke* hull form.

Source: <http://nationalinterest.org/>, 10 September 2017.

With its GN technology, the SPY-6 is roughly 30 times more powerful than the current 12-foot SPY-1 array with an antenna that is just two feet larger at 14 feet. The new radar also has much greater dynamic range compared to the SPY-1—particularly in areas with lots of interference from other emitters, jammers and clutter. The SPY-6 also has digital beam-forming capability, which enables rapid horizon-to-horizon surveillance of air targets while simultaneously devoting much more energy toward ballistic missile defense.

NUCLEAR ENERGY

INDIA

Rawatbhata Nuclear Facility will be Ready to Fuel Power Plants by 2022

The Rs 18,000-crore NFFFF and ZFF proposed to come up at Rawatbhata, 65 km from Kota in Chittorgarh district, will cater to needs of the upcoming 10 units of 700 MW atomic power plant in the country. It is likely to be completed by 2022. The Rawatbhata plant will be the second nuclear fuel facility after Hyderabad, which was built in 1971. The foundation stone of the nuclear fuel complex at Rawatbhata was laid by the Chairman of the AEC Dr. Shekhar Basu. This project was cleared in 2014 by the Union Cabinet but got delayed by almost two years due to environmental clearance.

Rawatbhata is country's largest nuclear power generation centre with completion of seventh and eighth unit of the RAPP. In Rawatbhata, six nuclear power plants are currently generating 1180 mwe of power. Two of new Indian-designed 700 mwe series of reactor (RAPP-7 and RAPP-8) would start generation soon. "The two reactors cost an estimated Rs 123.2 billion (\$2.6 billion). Once the two new reactors go into stream, total production from RAPS will touch 1400 MWE," said RAPP Station Director, Vijay Kumar Jain. The Hyderabad-based NFC has already issued notice inviting bids for the project According to an official NFC, experts found the predisposed site along river Chambal ideal for the fuel complex.

The official said that the proposed facility will supply nuclear fuel bundles and reactor core components. It is a unique facility where natural and enriched uranium fuel, zirconium alloy cladding and reactor core components are manufactured under one roof. NFC symbolises the strong emphasis on self-reliance in the Indian NPP. "As the number of nuclear plants in the country has increased in the past four decades, the need for setting up another NFC facility was

felt. As Rawatbhata is a big hub for nuclear power generation it was felt that this could be an ideal location. At present, NFC supplies fuel to the 19 operational power plants run by the NPC, which has 20 plants with an installed capacity of 4,800 MW.

Source: <http://www.dnaindia.com/>, 11 September 2017.

JAPAN

Japan Circling Back to Nuclear Power after Fukushima Disaster

In the immediate aftermath of the 2011 earthquake and tsunami that crippled the Fukushima Dai-ichi nuclear plant, Japan idled all 54 of its nuclear plants. Now, though, five of them are back online while many more may be on the way. PM Shinzo Abe, who is pro-business and who realizes that without carbon-free nuclear power the country won't meet its climate objectives, has said that reactors deemed safe by regulators would be restarted. To that end, the Japanese media is

reporting that the Tepco – the state-run utility that operated the Fukushima plant – is expected to get approval to rev up two units that resemble the design of the reactors that succumbed to the natural disaster in March 2011.

"One consequence of the accident was a gradual shutdown of all nuclear power plants, which has led to a significant rise in fossil fuels use, increased fuel imports and rising carbon dioxide emissions. It has also brought electricity prices to unsustainable levels," the IEA reports. "The IEA encourages Japan to increase low-carbon sources of power supply." Meanwhile, another Japanese utility, KEPCo., recently started up two different reactors. While 43 other reactors remain offline, about 21 re-start applications are now pending with an estimated of 12 units to come back in service by 2025 and 18 by 2030, Japan Forward reports. (The Fukushima accident took out four of the 54 nuclear units. Five of those are now back in service, leaving 43 idled.)

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Right now, nuclear energy is providing 1.7% of Japan's electricity, which is down from 30% before the 2011 accident. The Ministry of Economy, Trade and Industry says that if the country is to meet its obligations under the Paris climate accord, then nuclear energy needs to make up between 20-22% of the nation's portfolio mix – a country with limited natural resources upon which it can rely. Under that agreement, Japan has committed to cut its CO2 emissions by 26% between 2013 and 2030. "We believe that energy policy is a core policy of a nation, and must be approached from a medium- to long-term standpoint ... especially as Japan has few energy resources," the Federation of Electric Power Companies of Japan chairman Makoto Yagi is quoted as saying by the WNN.

One factor that has helped Japan is a nuclear watchdog that was created in September 2012: The NRA has eliminated the cozy relationships that allowed utility employees to become nuclear regulators and it has stood up to political pressure to turn a blind eye to operational shortcuts. The agency has shown its willingness to exert its influence and to routinely give updates on the disabled Fukushima nuclear facility. As such, the country's nuclear reactors are all going through rigorous stress tests to ensure that they can survive events similar to what happened in March 2011. The FAS has said that the accident at Fukushima was preventable and its findings are being used to enable the restarts of more nuclear units in Japan.

The potential restart of Japan's nuclear fleet is within grasp in large measure because the infrastructure is in place and dismantling it would take decades, all of which makes nuclear power a more plausible long term alternative than importing liquefied natural gas, or LNG. Besides the

economics, nuclear energy – from a climate point of view – is better than natural gas. No doubt, Japan has turned more and more to renewable energy and energy efficiency, which have helped the country reduce both its electricity consumption and its fossil fuel usage – something that a majority of the country's citizens favor. The Ministry of Economy, Trade and Industry suggests increasing its green energy mix from 9% today 22-24% by 2030. Major Japanese companies such as Toshiba, Hitachi and Mitsubishi are investing in wind, solar, and smart-grid technologies.

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In combination with nuclear energy, low-carbon sources would amount to roughly 45% of the electricity portfolio mix by 2030 – if Japanese trade and energy officials' plans come to fruition. Meantime, fossil fuels – coal, LNG and oil – would comprise 55% by then, which have been as much as 85% in recent years. "The key in moving forward is how to implement the new energy mix that the government has set," Federation of Electric Power Companies of Japan chairman Yagi said.

"The power companies will meet the (safety, energy security, economic efficiency and environmental conservation standards) and contribute to the energy policy of Japan by maintaining and establishing generation facilities as appropriate, fully in line with the government's policies."

The Japanese people's continued skepticism is natural and healthy. But their leadership asserts that the critics' concerns have been addressed and that the nuclear energy sector has undergone a transformation – one that is safer and more transparent than it has ever been. If Japan is to expand its economy while reducing its CO2 emissions, officials there reason that nuclear energy is critical and thus, they must leverage

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Source: <https://www.forbes.com/>, 08 September 2017.

POLAND

Poland to Treat Coal Addiction by Embracing Nuclear Power

Poland's ongoing large-scale investment in three new coal-fired power plants may be the country's last fossil fuel venture, its energy minister said, indicating a possible energy shift in the EU's largest eastern member amid revived plans to embrace nuclear power. Minister Krzysztof Tchórzewski told the Krynica-Zdrój Economic Forum in southern Poland that once the country's state-run energy firms have finished the three coal projects currently under construction, no more investments are planned. "After completing the investments that are now being conducted in big coal-fuelled units, we will not be planning new projects based on coal," Tchórzewski told the forum on 6 September.

But that does not mean an end to large-scale funding of energy infrastructure, as Poland has aspirations to open its first nuclear power plant by the end of the next decade. Progress on atomic energy plans, first announced in 2009, has been hampered by falling energy prices and negative public opinion following the 2011 Fukushima nuclear disaster. After the Law and Justice Party (PiS) won the last general election in 2015, PM Beata Szydło's government dusted the plans off and insisted it wants nuclear power online within ten years.

Tchórzewski revealed some details of the government's plan, explaining that "we would like to build three units in five-year intervals, with the first one coming in 2029", with costs predicted to

reach nearly €6bn. It is a seemingly odd change of policy from the authorities, given that both Szydło and President Andrzej Duda have gone on record as saying Poland has enough coal for the next two centuries. Poland also relies on coal to provide around 90% of its electricity needs.

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Ministers are ready to approve the swift development of a fleet of "mini" reactors to help guard against electricity shortages, as older nuclear power stations are decommissioned. The new technology is expected to offer energy a third cheaper than giant conventional reactors such as the ongoing Hinkley Point in Somerset.

But experts have warned for years that the cheapest sources of coal in the Silesian Basin are nearly depleted and that the country's mining sector will have to prepare for higher costs in the future. Poland's heating plants have also reported problems with fuel supply in recent months, which may lead to an increase in coal imports in 2017 and in 2018. How to actually finance large-scale coal plants has emerged as another problem for Warsaw. Energy holding company Tauron needs large-scale investment in order to modernise old power plants but its ability to invest in coal has been restricted by recent commitments. Other state power companies are finding themselves increasingly in the same position, which means coal faces an uncertain future in the EU member state most associated with coal power.

Source: <https://www.euractiv.com/>, 11 September 2017.

UK

'Mini' Nuclear Reactors Could Help Solve Britain's Energy Crunch and Cut a Third Off Bills, Ministers Hope

Ministers are ready to approve the swift development of a fleet of "mini" reactors to help guard against electricity shortages, as older nuclear power stations are decommissioned. The new technology is expected to offer energy a third cheaper than giant conventional reactors such as the ongoing Hinkley Point in Somerset. Industry

players including Rolls-Royce, NuScale, Hitachi and Westinghouse have held meetings in past weeks with civil servants about Britain's nuclear strategy and development of SMRs.

A report to be published by Rolls-Royce in Westminster claims its consortium can generate electricity at a "strike price" – the guaranteed price producers can charge – of £60 per mw hour, two thirds that of recent large-scale nuclear plants. SMRs are a fraction of the size and cost of conventional plants and were earmarked for funding from the £250m pledged by the Government in 2015 to develop "innovative nuclear technologies". It is hoped a fleet of these small reactors could be cheaply produced to guarantee Britain's energy supply, with further ambitions for the technology to be exported worldwide.

Whitehall sources confirmed that officials from the Department for Business were whittling down proposals from consortia keen to work with government to develop SMRs, with an announcement on the final contenders for funding expected soon. The report to be published by Rolls-Royce, entitled "UK SMR: A National Endeavour", which has been seen by *The Telegraph*, claims SMRs will be able to generate electricity significantly cheaper than conventional nuclear plants. The mini reactors are each expected to be able to generate between 200 MWs and 450 MWs of power, compared with the 3.2 GWs due from Hinkley, meaning more of them will be required to meet the UK's energy needs.

Source: <http://www.telegraph.co.uk>, 09 September 2017.

NUCLEAR COOPERATION

BRAZIL–CHINA

Brazil and China Enhance Nuclear Cooperation

The MOU was signed on 1 September by CNNC board chairman Wang Shoujun, Eletrobras superintendent of foreign operations, Pedro Luiz de Oliveira Jatobá, and Eletronuclear CEO Bruno Campos Barretto. It was signed in Beijing during a meeting of Chinese President Xi Jinping and Brazilian President Michel Temer. Eletrobras said

the MOU creates "the opportunity for a deepening of bilateral cooperation for peaceful uses of nuclear energy, highlighting the common interests in establishing a future partnership for completion of Angra 3". CNNC said it will work with Eletrobras and Eletronuclear to promote the construction of Angra 3 and future nuclear power plant projects.

Eletro-nuclear noted this is the third MOU it has signed with CNNC. In 2015, it signed one with CNNC and Eletrobras aimed at nuclear cooperation. In December 2016, Eletro-nuclear signed a bilateral MOU with CNNC to guide cooperation in the resumption of construction of Angra 3. Construction of Angra 3 originally started in 1984 on a PWR designed by German company KWU, but this faltered two years later. At that stage some 70% of the plant's equipment was said to have already been purchased and delivered to the site. A return to construction was approved in 2007, and an industrial agreement for the unit's completion was signed with Areva in December 2008.

Two Brazilian consortia were awarded contracts, one for electro-mechanical assembly associated with the reactor's primary system, the other for secondary-side work. However, following a corruption probe in mid-2015, Eletrobras suspended both contracts. In March 2017, the government announced it planned to sell Angra 3 by 2018. The NEPC in June 2017 reviewed ways to restart construction, but the government expects that it will take about five years and \$2.9 billion to complete the unit.

Source: <http://www.world-nuclear-news.org/>, 04 September 2017.

INDIA–JAPAN

Nuclear Cooperation Key to Future India-Japan Ties: Jaishankar

India said that Japan can make a substantive difference to its nuclear industry and defence as two domains that portend the future direction of the bilateral ties. Speaking at the 'India-Japan Colloquium', Foreign Secretary S Jaishankar also noted that the growing convergence of views between Japan and India has the capacity to drive

Asia's economy and development and stimulate the global growth.

"In this regard, the two countries have agreed to cooperate closely to promote connectivity, infrastructure and capacity-building in the regions that occupy the inter-linked waters of the Indo-Pacific," the foreign secretary said. Cooperation in civil nuclear energy and in defence are two domains that portend the future direction of our ties and the difference that Japan can make to our nuclear industry can be quite substantive, he said.

India and Japan signed a civil nuclear deal during PM Modi's Japan visit in November 2016. The deal, which enabled Japan to export nuclear power plant technology to India, came into force in July 2017. "Japan's openness to supply India with military technology reflects the high level of confidence that the two countries have developed in each other," Jaishankar said. Asserting that the interaction between India and Japan now has significance beyond the bilateral and the Asia- Africa growth corridor was just one example, he said drawing on all these factors, India and Japan stand ready to move their relationship forward with determination. PM Abe's forthcoming visit will present an occasion to demonstrate this concretely.

But in an increasingly uncertain world, they are now purposefully heading towards a more collaborative future. Their success in doing so has significant implications for the world," he said. Japanese PM Abe is expected to undertake a three-day visit from September 13. Accompanied by PM Modi, he is expected to go to Ahmedabad, where both the leaders will take

part in the ground breaking ceremony for the ambitious Mumbai-Ahmedabad High Speed Rail Project, commonly referred to as the bullet train project, on September 14.

Source: <http://www.oneindia.com/>, 08 September 2017.

URANIUM PRODUCTION

INDIA

'India is Uranium-Rich Country': Nuclear Chief Dr Sekhar Basu

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For a very long time these Indian-made nuclear reactors ran on very low efficiency. The reason being cited was that the uranium fuel was in short supply. In fact, the raison d'être of the Indo-US nuclear deal was to get access to imported uranium. The locally mined uranium is supplied to generate electricity and also to power nuclear weapons capability.

For a very long time one has only heard that India is country that is not blessed with indigenous uranium and that unless we import uranium there will be no energy independence. However, India's atomic chief Dr Sekhar Basu asserts that thanks to new explorations India can now call itself a uranium-endowed country. NDTV visited the uranium processing plant to get this rare insight. In an exclusive interview to NDTV, Dr Basu said that the development has helped improve uranium fuel supply to nuclear reactors in the country. "When I joined the atomic energy programme we were told India has just about 60,000 tons of mineable uranium. But today the quantity has grown by 4 to 5 times. Government is fully supporting us to make India uranium self-sufficient," Dr Basu said during a visit by NDTV to Jaduguda uranium mine, the oldest site in the country.

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uranium. The locally mined uranium is supplied to generate electricity and also to power nuclear weapons capability. India currently has 22 operating nuclear power plants which have an installed capacity of 6780 MW. Of these the two nuclear plants at Kudankulam in Tamil Nadu are run on uranium imported from Russia.

Source: <http://www.ndtv.com/>, 11 September 2017.

NUCLEAR DISARMAMENT

GERMANY–NORTH KOREA

Merkel Offers German Role in Iran-Style Nuclear Talks With North Korea

Angela Merkel has offered German participation in any future nuclear talks with North Korea and suggested that the 2015 agreement with Iran could serve as a model for negotiations. The chancellor's intervention reflects growing alarm in Europe that Trump is worsening one nuclear crisis by repeated threats to use military force against North Korea, and seeking to trigger a second one by torpedoing the Iran deal to which Germany, France and the UK are among the signatories.

"If our participation in talks is desired, I will immediately say yes," Merkel told the Frankfurter Allgemeine Sonntagszeitung in an interview. She pointed to the example of the agreement sealed in Vienna in July 2015 by Iran, the five permanent members of the UN Security Council and Germany, describing it as "a long but important time of diplomacy" that ultimately had a good end. "I could imagine such a format being used to end the North Korea conflict. Europe and especially Germany should be prepared to play a very active part in that," Merkel said.

In exchange for sanctions relief under the Vienna deal, Iran accepted strict limits on its nuclear

programme as a reassurance to the international community that it could never build a bomb. North Korea, on the other hand, is believed to already have a nuclear arsenal which it insists is not up for negotiation. Kim Jong-un hosted an elaborate banquet in Pyongyang over the weekend for military leaders, scientists and technicians to celebrate the country's sixth and most powerful nuclear test. The regime says the underground blast on 3 September was a two-stage thermonuclear device, or hydrogen bomb.

The state news agency, KCNA, published photographs showing Kim beaming with two of the scientific minds behind the country's surprisingly fast progress – Ri Hong Sop, the head

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of the country's nuclear weapons institute, and Hong Sung Mu, the deputy director of the ruling party's munitions industry department. The UN security council will convene on 4th September to consider a US resolution that would impose an embargo on oil exports to North Korea and technical imports from the embattled state, as well as

a partial naval blockade giving UN member states the right to board and inspect ships suspected of sanctions-busting.

China and Russia are expected to try to water down the resolution, while European council members are nervous that the Trump administration could consequently abandon the council as a forum for dealing with the North Korea crisis if it does not get its way. "I think the Europeans worry about the US going off the deep end," said Richard Gowan, a UN expert at the European Council on Foreign Relations. European anxiety has already been aroused by Trump's repeated emphasis on a possible military solution of last resort to contain North Korea, which many analysts fear increases the chance of miscalculation and a preemptive strike by either side.

The UK defence secretary, Sir Michael Fallon, said that "the dangers now of miscalculation or some accident triggering a response are extremely great". North Korea's nuclear weapons programme must be halted before it developed a ballistic missile capable of hitting London, he said, but a war must be avoided "at all costs". "The US is fully entitled to defend its own territory, to defend its bases and look after its people," he said. "But this involves us. London is closer to North Korea and its missiles than Los Angeles."

Theresa May's government is concerned about Trump's stated intention to extricate the US from the Iran deal, which some diplomats worry is motivated principally by his determination to obliterate all aspects of Obama's legacy more than by material shortcomings in the agreement. British officials see the deal as an important diplomatic achievement but, with Brexit looming, the government is fearful of alienating Trump, on whom it will have to rely for a speedy and favourable bilateral trade deal.

Trump has signalled he might not certify Iranian compliance with the deal to Congress in mid-October, when he is due to give his next endorsement. A report by the IAEA earlier this September confirmed that Iran was abiding by the limits set down in the agreement, but the US envoy to the UN, Nikki Haley, said Trump could withhold certification even if there were no technical violations, by judging the deal no longer to be in the interests of US national security. European leaders will seek to persuade Trump not to abandon or weaken the agreement at the UN general assembly, which Trump is due to address for the first time on 19 September.

Source: <https://www.theguardian.com/>, 10 September 2017.

NUCLEAR SECURITY

CHINA

IAEA Lauds China's Nuclear Security

The IAEA has praised China's efforts and progress in stepping up nuclear security and contributing to global governance of nuclear security. The IAEA made the comments after completing its first nuclear security assessment of China, at the request of the China Atomic Energy Authority (CAEA). The ten-day assessment concluded on 8 Sep.

The IAEA said in its report that China had adopted forceful measures to build a nuclear security supervision team and nurture nuclear security

talent, and played an active role in supporting regional and international nuclear security cooperation. Muhammad Khaliq, head of the IAEA's Nuclear Security of Materials and Facilities Section, said China's example in applying IAEA nuclear security guidance and using IAEA advisory services demonstrated its strong commitment to nuclear security at home and abroad.

The report suggested China improve its nuclear security laws and regulations and speed up legislation process as soon as possible to consolidate the legal foundation of nuclear security work. It also said China's nuclear development posed challenges to its nuclear security as nuclear energy and supporting facilities would develop quickly. ...

During the assessment, a team of experts reviewed China's laws and regulations on nuclear security, talked with representatives from government bodies including the CAEA and visited the Fangjashan Nuclear Power Plant at Qinshan Nuclear Power Base in Zhejiang Province, eastern

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China. As the central intergovernmental forum for scientific and technical cooperation in the nuclear field, the IAEA works to ensure safe, secure and peaceful use of nuclear technology.

Source: http://news.xinhuanet.com/english/2017-09/12/c_136603129.htm, 12 September 2017.

USA

This Half-Built South Carolina Facility could Keep Nuclear-Weapons Material Out of the Wrong Hands

American workers are constructing a project in South Carolina that is a vital component for keeping nuclear weapons and weapon-grade material out of proliferators' and terrorists' hands.

The MOX Fuel Fabrication Facility honors the US' commitment under the Plutonium Management and Disposition Agreement, which calls for the US and Russia to eliminate at least sixty-eight metric tons of weapon-grade plutonium. The MOX facility, a first-of-a-kind complex that is currently being built at the Savannah River Site, would convert surplus plutonium from retired nuclear weapons into a plutonium/uranium blend so it can be used in US commercial nuclear reactors. In this way, not only does the MOX fuel produce valuable electricity, but it renders the plutonium unusable for nuclear-weapons purposes.

Unfortunately, the DoE under the Obama administration made a decision to drastically shift the course of the plutonium disposition program. It proposed terminating the MOX program and, instead, taking the plutonium, diluting it, and storing it underground at the WIPP in New Mexico, an alternative that brings many unresolved financial, legal, environmental, regulatory and nuclear-safety concerns that will take many years to resolve.

Among the concerns is what would be done with the excess plutonium when WIPP is filled to

capacity, a near certainty that was conceded earlier in 2017 by former Energy Secretary Ernest Moniz. WIPP is the only functioning underground repository for nuclear materials, despite decades of efforts by the US government. As former chairman of the House Armed Services Committee, I supported the MOX program and witnessed wide bipartisan support in the House and in the Senate, including South Carolina Senators Lindsey Graham and Tim Scott. It has also enjoyed support from the Clinton and Bush administrations, the first term of the Obama administration, and Governor Henry McMaster of South Carolina. This is why it is particularly disappointing and risky to US national security to terminate construction of the MOX facility, which is more than 70 % complete, and begin a new,

untested disposal method, which is likely to have significant consequence not only on US and Russian efforts to dispose of weapon-grade plutonium but on nuclear clean-up efforts in the US as well.

In fact, we're already seeing the global consequences of walking

away from our commitment to the bilateral agreement. As a result, we no longer have the confidence that Russia will dispose of its own weapon-grade plutonium in accordance with the terms and conditions of the agreement. (Disposition was to have been monitored in both countries by the IAEA.) The only way to get the Russians back to the table is to continue with the MOX method of disposition. If we can demonstrate our commitment to MOX, then the Russians have stated publicly they are willing to consider the prospects of restoring the pact.

DOE's dilute-and-bury alternative to MOX does not meet the terms of the US-Russia plutonium disposition agreement. A critical difference between the two methods is that dilution does not change the structure of plutonium, so the material could conceivably be recovered and reused in weapons. That is an important distinction to the Russians and should be

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important to us. Additionally, DOE has overlooked and discounted many other factors that affect the suitability, cost and timing of placing thirty-four metric tons of weapon-grade plutonium in WIPP. DOE continues to use unsubstantiated cost estimates to justify terminating the MOX project and pursuing the unproven alternative of dilute and dispose. DOE has a history, noted by the GAO, of underestimating the costs of major capital projects and, years later, going in a different direction.

The contractor building the MOX facility has stated that it could complete construction in one-third of the time cited in the FY 2018 budget proposal and for less than half the cost. If true, I encourage the Trump administration to sit down with the contractor to negotiate a new deal. I am concerned about the effect on our national security of a further proliferation of nuclear weapons and weapons materials. The Trump administration should reconsider the merits of DOE's plutonium-disposition program and, more specifically, the MOX facility at the Savannah River Site as it pertains to the US' national-security efforts.

President Trump has the opportunity to leave a lasting legacy by exercising the leadership that only the US can provide, and succeeding where other administrations have fallen short, by making significant progress on non-proliferation that can be sustained well into the future.

Source: <http://nationalinterest.org/>, 09 September 2017.

NUCLEAR SAFETY

CHINA

China's Legislature Passes Nuclear Safety Law

China's parliament passed a new nuclear safety law aimed at improving regulation in the nuclear power sector as new projects are built across the

country. Officials say the law will give more powers to the regulator, the NNSA, and establish new systems that will improve the disclosure of information on issues like radiation, and prevent or minimise risks from nuclear accidents. "It fully embodies our 'safety first' approach and reflects our image as a responsible power, and also our strong determination to develop nuclear energy and the use of nuclear technology using the highest safety standards," NNSA vice-head Guo Chengzhan said at a briefing.

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China is in the middle of an ambitious reactor building programme aimed at bringing total nuclear capacity to 58 GWs by the end of the decade, up from 35 GWs now. But weak and opaque governance has long been seen as an industry problem, especially when it comes to determining the precise roles of the government, the military and state-owned nuclear enterprises on issues such as the handling of nuclear materials and the disposal of spent fuel.

opaque governance has long been seen as an industry problem, especially when it comes to determining the precise roles of the government, the military and state-owned nuclear enterprises on issues such as the handling of nuclear materials and the disposal of spent fuel. Guo said the new law focused on strengthening China's nuclear safety regime, and would create "institutional mechanisms" and a "division of labour" among regulators and enterprises to clarify responsibilities for safety.

Officials have repeatedly said China's nuclear industry has not experienced a single major accident or serious radiation incident in the 25 years since it connected its first reactor to the grid, making it far safer than coal. But the decision to construct dozens of new projects, many using advanced and untested "third-generation" reactor designs, has put the government under pressure to improve regulation and build public trust in nuclear power.

China also needs to expand its waste processing capacity and train hundreds of new technicians and safety staff. Mark Hibbs, senior fellow of the Nuclear Policy Program at the Carnegie Endowment for International Peace, said China has until now not addressed the legal authority of the

NNSA, a relatively under-resourced division of China's environment ministry. "People outside of China will commend and applaud the passage of legislation that empowers legally, without any doubts, the regulator to be responsible and to be authoritative," Hibbs said.

Source: <https://www.reuters.com/>, 01 September 2017.

NUCLEAR WASTE MANAGEMENT

BULGARIA

Bulgaria Starts Construction of Radioactive Waste Depot

Bulgaria started construction of a radioactive waste depot for its sole Kozloduy nuclear plant that is expected to become operational in 2021, the energy ministry said. In 2016, the Black Sea state signed a contract with German Nukem Technologies, controlled by Russia's state nuclear company Atomstroyexport, and four Bulgarian companies for the first phase of the facility that will help with the decommissioning of four Soviet-era nuclear reactors at Kozloduy. The 72 million euros project is financed by the Kozloduy International Decommissioning Support Fund, administered by the European Bank for Reconstruction and Development. "The construction of the national radioactive waste depository is extremely important for the development of nuclear energy in Bulgaria," Energy Minister Temenuzka Petkova said.

The three-platform depot, with a capacity of 138,200 cubic metres, will be used to store long-term radioactive waste that has been initially safeguarded in reinforced concrete packages. The "near-surface trench type" depository will be located in the 3-km "surveillance zone" of the Kozloduy plant. The facility will be filled with radioactive waste over the next 60 years. Bulgaria, which joined the European Union in 2007, has closed its four 440 MW Soviet-era

reactors at Kozloduy under its treaty with Brussels and over safety concerns raised by the EU. At present, Kozloduy operates two 1,000 MW reactors. An arbitration court ruled in June 2016 that the Balkan country had to pay nearly 550 million euros in compensation to Russia's Atomstroy export for cancelling a 10 billion euro project to build two 1,000 MW nuclear reactors at Belene on the Danube River. Six months later the Russian company announced it had received payment.

Source: <https://www.reuters.com/>, 29 August 2017.

USA

America's Only Underground Nuclear Waste Dump is Running Out of Space

The only underground nuclear waste repository in the US is running out of room and will reach its capacity in less than a decade, federal auditors have found. The WIPP in New Mexico does not have enough space for radioactive tools, clothing and other debris left over from decades of bomb-making and research, much less tons of weapons-grade plutonium that the nation has agreed to eliminate as part of a pact with Russia, the US GAO said.

Citing the delays and other reasons, Russia last fall suspended its commitment to get rid of its own excess plutonium. The US has not made a final decision about how to proceed. However, the Energy Department has agreed with auditors about the need to expand disposal space at the repository and devise guidance for defence sites and federal laboratories to better estimate how much radioactive waste must be shipped to New Mexico as the US cleans up Cold War-era contamination.

It added the Energy Department had no plans for securing regulatory approvals to expand WIPP over the next 10 years. "DOE modelling that is needed to begin the regulatory approval process is not expected to be ready until 2024," the auditors said in their report. Energy Department officials contend there is enough time to design and build addition storage before existing operations are significantly affected. A Senate committee requested the review from auditors amid concerns about ballooning costs and delays in the US effort to dispose of 34 metric tons of its plutonium.

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own excess plutonium. The US has not made a final decision about how to proceed. However, the Energy Department has agreed with auditors about the need to expand disposal space at the repository and devise guidance for defence sites and federal laboratories to better estimate how much radioactive waste must be shipped to New Mexico as the US cleans up Cold War-era contamination. The New Mexico repository was carved out of an ancient salt formation about 800 metres below the desert, with the idea that shifting salt would eventually entomb the radioactive tools, clothing, gloves and other debris.

Don Hancock, director of the nuclear waste safety program at the Southwest Research and

Information Centre in Albuquerque, said he was pleased the auditors acknowledged the space limitations and hoped the report would spur a public discussion about how to handle the surplus plutonium and waste from bomb-making and nuclear research. "The Waste Isolation Pilot Plant, it was never supposed to be the one and only," Mr Hancock said. "So it's past time to start the discussion of what other disposal sites we're going to have." Federal auditors say another two disposal vaults would have to be carved out to accommodate the waste already in the Government's inventory. More space would be needed for the weapons-grade plutonium.

Source: <http://www.abc.net.au/>, 07 September 2017.



Centre for Air Power Studies

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