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OPINION – Japan Times

Global Leaders Pay Tribute to Late IAEA Chief Yukiya Amano

Secretary-General Antonio Guterres offered condolences after the UN's nuclear watchdog agency on 22 July announced the death of Amano at age 72. Guterres said Amano "worked tirelessly to ensure that nuclear energy is used only for peaceful purposes." He added: "Mr. Amano confronted serious global challenges, including those related to the proliferation of nuclear weapons, with equanimity and determination. Our world is so much better for it." Iranian Deputy Foreign Minister Abbas Araghchi commended Amano for his "skillful and professional performance" as head of the IAEA. "May the Almighty bless his soul," Araghchi wrote on Twitter.

Amano, who had wide experience in disarmament, nonproliferation diplomacy and nuclear energy issues, had been chief of the key UN agency that regulates nuclear use worldwide since 2009. The news of his death comes at a time of increasing concerns and escalating tensions over Iran's nuclear program, after US President Donald Trump left a 2015 deal with world powers that restricted Iran's nuclear program in return for sanctions relief. Amano was heavily involved in the years long negotiations that led to the landmark

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Iran nuclear deal. John Bolton, Trump's national security adviser, said in a statement that Amano's "commitment to nuclear nonproliferation and his championing of peaceful nuclear energy have been unparalleled in leading the IAEA for almost a decade.... He will be sorely missed." There was reaction, too, from Japan. Foreign Minister Taro Kono hailed Amano's contribution to the international nuclear regulatory regime. "The

government of Japan expresses its utmost respect for Director General Amano's leadership and contributions in life. I offer my sincere condolences to his family and offer my prayers."

As head of the IAEA, Amano also dealt with the

aftermath of the devastating 2011 Fukushima nuclear power plant accident, where three reactors went into meltdowns after a tsunami. UN General Assembly President Maria Fernanda Espinosa hailed Amano as a "gender champion" who increased the share of female staff members at IAEA from 23 percent to 30 percent. Russian President Vladimir Putin sent Amano's wife, Yukika, a message expressing his condolences. "I personally met with Yukiya Amano many times and always admired his wisdom and foresight, and his ability to make carefully weighed decisions during some of the most complicated circumstances," the Russian government quoted the message as saying.

The IAEA said Amano died on 18 July but his family had asked the agency not disclose his death until a family funeral had taken place on 22 July. It did not give a cause of death for Amano or say where he died. The IAEA said Mary Alice Hayward, the agency's deputy director general and head of the department of management, would lead the agency in the interim. The IAEA flag was lowered to half-staff in tribute. The agency said Amano was planning to write soon to its board of governors announcing his decision to step down. It released part of that letter, in which Amano praised the agency for delivering "concrete results to achieve the objective of 'Atoms for Peace and Development.'" Amano added that he was "very proud of our achievements and grateful" to IAEA member states and agency staff.

Amano's death will be a strong blow for the nuclear agency, said Adnan Tabatabai, an expert with the Center for Applied Research in Partnership with the Orient in Bonn, Germany. "While I am convinced that the IAEA as an institution will be able to continue its work dedicated to nuclear nonproliferation, the loss of a personality like Yukiya Amano, who had embodied this dedication, will add to an already highly delicate and complex situation with regards to the nuclear agreement with Iran," he said. Tabatabai suggested that

opponents of the Iran nuclear agreement would "try to seize this opportunity to further weaken the position of the IAEA." "It is therefore of upmost importance that ... (Amano's successor) comes out in strong support" of the Iran nuclear deal, he said.

Germany's Foreign Minister, Heiko Maas, said Amano "made the IAEA stronger." Maas said the agency's inspection of the Iran nuclear deal was an example of Amano's "biggest-possible dedication, professionalism and independence." Germany is one of the nations that signed the 2015 Iran nuclear deal and is now trying to salvage it. Jackie Wolcott, the US ambassador to international organizations in Vienna, said Amano "was greatly respected as an effective leader, diplomat, and true gentleman by the entire staff of the US Mission" and other US diplomats. The TEPCO Holdings Inc., which ran the Fukushima nuclear plant, also praised the diplomat, saying it "received so much support and guidance on the decommissioning efforts" at the power plant from him.

Amano was Japan's representative to the IAEA from 2005 until his election as director general in July

2009, including a stint as chair of its board of governors from 2005-2006.

Before he became IAEA chief, Amano contributed to the 1995, 2000 and 2005 NPT Review Conferences and chaired the 2007 preparatory committee for the 2010 NPT Review Conference. A graduate of the Tokyo University Faculty of Law, Amano joined the Foreign Ministry in 1972 and was posted to jobs in Belgium, France, Laos, Switzerland and the United States. At the ministry, Amano was chief of the Disarmament, Non-Proliferation and Science Department from 2002 until 2005. He also previously served as an expert on the UN panel on missiles and on the UN expert group on Disarmament and Non-Proliferation Education. He is survived by his wife, Yukika.

Source: <https://www.japantimes.co.jp/news/>, 23 July 2019.

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OPINION – Sarah Abed

Washington’s Bully Tactics have Failed to Persuade Tehran to Negotiate a New Nuclear Deal

Iran’s Foreign Minister Javad Zarif is in New York for high level talks at the UN. He has been confined to a six-block radius. It’s not uncommon for Iranian diplomats along with envoys from North Korea, Syria and Cuba to be confined to a broader radius of 25 miles. Zarif’s movements, however, are limited to the UN Headquarters in Manhattan, the Iranian Mission to the UN, and the Residence of the Iranian Ambassador. Even with the restrictions placed on him with a limited visa, he has made time for a few interviews to discuss rising tensions with the United States and the Iran Nuclear Deal or JCPOA which President Trump unilaterally withdrew from fourteen months ago.

... I wrote about Iran’s decision to increase uranium stockpiles and uranium enrichment past JCPOA limits. Zarif has stated time and time again that the JCPOA includes legal remedies under paragraph 36 once one side of the agreement starts violating the terms, the other side is “free to start partial implementation”. Zarif has said that this can be reversed within hours.

In an interview with Fareed Zakaria...Zakaria asked “do you think there could be war between the United States and Iran?” Zarif responded “We will never start a war, we have never started a war... but we will defend ourselves and anybody who starts a war with Iran will not be the one who ends it”. In other interviews and statements that Zarif has given recently, he has made it clear that

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We will never start a war, we have never started a war... but we will defend ourselves and anybody who starts a war with Iran will not be the one who ends it”. although we are not close to a military war between the United States and Iran the US is presently engaging in an economic war by imposing harsh sanctions under its “maximum pressure campaign” and that these sanctions are affecting the most vulnerable members of Iranian society.

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Zakaria wrote a column for the *Washington Post* titled, “Trump is strangling Iran. It’s raising tensions across the Middle East”. In his article he highlighted the

incoherence of the Trump administrations strategy towards Iran, noting the White House News Release which stated that “There is little doubt that even before the deal’s existence, Iran was violating its terms”. Zakaria also noted the contradiction between Trump saying that he called

off military strikes against Iran at the very last minute because he didn’t want to kill 150 Iranians, while simultaneously increasing sanctions which have caused a significant rise in mortality to the tune of over 150 deaths. Zakaria also wrote about the humanitarian crisis that the Trump administration has

UK Ambassador Kim Darroch called the Trump administration dysfunctional and inept. He also alleged that Washington didn’t have a strategy for what would happen following their unilateral withdrawal. In the most recent leaks Darroch says that Trump axed the Iran Nuclear deal to spite Obama.

created in Iran and the geopolitical crisis in the Middle East, without creating a strategy to resolve either issue.

In a series of leaked memos that began about a week ago, UK Ambassador Kim Darroch called the Trump administration dysfunctional and inept. He also alleged that Washington didn’t have a strategy for what would happen following their unilateral withdrawal. In the most recent leaks Darroch says that Trump axed the Iran Nuclear deal to spite Obama. Darroch, who has now

resigned as a result of these leaked memos, called Trump's decision to abandon the international agreement "an act of diplomatic vandalism, seemingly for ideological and personality reasons" because the pact "was Obama's deal."

In response to questions about whether Iran will agree to negotiate a brand-new deal with the Trump administration, Zarif has made it clear that Iran is not interested in a new deal. That the JCPOA took twelve years of negotiations, and that it is the best deal that all parties involved can hope for.

In statements made to BBC HardTalk, such as "Once you start accepting illegal demands, there's

no end to it." And "If you allow a bully to bully you into accepting one thing, you will encourage him to bully you into accepting other things" Javad Zarif, Iran's Foreign Minister is highlighting Iran's frustration with the current administration, their bully tactics, and the effect they

have had on their European allies who are part of the deal. Zarif has said that the "three European countries" make nice statements, but that these statements do not provide relief for Iran. When asked during interviews about what it would take to find a solution for the deadlock, Zarif has said that all Iran wants is for the implementation of whatever was negotiated under the agreement.

Zarif also stated during the BBC interview with Zeinab Badawi that "President Trump is being advised by people who are not interested in peace but advancing an agenda that they have had". Zarif said that although he doesn't think President Trump wants to go to war that there are those close to Trump who are "crazy for war" and "thirst for war". Iranian officials have made it clear that if Iran wanted to build a bomb it could have already done so, but that they are not interested in building a nuclear bomb. Zarif has asked why Europe isn't concerned with the fact that Israel has 200 nuclear warheads. The IAEA has made

fifteen reports, five of which were after Trump's withdrawal all proving that Iran has been compliant with the JCPOA terms. The Trump Administration underestimated Iran's resistance to foreign domination. Bully tactics have failed to bring about the results they anticipated.

Source: <https://www.globalresearch.ca/>, 21 July 2019.

OPINION – Tony Karon

Iran is Gambling that Trump is Afraid of War

What's the point of having the world's most powerful military if we never use it, then—Secretary of State Madeleine Albright is said to have shouted at Gen. Colin Powell in 1992, over his reluctance to commit American force to the Balkan wars. President Donald Trump clearly agrees with Albright that the military is there to be used, but also with Powell that it should be kept out of quagmires in harm's way.

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But, despite his bellicose tweeting, Trump has declined every chance for expeditionary adventurism. That's because a key pillar of the president's "Make America Great Again" promise has been to reverse the interventionist legacy of President George W. Bush. "We're charting a path to stability and peace in the Middle East, because great nations do not want to fight endless wars," Trump reiterated at his 2020 campaign launch in Orlando last month (June), in language that could have just as easily come from Barack Obama. "They've been going on forever," he added, promising that he was removing troops and "finally putting America first."

Even as Trump was considering a wrist-slap air strike on Iran following its downing of a US Navy surveillance drone, Fox News's Tucker Carlson

warned him on air against being drawn into the vortex of a military confrontation with Tehran. Trump stood down (except, of course, on Twitter), and Iran saw its strategic reading vindicated: Trump wants to avoid going to war with a country three times the size of Iraq and with far better capacity to hit back.

Although the US Navy later downed an Iranian drone during a confrontation in the Strait of Hormuz, Iran has continued to up the ante in that strategically vital oil shipment passageway, most recently by seizing a British tanker in response to the UK's earlier interdiction of an Iranian tanker off Gibraltar. As the International Crisis Group's Ali Vaez told *The Wall Street Journal*, "The reality is that [Trump's] maximum pressure [strategy] has rendered Tehran more, not less, reckless."

A year ago, Trump tore up the international nuclear deal (JCPOA) and used US dominance of the international financial system to bully third parties into participating in a new sanctions regime, thereby preventing them from honoring their obligations under the nuclear deal and removing the incentives that had kept Iran compliant. Trump was persuaded by his Saudi and Israeli allies and their DC echo chambers to put Iran's economy into a stranglehold unless it surrendered to US terms that went far beyond the nuclear deal. It was an all-or-nothing gamble, conceived by a regime-change faction more alarmed by how the deal treated Iran as a legitimate partner than by anything happening in its nuclear program.

More sober analysts warned that Iran would not capitulate, and would choose confrontation over

surrender or the slow death of its economy. It's certainly clear, now, that Iran is willing to take risks in pursuit of ending the US economic siege. Iran is not going to concede, and it's betting that

Trump cannot afford a war. That looks like a smart wager, but one that carries a high risk of miscalculation on either side that could spark a conflagration despite the desire on both sides to avoid one.

Iran followed its downing a US drone in June with the resumption of limited uranium enrichment and threats to shipping. This

suggests a willingness of the Islamic Republic to absorb such force as Trump is willing to consider, in the hope that the resultant crisis prompts third parties to break with the US-led sanction regime. Some 20 percent of daily global oil demand passes through the Strait of Hormuz, meaning that any disruption of that shipping lane risks a major spike in global oil prices. As the Brookings Institution's Suzanne Maloney told *The Wall Street Journal*, "Provocations in the Gulf help galvanize more effective European diplomacy by raising the costs." She added, "They remind Trump of his own domestic interests in avoiding either spikes in the price of oil or another costly, protracted US military intervention in the Middle East as he begins his re-election campaign."

And precisely because it lacks a plausible end game—the Iranians cannot

capitulate and will keep raising the stakes in hopes of forcing the US side back to the table—Trump's "maximum pressure" campaign has, in fact, left the strategic initiative in Tehran's hands.... There's no question the collapse of the JCPOA dealt Iran a strategic setback, reversing some of the diplomatic gains Tehran had achieved through the

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deal, and by extension, through its nuclear work. It has effectively reset the clock, but only by about five years, to a moment when US blunders in the region had exponentially expanded Tehran's regional influence, and alarm over its growing capacity to build nuclear weapons had brought Western powers to the negotiating table with a regime most had preferred to see isolated or destroyed.

Nuclear weapons have never been an end in themselves; instead they provide the ultimate deterrent. US politicians from Trump to Hillary Clinton casually threaten to "obliterate" Iran, a nod to US nuclear capability. Iran knows that no power can seriously contemplate an existential attack on a regime capable of responding in kind.

Iran's nuclear activities fit the pattern of post-Hiroshima global statecraft: Nuclear weapons have never been an end in themselves; instead they provide the ultimate deterrent. US politicians from Trump to Hillary Clinton casually threaten to "obliterate" Iran, a nod to US nuclear capability. Iran knows that no power can seriously contemplate an existential attack on a regime capable of responding in kind. The attraction of a nuclear deterrent for any regime with more powerful enemies is obvious. "The Iranians had good reason to acquire nuclear weapons long before the present crisis, and there is substantial evidence they were doing just that in the early 2000s," realist US foreign policy scholar John Mearsheimer wrote recently in *The New York Times*. "The case for going nuclear is much more compelling today. After all, Iran now faces an existential threat from the United States, and a nuclear arsenal will go a long way toward eliminating it." ...

And so Iran achieved a diplomatic innovation: It never actually began to build a nuclear weapon, but it demonstrated sufficient proof of its ability to do that it was able to accrue many of the gains that other regimes had won only once they had built and tested atomic bombs. Iran's capacity to produce bomb materiel compelled the key international powers to recognize a regime that many would have preferred to shun.

Tehran appears to have begun research efforts into nuclear weapons—clerical prohibitions notwithstanding—in the early 2000s, in response to the nuclear program of its mortal enemy, Iraq's Saddam Hussein, who had attacked Iran in 1980 launching a brutal eight-year war financed by the

Saudis. Inspections following Operation Desert Storm in 1991 revealed a robust and sophisticated underground program that had brought Hussein perilously close to achieving nuclear-weapons capability. And on Iran's eastern flank, Saudi client-state Pakistan had nukes, as did Iran's key regional rival Israel, and of course, the United States did too. Ideology aside, there is a compelling incentive to obtain nuclear weapons.

The "untouchable" status afforded all nuclear-armed regimes would certainly have its appeal in Tehran.

But in its dealing with world powers, the Iranians were clearly open to other routes to take regime change off the table. In 2003, Tehran reached out to the Bush administration to offer talks in pursuit of a grand bargain that would address all US concerns about Iran, in exchange for normalizing relations. The administration, giddy with the illusion of victory in Iraq and the belief that Tehran had been intimidated by the American show of force, ignored the offer.

The Europeans continued to negotiate with Iran, hoping that offers of economic incentives could stop Iran from enriching its own uranium—which Iran is entitled to do under the NPT. The Europeans couldn't get Bush on board, and therefore couldn't take regime change off the table. And after two years of restraint, Iran turned on its centrifuges, realizing the leverage obtained by slowly, and legally, expanding the civilian nuclear infrastructure that would enable it, if it wanted, to build weapons. It was this leverage that ultimately compelled world powers to negotiate. And so Iran achieved a diplomatic innovation: It never actually began to build a

nuclear weapon, but it demonstrated sufficient proof of its ability to do that it was able to accrue many of the gains that other regimes had won only once they had built and tested atomic bombs. Iran's capacity to produce bomb material compelled the key international powers to recognize a regime that many would have preferred to shun.

It was the JCPOA's effective negation of a regime-change option that ignited such fierce hostility from Israel and the Saudis. The deal clearly restricted Iran's nuclear work and blocked pathways to weaponization, but at the expense of normalizing and legitimizing a regional challenger they'd long sought to eliminate. Sure, the nuclear deal did not deal with many problematic aspects of Iran's regional activities (much less of its repressive domestic policies, though that's something international agreements to keep the peace among states almost never do). Iran's ability to achieve nuclear breakout capacity had created a tactical urgency to conclude a deal limited to nuclear activities, but the underlying strategic assumption was that such a deal could potentially open the way to negotiate Iran's integration in the regional security arrangements—a grand bargain. That idea is deeply threatening to the Saudis, who since World War II had enjoyed a primacy in US Middle East policy trumped only by Israel....

Iran has now sought to revive that leverage by pushing its enrichment efforts past the limits it agreed to in the JCPOA, first of its stockpile of reactor fuel enriched to 3.7 percent and then, as it escalates, to the 20 percent level used in cancer treatment (which significantly shrinks the reprocessing time required to bring it to weapons-grade)—those limits remember are far more restrictive than those required by the Non-Proliferation Treaty, within whose parameters Iran's current nuclear work remains. But the damage the United States has done to the JCPOA

could be irreversible, vindicating the warnings of Iran hardliners that the "Great Satan" can't be trusted. "No sensible Iranian leader is going to wager his country's survival on who gets elected president of the United States," writes Mearsheimer. "American policy toward Iran over the past year makes it clear that Iranian leaders were foolish not to develop a nuclear deterrent in the early 2000s."

Mearsheimer believes that the short-term Iranian response will include a variety of military provocations designed to alarm the Europeans and others into defying the US sanctions that are killing Iran's economy. But the Europeans have been squeamish about openly defying the United States, and prospects for a do-over are fraught, not only

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for the Iranians, but for the five foreign powers that stood by and allowed Trump to destroy the JCPOA and replace it with a nothing-left-to-lose scenario for Tehran. Consider the incentives placed before Iran's leaders, right now, and it's not hard to see how

they'd read them as a creating a surrender-or-fight choice.

Having been burned before, Iran will expect significant, tangible concessions for a new deal. Effectively, Trump would have to reverse himself, regardless of how such a move was spun. He may also have to find ways of restraining his regional allies, particularly Israel, from launching attacks on Iran designed to draw Trump into the war he's desperate to avoid. (And restraining Israel is not part of the administration's playbook.)

Right now, though, Iran is not being shown any incentive for restraint. Mearsheimer predicts that the result will likely be Iran's following a more traditional path to securing the "untouchable" status nuclear weapons confer. The clearest sign that Trump may be panicking—Iran's President Hassan Rouhani called him "desperate and confused"—may be his tapping of Senator Rand Paul, a libertarian Republican and a critic of foreign

military interventions, as a back-channel emissary to Iran.... Iran has separately offered to ratify the Additional Protocol to the NPT, which would allow more intrusive inspections of its nuclear facilities on a permanent basis if Trump lifts sanctions. But under the JCPOA, Iran was required to take that step in 2023, so Tehran is simply offering to expedite a step to which it had previously agreed.

Restoring calm and reducing the rising danger of hostilities triggered by miscalculation will require that Iran's regime is credibly persuaded that its existence is not threatened by outside powers. Essentially, the United States will be relegating much of what was achieved by the JCPOA, but under less favorable circumstances after Trump has provided Tehran's hard-liners a compelling case study in the danger of trusting the United States as a negotiating partner.

Souce: <https://www.thenation.com>, 25 July 2019.

OPINION – Tom Le, Ryan Levy, Lucy Onderwyzer Gold

It's not Just Trump: Why North Korea won't Denuclearize

Ever the showman, President Donald Trump followed the G20 summit in Japan by becoming the first sitting US president to set foot in North Korea and re-establishing denuclearization negotiations. Pundits, North Korea experts, 2020 Democratic presidential candidates, and Democratic party leaders were quick to lambast the meeting, arguing that it was "squandering American influence," "legitimizing" Kim Jong-Un, and "one of the worst few days in

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American foreign policy." Many argue Trump's reality-TV diplomacy will not result in the denuclearization of North Korea. They give Trump too much credit. North Korea will not denuclearize because of an established American history of intervention, mixed-signals, and unambitious denuclearization efforts. Hard bargaining legitimizes Kim's leadership and scores political points domestically. More importantly, a nuclear capability may be the only thing preventing the international community from intervening in North Korean affairs.

The US has a history of withdrawing support from, and even overthrowing, states that have willingly relinquished their nuclear programs. Consider the case of Libya, which John Bolton has argued as a potential model for North Korean disarmament. Muammar Qaddafi's abrupt 2003 announcement of his intention to discontinue Libya's nascent nuclear weapons program was a sort of best-case scenario of non-proliferation. In exchange for improved economic and diplomatic relations with the US and the West, Qaddafi's government was remarkably cooperative, welcoming international monitors to oversee its compliance, acceding to international non-proliferation agreements, and even calling upon other states to discontinue their nuclear programs. But eight years later, US-Libya relations crumbled. Facing reports of human rights abuses and rhetoric from the Qaddafi regime that revealed a potential genocide, the Obama administration authorized NATO air strikes that ultimately enabled its overthrow.

Although Trump has displayed less interest than

his predecessors in punishing state-sponsored human rights abuses, disarmament would nonetheless make North Korea vulnerable to more forceful international criticism, and perhaps even action, on its dismal human rights record. The case of Iraq is similar. Although inspectors from the IAEA verified that Iraq's WMD programs had been dismantled, the Bush administration launched the Iraq War on the allegation that Iraq had renewed its pursuit of nuclear weapons. Like Libya, the regime that willingly conceded to US demands for disarmament was toppled by the US military.

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North Korea blames the regime changes in both states on their unwillingness to disarm, stating "The Saddam Hussein regime in Iraq and the Qaddafi regime in Libya could not escape the fate of destruction after being deprived of their foundations for nuclear development and giving up nuclear programs of their own accord." US presidents have struggled to articulate a consistent message regarding North Korea. On the one hand, departing from Clinton's policy of engagement and the 1994 Agreed Framework, Bush labeled North Korea a member of his Axis of Evil, noting "America will do what is necessary to ensure our nation's security." Similarly, Obama stated he: "will not hesitate to use our military might." And lest we forget, it was Trump that ratcheted up tensions with North Korea by threatening "fire and fury like the world has never seen."

On the other hand, they all sought peaceful engagement with North Korea. Bush through the Six-Party Talks, Obama secured a brief halt of North Korean nuclear testing, and Trump characterizes his relationship with Kim as a "Great

Friendship." A tit-for-tat strategy may be the norm, but not all nations have the luxury of turning on a dime like the US. Apparent is an American desire to have it both ways, seeking greater cooperation, while resorting to the language of fire and fury whenever North Korea misbehaves. While doing so appeals to a segment of the American electorate, it diminishes the US' negotiating credibility, as North Korea is unable to trust American intentions. Another interpretation is North Korea knows exactly what it wants and can point to US waffling to justify its inaction.

Apparent is an American desire to have it both ways, seeking greater cooperation, while resorting to the language of fire and fury whenever North Korea misbehaves. While doing so appeals to a segment of the American electorate, it diminishes the US' negotiating credibility, as North Korea is unable to trust American intentions.

Indeed, in April 2019 Kim stated: "Though the United States calls for a negotiated settlement of issues, it is stirring up hostility to us day after day, which is an act that is as foolish and risky as an attempt to put out a fire with oil." The US made clear to the world the power, clout, and security that nuclear weapons brought when it dropped them on Hiroshima and Nagasaki. US anti-nuclear actions have not been as ambitious or quick as necessary. Observers may point to US led efforts that have resulted in an 85% reduction in global nuclear stockpiles, yet for weak states such as North Korea, there is no qualitative difference between 30,000 warheads and 6,000 warheads.

Concerning disarmament and non-proliferation, the US suffers a legitimacy deficit. The future of the Treaty on the NPT is in doubt, as non-nuclear states have grown frustrated with the piecemeal approach to non-proliferation and disarmament. The US has been perfectly willing to criticize North Korea and Iran while committing \$1 trillion to renovate its nuclear arsenal and announcing its withdrawal from the INF arms control treaty.

Additionally, the Trump administration has made no effort to extend the New START Treaty, set to expire in 2021. When Trump has promised to make American nuclear capability “top of the pack,” there are few carrots the US can offer that does not seem entirely self-serving.

North Korea is also mindful of the US’ constant military build-up. Approving a 2019 defense budget of \$717 billion, Trump proudly stated: “we are going to strengthen our military like never ever before and that’s what we did.” Meanwhile, the continued escalation of tensions with Russia and threats to “invade” Venezuela leave little uncertainty what this militarization is meant to accomplish. It certainly does not help that one-third of Americans would support a preemptive strike on North Korea. This is not to argue that North Korea is blameless – its mercurial nature and flagrant disregard of its commitments more than warrants scrutiny. However, since the end of WWII, the US has shown that it respects nuclear deterrence and nuclear weapons buy a seat at the table. If the US is serious about getting North Korea to denuclearize, it needs to take steps towards reining in its militarization, which includes more aggressive disarmament.

Source: <https://intpolicydigest.org/>, 11 July 2019.

OPINION – Livemint

Use Diplomacy against Nuclear Proliferation

The stance and size of Pakistan’s nuclear arsenal have been wrought with speculation. For the first time, the matter has found place in the annual

report of India’s ministry of defence, according to which our western neighbour is “relentlessly” expanding its nuclear and missile capabilities. Reliable international estimates suggest that Pakistan now has at least 140 nuclear warheads,

slightly more than India does. Given the destructive capacity of a single atomic bomb, the actual count on either side is irrelevant. The point of nukes is to deter enemy attacks, not use them, and that is done through “credible minimum deterrence”, which India achieved in 1998, the year the country tested a series of explosive nuclear devices at Pokhran and spelt out its “no first use” doctrine. New Delhi’s

position has been clear: These weapons are to be used only in retaliation to a nuclear attack, but strike back India certainly will. Today, the country is equipped to launch a nuclear-tipped missile from a chosen location on land, high in the air, or off the coast at sea. This “triad” is all it

takes to keep adversaries away from any nuclear adventurism against us. The alternative would be mutually assured destruction, or MAD, which no rational player would want.

What should be evident from the above is that an expansion of a nuclear arsenal beyond the bare

minimum requirement is irrational. So is participation in a race to stockpile such dangerous arms. Yet, rationality does not always attend every urge known to mankind; unfortunately, far too many countries remain susceptible to oneupmanship over warheads. The absurdity that such a game could go to was seen at the peak of America’s rivalry with the Soviet Union. We had the sordid spectacle of two superpowers trying

The US has been perfectly willing to criticize North Korea and Iran while committing \$1 trillion to renovate its nuclear arsenal and announcing its withdrawal from the INF arms control treaty. Additionally, the Trump administration has made no effort to extend the New START Treaty, set to expire in 2021. When Trump has promised to make American nuclear capability “top of the pack,” there are few carrots the US can offer that does not seem entirely self-serving.

Reliable international estimates suggest that Pakistan now has at least 140 nuclear warheads, slightly more than India does. Given the destructive capacity of a single atomic bomb, the actual count on either side is irrelevant. The point of nukes is to deter enemy attacks, not use them, and that is done through “credible minimum deterrence.

to outdo each other on how many times either could blow up the world and end all life on the only planet known to have any. The US may currently have much of its attention focused on keeping Iran from going nuclear, the Islamic Republic having restarted uranium enrichment after Washington, DC, withdrew from the cap-and-inspect deal struck with Tehran in 2015, but its general disposition towards existing nuclear powers is significant for the signals it sends. If the US lets its nuke-control treaties with Moscow lapse, for instance, it could be taken as a licence for proliferation by countries keen on acquiring a more menacing war chest.

This is no small risk, since the New Strategic Arms Reduction Treaty between the US and Russia seems decreasingly likely to be renewed. The US security establishment is reported to believe that this arms agreement dating back to the Cold War has outlived its purpose, now that China has emerged as a force to reckon with. Will a multi-country deal be proposed as a replacement? If so, among which countries? Nothing is clear. The best New Delhi can do under these circumstances is track Pakistan's arsenal closely and deploy diplomacy to show Islamabad the futility of enlarging it. In the meantime, the international talks that need to begin right away concern the potential militarization of outer space. The Outer Space Treaty of 1967 is inadequate to the task of keeping the dark yonder nuke-free, and with the US keen on setting up a space force, the hope that no nuclear missile shall be aimed at earth from up there appears to be receding. On this, too, India ought to engage the world's other nuclear powers in a dialogue.

Source: <https://www.livemint.com/>, 21 July 2019.

OPINION – Eric R. Mandel

Has US Learned from its History of Nuclear Mistakes in the Middle East?

Does the United States realize that Israel's Begin Doctrine, never to allow an enemy to acquire nuclear weapons, is still very much in force? This is an existential issue, and Israel will act alone to enforce its own redline. A few years ago, a senior Middle East military intelligence expert told me that Iran was interested in doing work on weapons of mass destruction in Syria that would be undetected because the IAEA and the West were solely focused on Iranian territory.

According to Ronen Bergman's *The Secret War with Iran*, in 2007, an Iranian Islamic Revolutionary Guard Corps (IRGC) General Ali Reza Askari, who defected or was kidnapped from Turkey, confirmed that Iran had paid for a Syrian nuclear program built by North Korea. In 2007, two American foreign policy redlines were crossed. The Israelis had shared intelligence with the US proving with a high level of certainty that the Syrian regime under future genocidal dictator Bashar Assad was close to completing a nuclear reactor. The first American redline crossed was nuclear proliferation. The North Koreans, a rogue nation who had repeatedly lied to the United States over many administrations, had now built a nearly identical plutonium reactor to its own in Deir Al Zour, Syria. This was the ultimate challenge to the United States regarding nuclear weapons proliferation, which violated every American national security interest imperative.

The second redline was that the proliferation consisted of transactions we forbade between two

The best New Delhi can do under these circumstances is track Pakistan's arsenal closely and deploy diplomacy to show Islamabad the futility of enlarging it. In the meantime, the international talks that need to begin right away concern the potential militarization of outer space. The Outer Space Treaty of 1967 is inadequate to the task of keeping the dark yonder nuke-free, and with the US keen on setting up a space force, the hope that no nuclear missile shall be aimed at earth from up there appears to be receding.

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of the worst state sponsors of terrorism in the world. Yaakov Katz, editor-in-chief of *The Jerusalem Post*, tells the story in all of its compelling details in *Shadow Strike*, which is essential reading for all Middle East watchers.

So what did the United States do? It deliberated, and in the end was so hand-tied by the 2003 nuclear intelligence failure that claimed Iraq's Saddam Hussein had a nuclear weapons program that it decided not to strike the Syrian reactor even with compelling evidence that it existed, was unprotected and was not yet hot. All Condoleezza Rice and the Bush administration could see – with the exception of US vice president Dick Cheney – was a third Middle East War, and the best they could offer was bringing it to the UN.

The message heard in Tehran and Pyongyang was that the Americans speak loudly, but will not act to stop nuclear proliferation. In fact, the US went right back to talking to the North Koreans, and tried to help shepherd an Israeli-Syrian deal that would give the Golan Heights back to Syria. Fast-forward eight years to 2015 and the JCPOA (Iran Deal). The US decided to give Iran – a US State Department-designated state sponsor of terrorism – the right to enrich uranium, something not given to any other nation. All other countries that wanted nuclear power were provided at most with heavily regulated peaceful nuclear programs that couldn't ever turn their reactors into producing nuclear weapons grade material.

Iran knew from the American decision not to attack the Syrian reactor in 2007 or the Iraqi reactor in 1981, and from the post-traumatic damage Americans experience to this day regarding its two never-ending wars in Afghanistan and Iraq, that

the US would not attack Iran over its nuclear program, despite lots of bluster and sanctions.

The Iranians had all the leverage, and they knew it. Economic sanctions – unless exercised to the max – are not likely to get results when dealing with an Islamist totalitarian regime.

What has Israel learned? For 71 years, Israel has learned to never trust its existential security to anyone but itself. Israel took out the Syrian nuclear reactor itself. If it hadn't, either ISIS or Hezbollah would be nuclear today! If Hezbollah were nuclear, that would mean Iran would already be a nuclear power. Where are the thanks to Israel for saving the West from calamity in 2007 or 1981?

The US has little recourse with North Korea, as they already possess an unknown number of nuclear weapons. They do not need a ballistic missile to hit South Korea, Japan or the US; they can fly it on a plane and release it like the US did in Hiroshima and Nagasaki, or detonate it on an American coastline, paralyzing the electrical grid for months.

But unlike the North Koreans, the Iranians can still be stopped before they get to that point. Rejoining the JCPOA would guarantee that Iran has a clear path to nuclear bombs. It will

also guarantee nuclear proliferation in response to a nuclear Iran in all the Sunni authoritarian states whose stability is not guaranteed, making the possibility of Sunni jihadists becoming nuclear a real threat in the future, if there is another Arab Winter.

The answer is to stop Iran now with sanctions that are fully enforced, including secondary sanctions on China and European companies. US President Donald Trump needs to allocate more financial

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and manpower resources to all of his government agencies to implement the full force of sanctions. According to some of my Congressional friends, this is not the case; only more money is needed now.

Unless the regime collapses, it will be a growing and increasingly dangerous menace, because its underlying fundamental goal is for a Shi'ite revolution to change the face of the Middle East from Sunni to Shi'ite. Possessing nuclear weapons and the destruction of Israel are an integral part of that strategy. Imagine a US president looking back in the year 2028, having to deal at that time with an expansionist nuclear Iran that is threatening a nuclear Saudi Arabia, Egypt, Turkey and the UAE, with the world on edge, and saying "What were they thinking, that they allowed this to happen?" It remains to be seen whether Trump is a Rand Paul isolationist or a Mike Pompeo Republican who will act if American redlines on proliferation and an Iranian nuclear weapon are crossed.

Source: The writer is the director of MEPIN, the Middle East Political Information Network. <https://www.jpost.com/>, 24 July 2019.

OPINION – James M. Dorsey

Barreling Toward a Nuclear and Ballistic Missile Arms Race in the Middle East

US policy is not the only factor feeding the burgeoning nuclear and ballistic missile arms race in the Middle East. It is also being enabled by the inability or unwillingness of the other major powers – Europe, Russia, and China – to counter crippling US sanctions against Iran in ways that would ensure that Tehran maintains an interest in adhering to the 2015 international agreement that curbed its nuclear program despite last year's US withdrawal from the deal.

With the Middle East teetering on the brink of a military confrontation, Iran has vowed to start breaching the agreement next month if the international community, and particularly Europe, fails to shield it from US sanctions. Former IAEA deputy director general Olli Heinonen, a hardliner when it comes to Iran, asserted recently during a visit to Israel that Iran would need six to eight months to enrich uranium in the quantity and quality required to produce a nuclear bomb.

US and Chinese willingness to lower safeguards in their nuclear dealings with Saudi Arabia further fuels Iranian doubts about the value of the nuclear agreement and potentially opens the door to a nuclear arms race. US Secretary of State Mike Pompeo recently visited Saudi Arabia and the UAE before joining President Trump for visits to India and South Korea and talks with world leaders at a G20 summit in Japan. "We'll be talking with them about how to make sure that we are all strategically aligned,

and how we can build out a global coalition, a coalition not only throughout the Gulf states, but in Asia and in Europe...to push back against the world's largest state sponsor of terror," Pompeo said as he departed Washington.

Trump detailed the prism through which he approaches the Middle East in a wide-ranging interview with NBC News. He deflected calls for an FBI investigation into last October's murder by Saudi government agents of journalist Jamal Khashoggi in the kingdom's consulate in Istanbul. "Iran's killed many, many people a day. Other countries in the Middle East – this is a hostile place. This is a vicious, hostile place. If you're going to look at Saudi Arabia, look at Iran, look at other countries," Trump said, suggesting that crimes by one country provide license to others.

Asked whether Saudi arms buying was reason to let Saudi Arabia off the hook, Trump responded:

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"No, no. But I'm not like a fool that says, 'We don't want to do business with them.' And by the way, if they don't do business with us, you know what they do? They'll do business with the Russians or with the Chinese." Trump and other senior US officials reiterated in recent days that they would not allow Iran to acquire a nuclear weapon.

Europe has so far unsuccessfully sought to put in place an effective mechanism that would allow European and potentially non-European companies that do business with Iran to circumvent US sanctions unscathed. As the US prepared to announce new sanctions, Russia said it would help Iran with oil exports and its banking sector if the European mechanism fails to get off the ground. (It offered no details.) While countering the sanctions is Iran's immediate priority, Saudi moves to put in place the building blocks for a nuclear industry that could develop a military component and a ballistic missiles capability – moves that are occurring with the help of the Trump administration as well as China – are likely to increase Iranian skepticism about the nuclear accord's value.

Trump's argument that Russia and China would fill America's shoes if the US refused to sell arms and technology to Saudi Arabia is not without merit, even if it fails to justify a lack of safeguards in the provision of nuclear technology to the kingdom. In 2017, with the US refusing to share its most advanced drone technology, China opened its first overseas defense production facility in Saudi Arabia. State-owned China Aerospace Science and Technology Corporation (CASC) is manufacturing its CH-4 Caihong, or Rainbow drone, as well as associated equipment in Saudi Arabia. The CH-4 is comparable to the US armed MQ-9 Reaper drone.

Satellite images released by the Middlebury

Institute of International Studies and confirmed by US intelligence show that Saudi Arabia has significantly escalated its ballistic missile program with the help of China. The missile program runs counter to US policy, which sought for decades to ensure that Saudi Arabia had air supremacy in the region so it wouldn't seek to bypass the US to upgrade its missile capabilities.

The program, which started in the late 1980s with Saudi Arabia's first clandestine missile purchases from China, suggests that the

kingdom, uncertain about the reliability of the US, is hedging its bets. Saudi development of a ballistic missile capability significantly dims any prospect of Iran's agreeing to limit its missile program – a key demand put forward by the Trump administration.

In 2017, Saudi Arabia signed a nuclear energy cooperation agreement with China that included a feasibility study for the construction of high-temperature gas-cooled (HTGR) nuclear power plants in the kingdom as well as cooperation in intellectual property and the development of a domestic industrial supply chain for HTGRs built in Saudi Arabia. The HTGR agreement built on an accord signed in 2012 that involved maintenance and development of nuclear power plants and research reactors, as well as the provision of Chinese nuclear fuel. The Washington-based ISIS warned at the time that the 2015 Iran nuclear agreement had "not eliminated the kingdom's desire for nuclear weapons capabilities and even nuclear weapons."

The Trump administration, eager to corner a deal for the acquisition of designs for nuclear power plants, a contract valued at up to \$80 billion depending on how many Saudi Arabia ultimately decides to build, has approved several nuclear technology transfers to the kingdom. It has also approved licenses for six US firms to sell atomic

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power technology to Saudi Arabia. Saudi Arabia is nearing completion of its first atomic reactor in the King Abdulaziz City for Science and Technology near Riyadh.

A signatory of the nuclear NPT, Saudi Arabia has ignored calls by the IAEA to implement proportionate safeguards and an inspection regime that would ensure that it does not move toward development of a nuclear military capability. "Saudi Arabia is currently subject to less intrusive monitoring by international inspectors because Riyadh concluded what is known as a small quantities protocol with the agency. The small quantities protocol was designed to simplify safeguards for states with minimal or no nuclear material, but it is no longer adequate for Saudi Arabia's expanding nuclear program," Kelsey Davenport, director of Non-proliferation Policy at the Arms Control Association, told Middle East Eye. Ms. Davenport warned that "given these factors, there are legitimate reasons to be concerned that Saudi Arabia is seeking to develop the technical capabilities that would allow Riyadh to quickly pursue nuclear weapons if the political decision were made to do so."

Source: <https://besacenter.org/>, 28 July 2019.

OPINION – Samantha Boh

Will Singapore Warm up to Nuclear Energy to Combat Climate Change?

Eight years since the Fukushima nuclear disaster triggered a global rethink on energy policy, signs have emerged that Singapore may be warming back up to the power source. Pro-nuclear chatter in the city state was spurred last month (June) when Ho Ching – the chief executive of Singapore state investment fund Temasek Holdings, who is married to Prime Minister Lee Hsien Loong – published a lengthy Facebook post expressing support for the power source. "Overall, for a greener earth and to reduce carbon emissions, we

must master and adopt nuclear energy as a key solution. For now, it is better [that] developed and more capable nations step up their nuclear power capacity," she said. "This will reduce the demand for fossil fuels, and lower the overall carbon emissions."

Ho's post came attached to a Bloomberg opinion piece that criticised Germany's decision to phase out all nuclear power by 2022 – 16 years ahead of coal in 2038. It was a telling sign that Singapore, which has declared twice in the past

12 years that nuclear power is unsuitable, may be changing its tune towards nuclear power. And it's not alone. Global fear of nuclear energy flared in the wake of the 2011 accident in Japan. But spurred on by the mounting threat of climate change, pressure to abandon dirtier fossil

fuels, advances in nuclear energy research and the prospect of safer reactors, many governments are now having a change of heart. According to the World Nuclear Association, 30 countries – including the United Arab Emirates, Turkey, Nigeria, Bangladesh, Egypt and Indonesia – are currently considering, planning or starting nuclear power programmes.

Enhanced Safety: Singapore's interest in nuclear energy has ebbed and flowed over the years due to one reason: safety. In 2007, Prime Minister Lee said nuclear energy was not a feasible alternative energy source because there was simply not enough land to build plants with the necessary 30km safety radius. But three years later, he said the country needed to be prepared for the day it does become necessary and feasible, maybe even in his lifetime. But interest waned again in 2012 – a year after the Fukushima nuclear disaster – when a two-year pre-feasibility study concluded that present nuclear energy technology was not yet suitable for Singapore. The city state has nonetheless kept up on nuclear safety research, with the National

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Research Foundation in 2014 launching a S\$63 million (US\$46.3 million) Nuclear Safety Research and Education Programme to examine the implications of such developments.

In her Facebook post, Ho said nuclear power generation had become much safer since Fukushima, noting that Singapore was once a keen supporter of the technology. The city state even sent nuclear scientist-turned-politician Tay Eng Soon to Britain's Atomic Energy Agency for training, she added. Unlike second-generation nuclear reactors, third-generation reactors have passive cooling systems. So in the event of a power outage, like at Fukushima, nuclear plants could still be cooled to prevent a core meltdown, said Professor Chung Keng Yeow, director of the Singapore Nuclear Research and Safety Initiative at the National University of Singapore. Scientists and engineers around the world are now developing the next generation of reactors, promising a close to zero chance of core meltdowns. They are also developing smaller, modular ones, which promise to be safer and easier to manage as they produce less heat. The prospect of smaller and safer reactors could be the game changer Singapore has been waiting for. For safety reasons, nuclear plants have always needed surrounding exclusion zones – a hard criterion for an island state. But there had been debate over whether the smaller and safer reactors would need the same safety radius, Chung said.

"In the future, there could be a reactor with a smaller exclusion zone. Then, it could be a different story. At least for now, if you are just looking at technology and safety guidelines, it is difficult for Singapore," he said. But the focus on safety had also driven up costs, said Philip Andrews-Speed of the NUS' Energy Studies Institute. "The more you demand safety, the more expensive it gets. It's just like cars, the more things

you put in it, the more expensive it gets," he said.

The Climate Change Factor: As the world moves to keep the rise in global temperature this century well below 2 degrees Celsius, a shift away from fossil fuels to clean energy sources has proved the only way forward. But experts say while renewable energy remains the popular and more established choice, it might not work for all. "The issue with renewables is intermittency," said Claude Guet, students & research programme director at NTU's Energy Research Institute. "It is a very local, national problem. If you are in Australia, solar is a very good option. If you are in Singapore, which is on the equator, there is not so much wind. And there is no room for enough solar panels."

About 95 per cent of Singapore's electricity is generated using natural gas, piped from Malaysia and Indonesia. Solar energy, Singapore's best source of renewable energy, contributed only about 0.8 per cent of its total electricity-generation capacity last year – though it has the potential to meet 25 per cent of the city state's energy demands by 2025.

Energy independence has also been a driving factor for some nations, namely France, where more than 70 per cent of electricity is generated through nuclear power plants. "No country wants to rely heavily on another

country for its energy supply," said Guet, who was also senior adviser to the chief executive officer of CEA (French Alternative Energies and Atomic Energy Commission). "The French went nuclear because if we went with oil we would have to rely on the Middle Eastern countries." About 95 per cent of Singapore's electricity is generated using natural gas, piped from Malaysia and Indonesia. Solar energy, Singapore's best source of renewable energy, contributed only about 0.8 per cent of its total electricity-generation capacity last year – though it has the potential to meet 25 per cent of the city state's energy demands by 2025, according to a 2014 white paper by the Sustainable Energy Association of Singapore. "If you were to take a global and balanced view, I would say nuclear could, together with renewables, energy efficiency and carbon capture and use, bring about a net-zero carbon future," Andrews-Speed said.

All about the Messaging: But far more than safety and technology has hampered some countries' uptake of nuclear power. Much of that decision hinges on public perception. According to Shirley Ho, associate chair (faculty) at NTU's Wee Kim Wee School of Information and Communication, public opinion around nuclear power can be based on inaccuracies. After holding a series of focus groups with 39 Singaporeans, Ho found many participants were misinformed about the operations of well-functioning nuclear power plants; they thought the facilities emitted harmful radiation to the environment and public, and utilised technology that could be weaponised.

In truth, the radiation emitted from a well-functioning nuclear power plant is less than the radiation experienced on an aeroplane flight. "If the public does not know much about nuclear energy and all they have are misperceptions, policymakers will need to rectify them first before even starting a conversation on nuclear energy," she said. The debate on nuclear energy has finally boiled down to messaging. Countries like France did well at communicating the benefits of nuclear energy that struck a chord with the public, she said. "If saving the environment and mitigating climate change is not on the top of the public's agenda, it will be very difficult to have that discussion on nuclear energy by highlighting these benefits."

Source: <https://www.scmp.com/>, 22 July 2019.

OPINION – World Nuclear News

Nuclear's Small Role in Humanity's Biggest Adventure

On 21 July, 1969, Neil Armstrong stepped onto the Moon. During the brief few hours he and Buzz Aldrin spent on the surface they deployed a suite of scientific experiments, some of which would depend on radioisotope heaters to protect them

from the harsh lunar night. Dr Jonathan Cobb, senior communication manager at World Nuclear Association, describes nuclear technology's role in the historic event. "There you go. Good work; good show. Hey, whoa; stop, stop! Back up." Not quite as famous as 'One small step...' but nevertheless words said by Neil Armstrong on the surface of the Moon, 50 years ago this week. They were said to Buzz Aldrin as the two astronauts, nearing the end of their moonwalk and running out of time, hurried to set up a series of experiments on the lunar surface.

Originally it had been planned for a more complex set of experiments, called the Apollo Lunar Surface Experiments Package (ALSEP), to be carried on Apollo 11. These would have been powered by a SNAP-27 radioisotope thermoelectric generator (RTG), which would convert the heat energy from radioactive decay to electrical energy. However, initial plans for there to be two moonwalks during the Apollo 11 mission had been revised to just one - with the total time spent on the Moon's surface planned to be under three hours. The scientific experiments would need to be set up in just ten minutes. The intended Apollo Lunar Surface Experiments Package (ALSEP) would need to be simplified to allow deployment in that short timeframe.

The Bendix Corporation had been awarded the contract to develop the ALSEP in early 1966. They proposed a simplified set of experiments collectively termed the Early Apollo Scientific Experiments Package, or EASEP. These would utilise components that had been in preparation for the proposed Apollo 13 ALSEP. Instead of using an RTG for power, the EASEP would be powered by two solar panels, and therefore could only operate during the lunar day. The experiments would consist of a passive seismometer, designed to measure seismic activity and physical properties of the lunar crust and interior, and a

After holding a series of focus groups with 39 Singaporeans, Ho found many participants were misinformed about the operations of well-functioning nuclear power plants; they thought the facilities emitted harmful radiation to the environment and public, and utilised technology that could be weaponised.

lunar dust detector to measure dust accumulation. Without protection, the suite of experiments would have been exposed to temperatures as low as -175°C during the lunar night. To overcome this, two isotope heaters (now more usually called radioisotope heater units) were included, built into the passive seismometer package. The two 15-watt heaters were attached to a thermal plate and were designed to keep components to a temperature higher than -54°C to ensure their required reliability. The heat they produced came from the radioactive decay of 36 grams of plutonium 238, at the centre of each of the heaters.

The heaters, developed by the Atomic Energy Commission, were the first major use of nuclear technology in a manned space flight mission. Each heater was 7.6 cm in diameter, 7.6 cm long, and weighed 57 g, including multiple layers of shielding and protective materials. The plutonium fuel was encased in various materials chosen for radiation shielding and for heat and shock resistance. These materials included a tantalum-tungsten alloy, a platinum-rhodium alloy, titanium, fibrous carbon, and graphite, with an outer layer of stainless steel. Extensive safety analyses and tests were performed by Sandia Laboratories at Albuquerque, New Mexico, to determine the effects of an abort or any conceivable accident in connection with the moon flight. The safety report by the Interagency Safety Evaluation Panel, made up of representatives of NASA, the AEC, and the Department of Defense, concluded that the heater presented no undue safety problem to the general population under any accident condition deemed possible for the Apollo mission.

Apollo 11 lifted off at 13:32 UTC on 16 July and landed on the Moon at 20:17 UTC on 20 July. At 2:56 UTC on 21 July Neil Armstrong, commander of the mission, stepped on to the lunar surface. At 4:25 UTC, Buzz Aldrin, the lunar module pilot,

transported the scientific package about 17 m south of the Lunar Module and set up the equipment. The experiments were turned on by ground command while the astronauts were still on the surface, and data was first received at 4:40 UTC. The seismometer was able to detect the impact of articles discarded by the astronauts as they prepared to return to the orbiting command module.

The long lunar day meant that the solar panels provided power until a few hours before local lunar sunset on 3 August. During that first lunar day of operations, the seismometer recorded a number of events which appeared to scientists to represent seismic activity and/or rock slides down the sides of nearby craters. As night fell the isotope heaters began their task of providing enough heat to protect the experimental apparatus.

When the sun rose on the next lunar day - August 19 - Ground Control turned the instrument on again. The isotope heaters had worked successfully. The EASEP began reporting experimental data again. It continued to function until 27 August, when near the lunar noon and with temperatures at their highest, the EASEP ceased responding to commands from Earth stations and the experiment was formally stopped.

However, some data continued to be received, and shortly after a second lunar night, the thermal plate reported a temperature of -47°C , compared to -152°C for the unprotected solar panel still in shade. From Apollo 12 onwards, missions would carry the more extensive ALSEP. These would upgrade their power source to the SNAP-27 radioisotope thermoelectric generator, which allowed more extensive and continuous operation, with data being returned many years after the last astronaut had stepped on the Moon. Radioisotope heater units and radioisotope

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thermoelectric generators would go on to power and support some of the most successful space missions, including the Mars rovers and space probes sent to Jupiter, Saturn, Uranus, Neptune and Pluto, returning images and other data that have broadened our understanding and filled us with wonder.

Source: <http://world-nuclear-news.org/>, 18 July 2019.

NUCLEAR STRATEGY

CHINA

China Pursues Nuclear Strategy of Self-Defense: White Paper

China pursues a nuclear strategy of self-defense, the goal of which is to maintain national strategic security by deterring other countries from using or threatening to use nuclear weapons against China, a white paper said. China is always committed to a nuclear policy of no first use of nuclear weapons at any time and under any circumstances, and not using or threatening to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones unconditionally, said the white paper titled "China's National Defense in the New Era," released by the State Council Information Office. China advocates the ultimate complete prohibition and thorough destruction of nuclear weapons. China does not engage in any nuclear arms race with any other country and keeps its nuclear capabilities at the minimum level required for national security, according to the white paper.

Source: <http://www.xinhuanet.com/>, 24 July 2019.

INDIA

'No Need to Change NFU Policy', Says India's Top Nuclear Scientist

One of India's top nuclear physicists credited with making the country a nuclear power said there was no need to change the "No First Use" policy – New Delhi's declared policy on the use of nuclear weapons.

"There is no need to change the "No First Use" policy. As a responsible country it is a good position to keep," former chief scientific advisor to the government Dr R Chidambaram said while addressing the Jasjit Singh Memorial lecture organised by the Centre for Air Power Studies on national security in New Delhi. Strongly backing the No- First Use policy Dr Chidambaram said, "If you get every country to agree, disarmament would be achieved globally."

Chidambaram (82) who had also served as the director of the BARC and chairman of India's Atomic Energy Commission, was a key member of the teams that carried out India's two nuclear tests in Pokhran in 1974 and 1998, Dr Chidambaram also rejected need to carry out any more tests. "We cleaned up our knowledge of physics during the test then, and with supercomputing and better modelling, India does not need to carry out any further tests," he said and added, "India has declared

a moratorium on further nuclear tests." Speaking about the nuclear tests, Dr Chidambaram said all possible requirements were adequately tested. "One of the fission devices tested was ready for 15 years. We tested storage as well. India now has all the data needed and tests are not necessary," he added.

China advocates the ultimate complete prohibition and thorough destruction of nuclear weapons. China does not engage in any nuclear arms race with any other country and keeps its nuclear capabilities at the minimum level required for national security, according to the white paper.

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He described India's nuclear programme as "anti-fragile" and said "the more control that established nuclear powers put on us the better we became." At the same time he advised ample caution against trying to develop every technology internally. "If anything is denied you should have the capability to develop it, but there is no need to reinvent the wheel." Dr Chidambaram who addressed a wide gamut of issues that affect national security, said that "development without security is vulnerable whereas (spending on) security without development was meaningless."

Source: Sudhi Ranjan Sen, <https://www.hindustantimes.com/>, 17 July 2019.

PAKISTAN

Pakistan would Give Up Nuclear Weapons if India Did: Imran Khan

Prime Minister Imran Khan on 23 July dismissed the notion of any nuclear war between Pakistan and India, saying his country would give up its weapons, if its eastern neighbour did the same. In an interview with Fox News, the Prime Minister responded in affirmative when asked "If India said we would give up nuclear weapons, would Pakistan?"

"Yes, because nuclear war is not an option. And between Pakistan and India, the idea of nuclear war is actually self-destruction, because we have a 2,500-mile border. "Also, I think there's a realisation in the subcontinent – as there was some incident that happened last February – and we again had tension at the border."

... Khan categorically dismissed any "concerns" about Pakistan's nuclear weapons getting into the

Yes, because nuclear war is not an option. And between Pakistan and India, the idea of nuclear war is actually self-destruction, because we have a 2,500-mile border. "Also, I think there's a realisation in the subcontinent – as there was some incident that happened last February – and we again had tension at the border.

hands of terrorists. "Pakistan has one of the most professional armies and one of the most comprehensive command and control systems for our nuclear weapons." "They have absolutely no need to worry," Khan said, and added "the United States knows about it because we share our intelligence with the US about the safety measures in place for our nuclear programme."

Source: *Khaleej Times*, 23 July 2019.

BALLISTIC MISSILE DEFENCE

NORTH KOREA

Nuclear Talks in Doubt after North Korea Tests Ballistic Missiles, Diplomat Cancels Meet with US

North Korea test-fired two new short-range ballistic missiles on 25 July, South Korean officials said, its first missile test since its leader, Kim Jong Un, and US President Donald Trump agreed to revive denuclearisation talks last month (June). South Korea, which supports efforts by North Korea and the United States to end years of hostility, urged the North to stop acts that are unhelpful to easing tension, saying the tests posed a military threat on the Korean peninsula.

The South's National Security Council said it believed the missiles were a new type of ballistic missile but it would make a final assessment with the United States. Firing a ballistic missile would be a violation of UN Security Council resolutions that ban the North from the use of

The South's National Security Council said it believed the missiles were a new type of ballistic missile but it would make a final assessment with the United States. Firing a ballistic missile would be a violation of UN Security Council resolutions that ban the North from the use of such technology. North Korea has rejected the restriction as an infringement of its sovereign right to self-defence.

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North Korea launched the missiles from the east coast city of Wonsan with one flying about 430 km (267 miles) and the other 690 km (428 miles) over the sea. They both reached an altitude of 50 km (30 miles), an official at South Korea's Defence Ministry said. Some analysts said the North appeared to have retested missiles it fired in May, but two South Korean military officials said the missiles appeared to be a new design. The launch casts new doubt on efforts to restart stalled denuclearisation talks after Trump and Kim met at the demilitarised zone (DMZ) between the two Koreas at the end of June.

US Secretary of State Mike Pompeo and North Korean Foreign Minister Ri Yong Ho had been expected to meet on the sidelines of a Southeast Asian security forum in Bangkok next week. But a diplomatic source told Reuters that Ri had cancelled his trip to the conference. The White House, Pentagon and US State Department did not immediately respond to requests for comment. Japanese Prime Minister Shinzo Abe said the test had no immediate impact on Japan's security, according to Kyodo News.

US national security adviser John Bolton, who has taken a hard line towards North Korea, made no mention of the launches in a tweet after a visit to South Korea. He said he had "productive meetings" on regional security. South Korea's nuclear envoy, Lee Do-hoon, had phone calls with his US counterpart, Stephen Biegun, and his Japanese counterpart, Kenji Kanasugi, to share their assessment, South Korea's foreign ministry said in a statement. Chinese foreign ministry spokeswoman Hua Chunying told a briefing that Beijing had noted the launch, and called for North Korea and the United States to reopen negotiations "as early as possible".

'Clear Message': After Trump and Kim met last month (June), the United States and North Korea vowed to hold a new round of working-level talks soon, but Pyongyang has since sharply criticised upcoming joint military drills by US and South Korean troops. North Korea's foreign ministry accused Washington this month (July) of breaking a promise by holding military exercises with South

Korea. Kim inspected a large, newly built submarine from which ballistic missiles could be launched. "By firing missiles, taking issue with military drills and showing a new submarine, the North is sending one clear message: there might be no working-level talks if the United States doesn't present a more flexible stance" said Kim Hong-kyun, a former South Korean nuclear envoy.

Kim Dong-yup, a former navy officer who teaches at Kyungnam University in Seoul, said the weapons tested appeared to be the same as the ones tested in May, which were less of a challenge than long-range missiles but "enough to subtly pressure" Washington. But the South Korean military believes they may be new, because they travelled further. In North Korea's previous missile test in May, the projectiles flew only 420 km (260 miles) and 270 km (168 miles) though they reached the same altitude of about 50 km (30 miles). "We're very cautious because it's difficult to extend the range within such a short time," said one military official, who asked not to be identified due to the sensitivity of the issue. ...

Source: <https://www.news18.com>, 25 July 2019.

SOUTH KOREA

Beef Up Missile Defense

North Korea said that its test launches of "new-type" ballistic short-range missiles were "a demonstration of its power" and a "solemn warning to South Korea." "South Korea's leader must not make a mistake of ignoring the warning," North Korean leader Kim Jong-un said, according to the North Korean Central News Agency. The state media outlet said that Kim instructed the missile launches and personally watched them.

The general view of the North's provocation is that it seeks to raise its negotiating power ahead of nuclear talks with the US. But the South should not view North Korea's missile launches only in the light of negotiations. It is concerning that the North has upgraded its missile capability stage by stage.

North Korea is likely to test-fire the new-type missiles several more times before deploying

them for actual warfare. The South Korean military failed to track the two missiles North Korea fired. It announced the first missile flew 430 kilometers but later corrected the distance to some 600km after its joint detailed analysis with the US military.

The South's military authorities said the missiles test-fired by the North look similar to Russia's Iskander ballistic missiles. The Iskander is nuclear-capable, can fly at a "flattened" altitude of around 40 km and make in-flight guidance adjustments. It is reportedly hard to intercept this type of missiles with the US and South Korean missile defenses now in place.

If the South is unable to intercept a missile, its strategic facilities within its range can be destroyed. A missile with a range of 600km can reach anywhere in South Korea. South Korea must urgently beef up its missile defense capabilities. The military authorities appear to be trying to avoid admitting North Korea's missile threats. The South Korea-US Combined Forces Command noted the missile launches were "not a threat directed at South Korea or the US."

Can the military relax because the missiles fired by the North were not directed at South Korea when the entire nation falls within their range if they are fired southward and we are unable to intercept them? While the North launched missiles then said they were a warning to the South, the South Korean president is silent. President Moon Jae-in has not presided over a security meeting to discuss how to respond to the latest missile launches. Cheong Wa Dae and the government have not issued any statement protesting the North Korean provocation. Rather, the government tried to calm the fallout from the North's missile launches.

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Asked about North Korea's intent behind its continued missile provocations, a Cheong Wa Dae official told reporters: "We cannot say openly about it." As for the KCNA reports, the official said that the South cannot make its position clear in response to them "because the reports are not an official North Korean position." Few would deny that all of North Korea's news media speak for Kim.

The North's ballistic missile launches violate UN Security Council resolutions. Nevertheless, the North turned on the South, likely because of the latter's submissive attitude toward Pyongyang. When the North fired ballistic missiles in May, Cheong Wa Dae and the military hesitated to call them ballistic missiles. Their analysis of the missile launches is still not over. ...

Source: <http://www.koreaherald.com/view.php?ud=20190728000113>, 28 July 2019.

NUCLEAR ENERGY

CHINA

China Launches Small Reactor Project in Push for Nuclear Dominance

China has started building its first small modular reactor (SMR) project on the island province of Hainan, the state-owned China National Nuclear Corporation (CNNC) said, as part of the country's efforts to diversify its nuclear sector. The project was originally scheduled to go into construction in 2017. The company did not say when the project was likely to be completed.

The country's first demonstration SMR at the Changjiang nuclear facility in Hainan will be used to "verify the design, manufacture, construction and operation of the technology and accumulate valuable experience in small nuclear power

The country's first demonstration SMR at the Changjiang nuclear facility in Hainan will be used to "verify the design, manufacture, construction and operation of the technology and accumulate valuable experience in small nuclear power plants.

plants," CNNC said in a notice. China hopes the reactor - "Linglong One" - will eventually stand alongside its bigger third-generation "Hualong One" model as it bids to export its advanced nuclear technologies and build projects overseas.

SMRs are around a third of the size of conventional reactors and can be used in the remote countryside, shipped to islands and plugged into existing grid infrastructure. They are also expected to be used in China for urban heating and desalination projects. The State Power Investment Corporation said last month (June) that it was planning to build a small-scale pilot heating reactor in the northeastern city of Jiamusi, with the aim of putting it into operation by 2024.

China's ambitious reactor-building plans have been held back by its decision to rely on larger, safer but untested "third-generation" reactor designs, which are costly and have long construction time. The world's first AP1000, designed by U.S.-based Westinghouse, finally went into operation at Sanmen on China's eastern coast last year, some four years behind schedule. The world's first EPR, designed by France's Areva, also went into operation in China last December. China is expected to complete its first reactor using its own domestic Hualong One technology by the end of next year, ahead of schedule.

Source: <https://in.reuters.com/>, 18 July 2019.

FRANCE

EDF Cuts Output at St. Alban Nuclear Power Plant as France Boils

French utility EDF will cut output at the two reactors at its St. Alban nuclear power plant due to scorching temperatures and dry weather which have limited its use of river water to cool the reactors. EDF uses water from the Rhone to cool the two 1,335 MW capacity reactors at St. Alban.

The utility warned that output at the plant could be affected by the low flow rate of the Rhone river. Its use of water from rivers as coolant is regulated by law to protect plant and animal life and it is obliged to cut electricity generation in hot weather when water temperatures rise, or when river levels and the flow rate are low.

The company said it would reduce power generation at the St. Alban 1 reactor by 400 MW from Tuesday evening until Thursday (23-25 July).

Generation at the St. Alban 2 reactor will be cut by 450 MW from Tuesday until mid-morning on Wednesday (23-24 July). Other EDF nuclear power facilities along the Rhone include the Bugey, Cruas and Tricastin plants, each of which has an installed capacity of 3,600 MW.

Lack of rainfall and hot weather in southeastern France have pushed groundwater, which feeds the river, to very low levels and cut its flow rate. France, like much of western Europe, is bracing for another heat wave which is expected to increase electricity demand for cooling. French and German spot electricity prices for day-ahead delivery hit their highest since February as the forecast rise in power demand coincided with reduced nuclear availability. EDF, which operates France's 58 nuclear reactors that account for over 75% of its electricity needs, said that it could prolong planned outages at its two Golfech nuclear reactors because of the heat wave.

Source: <https://energy.economictimes.indiatimes.com/>, 24 July 2019.

GENERAL

Mega Droughts and Desalination – Another Pressing Need for Nuclear Power

About 20% of the world's population has no access to safe drinking water, and this number will increase as the population continues to grow and

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global freshwater sources continue to decline. The worst-affected areas are the arid and semiarid regions of Asia, the Middle East and North Africa.

UNESCO has reported that the freshwater shortfall worldwide will rise to 500 trillion gallons/yr by 2025.

They expect water wars to break out in the near future.

The World Economic Forum says that shortage of fresh water may be the primary global threat in the next decade. But 500 trillion gallons/year only requires about 1,500 seawater desalination plants like the ones being built in California and Saudi Arabia. At a billion dollars a pop, that's a lot cheaper than war and starvation.

The World Economic Forum says that shortage of fresh water may be the primary global threat in the next decade. But 500 trillion gallons/year only requires about 1,500 seawater desalination plants like the ones being built in California and Saudi Arabia. At a billion dollars a pop, that's a lot cheaper than war and starvation.

Unfortunately, we presently desalinate only 10 trillion gallons/year worldwide. As reported in the Tri-City Herald and NY Times, stock exchange mutual funds have even formed surrounding water scarcity and have done quite well, like the AllianzGI Global Water Fund. This fund has averaged almost 10% since 2010 compared to under 6% for its average peer fund. These companies mainly deliver, test and clean drinking water. In California, the Mega Drought, that ended in 2017 ran for five years, severely straining water supplies, agricultural needs and wildlife. It clarified the need to build new desalination plants like every other modern arid population in the world. Most of Abu Dhabi's gas-fired power plants provide electricity to their huge desalination plants that deliver over a billion gallons of drinking water a day, at about 40¢/gallon. And it tastes good, too, I've tried it.

California needs 30 large desalination plants to deal with future mega droughts. They did recently

build one in Carlsbad, but it's not nearly enough. Desalination technologies are capable of treating water from a wide variety of sources, including brackish groundwater, surface water, seawater, and domestic and industrial wastewater. While the wastewater from desalination is itself

problematic, MIT has developed a process to turn it into useful products. The two main types of desalination are:

Thermal desalination (using heat energy to separate the distillate from high salinity water), represented by Multiple Effect Distillation (MED),

Multi-Stage Flash distillation (MSF) and Mechanical Vapor Compression (MVC), the latter primarily used to desalinate highly salty waters and industrial wastewater for industrial use, not necessarily for drinking.

Reverse osmosis (RO) membrane separation, which uses a membrane barrier and pumping energy to separate salts from the water.

These are common in homes and businesses.

Electrical energy is used for membrane-based systems and thermal energy is used for distillation systems. Some hybrid plants combine both membrane and distillation. Most desalination plants in the

Most desalination plants in the world use fossil fuels to power them, but it's even better to power them with nuclear energy. The new fleet of Small Modular Nuclear Reactors (SMRs) are ideal as they produce both thermal energy and electrical energy without producing greenhouse gases.

world use fossil fuels to power them, but it's even better to power them with nuclear energy. The new fleet of Small Modular Nuclear Reactors (SMRs) are ideal as they produce both thermal energy and electrical energy without producing greenhouse gases. But only 15 out of the thousands of desalination plants operating today worldwide are powered by nuclear. A small one is at the Canyon Diablo Nuclear Plant in California, slated to be closed soon. The plant could power several huge desalination plants for decades that could

desalinate its own cooling water, removing the most commonly stated problem with the plant. In contrast, all nuclear-powered naval vessels routinely use nuclear energy to desalinate seawater.

SMRs, like NuScale's, allow places with smaller electrical grids and limited infrastructure to add new electrical and water capacity in small increments and allow countries to site them as needed at many distributed locations. NuScale's small power module is in its last stages of licensing by the Nuclear Regulatory Commission and will be ready in only a few years. NuScale's small power modules are about 60 MW each and up to 12 of them can be put together to make a power plant up to 720 MW - a 12-pack....

Source: James Conca, <https://www.forbes.com/>, 14 July 2019.

IRAN

Iran to Start Constructing 2nd Phase of Bushehr Nuclear Power Plant Next Month

Ali Akbar Salehi, head of the Atomic Energy Organization of Iran (AEOI), made the remarks in a meeting with the members of the Energy Commission of Iranian Parliament, a member of the commission Jalal Mirzaei told Mehr correspondent. Mirzaei said that the nuclear chief in the meeting presented a report on the latest status of the country's nuclear activities to the lawmakers. The lawmaker added that Salehi had told them that the construction of the second phase of Bushehr nuclear power plant will start next month in cooperation with Russia.

Source: <https://en.mehrnews.com/>, 21 July 2019.

PERSIAN GULF

Advanced Nuclear Reactors Hold Promise of Clean Energy for Gulf Countries

Saudi Arabia will be one of a handful of countries expected to receive state-of-the-art advanced nuclear reactors from China and Russia, according

to a new report. The report, "Advancing Nuclear Innovation: Responding to Climate Change and Strengthening Global Security," was commissioned by the Global Nexus Initiative. This is a project established by the Partnership for Global Security, a Washington DC-based think tank, and the Nuclear Energy Institute (NEI), which represents the US nuclear energy industry. It is a publicly available assessment of the non-proliferation, security, and geopolitical characteristics of advanced nuclear-reactor technology.

The report, which took 16 experts over a year to produce, says that advanced reactors will likely be ready for deployment within one to two decades, setting the stage for major technological competition among

powerful geopolitical rivals. Although complicated by politics, the economic case for countries to invest in civil nuclear reactors as part of a mix of alternative energy sources is compelling. The Global

Nexus Initiative report says the international community should strive to make sure that any race for market share among geopolitical competitors strengthens nuclear governance rather than weakens it.

"In order to meet the energy and climate challenges which the world faces, advanced reactors should be ready for deployment in the 2025 to 2030 framework," said John Bernhard, a senior associate at the Partnership for Global Security who earlier served as Denmark's ambassador to the IAEA. "These reactors will generally have various advantages — they are smaller and more flexible than traditional reactors, which means inter alia that in many countries, including Saudi Arabia, they can be deployed in remote and arid areas."...

Electricity use will rise in the Kingdom due to the ongoing growth of urban areas and plans to develop a strong manufacturing sector. At the same time, according to the Electricity and Cogeneration Regulatory Authority (ECRA), nine

The Global Nexus Initiative report says the international community should strive to make sure that any race for market share among geopolitical competitors strengthens nuclear governance rather than weakens it.

percent of the electricity is used for desalination, on which Gulf countries are heavily dependent in the absence of fresh-water sources. Compared with traditional nuclear reactors, the advanced ones can offer reduced construction time and costs, and a wider variety of sizes and outputs for different locations and applications." Besides emission-free electricity generation, they may help in desalination of sea water, which could provide a new source of fresh water to areas in need," Bernhard said. "A general benefit of nuclear energy is its potential role in producing carbon-dioxide emission-free electricity for a number of purposes. For the foreseeable future, renewable energy sources like wind and sun will probably not be able to deliver the output needed, such as in industrial development."

Nuclear-energy experts say advanced reactors offer interesting new possibilities, especially for nuclear newcomers such

as Saudi Arabia. "From a climate-change standpoint, this may be a valuable contribution to the achievement of the Paris Agreement goals from some of the biggest oil-producing countries," Bernhard said. "I would expect that for various reasons, several Gulf states will be interested in including nuclear energy, partly from advanced reactors." A case in point is Saudi Arabia. Among the many goals of its Vision 2030 is a reduction in dependency on oil revenues. To this end, the government has set ambitious goals for renewables, such as 9.5 gigawatts of solar and wind power by 2023....

The peaceful use of nuclear energy has been globally important for more than 60 years, resulting in 452 nuclear reactor units in 32 countries, most of them in Europe, North America, East Asia, and South Asia." Nuclear energy is clean and generates 24/7 so it's a good companion to sun and wind. Renewables such as solar and wind are excellent sources of energy but dependent on

weather conditions, which aren't always stable," said Lady Judge, who is also a member of the International Advisory Board for the development of nuclear energy in the UAE. "So you need to have a stable force of clean energy which is available around the clock to back up any other system of power generation."

Of course there is no glossing over the importance of the newcomers ensuring, in cooperation with the IAEA, that their nuclear facilities, whether advanced or traditional, live up to the highest standards and requirements with regard to security. Nuclear technology can have dual use,

peaceful or weaponized. An extensive and effective international safeguards regime, implemented by the IAEA, exists to contain the potential proliferation of nuclear weapons. However, because of their unique features, advanced reactors do not easily fit into the existing national regulatory or international governance regimes, according to the

However, because of their unique features, advanced reactors do not easily fit into the existing national regulatory or international governance regimes, according to the Global Nexus Initiative's report. In fact, they pose new challenges for the safeguards system. As such, they will be subject to new security measures to help prevent a hostile outside attack, nuclear terrorism and insider sabotage.

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"These new technological challenges must be effectively addressed," the authors of "Advancing Nuclear Innovation" say. "Several countries are focused on developing advanced reactors, including the US, Canada, South Korea, the UK, France, Russia and China. But the lack of a developed regulatory system and regulator experience is a challenge for all nations." As advanced nuclear reactors move through the design and development phase, it is also vital to have well-developed test beds to demonstrate the technology, the report says, adding that Russia and China have an advantage in this area.

According to Dr. Peter Bode, a former associate professor in nuclear science and technology at

Delft University in the Netherlands, the use of nuclear-power plants in the future energy mix is beyond debate. "Solar, wind and other renewables will not be sufficient," he said. "But the future of nuclear in the region is positive, with plants in the UAE expected to be operational soon and used as an example that will quickly be followed by others." In a region where the future of oil and gas is unknown, nuclear power is expected to play a significant role. "It is a good companion, even currently, and certainly in the future," Lady Judge said. "And that feeling of energy security and energy independence, which nuclear brings, is one which many countries in the Gulf would like to share."

Source: Caline Malek, <https://www.zawya.com/>, 14 July 2019.

The industry's future is riding on largely unproven technologies like that of TerraPower because they're smaller and deemed safer than today's huge reactors. "Without this next generation of nuclear, nuclear will go to zero," Gates said

USA

Bill Gates Faces "Daunting" Nuclear Energy Future

The Microsoft co-founder has focused much of his time lately on climate change and energy innovation. In an exclusive interview with Axios, Gates said that setbacks he is facing with TerraPower, a nuclear technology firm he co-founded in 2006, has got him questioning the future of that entire energy source.

The Big Picture: At 10% of global power supply, nuclear power is the second-largest electricity source (after hydropower) that emits no carbon dioxide. It's declining in most places around the world, including the U.S., due to aging reactors, cheaper energy alternatives and public unease about radioactive risk — despite its benefits to addressing climate change. The industry's future is riding on largely unproven technologies like that of TerraPower because they're smaller and deemed safer than today's huge reactors. "Without this next generation of nuclear, nuclear will go to zero," Gates said during an interview in Washington last month (June). Germany is shutting 22 nuclear plants, France — a leader in

clean-burning nuclear power — has plans to shut down some of its reactors and a similar trend is underway in the US due to economic conditions, said Gates, before adding with a sigh: "So yes, it is daunting."

Flashback: Gates announced in December that TerraPower was scrapping plans to build a demonstration reactor in China, largely due to the Trump administration deciding that fall to crack down on technological agreements between the two nations. "There are times like when TerraPower gets told not to work in China, you're

thinking, 'Boy, is this thing going to come together or not?' " Gates said in what are his first public comments on the matter since it happened. "That was a real blow."

Where it Stands: Gates is now trying to build

TerraPower's demonstration reactor in the U.S., calling on the Energy Department and Congress to more aggressively support advanced nuclear power through more funding and new legislation. Such a plant could cost anywhere between \$3-\$6 billion, say experts and Gates' energy advisers. Bellevue, WA-based TerraPower is opening a new 65,000-square foot facility in the same region later this year to expand its research and testing, which is currently done in a lab 1/6th that size. Gates, whose net worth is roughly \$100 billion, hasn't disclosed how much money he has put toward the company, but experts think it's at least \$500 million.

"If at the end of the day we don't find a country that wants to build an advanced nuclear power plant, then TerraPower will fail. I'm going to keep funding it for a period of years. And working with the US is our strategy right now." — Bill Gates

What they're Saying: While Gates believes TerraPower has the most viable technology with the best chance of succeeding right now, numerous companies, led by NuScale, are pursuing other kinds that experts say could succeed where TerraPower isn't.

On Strategy: TerraPower made a big bet in 2015 working in China and with a government-owned entity. The thinking was that China has two things America doesn't — growing electricity demand and a long-term strategic energy plan. But, "TerraPower made a specific decision to focus on China for their first product and it hurt them when the current administration drew hard lines on U.S.-China collaboration," said Todd Allen, a nuclear energy expert at the centrist think tank Third Way. "Companies like NuScale that have a US focus for their first deployment do not have the same issue."

On Technology: TerraPower's technology, called the traveling wave reactor, would produce far less waste than current ones because it converts depleted uranium already considered a waste into fuel instead of creating new waste like today's tech. Producing less waste is a big plus because big disagreement persists on how best to store radioactive waste. But its technology is more unproven and more complex than its counterparts, experts say, and it's ran into specific technical challenges, *The Washington Post* reported earlier this year. By contrast, the Oregon-based NuScale uses technology more rooted in today's type, which means it doesn't need to build a demonstration plant, its chief commercial officer, Tom Mundy, said in an interview. "TerraPower's traveling wave may prove to be an example of a very ambitious attempt to solve a very challenging problem that has turned out to be too expensive and too difficult," said Chris Gadomski, head of nuclear research at Bloomberg New Energy Finance. "There are other simpler, easier ways to introduce advanced technology with less technology risk and financial burden."

What I'm Watching: NuScale, the first company to work with federal regulators in this area, is expecting a key review to be done by year's end,

final design approval by the second half of next year and — if all goes as planned — a reactor operating by 2026.

Source: <https://www.axios.com>, 15 July 2019.

URANIUM PRODUCTION

INDIA

Major Uranium Production Centre in Telangana

Telangana State is part of the Central Government's thrust areas with regard to mining of uranium, and a "major uranium production centre" is being planned in the State, Union Minister of State for Atomic Energy & Space Dr Jitendra Singh informed the Lok Sabha. He said

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UCIL under DAE, has made a detailed plan in line with Government's vision to achieve self-sufficiency in uranium production. With resources already identified, major production centres have been planned in Jharkhand, Andhra Pradesh, Karnataka, Telangana, Chattisgarh and Rajasthan. The information was provided by the

Minister in a written reply to the Lok Sabha.

It may be recalled that the Forest Advisory Committee of the Central Government in May this year, gave an in-principle approval for exploratory drilling for uranium ore in a total of 83sqkm in Amrabad Tiger Reserve in Nagarkurnool and in Nidgul reserve forest area in Nalgonda districts. The FAC had said that the uranium mining project in Telangana is "critical importance from national perspective."

Source: <https://telanganatoday.com>, 24 July 2019.

USA

Trump Rejects Increased Uranium Production Requirement, for Now

The Trump administration announced it won't require nuclear power plants in the US to buy more

domestically produced uranium. KNAU's Ryan Heinsius reports, that came as a surprise to some environmental groups. The Department of Commerce in April recommended that nuclear plants be ordered to buy a quarter of their uranium from US sources. But, the White House announced it wouldn't act, and instead will create a taskforce to study the issue.

US uranium production is at its lowest level in nearly seven decades. Domestic power plants purchase only about 7% of their uranium

from domestic suppliers, and the rest is imported from Canada, Australia, Russia, and other countries. Uranium companies had pushed for the so-called "buy America" requirement, saying dependence on imports threatens national security.

Environmental groups, however, welcomed the president's decision. They say boosting US uranium production would lead to more mining on public lands in the Southwest, threatening Bears Ears National Monument and possibly the Grand Canyon. New uranium claims are banned on a million acres outside the park, but conservation groups worry it could be lifted by the administration.

Source: <https://www.knau.org/>, 16 July 2019.

NUCLEAR COOPERATION

INDIA-FRANCE

French MNC EDF Upbeat on India across Renewables, Nuclear, T&D Sectors

French power multinational EDF (Électricité de France) is upbeat on India across several areas including renewables, nuclear power, transmission and distribution systems, and smart

grids. The company, which had bagged a mega project to deploy five million smart meters in Bihar and Andhra Pradesh, has completed pilot projects and is stepping up efforts to deploy them.

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with Andhra Pradesh and Bihar. With this project, EDF is now active in India in all the areas that are key for reducing the country's carbon dioxide emissions through low carbon electricity generation of nuclear and renewable, smart grids and intelligent public lighting." During her interaction with BusinessLine, Marianne said, "India is a key country for EDF. We want to be part of the Indian Energy Transition Programme. We have won a very competitive and very innovative

Marianne said, "India is a key country for EDF. We want to be part of the Indian Energy Transition Programme. We have won a very competitive and very innovative contract, which is one of the two five million contracts.

Marianne Laigneau, Group Senior Executive Vice-President In-Charge of International Division, said, "EDF has been awarded the biggest ever contract in India by Energy Efficiency Services Limited (EESL), where it has to design, install and integrate a network of 5 million smart metres across India starting with Andhra Pradesh and Bihar. With this project, EDF is now active in India in all the areas that are key for reducing the country's carbon dioxide emissions through low carbon electricity generation of nuclear and renewable, smart grids and intelligent public lighting." During her interaction with BusinessLine, Marianne said, "India is a key country for EDF. We want to be part of the Indian Energy Transition Programme. We have won a very competitive and very innovative contract, which is one of the two five million contracts."

Service, Data Support: "We are providing a global service right from design of data support, we control and manage systems of the process. Since we are

installing these meters in two Indian States, it is challenging. The smart meter integration is good news for Discoms as they can cut down on commercial losses," she explained. EDF has already installed 20 million smart meters in France out of a programme of 35 million metres. The potential for smart metres in India is huge — possibly projected to be 300 million metres, she said. "We are part of the Jaitapur project which is going to be the largest nuclear plant in the world and is now under negotiation with NPC. This, along with the smart meters, are our two major initiatives. Apart from this, EDF has 1.1 gigawatt

of wind and solar capacity in renewables either in operation, construction or in development. This is a mix of wind and solar projects. We recently won tenders in Rajasthan and Uttar Pradesh," she said.

Various Segments: "In India we are present for more than 25 years. Our ambition is to grow renewables, to finish negotiation on the nuclear project and to grow by deploying smart metres, smart grids, batteries and storage. We will be active partner for India in all the segments of the value chain," Marianne said. "We have invested €1.2 billion in renewables and made some acquisitions. If we move up to two GWs in four to five years we will be a major player in the renewable energy market in India," she said.

Source: V Rishi Kumar, <https://www.thehindubusinessline.com/>, 21 July 2019.

CHINA-KENYA

China to Help Kenya Pick Location of First Nuclear Power Plant

The Indian Ocean, Lake Victoria and Lake Turkana have been identified as the most optimal sites for the establishment of Kenya's first nuclear power plant, local media reported. China National Nuclear Corporation (CNNC) is helping the East African nation's Nuclear Power and Energy Agency (NuPEA) to identify the sites that would host the first nuclear plant in the country. "Currently, we have zeroed in at the coast along the Indian Ocean, Lake Victoria and Lake Turkana as the most ideal sites. We have excluded the Rift Valley because we need enough water to cool the plant," Mr Collins Juma, the NuPEA chief executive said.

Kenya aims to build a nuclear plant with a capacity of 1,000 MW, by 2027, to diversify its energy mix. The country currently produces 35% of its energy from hydropower and the rest from geothermal,

wind and diesel. Plans to develop a 1,050-megawatt coal-fired plant on the coast, using funding from China, have been delayed by court action from environmental activists.

NuPEA forecasts its capacity rising to a total 4,000MW by 2033 making nuclear electricity a key

component of the country's energy mix. Kenya Vision 2030 has identified energy as a key enabler for its realization and installation of nuclear energy will help the country attain the Big Four Agenda as well as realization of safe, reliable and effective energy.

Source: <http://northafricapost.com/>, 19 July 2019.

NUCLEAR SECURITY

USA-EUROPE

US Keeps 150 Atom Bombs Secretly in Europe and Turkey, Reveals Leaked NATO Report

A leaked report of the NATO has revealed that the United States has stored as many as 150 nuclear weapons, specifically B61 gravity bombs, in European countries such as Belgium, Germany, Italy, the Netherlands and Turkey. The document titled 'A New Era for Nuclear Deterrence? Modernisation, Arms Control, and Allied Nuclear Forces' released by NATO in

April reveals the secret stash, according to Belgian newspaper De Morgen. The report stated: "These bombs are stored at six US and European bases - Kleine Brogel in Belgium, Buchel in Germany, Aviano and Ghedi-Torre in Italy, Volkel in The Netherlands, and Incirlik in Turkey." While the document was deleted, the draft version states that the report was drawn from a Nuclear Threat Initiative, a non-governmental organization 2018 report, that does not reveal any specific details about the whereabouts or the type of nuclear weapons.

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Canadian Senator Joseph Day wrote the report for the Defense and Security Committee of the NATO Parliamentary Assembly. However, the report was the first draft and changes may be made before NATO parliamentary assembly in November. "All information used in this report is open-source material," Day told *Washington Post*. NATO officials have refrained from discussing the location of US nuclear weapons in Europe. However, "This is not an official NATO document," an official said on conditions of anonymity.

'Open Secret': However, Day told Global News that the 'leak' was intentional. "I think it's very important people understand this was an honest attempt by the NATO Parliamentary Assembly, one of the committees, to inform the public, but more importantly to inform the lawmakers and the Parliamentarians about what the current state of affairs is in relation to this important aspect of NATO in maintaining peace and security in the world." "And to suggest that there was a mistake or to suggest that somehow we were leaking information that wasn't public information before is wrong and it's more sensationalism and false reporting," he added.

Lawmaker Samuel Cogolat told AFP that the nuclear weapon hidden in Kleine-Brogel airbase in northern Belgium was an "open secret". "We demand a fully transparent debate - we must stop this lying and put an end to this hypocrisy," he said. Even the Director for Disarmament and Threat-reduction Policy at the Arms Control Association, Kingston Reif told the *Washington Post* that US nuclear weapons were not a surprise, "This has long been fairly open

Even the Director for Disarmament and Threat-reduction Policy at the Arms Control Association, Kingston Reif told the *Washington Post* that US nuclear weapons were not a surprise, "This has long been fairly open knowledge," he said. He also revealed that the nuclear weapons were originally kept in preparation to stop "a Soviet invasion of Western Europe because of inferior US and NATO conventional forces - no longer exists.

knowledge," he said. He also revealed that the nuclear weapons were originally kept in preparation to stop "a Soviet invasion of Western Europe because of inferior US and NATO conventional forces - no longer exists," Reif said. A Belgian minister reportedly acknowledged the presence of US nuclear weapons at Kleine-

Brogel, in north-west Brussels during the 1980s reported Gulf News.

Source: Pritha Mallick, <https://www.ibtimes.co.in/>, 18 Jul 2019.

Activists Tell how they Broke into German Military Base Storing US Nuclear Weapons

It turns out you need just \$15.99 to buy household clippers to cut through a fence to gain access to a German military base. That's what four "activists" did when they broke into the Buechel Air Base to protest against the US nuclear weapons stored there... and this was not the first time that a "highly secured" facility was penetrated.

The go-in is part of the annual International Action Week that calls for the removal of US nuclear weapons from Germany. It that was first organized in 2017. This year it began on March 26 and will end on August 9. In two years 60 protesters got inside the base. Military officials

repeatedly stated that activists wouldn't be able to infiltrate the Buechel Air base this year due to the new strict security measures, which would prevent protest actions at all costs. However, according to one of the go-in activists Brian Terrell, a co-coordinator for Voices for Creative Nonviolence, the security apparatus around nuclear weapons is really only public relations.

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"It is usually quite easy to enter a military base like Buechel. 'They have many civilian contractors, employees and in many cases families of soldiers. I have been stopped or arrested at many military bases, often only because I was identified as a protestor.' – Terrell said. When the group he was in cut the fence and got into the Buechel base, they had only a few minutes before getting arrested. However this happened not because security systems at the base detected intrusion.

"A car carrying 3 others who were to join us was stopped by the police and so they were alerted.

Because the peace camp was announced, there were many more police than usual, road blocks, surveillance," Terrell continued. "The military policeman who arrested us was very upset that we had destroyed government property (the fence) and broke German law by trespassing. I told him that the US government broke

German and international law by bringing nuclear weapons there. He went on about the hole in the fence - I told him that the fence is a small matter, too small for our attention, compared with the destruction of everything that the nuclear bombs threaten."

Another activist who took part in the July 10 action, Susan Crane commented, "The flaw in the security systems of nuclear weapon bases is that the governments think that nuclear weapons bring security." Nevertheless, they don't. According to John LaForge, of Nukewatch, and the coordinator of the US Peace Delegation to Germany, it was even easier to break into the base in 2018. That time three major go-in actions succeeded. Two activists managed to reach Protected Aircraft Shelters and occupied the top of them for hours. The campaign was 'highly embarrassing' for the military so they constructed an additional perimeter fence and greatly increased the number of security patrols.

Why didn't the undertaken measures work?

Disarmament activists have repeatedly shown the fences and guard staff around nuclear weapons systems to be lax, weak, ignored, and nearly vacant. According to the executive director of World Beyond War David Swanson, careers overseeing nuclear weapons seen as low-status, unprestigious jobs. "One of the possible reasons why the enclosing structures at such bases are so weak is that nuclear weapons have been forgotten and de-prioritized. I think, not just because nukes have been forgotten, but also because the theater, the propaganda would serve

no purpose at nuclear bases." That is why NATO just let slip the names of the 6 bases in 5 nations in Europe. "It's just not a priority anymore, it's out of fashion, it's culturally deemed uninteresting or passed', he concluded." Dr. Mark Gubrud, adjunct assistant professor in peace, war, and defence at the University of North

The activists' stories about how easy it can be to sneak into a military base may sound alarming, given that major European countries, including Germany, France and the United Kingdom continue to face significant terror threats. Those concerns may be heightened after a NATO committee recently inadvertently revealed the exact locations of US nuclear weapons across Europe.

Carolina, considers the nuclear weapons and their forward-deployment on the ground in Europe relics of the Old Cold War. So they are being kept there more for political than military reasons.

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Source: <https://sputniknews.com/>, 20 July 2019.

NUCLEAR PROLIFERATION

IRAN

Bolton's Nuclear Enrichment Remarks Lack Legal Validity

Bolton tweeted that Iran should not have been allowed to maintain enrichment capabilities in the 2015 nuclear deal, known as the Joint

Comprehensive Plan of Action. "One of the worst mistakes of the Iran deal, now on full display, was allowing Iran to maintain enrichment capabilities. There should be no enrichment for Iran. Maximum pressure continues until Iran abandons its nuclear ambitions & malign activities," Bolton tweeted.

Shamkhani said, "Remarks made by the US national security adviser in which he denies Iran's rights to enrich uranium are symbols of falsity, unilateralism and violation of international norms and lack any legal credibility." He noted that any country which is a signatory to the Non-Proliferation Treaty is legally entitled to enrich uranium for peaceful purposes. He added that Iran's right to enrich uranium has been recognized in the JCPOA and also in the 2231 resolution of the UN Security Council. The security chief added if this right was not recognized Iran would have not entered nuclear talks which produced the JCPOA.

According to the NPT, even NPT signatories mastering nuclear technology are duty bound to help others to use nuclear technology for peaceful purposes. "... in furtherance of this principle, all Parties to the Treaty are entitled to participate in the fullest possible exchange of scientific information for, and to contribute alone or in co-operation with other States to, the further development of the applications of atomic energy for peaceful purposes."

Source: <https://www.tehrantimes.com/news/>, 20 July 2019.

PAKISTAN

Pakistan Expanding its Nuclear Capacity

Despite a crippling economy and major internal security issues, Pakistan has been expanding and

enhancing its nuclear capabilities, Indian security agencies have said. The Ministry of Defence in its annual report said, "Pakistan continues to relentlessly expand its military forces, especially nuclear and missile capabilities despite a financial crisis." The report further pointed out that Pakistan has been torn by ethnic-regional conflicts, with the zone of conflict expanding from tribal areas on the Pakistan-Afghanistan border to the hinterland.

Ministry of Defence also stated that religious extremism is on the rise. It also stated that the Pakistan military has avoided to take action against jihadi and internationally-proscribed terror outfits that target Pakistan's neighbours. It also states that Pakistan is making efforts to consolidate its position on the country's defence policies and foreign policies after Imran Khan took over as Prime Minister.

The report states that Pakistan has continued to support terror groups which continued infiltrating into India under the cover of "massive cross-LoC and cross-border firing in Jammu and Kashmir". "The Pulwama terror attack in February perpetrated by the Jaish-e-Mohammed confirmed yet again that India remains a persistent target of Pakistan's state-sponsored cross-border terrorism policy," the report added. Referring to the Balakot air strikes after the Pulwama suicide attack which killed 40 Central Reserve Police Force personnel, the report stated that India will continue to take robust and decisive steps to ensure its national security.

The Ministry further pointed that state-sponsored terrorism by Pakistan in J&K remains the foremost security challenge for India. The situation in J&K has remained volatile with ceasefire violations and frequent skirmishes on the LoC between

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Indian and Pakistani troops and terror-related incidents particularly in South Kashmir in the hinterland. The report states, "India's position is that Pakistan must take credible and irreversible steps to stop supporting terrorists and terror groups operating from territories under its control launching attacks against India."

Source: Sumit Kumar Singh, <https://www.dnaindia.com/>, 19 July 2019.

NUCLEAR NON-PROLIFERATION

RUSSIA–FRANCE–IRAN

Vladimir Putin, Emmanuel Macron Call for Efforts to Save Iran Nuclear Deal

Russian President Vladimir Putin and French President Emmanuel Macron have agreed on the need to consolidate efforts to save the Iran nuclear deal following months of soaring tensions. In a statement, the Kremlin said, during a telephonic conversation today both leaders agreed the Iran deal known as the Joint Comprehensive Plan of Action was an important factor in ensuring security in West Asia and maintaining non-proliferation regime. It said both sides stressed the advisability of consolidating efforts of all countries that are interested in preserving the Comprehensive Plan.

US President Donald Trump last year withdrew from the multinational accord negotiated by his predecessor Barack Obama under which Iran drastically scaled back its nuclear programme. Mr Trump instead imposed sweeping sanctions prohibiting Iranian oil exports in a bid to reduce the clerical regime's regional clout.

Source: <http://www.newsonair.com/>, 18 July 2019.

NUCLEAR DISARMAMENT

GENERAL

Nuclear Disarmament Experts Meeting in Tokyo

A group of nuclear disarmament experts is meeting in Tokyo to draw up proposals for next year's conference reviewing the NPT. The 2-day meeting of the Group of Eminent Persons for Substantive Advancement of Nuclear Disarmament opened. It is its fifth and last meeting. The forum of experts from 10 countries, including Japan, the US and Russia, was established by the Japanese government in 2017.

Members have met in the atomic-bombed cities of Hiroshima and Nagasaki, and elsewhere to discuss measures to pursue nuclear disarmament by overcoming differences between nuclear and non-nuclear states. In an opening speech, Japanese

Parliamentary Vice-Minister for Foreign Affairs Kiyoto Tsuji expressed hope for meaningful discussions to realize a world without nuclear weapons.

Tsuji stressed that it is indispensable for countries with different positions to continue tenacious dialogue and pursue concrete, feasible efforts. The experts are expected to reaffirm the importance of upholding the principles of the NPT, which obliges nuclear-armed states to promote nuclear disarmament negotiations. They are also expected to discuss the Intermediate-

Range Nuclear Forces Treaty, which is due to expire next month if the US and Russia fail to reach an agreement to save it. The NPT review conference is to be held at the UN headquarters in New York in April to May next year.

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SWEDEN

Sweden Says not Signing UN Nuclear Treaty

Sweden will not sign a UN treaty calling for the ban of nuclear weapons, foreign minister Margot Wallstrom said. "The government will, as it stands now, not sign the convention on a prohibition of nuclear arms," Wallstrom told reporters at a press briefing in Stockholm. The UN treaty on the Prohibition of Nuclear Weapons (TPNW), which calls for the ban of "nuclear weapons or other nuclear explosive devices," was adopted by the UN General Assembly in July of 2017 with the approval of 122 countries, including that of Sweden.

Wallstrom noted that while Sweden had voted in favour, it had also expressed concern about the lack of a clear definition in the treaty of which weapons would be covered, and how it would relate to other treaties, such as the Treaty on the NPT. Instead of signing the treaty, Sweden would seek observer status, Wallstrom said, adding her country remained committed to a world free of nuclear arms. "I would have wished we had a convention that is possible to sign... But you also have to be a realist," Wallstrom said. The treaty has been signed by 70 countries and ratified by 23. It will come into force with ratification by 50 countries. The accord is seen as largely symbolic since none of the nine countries known or suspected to have nuclear weapons put their names down.

Source: <https://www.dailypioneer.com/>, 13 July 2019.

NUCLEAR SAFETY

JAPAN

Japan's Tepco to Decommission Second Fukushima Nuclear Station

Tokyo Electric Power said it plans to decommission its Fukushima Daini nuclear station, located a few

miles south of the bigger Fukushima Daiichi plant where three reactors melted down after an earthquake and tsunami in 2011. Scrapping the reactors could mean Japanese nuclear operators would decommission 21 units, or nearly 40% of their pre-disaster fleet, saddling them with billions of dollars of costs to dismantle and decontaminate the facilities.

... The company, also known as Tepco, said it would forward a proposal to its board on decommissioning the Daini station. A company spokeswoman declined to provide further details or specify when the meeting would be held. Tepco President Tomoaki Kobayakawa has plans to visit Fukushima and update prefecture and municipal

officials on Daini station, the company said earlier in the day. The company had said in June last year it was considering decommissioning the reactors at the Daini station.

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A Reuters analysis late last year showed it was unlikely that Daini would ever restart. Japan has eight reactors operating and many are still going through a relicensing process under new safety standards imposed after the disaster highlighted regulatory and operational failings. Three reactors at Fukushima Daiichi, which had six reactors and is located about 12 kilometres (7 miles) north of Fukushima Daini, suffered meltdowns after the giant March 2011 earthquake and tsunami shut down the plant's cooling systems. The 2011 disaster forced 160,000 people to evacuate areas near the Fukushima plant and many of them have not returned to the most contaminated areas.

Japan's government estimated in 2016 that the total cost of dismantling Fukushima Daiichi, decontaminating the affected areas, and paying compensation would amount to about \$200 billion. The Daini station, which has four reactors, also came close to a disaster, but retained enough back-up power to keep cooling going. Successive Fukushima governors had called for it to be scrapped.

Scrapping the Daini station will leave Tepco with just one potentially operational nuclear station, Kashiwazaki-Kariwa, where the company is trying to revive two of the eight reactors under new safety regulations against strong local opposition. It will also leave Japan with 33 reactors, compared with 54 before the disaster: many operators decided to scrap older units that would cost too much to meet new safety standards imposed after the world's worst nuclear catastrophe since Chernobyl in 1986.

Source: Aaron Sheldrick, <http://news.trust.org>, 24 July 2019.

TURKEY

Turkey's Akkuyu Nuclear Plant Facing Numerous Safety Concerns

Top-level officials working at Turkey's Akkuyu Nuclear Power Plant construction project say a series of problems, including lack of design adaptation and a shortage of competent engineers on site, are posing serious safety concerns, left-wing *Birgün* newspaper reported.

The project hit a snag in May when fissures discovered in the foundations, according to pro-government outlet HaberTürk. New concrete was laid only for more cracks to be discovered. The problem of the cracks, discovered by Turkey's Atomic Energy Authority (TAEK), have since been fixed, however the foundation of the plant remains a problem.

Located in Turkey's Mediterranean coastal town of Mersin, Turkey's first nuclear power plant Akkuyu is a joint Russian-Turkish project with Russian energy company Rosatom as the majority stakeholder. President Recep Tayyip Erdoğan and his Russian counterpart Vladimir Putin kicked off the construction of the plant on Apr 3 amid concerns about the potentially destructive ecological consequences of the plant. The project hit a snag in May when fissures discovered in the foundations, according to pro-government outlet HaberTürk. New concrete was laid only for more cracks to be discovered.

The problem of the cracks, discovered by Turkey's Atomic Energy Authority (TAEK), have since been fixed, however the foundation of the plant remains a problem. The design of the plant was created

with Russian landscape and weather in mind and is in need of revision to be adapted to Turkey's warm climate, officials told *Birgün*. "For example, sloping in the mountains should be conducted in a more horizontal fashion, but it has been done vertically to minimise costs and this is resulting the boulders continually rolling down the hills," one official said. The ground the plant is being built on, which according to a geology engineer, who spoke on condition of anonymity, is filled with gaps and cannot support the plant. "Technically speaking, you can construct a structure over any kind of surface.

However, the structure at hand is not a copy-paste matter, it must be revised according to the present surface. None of this is happening because the engineers of the project are not competent," the engineer said, pointing to gaps that may lead to condensation, among other problems. The project is run entirely on the "past experiences" contractors, one official said. "They are acting as though a building is being constructed instead of a nuclear reactor. And even during the process of

constructing a building, a much more serious plan of action is followed." The cooling of the plant is to take place through the waters of the Mediterranean Sea.

The warm water to be released into the sea after the cooling process, a chemical engineer who spoke to left-wing *Birgün Daily* said, will lead to increased temperatures in the water, which in turn affects marine life. "Chlorine is placed in the water to avoid mussels etc. from sticking to the pipes used to draw the water. And then this water, which now naturally has chlorine in it, is released into the sea", the official said. "Imagine the damage this can create in the sea, which is filled with living organisms."

Source: <https://ahvalnews.com/>, 21 July 2019.

NUCLEAR WASTE MANAGEMENT

USA

Earthquakes Repeatedly Striking Proposed US Nuclear Waste Site

Repeated earthquakes could risk releasing deadly radioactivity into the earth if plans for a nuclear waste site in go ahead in Nevada’s desert, the state’s governor has warned. Tens of thousands of tons of highly radioactive used nuclear reactor fuel are due to be transferred from 35 US states to a new facility in the Mojave Desert. The Yuka Mountain nuclear waste repository is set to store this material deep within the earth. But a series of recent earthquakes in the Mojave Desert has raised concerns about the safety of storing radioactive waste at the facility.

On 4 July, a 7.1 magnitude earthquake ruptured the earth in the desert, which stretches across the California-Nevada border. The force of the quake cracked buildings, sparked fires, damaged roads and caused several injuries in southern California. It was followed by a 6.4-magnitude temblor two days later. In the wake of the earthquakes, the governor of Nevada Steve Sisolak said he was committed to “fighting any continued federal effort to use Nevada as the nation’s nuclear dumping ground”. “These significant recent earthquakes so near to Yucca Mountain show one of the many geologic problems with the site as a nuclear waste repository,” he said.

Mr Sisolak sent a letter to the energy secretary, Rick Perry, urging him to reconsider the location of the facility. The US government began considering sites for storing radioactive waste that is produced as old nuclear fuel is reprocessed into nuclear weapon materials in 1982. In 2002, Yuka Mountain was designated as the only site in the country to receive the radioactive material. But Nevada has fought the proposed nuclear

waste repository at every step, arguing that US government studies downplayed the risk of earthquakes damaging the repository and releasing deadly radioactivity. The project was shelved in 2010 under pressure from then-Senate Democratic Majority Leader Harry Reid of Nevada and Barack Obama. They said nuclear waste should be stored in a state that wants it. But in March 2019, Mr Perry, the Trump administration’s energy secretary, set aside \$116m to push forward the project and restart licensing hearings.

Source: <https://www.independent.co.uk/>, 20 July 2019.

UKRAINE

Liquid Radioactive Waste Treatment Plant Launched in Kyiv Region

A liquid radioactive waste treatment plant has been launched at the decommissioned Chernobyl nuclear power plant’s site in Kyiv region, according to the State Agency of Ukraine on Exclusion Zone Management. “The liquid radioactive waste treatment plant has begun work at the Chernobyl NPP.

During the first week of its operation, it processed 2,755 kg of liquid radioactive waste (still residue),” it said.

According to Chernobyl NPP specialists, liquid waste is processed in several stages and, as a result, it is solidified in the form of a cement compound, which is a safer form of radioactive waste storage and disposal. Thirty-four barrels filled with processed radioactive waste are now in the waste aging hall at the Chernobyl NPP’s industrial site. After the aging and radiation monitoring for compliance with the acceptance criteria for disposal, the barrels will be sent for disposal in a specially equipped near-surface solid radioactive waste repository. “To date, the design capacity is being reached in phases. Gradually, the plant should reach forty-two 200-liter barrels

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(packages) for disposal per day. With the plant's uninterrupted operation throughout the 250 working days, it is 10,500 barrels per year," the press service of the State Agency of Ukraine on Exclusion Zone Management quoted Chairman Vitaliy Petruk as saying. As reported by UNIAN,

the State Architectural and Construction Inspectorate of Ukraine in April 2018 issued a license to the liquid radioactive waste treatment plant for compliance with building standards. ...

Source: <https://www.unian.info/>, 18 July 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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