



NUCLEAR SECURITY



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

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OPINION – R.B. Grover

India Must Achieve the Target of 63 GW Nuclear-Installed Capacity by 2032

In 2015, India communicated its intended nationally determined contribution (INDC) for the period 2021-30 consisting of eight elements. Of these, two have a direct relationship with nuclear energy: to achieve about 40% cumulative electric power installed capacity from non fossil fuel-based energy resources by 2030, and to reduce the emissions intensity of its GDP by 33-35% from 2005 levels. To achieve the first target, India also commits to make efforts to achieve 63 GW installed capacity based on nuclear generation by 2032, provided nuclear fuel supply is ensured.

Gol clearly indicated its intention to accelerate growth of nuclear energy when in his Budget 2016 speech, Finance Minister Arun Jaitley announced the need to diversify sources of power generation for long term stability. He spoke about drawing a comprehensive plan, spanning the next 15-20 years, to augment the investment in nuclear power generation, and budgetary allocation up to Rs 3,000 crore a year. Considering that investments in power in India generally involve a debt-to-equity ratio of 70:30, this means an investment of Rs 10,000 crore a year. On May 17, 2017, the Cabinet approved the construction

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of 10 units of indigenous PHWRs of 700 MW each. This was followed by the landmark event of a general framework agreement signed with Russia on June 1 for setting up another two reactors of 1,000 MW each at Kudankulam, Tamil Nadu. The joint declaration reiterated the commitment of both sides to the vision document signed in 2014, which included the construction of six reactors, each of 1,200 MW, at a new site.

Reactors having a total installed capacity of 6,780 MW are in operation. One Prototype Fast Breeder Reactor (PFBR) having a capacity of 500 MW is under commissioning. Four PHWRs, each of 700 MW, are under construction. The foundation

stone for two PHWRs of 700 MW rating was laid in 2014, and the Nuclear Power Corporation of India is moving towards first pour of concrete. And agreements for the construction of four reactors of 1,000 MW rating at Kudankulam have been signed.

Negotiations with the US and France are ongoing to tie up constructions of more nuclear power plants. Overall, the country is progressing to achieve the target of 63 GW by 2032. This development should be examined with India's evolving electricity mix. Fuelled by GDP growth, electricity demand is rising. Aspirational India demands reliable electricity supply. For the year ended March 31, 2017, total electricity generation was 1,242 billion units, with coal contributing 994 billion units. Generation by captive power plants was additional and could be about 170 billion units, mostly from thermal power plants. Nuclear and Variable Renewable Energy (VRE) sources contributed about 40 billion and 81 billion units respectively.

VRE sources are intermittent. Therefore, integrating VRE sources in the grid results in high system cost. Two issues regarding energy generation should be highlighted. One, 'external costs'. The term is used to denote the cost that the party responsible for generating emissions does not account for and, consequently, consumers of electricity do not pay for. They are paid in terms of health effects (deaths, serious and minor illnesses, etc) by those exposed to emissions and may not be even using electricity.

The EU's Extern E project studied external costs during 1990-2005. It concluded that nuclear has the least health effects among the electricity generation technologies studied: lignite, coal, oil, gas, biomass and nuclear. The EU's New Energy

Externalities Development for Sustainability study also concluded that nuclear has very low external costs as compared to other technology options. It also favours wind and solar, the two also having low external costs, but also low energy density, constraints on their location and being intermittent, resulting in high system cost. The second issue is the ratio represented by Energy Returned (ER) over Energy

Invested (EI). Governments, business houses and individuals are all concerned about energy use efficiency. How about efficiency of energy production? Energy economists have devised a term EROI to represent the ratio of ER over EI in output. Net energy gain, or useful energy available to society, is the difference between ER and EI. EROI's value depends on factors like system boundary used for analysis, method of handling heat energy and electricity, and how one addresses the dynamic effect. The issue of dynamic effect arises from the fact that the grid has a certain EROI and this could be higher than the EROI of the energy source under evaluation.

For input, one will draw energy from the grid and use it to produce, say, photovoltaic cells, which have a low EROI. A significant amount of energy is used up in building energy infrastructure when energy demand is increasing. To evaluate inherent characteristics of an energy technology, it is appropriate to make adjustments for this factor. This is termed as dynamic effect. According to a Princeton University study, for a particular electricity growth scenario for the period 2010-2100, dynamic EROI is as follows: nuclear (62), hydro (57), wind (39), coal (38), gas (8) and solar (6). This data does not factor in energy associated with grid integration, which is very high for solar and wind. A low value of EROI means more flow of material per unit of electricity generated. Higher the flow of material, larger the ecological footprint.

Overall, the country is progressing to achieve the target of 63 GW by 2032. This development should be examined with India's evolving electricity mix. Fuelled by GDP growth, electricity demand is rising. Aspirational India demands reliable electricity supply. For the year ended March 31, 2017, total electricity generation was 1,242 billion units.

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A value less than about 10 raises issues of sustainability. At present, VRE sources contribute a small fraction of energy to the grid. If their share is increased beyond about 10%, they will not only make grid management difficult, but they will also have an adverse effect on the EROI of the grid.

So, as India embraces an ambitious growth path based on low-carbon energy sources, an approach that integrates positive features of all sources needs to be adopted. India must do everything to achieve the target of 63 GW nuclear-installed capacity by 2032 and set an aggressive target of nuclear generation, say, 25% of total generation, to be achieved by the middle of the century.

Source: <http://blogs.economictimes.indiatimes.com>, 15 July 2017.

OPINION – Manpreet Sethi

Chinese Responsibility on DPRK: No ‘Theory’, Immutable Reality

Recent videos from North Korea show their Supreme Commander of the Army, Kim Jong-un, chuckling away as he watches his country’s missile launches. Indeed with the recent test of the claimed ICBM, which has been justified by the country as a legitimate right to self defence, the ‘Dear Leader’ has several reasons to smile. It is the US that is fuming, faced as it is with rather grim options. Exasperated, US President Donald Trump has not been shy of accusing China of not living up to its responsibility to help defang North Korea of its nuclear weapons. US Secretary of State Rex Tillerson warned that the US was at the end of its strategic patience. Cheekily, China advised him to undertake proactive diplomacy with the DPRK instead.

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Refusing to accept American allegations, China has hit hard at what it calls the “China responsibility theory.” It maintains that the core of the problem is the security conflict between the US and the

DPRK and that the two should handle it themselves. As stated by the Chinese Foreign ministry spokesman, “China is neither the focus of the Korean Peninsula nuclear issue, nor the one that escalates the tension.” Rather, it claims to have played a “constructive role” in trying to find a solution

and accuses vested interests of “confusing public opinion.” Indeed, the North Korean nuclear imbroglio is far more complicated for any one country to solve. But, China is punching far below its weight on the DPRK when it shirks its responsibility on the matter by dismissing it as a ‘theory’. After all, China was responsible for the creation of the problem when it provided tacit support to the Kim dynasty’s nuclear efforts, including facilitation of cooperation through other beneficiaries of its own nuclear weapons largesse. And, it is China that still wields the maximum amount of leverage through its economic and political relations with an otherwise isolated Communist regime. While China has gone along on some of the more recent UN Security Council resolutions that sanction the DPRK, it has been careful not to take any measures that destabilise the regime. The US, though, alleges that China ignores/condones/allows some Chinese

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enterprises to continue working with North Korea. In fact, one Chinese bank was cut out of the American financial system for allegedly being involved in laundering money for North Korea. Is there a way out of these allegation and counter-allegations of the big powers? It is clear that Kim Jong-un would like to leverage his nuclear and missile programme as a bargaining chip. The key lies in finding what he would be willing to settle

for.China has seconded the DPRK's suggestion of a halt of US-South Korea military exercises in exchange for a moratorium on missile launches and nuclear tests by the DPRK. This might not be a bad idea especially since South Korea's President, Moon Jae-in, has taken a first step in indicating his willingness to have talks with his neighbour. But the time so gained through this double suspension and the

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ultimate objective of the talks would have to be to provide a sense of security to the regime.This would only be possible through some sort of an acceptance of its nuclear status, an issue that has evoked much indignation in the US and South Korea since any hint of grant of such status to a 'rogue' nation is deemed anathema to the non-proliferation hardliners.While this is understandable, it is often forgotten that other nations described as rogue at another point of time in history have been accommodated in the past. China itself was one of them. In 1966, two years after China tested its nuclear weapon, it was described as a rogue regime when the then Chairman of the Communist Party of China, Mao Zedong, began the bloody Cultural Revolution in which millions of Chinese died and when it aggressively sought to export its revolution to other countries. But within five years of the Chinese nuclear test, the US had engaged the country in a dialogue, though covertly at first. The point of the above paragraph is not to condone the actions of North Korea, but to provide a perspective. It must be accepted that denuclearisation of the DPRK is not a possibility. Even a military offensive has little chance of success, but it would certainly extract a very high cost on human life. The next

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best thing then to do would be to engage the country in such a way as to enhance its sense of security to eventually reduce its reliance on nuclear weapons, enmesh it in an architecture of verifiable safeguards, and nudge its nuclear thinking and behaviour along more acceptable norms. Then, in time, if universal nuclear disarmament was ever to become a reality, North Korea could also join in as another nuclear possessor.It does not behove China, and nor is it in its regional security interest, to dismiss its responsibility in resolving the North Korean nuclear crisis as mere theory. Countries become great powers by taking responsibility for matters of international concern, not merely by announcing huge projects, counting only 'rogue' regimes amongst their best friends, and winning over smaller nations only with money and military muscle.*Source: <http://www.ipcs.org>, 19 July 2017.*

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OPINION – Tytti Erästo

Time to Change US Approach on the Nuclear Weapons Ban Treatyl

n case you haven't yet heard, nuclear weapons will soon be banned by international law. Over 120 countries negotiated a Nuclear Weapons

Prohibition Treaty at the United Nations on 7 July. While the negotiators were fervently clapping their hands over what they see as the beginning of the end of nuclear weapons, the response from the nuclear-armed states was deafening silence.Prior to the negotiations, the United States made little secret of its disdain for the treaty and also pressured

allies to oppose it. As that battle is now lost, it would be wise to adjust the strategy based on

the old adage: if you can't beat them, join them. Both the Obama and the Trump administrations have opposed the Prohibition Treaty. A senior official for President Obama characterized the treaty process as "polarizing" and detached from the reality that several countries "count on nuclear weapons as a deterrent." The current US ambassador to the United Nations, Nikki Haley, dismissed the ban as unrealistic, referring to the need to protect "those of us that are good" against

Opposition to the treaty has also united the United States and Russia, which have both portrayed the Prohibition Treaty as a threat to the 1968 NPT — the cornerstone of the international non-proliferation regime. But since the start of the nuclear era, the elimination of nuclear weapons has been a universally shared objective.

bad actors, such as North Korea. Opposition to the treaty has also united the United States and Russia, which have both portrayed the Prohibition Treaty as a threat to the 1968 NPT — the cornerstone of the international non-proliferation regime. But since the start of the nuclear era, the elimination of nuclear weapons has been a universally shared objective. It has also enjoyed bipartisan support in the United States. Obama's commitment to the long-term vision of a nuclear-free world is well known, but few recall that President Ronald Reagan went even further by pursuing talks with the Soviet Union on the abolition of all of their nuclear arsenals. Disarmament was also an integral part of the NPT bargain: while the non-nuclear states agreed to remain as such, the nuclear-armed states would pursue "negotiations in good faith on effective measures relating to... nuclear disarmament" — and, eventually, also "on a treaty on general and complete disarmament." The Prohibition Treaty is thus perfectly in line with the NPT. The same cannot be said of the current policies of the two biggest nuclear-armed states, neither of which is showing serious commitment to nuclear disarmament. The Trump administration

In addition to reaffirming and strengthening their existing commitments not to ever acquire nuclear weapons, the negotiators also took great care to address US concerns about contradictions with the NPT in the treaty text. Although no treaty is perfect, the negotiators deserve credit for having chosen the moral high ground to express their discontent with the existing order.

seems reluctant to accept a nuclear-free world even as an aspirational goal: it is currently reviewing "whether traditional US fidelity to that visionary end-state of abolition...is still a viable strategy." Instead of being the cause of the current polarization, the Prohibition Treaty is a symptom of a long-held frustration by the non-nuclear states over the lopsided implementation of what were meant to be reciprocal NPT commitments. At the same time, it is their attempt to rectify what is seen as the

increasingly tyrannical and dysfunctional nuclear oligarchy upheld by the nuclear-armed states. The nuclear-armed states' policy of disregarding the treaty, alongside their disarmament commitments, is therefore bound to create more resistance. Such a policy is symptomatic of a failure to see that the special "great power" status of the five nuclear-armed states has always depended, not only on retaining the monopoly of indiscriminate violence, but also on being regarded as responsible guardians of the global nuclear order. At present, a logical gesture of accommodation by the United States and other nuclear-armed states would be to welcome the Prohibition Treaty. This should be based on the acknowledgement that the treaty strengthens the non-proliferation norm, which is clearly in US interests: in addition to reaffirming and strengthening their existing commitments not to ever acquire nuclear weapons, the negotiators also took great care to address US concerns about contradictions with the NPT in the treaty text. Although no treaty is perfect, the negotiators deserve credit for having chosen the moral high ground to express their discontent with the existing order. No one expects the nuclear-armed states to join the treaty in the

immediate future. However, they could win the hearts of the ban supporters by simply signaling their intent to do so — or to negotiate an even better agreement based on more stringent verification mechanism — when circumstances allow it in the future. Of course, this would require the United States to reaffirm that it still subscribes to the shared vision of a nuclear-free world. Regardless of its eventual position on the Prohibition Treaty, this is the minimum that the United States should do for the sake of credibility with its NPT commitments. Second, the United States should demonstrate political will and creativity to engage in nuclear arms control efforts with Russia. While such cooperation seems difficult in the current situation, progress in nuclear arms control — or even in preserving existing agreements, notably the Intermediate-Range Nuclear Forces Treaty and New START — could redeem the bilateral relationship. In the meanwhile, the United States should cooperate with other countries in developing methods for nuclear disarmament verification. Like it or not, the Prohibition Treaty is set to become international law, and hence it cannot be ignored into oblivion. The treaty enjoys broad international support, not just among the non-nuclear states but also the global civil society, which finds it increasingly difficult to believe that nuclear disarmament is impossible just because of a few “bad actors.” Instead of swimming against the tide of history and global public opinion, the US might find that its own interest in reducing nuclear threats would also be better served by going with the flow. Source: <http://thehill.com>, 23 July 2017.

OPINION – Mina Al-Oraibi

Tehran’s Missile Roll-out Suggests New Round of Strategic Posturing

On 15th July, Iranian state media hailed the launch of a new missile production line. According to Iran’s defence minister Hossein Dehghan, the

newly-produced Sayyad 3 missile can reach an altitude of 27 kilometres and travel up to 120km. This means that today Tehran has missiles that can be aimed at planes, cruise missiles, drones and across Iran’s borders. The development of these and similar missiles point to the Iranian regime adopting a policy of escalation.

In just the last few weeks, Iran has fired several ballistic missiles into Syria, announced its intention to work more closely with North Korea and said it is working with Russia to develop armed drones. Iran’s announcement came days after the US introduced new sanctions targeting individuals and entities supporting Tehran’s “malign activities in the Middle East”, including the continued development of its ballistic missile programme. From reports of orchestrating cyberattacks to its

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persistent militarisation of regional policies, Iran’s posturing is that of a nation preparing for a confrontation.

In a statement on July 18 unveiling a new round of sanctions against Tehran, the US state department said “the US remains deeply concerned about Iran’s malign activities across the Middle East which undermine regional stability, security, and prosperity”. That is a sentiment shared in many parts of the region.

In Lebanon, Iraq and Syria, Iran is developing a network of armed groups that pledge their allegiance to Tehran, even at the cost of undermining their own governments. The continued expansion of Iran’s military capabilities, bolstered by hundreds of millions of dollars of sanction relief, come at a time when it is testing regional powers and the American administration. Six months after the inauguration of Donald Trump, the Iranian regime is testing the boundaries of what will be acceptable in Washington. However, Iran’s latest moves cannot simply be seen as part of an effort to “flex muscles” or send signals to

Washington. Instead, they represent a clear policy of expanding military might that has increased since the signing of the Joint Comprehensive Plan of Action (JCPOA) two years ago. Under the agreement, Iran's nuclear policy is restrained and monitored for a decade. Thus far, Iran has spent the two years since the implementation of the nuclear deal developing its ballistic missile technology and indicating its intention to grow its military might. It is not hard to imagine what it plans to do in the next eight years. What is clear is that Tehran has no intention of curbing its ambitions. Ayatollah Ali Khamenei, Iran's supreme leader, praised Iran's missile attack inside Syrian territory as "an act of worship", urging the Islamic Revolutionary Guard Corp to "keep working on missiles as much as you can", during a meeting with its leaders, as reported by Tasnim news agency.

There are some who would argue that Iran is not alone in seeking to bolster its military capabilities in the Middle East. That is a fact. From the UAE to Saudi Arabia to Turkey, there are significant military powers in the region. However, there are three important differences that make Iran stand out as a threat to the region.

First, unlike its Arab neighbours, Iran has recently pursued a clandestine nuclear programme, which its missiles could be developed to deliver. It developed this programme and contravened international nuclear agreements. Second, Iran is the only one among these countries that continues to have United Nations Security Council resolutions set against its missile programme. Developing and testing its ballistic missiles is in direct defiance of UN Security Council Resolution 2231. Third, Iran is the only country in this region whose publicly stated position is to "export" its theocratic "revolution" since 1979. Under this banner, it has openly supported armed groups that work directly to undermine state structures. Iran supports armed non-state actors in various

conflict zones in the region, leading to the weakening of state structures and heightened concerns about its role in the region.

Of course, Iran is not alone in undermining the region's stability. ISIL and Al Qaeda pose significant threats, however they are not legitimate nation states. On the other hand, Israel too poses a significant threat to the region, not least to Palestine, which Iran has long used as an excuse to build up its forces without providing any real solutions to its people's plight. While Iranian leaders continue to use political slogans and rhetoric, their recent military build-up raises questions as to Tehran's intentions in a region that cannot be subjected to yet more threats.

Source: <https://www.thenational.ae>, 23 July 2017.

OPINION – Richard N Haass

North Korea Lesson

North Korea has produced a number of nuclear warheads and is developing ballistic missiles capable of delivering them around the world. Many governments are debating how to prevent or slow further advances in North Korea's capacity and what should be done if such efforts fail. These are obviously important questions, but they are not the only ones. It also is important to understand how North Korea has succeeded in advancing its nuclear and missile programs as far as it has, despite decades of international efforts. It may be too late to affect North Korea's trajectory decisively; but it is not too late to learn from the experience. What follows are ten lessons that we ignore at our peril.

First, a government that possesses basic scientific knowhow and modern manufacturing capability, and is determined to develop a number of rudimentary nuclear weapons, will most likely succeed, sooner or later. Much of the relevant information is widely available.

Second, help from the outside can be discouraged

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and limited but not shut down. Black markets exist any time there is a profit to be made. Certain governments will facilitate such markets, despite their obligation not to do so.

Third, there are limits to what economic sanctions can be expected to accomplish. Although sanctions may increase the cost of producing nuclear weapons, history suggests that governments are willing to pay a significant price if they place a high enough value on having them. There is also evidence that some or all of the sanctions will eventually disappear, as other governments come to accept the reality of a country's nuclear status and choose to focus on other objectives. That is what happened in the case of India.

Fourth, governments are not always willing to put global considerations (in this case, opposition to nuclear proliferation) ahead of what they see as their immediate strategic interests. China opposes proliferation, but not as much as it wants to maintain a divided Korean Peninsula and ensure that North Korea remains a stable buffer state on its borders. This limits any economic pressure China is prepared to place on North Korea over its nuclear efforts. The United States opposed Pakistan's development of nuclear weapons, but was slow to act, owing to its desire in the 1980s for Pakistani support in fighting the Soviet Union's occupation of Afghanistan.

Fifth, some three quarters of a century since they were first and last used, and a quarter-century after the Cold War's end, nuclear weapons are judged to have value. This calculation is based on security more than prestige. Decades ago, Israel made such a calculation in the face of Arab threats to eliminate the Jewish state. More recently, Ukraine, Libya, and Iraq all gave up their

nuclear weapons programs either voluntarily or under pressure. Subsequently, Ukraine was invaded by Russia, Iraq by the US, and Libya by the US and several of its European partners. Saddam Hussein in Iraq and Muammar el-Qaddafi in Libya were ousted. North Korea has avoided such a fate, and the third generation of the Kim family rules with an iron fist.

It is doubtful that the lesson is lost on Kim Jong-un.

Sixth, the Non-Proliferation Treaty—the 1970 accord that underpins global efforts to discourage the spread of nuclear weapons beyond the five countries (the US, Russia, China, the UK, and France) that are recognized as legitimate nuclear weapons states for an unspecified but limited period of time—is inadequate. The NPT is a voluntary agreement. Countries are not obliged to sign it, and they may withdraw from it, with no penalty, if they change their mind. Inspections meant to confirm compliance are conducted largely on the basis of information provided by host governments, which have been known not to reveal all.

Seventh, new diplomatic efforts, like the recent ban on all nuclear weapons organized by the United Nations General Assembly, will have no discernable effect. Such pacts are the modern-day equivalent of the 1928 Kellogg-Briand Pact, which outlawed war.

Eighth, there is a major gap in the international system. There is a clear norm against the spread of nuclear weapons, but there is no consensus or treaty on what, if anything, is to be done once a country develops or acquires nuclear weapons. The legally and diplomatically controversial options of preventive strikes (against a gathering threat) and preemptive strikes (against an imminent threat) make them easier to propose than to implement.

Ninth, the alternatives for dealing with nuclear proliferation do not improve with the passage of time. In the early 1990s, the US considered using military force to nip the North Korean program in

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The alternatives for dealing with nuclear proliferation do not improve with the passage of time. In the early 1990s, the US considered using military force to nip the North Korean program in the bud, but held off for fear of triggering a second Korean War. That remains the case today, when any force used would need to be much larger in scope and uncertain to succeed.

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Finally, not every problem can be solved. Some can only be managed. It is much too soon, for example, to conclude that Iran will not one day develop nuclear weapons. The 2015 accord delayed that risk, but by no means eliminated it. It remains to be seen what can be done vis-à-vis North Korea. Managing such challenges may not be satisfying, but often it is the most that can be hoped for.

Source: <http://www.myrepublica.com>, 26 July 2017.

OPINION – Cindy Vestergaard

Australian Uranium is Heading to India – How India Used its Growing Power to Shape the International Uranium Market

The first shipment of Australian uranium to India marks the next stage in contract negotiations between India and Australian industry. The commercial uranium sales to India heralds a new phase in a decades-long policy debate.

India's economy is the seventh largest in the world, predicted to rank third by 2030 and second by 2050. Energy is central to its rising potential, especially considering PM Modi's promise to connect all citizens to a reliable power grid.

In December, India's Central Electricity Authority forecasted that 57 per cent of India's total capacity will come from non-fossil fuel sources by 2027- aiming to surpass India's renewable energy targets set in Paris two years ago. India intends to generate 275 gigawatts from renewables, alongside 72 GW of hydropower and almost 15 GW of nuclear energy.

India has 22 operating nuclear reactors with a capacity of almost 7000 megawatts, generating

approximately three per cent of India's electricity. The annual uranium requirement for the current fleet is approximately 1400 tonnes of uranium (tU) per year. Five more reactors are under construction and ten more are planned- once completed this would see India's annual uranium needs more than doubling double to 3600 tU. To meet the fuelling needs for current and new reactors, India utilises uranium resources at home and imports from abroad. While India does have its own domestic uranium deposits, they are small and low-grade, with production insufficient to meet even current reactor requirements.

Uranium reserves are expressed as resources of 'recoverable' uranium at a fixed market price. According to the 2016 'Red Book', the world's reference for uranium resources, Australia has the world's largest known uranium reserves, with more than a million tU recoverable for less than US\$130 per kilogram. India, which does not list its reserves based on price, is far down the list at 181,606 tU of known conventional in situ resources. According to India's Red Book submission, this would be sufficient to support 10-16 GW installed capacity of pressurised heavy water reactors, operating at 80 per cent for forty years.

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Recent exploration activities have reportedly increased reserves to approximately 208,000 tU. However, exploiting identified reserves takes time, where factors such as environmental sensitivities, land acquisition, economic viability and public consensus are among the range of issues affecting the potential for uranium to be extracted. Given that India does not publish its annual production figures for reasons of 'public interest,' it is difficult to ascertain current production figures. Estimates from the World Nuclear Association assume that India has been producing approximately 385 tU per year since 2012 — under a third of the amount needed annually to feed its current reactors.

India's nuclear expansion is facilitated by its re-entry into the global civilian nuclear market after more than three decades of isolation. In September 2008, the NSG granted India an exemption from its rules requiring a comprehensive safeguards agreement with the IAEA as a condition of nuclear supply. The waiver made India the only State outside of the Treaty on the Nonproliferation of Nuclear Weapons to be accepted in mainstream international nuclear trade. Since then, New Delhi has signed 13 bilateral nuclear cooperation agreements (NCAs), including with France, Japan, United States, Canada and Australia.

In February 2009, India signed an umbrella safeguards agreement with the IAEA (INFCIRC/754), placing 10 nuclear power reactors under safeguards. India has since added more facilities to the list of those subject to safeguards- as of February 2015, 22 facilities were included.

The first to supply uranium to India was the French-owned company AREVA, which shipped 300 tU of uranium ore concentrates in 2008, followed by Kazakhstan (Kazatomprom) and Russia (JSC TVEL Corporation). State-owned Uzbek mining company Navoi Mining & Metallurgy Combine and Canada's Cameco have also signed contracts, with the first shipment of Canadian uranium arriving in India in December 2015.

The nuclear cooperation agreement with Australia entered into force in November 2015. It was reported in August 2016 that Australian companies were in negotiations with India to provide 1,500 tU over five years. More recently, during his visit to India in April 2017, PM Turnbull said Australia would start supplying uranium to India "as soon as possible." The lengthy timeline for contract negotiations is typical — it took Cameco and India's Department of Atomic Energy two years

to finalise the contract after the NCA with Canada entered into force.

India's NSG exemption has given New Delhi its own status in the international nuclear market, particularly in relation to its bilateral civil nuclear cooperation agreements.

Australia's agreement with India, for example, is unlike any other of its 23 NCAs in that it does not include any provision for dealing with the consequences of non-compliance with the NCA or the IAEA, nor fall back safeguards should the IAEA not be able to monitor Australian material for any reason. Australia's NCAs with the US, Russia and China reference making arrangements for equivalent measures based on "Agency safeguards principles and procedures" in the absence of IAEA monitoring, whereas the Australia-India agreement calls for Parties to "consult and agree on appropriate verification measures."

The Australia-India agreement also gives India advance consent to reprocess Australian uranium. This raises particular concerns given India continues to produce fissile materials for its nuclear weapons program. Notably, this provision

exists in only one other Australian NCA, Japan, a state that does not possess nuclear weapons. That said, the NCA stipulates that advance consent for India is restricted to facilities dedicated to reprocessing safeguarded material as per the agreement India and the US concluded in July 2010. That agreement specifies that India will establish a new reprocessing facility for safeguarded nuclear material under IAEA safeguards.

India also does not accept bilateral reporting requirements on obligated nuclear material. These bilateral reporting requirements are employed by a number of suppliers, including Australia, as a

The first to supply uranium to India was the French-owned company AREVA, which shipped 300 tU of uranium ore concentrates in 2008, followed by Kazakhstan (Kazatomprom) and Russia (JSC TVEL Corporation). State-owned Uzbek mining company Navoi Mining & Metallurgy Combine and Canada's Cameco have also signed contracts, with the first shipment of Canadian uranium arriving in India in December 2015.

way to 'flag' their material as it moves through the nuclear fuel cycle in other countries.

India argues that because all imported uranium will be used in safeguarded facilities and thus reported to the IAEA, there is no need for bilateral reporting. Australia's agreements with China and Russia, signed in 2006 and 2007 respectively, included bilateral reporting requirements on Australia's obligated nuclear material (AONM).

Under Australia's Nuclear Non-Proliferation (Safeguards) Act 1987, the Director General of the Australian Safeguards and Non-proliferation Office (ASNO) reports annually on the total quantities of AONM at each stage of the nuclear fuel cycle and its intended end-use. On 15 June, appearing before the Joint Standing Committee on Treaties (JSCOT), ASNO's Director General advised that the mechanism developed with India will allow him "to determine the disposition of Australian obligated nuclear material in India and fulfil [the] reporting obligations under the Safeguards Act."

Australia's approach to its uranium production and trade has traditionally focused on using its resource muscle to promote domestic and international nuclear non-proliferation objectives. The overriding motivation however for Canberra in moving forward with NCA negotiations with India was developing a strategic relationship with New Delhi while at the same time further deepening its alliance with the United States. As was noted by JSCOT in 2015, the agreement with India "represents a different approach to non-proliferation in India; using engagement to bring India into the nuclear non-proliferation mainstream." In effect, India has been able to use its muscle as a rising economy to bring the mainstream also into its favour.

Source: <https://www.policyforum.net>, 24 July 2017.

NUCLEAR STRATEGY

NORTH KOREA

The success of North Korea's first true intercontinental ballistic missile, possibly capable of reaching Alaska, has sparked speculation over how the isolated country managed to advance the technology so much faster than expected. Experts say available images of Pyongyang's missiles show obvious Russian traits, but most likely they were developed with the country's own capability, based on technology obtained and studied for decades. ...

That includes the latest Hwasong-14, tested on July 4, 2017 with an estimated range of more than 6,000km, which qualifies as an ICBM. The liquid-propellant engine of the Hwasong-14, as well as its predecessor, the 3,700km-range Hwasong-12, both originate from an old Soviet R-27 Zyb missile, Zhao said.

The Hwasong-14 just added some additional stage-2 engines to the -12. And a variation of the same engine – the Isayev 4D10 – is also used on Musudan,

the 2,500km IRBM, or Hwasong-10, as it is officially named, according to Zhao. It is estimated that Pyongyang began to possess the R-27 technologies in 1992. The chaos that followed the collapse of the Soviet Union provided then-DPRK leader Kim Il-sung, Kim Jong-un's grandfather, with the chance to obtain the Soviets' R-27 Zyb, an SLBM that is capable of carrying 650kg of load, including a nuclear warhead, and has a 2,400km range. ...

The USSR provided its communist ally with education and training, expert advisers and even blueprints, according to Zhao. North Korea initially based its primary missile development in the 1970s on Soviet Scud missiles. From there, it developed its early Rodong and Taepodong series rockets. Generations of talented North Korean engineers have been sent to study at Moscow's nuclear and missile research institutions such as

India argues that because all imported uranium will be used in safeguarded facilities and thus reported to the IAEA, there is no need for bilateral reporting. Australia's agreements with China and Russia, signed in 2006 and 2007 respectively, included bilateral reporting requirements on Australia's obligated nuclear material (AONM).

the renowned Joint Institute for Nuclear Research Dubna. Later these technicians became the core members of their own country's development programme. Andrei Chang, founder of military magazine Kanwa Asian Defence, said a key reason behind Pyongyang's fast progress is that the country's missile experts are not only well-educated and bright, but also are in the habit of "working hard without any complaints". ...The regime also hired a number of Russian experts after the fall of the USSR. In 1992 it was reported that a group of Russian scientists and missile specialists was arrested while attempting to travel to Pyongyang, Meanwhile, many missile engineers had already been working in the DPRK, according to a report by the Nuclear Threat Initiative think tank.

...Pyongyang's recent remarkable improvement in rocket science also included successful tests of the Pukguksong-1 and 2, which use solid fuel engines more advanced than that of the liquid-fuelled R-27. International observers have not completely agreed on the origin and exact developmental path of these missiles. There was speculation that the Pukguksong-1 SLBM might have been developed with help from China's SLBM. But pictures of the Pukguksong launches show the designs also bear strong resemblance to the R-27. "From what we see so far, North Korea worked out the technologies of solid-fuelled engines by repeatedly copying the Russian liquid fuelled engines, and based on that they moved on the solid-fuelled," said military commentator Song Zhongping.

... Pakistan, an ally of Beijing, is also unlikely to have passed on any China-originated missile technology to North Korea, although they did cooperate on nuclear weapons for some time before the United Nations imposed sanctions on Pyongyang, he said. But the North Korean leaders defied the objection from Beijing despite the strict

sanctions. They have been extremely determined to become a "leading missile power in Asia". North Korea has no claim to that status yet, as its R-27 technologies, developed by the Soviets from 1968 through 1988, still trail those in the most advanced missiles of the US, Russia, China, and even India and Israel. However, Pyongyang has exchanged missile technology with Iran, and helped Tehran with its missile and rocket development. The Hwasong missile family and Iran's later Shahab series are obviously related. Some R-27 technologies have been also seen on Iranian rockets Safir and Simorgh.

The UN sanctions and trade embargo on missile-related electronic devices and fuel-related chemical substances has forced Pyongyang to find illegal smuggling channels or use civilian products as substitutes. That has been caused problems that affect the success rate and potential for mass producing ICBMs, Song noted. Nevertheless, the efforts of North Korean scientists already have made the Hwasong-14

capable of reaching the US states of Alaska and Hawaii. It is only a matter of time before the North Koreans develop a nuclear warhead that will be loaded on these vehicles. ...

Source: <http://www.scmp.com>, 22July 2017.

BALLISTIC MISSILE DEFENCE

INDIA-ISRAEL

Israel to Partner DRDO for Developing Missile Defence System for India

In a major upgrade to its defences, the Indian Army has signed a MoU with the DRDO to raise one regiment of the advanced Medium Range Surface to Air Missiles (MRSAM). The army plans to have a total of five regiments of this air defence system, which will be deployed opposite to China and Pakistan.

The MRSAM marks a paradigm shift in the capabilities of the Indian Army. The system can shoot down enemy ballistic missiles, aircraft, helicopters, drones, surveillance aircraft and AWACS aircraft. Meant for the Army Air Defence, the MRSAM is an advanced, all weather, mobile, land-based air defence system. It is capable of engaging multiple aerial targets at ranges of more than 50 km. Each MRSAM system comprises a command-and-control system, a tracking radar, missiles, and mobile launchers.

Each regiment consists of four launchers with three missiles each. So five regiments will have 60 missiles. A MOU has been signed between the army and the DRDO for one regiment. "The MOU marks the beginning of the development of the MRSAM in the configuration required by the army," said a defence ministry official, adding that the entire project is worth Rs 17,000 cr. Earlier in the year, the Cabinet Committee on Security headed by PM Modi approved a proposal for procuring the MRSAM system for the army. According to the proposal, the army will induct five regiments of the system. The system will be jointly developed by Israel Aerospace Industries (IAI) and DRDO with the involvement of private sectors and DPSUs. "The system will have majority indigenous content, giving boost to the Make-in-India initiative.

The participation of Indian companies in producing MRSAM will empower them in the field of high tech weapon technology. In July 2016, the IAI and DRDO conducted three flight tests of the MRSAM at the integrated test range off the Odisha Coast. The missile successfully intercepted moving aerial targets in all three tests. The MRSAM is a land-based variant of the long-range surface-to-air missile (LRSAM) or Barak-8 naval air defence system, which is designed to operate from naval vessels.

Source: <http://economictimes.indiatimes.com,21 July 2017>.

RUSSIA-USA

Why Russia's Ballistic-missile Defence Works and America's Kinda Doesn't

The US has spent \$US40 billion on the ground-based midcourse ballistic-missile-defence system. By the end of 2017, it wants to have 44 missile interceptors stationed in Alaska and California to fend off a possible nuclear-missile attack. While the ground-based midcourse missile-defence system has had some success in tests, real-world conditions could easily stress the system to the max, leaving the US vulnerable to nuclear attacks. On the other hand, Russia has 68 nuclear-tipped ballistic-missile interceptors around Moscow. US missiles interceptors do not have explosive payloads and have to actually slam into an incoming warhead to incapacitate it. ...

So the US would have to fire at least four interceptors to every one missile threat. So with the US's 44 interceptors, "at most you could destroy 11 warheads," Blair said, "and

Russia could throw 1,000 at us." But the Russian system, though horribly dangerous, works much better. According to Blair, because Russia's interceptors do explode with tremendous nuclear blasts, "it could miss a missile by half a mile and still get it." So how does the US deter nuclear attacks from Russia? Blair said that the US has at least 100 nuclear missiles targeted at Moscow. In the event of an attack, the US would fire missile after missile at Moscow as Russia's own nuclear missiles stop them in the sky. Eventually the supply of interceptors would be exhausted, or, more likely, one would fail. It would be the most violent and catastrophic event in human history, but US missiles would eventually get through as missile silos in Siberia open and fire missiles toward the US.

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However, just because nuclear-tipped interceptors work doesn't mean they're a good idea. A nuclear blast above earth could easily cause an electromagnetic pulse or a blast that would wipe out satellites and electricity, potentially costing lives. Furthermore, accidental interceptor fires do happen, so it's probably best not to arm them with nuclear warheads. It says something about now insecure Russia's leadership that it would surround its most populous city with 68 dangerous nuclear missiles.

Source: <https://www.businessinsider.com.au>, 22 July 2017.

NUCLEAR ENERGY

GENERAL

Nuclear an 'Unconditional Part' of Green Energy Balance

Nuclear power has an essential role to play in achieving a 'carbon free' future, Rosatom Deputy Director-General Kirill Komarov said on 18 July during the Expo-2017 conference in Astana, Kazakhstan.

Komarov spoke during a panel session *Carbon-free energy as the energy of the future*, which also included Helmut Engelbrecht, chairman of the World Nuclear Association, Luis Echávarri, former Director-General of the OECD Nuclear Energy Agency, Dominique Minière group senior executive Vice President of nuclear and thermal at EDF, Takuya Hattori, former President of the Japan Atomic Industry Forum, and Tom Blees, President of The Science Council for Global Initiatives. Rosatom included their comments in a statement about their discussion on 19 July.

"Everyone remembers the decisions of the Paris climate conference, which declared the consolidation of efforts of most countries to create a green energy future. Now it is necessary to deal with details because, when people talk about eco-friendly energy, they mean solar, wind, and hydropower and often forget nuclear power,

though this is undoubtedly part of the green energy mix," Komarov said. "Clean energy of all kinds should not be in competition, but be used in combination," he added.

Komarov noted that nuclear power is a reliable and predictable source of electricity that supports economic development by providing "clear conditions" that may be forecast 60 years ahead. It also offers "low volatility" because the "commodity component" in the cost of energy generated by nuclear power plants is very low - below 3%.

"For comparison, the cost of the fuel for gas and coal plants amounts to 60-70%," he added.

Komarov noted that scientists agree renewable energy should not exceed 40% of a country's electricity mix, since the grid could not support a greater share.

"This is not an absolute figure, but we should determine a place for each source of power generation. We believe the construction

of 1000 GWe of new nuclear power plants by 2050 to be a realistic target," he said.

Engelbrecht added: "Nuclear power currently has an 11% share of the world energy balance. If we build nuclear power plants as we did in the 1970s and 1980s, then we'll be able to supply 25% of the world's energy by 2050."

He also stressed that it is important to observe international regulations on the use of nuclear energy, including agreements on the construction of nuclear facilities with neighbouring states. Echávarri said it is necessary to develop sources of renewable energy, but at the same time baseload power must be provided, meaning nuclear.

Hattori noted the three main principles of the development of nuclear power: energy security, environmental safety and cost efficiency. Considering that Japan is currently importing all of its electricity from abroad, "everybody

Nuclear power has an essential role to play in achieving a 'carbon free' future, Rosatom Deputy Director-General Kirill Komarov said on 18 July during the Expo-2017 conference in Astana, Kazakhstan.

understands that we need nuclear power”, he said. Japan’s nuclear power industry is making “steady progress” with regaining public acceptance, and ten reactors are scheduled for start-up by the end of this year, he said. The country aims to reduce its CO2 emissions by 26% by 2030, he added.

Blees stressed that world electricity demand is forecast to increase by 30% by 2040. This, he added, excludes demand for power required for water desalination, the charging of electric cars and electric motors for airplanes.

Source: <http://www.world-nuclear-news.org>, 19 July 2017.

INDIA

Indian Nuclear Power Programme

Substantial work has been carried out in the areas of research on technologies for utilization of thorium in nuclear fuel cycle, and on the development of an AHWR, for use of thorium based fuel on a large scale.

BARC has developed a design for AHWR, a Technology Demonstrator Reactor of 300 MW, for utilisation of Thorium. The reactor is designed and developed to achieve large-scale use of thorium for the generation of commercial nuclear power which is a part of India’s three stage nuclear power programme. Thus, AHWR is not only a stepping stone to the third stage but also expected to provide a platform for developing and testing technologies required for the third stage. AHWR is designed with the motto of highest level of safety and security.

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The Government, in December, 2016, has accorded in-principle approval for the Tarapur Maharashtra Site (TMS) for locating the 300 MW Advanced Heavy Water Reactor. During the last five years, KKNPP 3&4 (2X1000 MW) and KKNPP 5&6 (2 x 1000 MW) projects at Kudankulam, Tamil Nadu being set up in technical cooperation with Russian Federation have been accorded financial sanction and administrative approval by the Government. The construction of KKNPP 3&4 has commenced and the General Framework Agreement for KKNPP 5&6 has been concluded.

In respect of setting up nuclear power projects in cooperation with the USA, discussions with M/s Westinghouse Electric Company (WEC) and GE Hitachi Nuclear Energy (GEH) have commenced to arrive at viable project proposals. The approved completion cost of the KKNPP 3&4 (2X1000 MW) project is Rs. 39,849 crore and that of KKNPP 5&6 (2 x 1000 MW) is Rs. 49,621 crore. The project proposals of the other projects to be set up with Russian & US technical cooperation are at various stages of discussion.

The allocations will be made project-wise on approval of the projects. These projects are expected to start power generation beyond 2020.

The role of nuclear power in the near term is to supplement generation from fossil fuel sources and in the long term, provide the country energy security. All energy

sources including coal and nuclear will be deployed optimally to meet the country’s growing electricity demand. This information was

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provided by the Union Minister of State (Independent Charge) Development of North-Eastern Region (DoNER), MoS PMO, Personnel, Public Grievances & Pensions, Atomic Energy and Space, Dr Jitendra Singh in written reply to a question in Lok Sabha on 19 July.

Source: <http://www.business-standard.com>, 19 July 2017.

India to Set Up Five Nuclear Reactors in Cooperation with Russia, France & USA

The government has accorded 'in principle' approval of five coastal sites and designated them for locating large capacity LWRs for Nuclear Energy in cooperation with the Russian Federation, France & the US. Details of progress in the Indo-US nuclear deal were given by Dr. Jitendra Singh, Union Minister of State for Atomic Energy and Space in a written reply to a question in Rajya Sabha 19 July, 2017.

"The fruition of International cooperation in nuclear energy or Indo-US nuclear deal as has been commonly known, has resulted in enabling import of fuel for reactors placed under IAEA Safeguards and paved the way for setting up of LWRs with foreign technical cooperation," said Dr. Singh, who also holds the charges of Union Minister of State Development of North-Eastern Region (DoNER), MoS PMO, Personnel, Public Grievances & Pensions. He

further said, " The government has accorded 'in principle' approval of five coastal sites and designated them for locating such reactors in cooperation with the Russian Federation, France & the USA. Two projects, KKNPP 3&4 (2X1000 MW) and KKNPP 5&6 (2X1000 MW), to be set up in technical cooperation with Russian Federation at Kudankulam, Tamil Nadu have been accorded financial sanction.

Construction of KKNPP 3&4 has commenced. Discussions with technology partners from France

and USA have commenced to arrive at viable project proposals". At present there are nine reactors under construction and another twelve have been accorded administrative approval and financial sanction by the government, work on which is being taken up progressively. The government has recently accorded financial sanction for ten indigenous 700 MW reactors and two reactors [KKNPP 5&6 (2X1000 MW)] has to be set up in technical cooperation with Russian Federation. The approved completion cost of KKNPP 1 to 6 is Rs. 106740 crore for the total capacity of 6 x 1000 MW.

Source: <https://www.outlookindia.com>, 19 July 2017.

NUCLEAR COOPERATION

CHINA-POLAND

CGN in Line to Build Poland's First Nuclear Power Plant

China General Nuclear Power Group (CGN) is in discussions with the Polish government with a view to potentially building the country's first nuclear power plant.

In a statement CGN said talks took place with a Polish delegation headed by Andrzej Piotrowski, Deputy Minister of energy in Shenzhen in July. Piotrowski met his Chinese counterpart Li Fanrong in Beijing. The two countries signed a memorandum on

nuclear cooperation for civil use. The Polish delegation visited Dayawan nuclear plant and Hualong One reactors project, according to the statement released on CGN's website.

It's another sign of the growing influence of CGN in the European market, having already signed up to partner with EDF to develop the Hinkley Point C nuclear power project in England, a project hailed as a gateway to promote Chinese nuclear technology.

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"The UK has a very high standard for nuclear energy, especially in the aspect of its safety. If Hualong One could enter the British market, it means that the nuclear technology of China comes very close to those of developed countries," Zhao Chengkun, former director of China's National Nuclear Safety Administration, told China Business News. Poland government plans to build two nuclear power plants with a total capacity of six million kilowatts, the statement noted. Companies including France's Areva and EDF, the US' Westinghouse and Canada's SNC-Lavalin Nuclear are also eyeing to take part in the race, according to Polish media.

Source: <http://www.powerengineeringint.com>, 25 July 2017.

INDIA–JAPAN

India, Japan Civil Nuclear Cooperation Deal Comes into Force

A landmark civil nuclear cooperation deal between India and Japan that provides for collaboration between their industries in the field came into force on 20 July, 2017, eight months after it was sealed. ...Foreign Secretary S Jaishankar and Japanese ambassador Kenji Hiramatsu exchanged diplomatic notes, marking operationalisation of the pact, the external affairs ministry said.

The civil nuclear cooperation agreement was signed in November 2016, during PM Modi's visit to Tokyo. "The memorandum we signed on civil nuclear energy cooperation is more than just an agreement for commerce and clean energy, it is a shining symbol of a new level of mutual confidence and strategic partnership in the cause of peaceful and secure world," Modi said. "No friend will matter more in realising India's economic dreams than Japan. We have made enormous progress in economic cooperation as also in our regional partnership and security cooperation," said Modi after signing the deal. On his part, Japanese PM Shinzo Abe said, "We have taken the relationship to a new level."

The deal allows Japan to export nuclear technology to India, making New Delhi the first non-NPT signatory to have such a deal with Tokyo. ...There was political resistance in Japan — the only country to suffer atomic bombings during World

War II — against a nuclear deal with India, particularly after the disaster at the Fukushima Nuclear Power Plant in 2011. Japan is a major player in the nuclear energy market and an atomic deal with it will make it easier for US-based nuclear plant makers Westinghouse Electric Corporation and GE Energy Inc to set up atomic plants in India as both these conglomerates have Japanese investments. *Economic Times* reports that Japan will also assist India in nuclear waste management and will undertake joint manufacturing of nuclear power plant components under the 'Make in India' initiative. ...

Source: <http://www.firstpost.com>, 21 July 2017.

INDIA–AUSTRALIA

Australia Ships First Uranium to India for Testing, Bishop Says

Australia has sent its first uranium shipment to India for testing purposes ahead of possible commercial sales to the nation, Foreign Minister Julie Bishop said. "I can confirm that the first shipment of uranium has taken place in mid-July, when a small sample of uranium was transferred for testing purposes," Bishop said in an emailed statement on 22 July. "The transfer is part of ongoing commercial negotiations between Australian uranium exporters and India's DAE on possible sales contracts for civil nuclear-power generation," Bishop said. Former Prime Minister Tony Abbott signed an agreement with India for civil nuclear cooperation in September 2014, opening the door for uranium sales. Australia's current leader, Malcolm Turnbull, said in April he was looking forward to exporting uranium to the nation as soon as possible after holding talks with his Indian counterpart Narendra Modi.

Source: <https://www.bloomberg.com>, 22 July 2017.

SAUDI ARABIA–SOUTH KOREA

Riyadh, Seoul Review Progress of Nuclear Project

Saudi Arabia and South Korea have reviewed the System-integrated Modular Advanced reactor Technology (SMART) project, which aims to design and develop compact nuclear reactors so the

Kingdom can diversify energy sources in line with Vision 2030. The King Abdullah City for Atomic and Renewable Energy (KACARE) is developing the project in association with the Korea Atomic Energy Research Institute (KAERI) and other Korean firms specializing in atomic energy. KACARE and KAERI are mandated to achieve energy self-reliance via nuclear technology in their respective countries. The third meeting on the SMART project was held in South Korea to review activities in connection with the initial engineering design, Korean Embassy spokesman Youngjae Kim said on 20 July.

The basis of this cooperation is a MoU signed in 2015 during the visit to the Kingdom by then-South Korean President Geun-Hye Park, the spokesman added. "SMART is a better option in terms of safety than large units," he said, adding that the Saudi-Korean cooperation may lead to commercializing and promoting SMART to other countries. KACARE said in a statement that the meeting reviewed progress "to ensure project completion on time, hand in hand and shoulder to shoulder with the Korean stakeholders." KACARE is laying down engineering designs so the Kingdom can produce electricity and desalinated water, and potentially export atomic energy.

Source: <http://www.arabnews.com>, 22 July 2017.

URANIUM PRODUCTION

GENERAL

Uranium Prices See Lackluster Movement

Uranium spot prices have risen for seven straight weeks, but the ascent has been very modest with Trade Tech's weekly spot price indicator appreciating only 4.3% over the period. As the commodity ascended, \$20 per lb. was the point of resistance in past weeks, but that level was eventually breached and now \$20.50 per lb is acting as the next resistance point. While buyers are showing interest in buying uranium

when sellers push for prices above \$20.50 per lb this interest is drying up. The reason for the lackluster movement in the market remains the near-term uncertainty for demand.

While positive expectations for uranium are being supported by the large amount of nuclear power plants under construction in emerging markets such as China, not everyone is eager to jump on the nuclear power bandwagon. South Korea's new leader is looking at phasing out nuclear energy as a source of power and has halted all new

nuclear reactor construction. This move has been met with opposition, with even environmentalists saying that without nuclear power the country may not be able to meet its emissions reduction targets as part of the Paris Climate Accord.

Also, the new French government set a target of reducing nuclear power in France's energy mix to 50% by 2025.

While some countries are moving away from nuclear power, others are fully embracing it. China has dozens of nuclear power plants in the construction and planning phases, and India has continued to ramp up its nuclear power plans. In recent developments, the nuclear cooperation agreement signed between India and Japan has now entered into force. The agreement will mean that India can use Japan's technology to advance its nuclear power sector.

Source: <http://www.economiccalendar.com>, 24 July 2017.

NUCLEAR NON-PROLIFERATION

EUROPE-UKRAINE

The European-Ukrainian Nuclear Mistake

Since the end of the Cold War, Europe has botched several major security crises, from refugees to referenda. Europe's worst mistake was the nuclear disarmament of Ukraine 23 years ago. It continues to have lasting, negative consequences for European security.

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In 1991, with the dissolution of the Soviet Union, Ukraine found itself in possession of the third-largest nuclear stockpile in the world. Though Ukraine did not have the weapons' operational capability, the windfall was a mixed blessing. By 1994, Ukraine had decided to destroy the nuclear stockpile and join the Treaty on the NPT. This move was widely supported by Western powers. The US, UK, and Russian Federation signed the Budapest Memorandum in response to Ukraine's decision. The Memorandum stated that the three nations would "respect the independence and sovereignty and existing borders of Ukraine" and would "refrain from the threat or use of force." Additionally, France and China signed separate but similar documents in support of Ukraine.

It became apparent that Budapest Memorandum signers and other interested nations would not defend Ukraine's physical sovereignty when Russian forces invaded Crimea in 2014. This led to many questions: Should Ukraine have surrendered its nuclear arsenal? Should Ukraine reacquire nuclear weapons in the face of a belligerent Russian bear?

What role do the signers of the Budapest Memorandum have in the Crimean Crisis and broader war in the Donbas region? The best the United States could muster was a strongly-worded statement. Although debate rages around nuclear weapons, they have proven to be an extremely successful deterrent. Nuclear weapons have prevented major wars across many tense, bilateral relationships; the US-USSR, USSR-China, and India-Pakistan relationships are all examples. The reason is simple: if a nation invades another who can assuredly deploy nuclear weapons, there is a great risk of a catastrophic response.

Russia, like any major power, is interested in expanding its reach and influence. Russian expansion has two main roads into Eastern Europe. The first leads through the Baltic States

and Poland. After the collapse of the Soviet Union, these countries feared upstart Russian aggression leading these states to quickly join NATO. The second route travels through Ukraine and the Balkans to reach Central Europe. Ukraine also attempted to join NATO but to no avail. With the Baltic States' accessions to NATO and the ease of Western military deployment to Estonia, Latvia and Lithuania, Ukraine gained the interest of Russian expansionism.

Additionally, the United States is much more likely to uphold NATO's article five than the Budapest Memorandum in the face of additional Russian aggression. Many policymakers assume Russia is interested in regaining "lost" territory from the collapse of the Soviet Union—especially territory as rich in natural resources and fertile ground as Ukraine. With this understanding of Russia's geographic options into Europe, it becomes apparent that European security partially lies with Ukraine. Europe has avoided Russian aggression since 1991, but that successful streak is coming undone with the annexation of Crimea and the ongoing struggle in the Donbas region. European powers

and the US have shown they are not interested in deploying military forces to Ukraine. This will bring Russia closer to the Western powers' doorstep in time, thereby creating Europe's greatest current security concern.

There is historical evidence that nuclear weapons guarantee sovereignty. Though the US China, Russia, India, and Pakistan are all nuclear states, none have employed weapons of mass destruction nor have they lost territory when coming into conflict with each other. Had Ukraine maintained its nuclear arsenal, even at a fraction of the size, Kiev would possess strong deterrent capabilities. Ukraine took a gamble in 1994. They assumed the Budapest Memorandum and joining the NPT would guarantee security. Unfortunately, security treaties

There is historical evidence that nuclear weapons guarantee sovereignty. Though the US China, Russia, India, and Pakistan are all nuclear states, none have employed weapons of mass destruction nor have they lost territory when coming into conflict with each other. Had Ukraine maintained its nuclear arsenal, even at a fraction of the size, Kiev would possess strong deterrent capabilities. Ukraine took a gamble in 1994. They assumed the Budapest Memorandum and joining the NPT would guarantee security.

and agreements are fickle. Should the US and UK militaries deploy and take part in a small, regional conflict in eastern and southern Ukraine? There are few reasons to do so. Moreover, Europe does not possess the unified desire and capability to defend Ukrainian territorial integrity without the US war machine. With the Russian annexation of Crimea and war in the Donbas now past its three-year anniversary, it is clear the West has no intentions of resolving the issue or assisting Kiev in the short run. This bodes ill for European and Ukrainian security in the coming years. Ukrainian nuclear weapons would change that.

Source: <https://chargedaffairs.org>, 17 July 2017.

IRAN

Trump Re-Ups Iran Nuclear Deal He Once Called the 'Worst Deal Ever'

It took President Donald Trump 55 minutes of a one-hour meeting...to argue with aides that he didn't want to re-certify America's nuclear deal with Iran—an Obama-era deal he roundly condemned on the campaign trail—only to capitulate in the last five, *The New York Times* is reporting. Problem for Trump is that the nuclear deal is actually working.

For those who do not understand what the Iran Deal is, I'll explain. In short, the deal basically keeps Tehran from pursuing a nuclear weapon. Or, perhaps more accurately, delays the process. Nothing else. It doesn't deal with Tehran's alleged support of terrorism (which Trump, in part, reportedly wants to punish them for), nor does it address any other regional issues—of which there are admittedly many. Let's not pretend that Iran is any sort of good guy here, that it's not rife with anti-Semitic rhetoric, a sponsor of terrorism or a disruptive presence in Iraq. But no matter how

many times the IAEA says Tehran is not breaking the rules (on the most part), Trump insists on believing the contrary. Without presenting any facts, Trump has long lamented that the deal, brokered by the former Obama administration, was the "worst deal ever." During his run for the White House, he vowed to end it. Yet on 17 July, as a legal deadline to do so loomed, Trump reluctantly agreed to re-up the agreement.

The deal allows for Iran to produce small amounts of uranium unsuitable for making a bomb, a cap that lasts 15 years. Now, if Tehran honors the deal, it likely will not have enough centrifuges and other materials to make enough weapons-grade uranium for a bomb in less than a year for at least 10 years. The thinking behind this is clearly to delay Tehran in hopes that diplomacy will steer

them from their nuclear ambitions. Again, it's a gamble, but one the entire international community is hedging its faith on. The IAEA has consistently found that Tehran is playing by the rules, but Trump insists on arguing that it is not. He wants to ratchet up sanctions against Iran for supporting terrorism, even though the agreement doesn't deal with anything other than non-proliferation compliance. Pursuing aggression against Iran

because of issues outside of the stipulations of the deal is pure bullshit. Don't try and make sense of any of it.

For the foreseeable future, it is doubtful Washington will have warm relations with Iran. That's not the aim at this point. The goal is to prevent them from building nukes. And that plan is actually working. But this isn't about that. Trump simply wants to report to his base that he is "tough on Iran," even though they're submitting to demands of the deal. Tehran could allow the entire GOP Congress to set up shop in its nuclear facilities and Trump would still find a reason to

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claim Iran isn't being transparent. This has a lot less to do with the policy reality on the ground and a lot more to do with Trump needing to appear to deliver on a campaign talking point.

Source: <http://foxtrotalpha.jalopnik.com>, 20 July 2017.

NUCLEAR DISARMAMENT

INDIA

India Remains Committed to Non-discriminatory, Verifiable Nuclear Disarmament

India...remains committed to universal, non-discriminatory and verifiable nuclear disarmament. In response to a query regarding India's view on a treaty to ban nuclear weapons, MEA spokesperson Gopal Baglay said that India continues to attach priority to and remains committed to universal, non-discriminatory and verifiable nuclear disarmament. A UN Conference on July 7 this year adopted treaty prohibiting nuclear weapons. The treaty through an inclusive multilateral process in the United Nations framework, which involved both states and members of civil society, is the culmination of three international conferences held between 2012 and 2014 that considered the catastrophic humanitarian consequences of the use of nuclear weapons and their associated risks. Baglay said that India, however, did not participate in the negotiations on a treaty on the prohibition of nuclear weapons which were concluded in New York on July 7, 2017, adding that also, none of the other states possessing nuclear weapons participated in the negotiations.

"These negotiations were conducted under UN General Assembly rules of procedure, pursuant to UN General Assembly Resolution 71/258 of 23 December 2016. India had abstained on this

Resolution and provided a detailed Explanation of Vote. India had further expressed its position on the issue of its non-participation in these negotiations at a Plenary of the Conference on Disarmament on 28 March 2017," he said. Baglay further said that India, therefore, cannot be a party to the treaty, and so shall not be bound by any of the obligations that may arise from it.

He said India believes that this treaty in no way constitutes or contributes to the development of any customary international law. "India reiterated its commitment to the goal of a nuclear weapon free world. India believes that this goal can be achieved through a step-by-step process

India reiterated its commitment to the goal of a nuclear weapon free world. India believes that this goal can be achieved through a step-by-step process underwritten by a universal commitment and an agreed global and non-discriminatory multilateral framework. In this regard, India supports the commencement of negotiations on a comprehensive Nuclear Weapons Convention in the Conference on Disarmament, which is the world's single multilateral disarmament negotiation forum working on the basis of consensus.

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Source: <http://www.abplive.in>, 18 July 2017.

NUCLEAR TERRORISM

PAKISTAN

State Department Report on Terrorism Accuses Pakistan of Allowing Terror Groups' Operations from its Soil

The State Department released its annual report, Country Reports on Terrorism 2016, which provides the Department of State's annual Congressionally-mandated assessment of trends and events in international terrorism that transpired from January 1 to December 31, 2016, on Wednesday.

The report states that numerous terrorist groups, including the Haqqani Network (HQN), Lashkar e-Tayyiba (LeT), and Jaish-e-Mohammad (JeM),

continued to operate from Pakistani soil in 2016. "Although LeT is banned in Pakistan, LeT's wings Jamaat-ud-Dawa (JuD) and Falah-i-Insaniat Foundation (FiF) were able to openly engage in fundraising, including in the capital," said the report. "LeT's chief Hafiz Saeed (a UN-designated terrorist) continued to address large rallies, although in February 2017, Pakistan proscribed him under relevant provisions of Schedule Four of the Anti-Terrorism Act, thus severely restricting his freedom of movement. The 2015 ban on media coverage of Saeed, JuD, and FiF continued and was generally followed by broadcast and print media."

According to the report, the Pakistani government did not publicly reverse its December 2015 declaration that neither JuD nor FiF is banned in Pakistan, despite their listing under UN sanctions regimes, although in January 2017, Pakistan placed both organizations 'under observation' pursuant to Schedule Two of the Anti-Terrorism Act. While not a ban, this allows the government to closely scrutinize the activities of both organizations, it added.

The report further said that on November 11, Pakistan's National Counterterrorism Authority (NACTA) published its own list of banned organizations that placed JuD in a separate section for groups that are 'Under Observation', but not banned. "Pakistan continued military operations to eradicate terrorist safe havens in the Federally Administered Tribal Areas, although their impact on all terrorist groups was uneven," said the report.

Nevertheless, the report said that throughout 2016, the Government of Pakistan administered an Exit Control List intended to prevent terrorists from traveling abroad.

"To combat WMD trafficking, Pakistan harmonized its national control list with items controlled by the Nuclear Suppliers Group, and continued to

harmonize its control lists with other multilateral regimes, such as the MTCR and the Australia Group," it read. "Pakistan improved legal and regulatory cooperation, industry outreach, and nonproliferation awareness for the Strategic Export Control Division and Pakistani Customs. In addition to industry outreach, Pakistan also delivered technical trainings to licensing and enforcement officials for the proper detection, interdiction, and identification of dual-use commodities that could be used to create WMDs."

The report further said Pakistan was a 'constructive and active participant' in the Nuclear Security Summit process and in the Global Initiative to Combat Nuclear Terrorism, and worked to strengthen its strategic trade controls, including

updating its national export control list. The State Department's Export Control and Related Border Security (EXBS) Program increased the Government of Pakistan's enforcement capacity by sponsoring training for Pakistani Customs and the Strategic Export Control Division officials on how to properly identify strategic commodities of concern, it

said, adding that these commodity identification and advanced interdiction trainings were implemented by the US Department of Energy. ...

Afghanistan: Meanwhile, the report said that terrorist and insurgent groups are active in the border region of Afghanistan and Pakistan. "The Government of Afghanistan struggled to assert control over this remote terrain, where the population is largely detached from national institutions," it read. "Afghanistan generally cooperated with US counterterrorism efforts, although there were some disagreements on the role of US nationals during combined counterterrorism operations. President Ghani has actively pursued cross-border security cooperation with the Government of Pakistan, including the prospect of joint operations to reduce safe havens on both sides."

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Since the transition from the International Security Assistance Force (ISAF) to Resolute Support in January 2015, the trilateral border agreement that governed the Afghanistan-Pakistan border (ISAF was also a signatory) expired and the two countries were unable to finalize a bilateral agreement to replace it, said the report. "While there were some positive tactical-level steps taken by each country's military to improve operational coordination, regular cross-border shelling, and terrorist attacks on both sides of the border made formal agreement politically untenable," it added.

The report further said the potential for WMD trafficking and proliferation remained a concern in Afghanistan because of its porous borders and the presence of terrorist groups. "The US and Afghanistan continued to work to finalize a bilateral framework to facilitate closer cooperation to counter nuclear terrorism and enhance Afghanistan's capabilities to prevent, detect, and respond to nuclear smuggling incidents," it said. "The Afghanistan and US governments also continued to work to implement comprehensive strategic trade controls and strengthen Afghanistan's border security system."

The Department of State's Export Control and Related Border Security (EXBS) Program contributed to strengthening Afghanistan's border enforcement capacity by providing training to the Afghan Customs Department, the report added. "EXBS also sponsored regional cross-border collaboration through trainings with its South and Central Asian neighbors through the US Department of Energy as well as Organization for Security and Cooperation in Europe and the UN Office on Drugs and Crime – World Customs Organization's Container Control Program."

According to the report, the US continued to assist the Afghan government in building capacity to

secure potentially dangerous biological materials and infrastructure housed at Afghan facilities, promote surveillance capabilities to detect and identify possibly catastrophic biological events, and engage Afghan scientists and engineers that have WMD or WMD-applicable expertise.

Source: <https://www.samaa.tv>, 20 July 2017.

NUCLEAR SAFETY

GENERAL

Greater Transparency for Nuclear Safety Convention

All contracting parties to the international Convention on Nuclear Safety (CNS) have now made their national reports on the implementation of their obligations publicly available, the first time this has happened since the convention was established in 1996.

The CNS legally commits participating states operating land-based nuclear power plants to maintain a high level of safety by setting international benchmarks -

largely based on fundamental principles set out by the IAEA standards - covering nuclear plant siting, design, construction, operation, financial and human resources, safety assessment and verification, quality assurance and emergency preparedness. It entered into force on 24 October 1996, and as of June 2017 had 81 contracting parties - countries that have deposited an instrument of ratification, acceptance or approval. Ten further countries have signed the convention but not yet ratified it.

The convention requires parties to report on their implementation of obligations under the convention. The full set of national reports, which are open to peer review by other contracting parties, are now publicly available on the IAEA's web site, Ramzi Jammal, President of the Seventh

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Review Meeting of the CNS, announced on 21 July. Reports are now available for 78 countries and Euratom, which were contracting parties to the CNS at the time of the Seventh Review Meeting. Thirty-six countries and Euratom published reports at the previous review meeting, which was held in 2014. Jammal, executive Vice-President of the Canadian Nuclear Safety Commission, was elected as President of the Seventh Review Meeting of the CNS in March and will hold the post until October 2018. The next review meeting will be held in 2020.

Source: <http://world-nuclear-news.org>, 24 July 2017.

IRAN-EU

Iran, EU Launch Nuclear Safety Cooperation Project

Iran and the EU have launched a joint project to cooperate on nuclear safety programme.... Following the meeting on 12th July, 2017 between the visiting EU delegation headed by Olivier Luyckx, the director of EU nuclear safety unit, and Hojjatollah Salehi, the director of Iran's nuclear safety center, both sides officially announced the start of the 2.85-million-US-dollar project. The project is part of a 5.7-million-US-dollar package approved in 2016 with regard to Iran-EU cooperation on nuclear safety to enhance Iran's nuclear safety capabilities in various spheres, including the establishment of a nuclear safety center....

Under the agreement which will last for three and a half years, the EU will support the Iranian Nuclear Regulatory Authority to develop a nuclear regulatory framework and will support Iran's accession to several international nuclear conventions. The project, signed within the framework of Iran's nuclear deal, also seeks to provide more training opportunities to Iranian experts on nuclear safety procedures. Iran and six world powers, including Britain, China, France, Germany, Russia and the US, reached an

agreement on the Iranian nuclear issue on July 14, 2015, which put it on the path of sanctions relief but with more strict limits on its nuclear program. The deal set limits on Iran's nuclear activities as it would take Tehran at least one year to produce enough fissile material for a nuclear weapon, and allowed regular inspections of the facilities inside Iran. In return, the US and the EU will suspend nuclear-related sanctions against Iran, including recalling all past UN Security Council sanction resolutions.

Source: <http://www.globaltimes.cn>, 15 July 2017.

NUCLEAR WASTE MANAGEMENT

UAE

UAE to Develop Radioactive Waste Management Policy

ENEC stressed, however, that if the government did decide in favour of the reprocessing strategy, the service would be outsourced and implemented outside the UAE, in compliance with the conditions of the UAE's Peaceful Nuclear Energy Program.

The UAE government is in the process of developing a national radioactive waste management policy for the nuclear waste that will be generated at the Barakah nuclear power plant. At a press briefing held on 17 July, in Abu Dhabi, officials from Emirates Nuclear Energy Corporation (ENEC) said that the planned policy will address the management and disposal of not only spent nuclear fuel, but other radioactive waste in the country. The policy will reportedly identify long-term waste management strategies, with the reprocessing of used nuclear fuel among the options being considered. ENEC stressed, however, that if the government did decide in favour of the reprocessing strategy, the service would be outsourced and implemented outside the UAE, in compliance with the conditions of the UAE's Peaceful Nuclear Energy Program.

According to ENEC, the UAE wants to show how nuclear energy can be used for "peaceful purposes without opening any doors to different uses" by deciding against allowing enrichment and reprocessing to be done in the country. Elaborating, Maryam Qasem, head of nuclear fuel fabrication procurement at ENEC, said that

enrichment refers to the process of increasing the percent composition of the isotope uranium-235 from 0.72% – the amount found in natural uranium – to 5%, so the uranium can be used to generate nuclear energy for electricity purposes. She noted that the process carries risks because uranium can be weaponised by increasing the isotope composition to 90%. This risk is reportedly what the UAE government wants to avoid, hence the decision not to allow enrichment to be conducted in the country. With reprocessing, on the other hand, there's concern that it could lead to a possible proliferation of plutonium, which can also be used to make weapons.

She said that whether the government decides to go for reprocessing remains to be seen, pointing

out that the country still has time to mull over its options because its current waste management strategy will allow for 70 to 80 years of safe storage at the plant. This strategy, Qasem explained, involves the use of concrete and steel-lined "spent fuel pools", where used fuel will be stored for 10 to 20 years, allowing it to cool, before it is then moved to concrete and steel containers called dry casks, for long-term storage. During the press briefing, ENEC also announced that the Barakah Nuclear Energy Plant, which consists of four nuclear reactors housed in four separate units and the largest single nuclear energy new-build project in the world, is now 81% complete.

Source: <http://www.constructionweekonline.com>, 20 July 2017.



Centre for Air Power Studies

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