Indo-US Civil Nuclear Deal: Delayed Progress and Implicit Gains

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Abstract

The post-Cold War geopolitical environment and China's emergence as an economic powerhouse was the principal catalyst of the Indo-US civil nuclear deal. The civil nuclear deal was a business deal between India and the United States. The purpose was to fulfil India's increasing energy demands by opening up to the international nuclear market and to purchase nuclear power plants from the US. However, the operationalisation of the deal could not take off for more than a decade after the conclusion of the agreement in 2008 due to India's Civil Liability for Nuclear Damage Act of 2010. On the contrary, the deal helped India achieve many of the unstated goals. This deal enabled India to import fissile material for its dual-use technologies under the limited safeguards of the International Atomic Energy Agency (IAEA) after getting a waiver from the Nuclear Supplier Group (NSG). The deal also enabled India to apply for the full membership of NSG without being a signatory to the Nuclear Non-proliferation Treaty (NPT) with the strong backing of the US, which makes it an exceptional case. This paper aims to analyse how this deal served the strategic objectives of India and the US despite the delay in the operationalisation of the deal for more than a decade. This paper argues that the deal happened under the cover of business in civilian nuclear technology while the actual aim was to empower India against rising China as a part of the US containment policy. The paper explores how India's military nuclear programme is benefiting from its nuclear material trade and how it is harmful to the strategic stability in South Asia.

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Keywords: *civil nuclear deal, implicit gains, nuclear power plants, fissile material, unsafeguarded nuclear programme, nuclear technology*

Introduction

The operationalisation of the civil nuclear deal between India and the United States, approved on 1 October 2008, was delayed for more than a decade. The stated purpose behind the deal was India's quest for producing a vast quantity of energy by reaching out to international trade in civil nuclear technology and material. However, during the period, it only achieved most of its unstated goals and failed to build new reactors for electricity production. Despite the increasing demand for energy since 2010, India's civil nuclear liability law's inconsistency with international conventions had put limits on foreign technology transfer to India. Even after redressing the liability issues, the progress in the implementation process is still slow. The ground-breaking negotiations between President Barack Obama and Indian Prime Minister Narendra Modi in 2015 and 2016 resulted in contractual arrangements for six reactors, which were due to be signed in 2017.[1] After further delay, both countries reached an agreement on 13 March 2019 to build six nuclear reactors. Progress started because of the personal interest of the US President Donald Trump who is interested in selling more energy products to India that is ranked the third-biggest buyer of oil.[2] Russia also agreed in October 2018 to sign a pact with India to build six Russian-design nuclear reactors on a new site.[3] On President Trump's visit to India in February 2020, in a joint statement, Trump and Modi gave green light to the Nuclear Power Corporation of India Limited (NPCIL) and Westinghouse Electric Company to prepare a commercial and technical proposal for the construction of six nuclear reactors in India.[4]

Due to the persistent delay in the operationalisation of the deal, the true potential of the civil nuclear deal has not been realised. Nevertheless, this deal materialised many of India's unstated goals

since 2005. First, the deal opened doors for broader commercial, strategic, and defence cooperation between India and the US. It enabled India to trade in civil nuclear technology without signing the Nuclear Non-proliferation Treaty (NPT) and the Comprehensive Test Ban Treaty (CTBT) that marked the Indian nuclear programme as an exceptional case since the establishment of the nuclear non-proliferation regimes.[5]

Following the nuclear agreement, the US support granted India a waiver from the Nuclear Supplier Groups (NSG) safeguards to import fissile material and civil nuclear technology. Therefore, the deal opened doors for India to establish nuclear cooperation with other members of the NSG and accorded India a 'de facto status' of a nuclear weapons state (NWS).[6] Nuclear cooperation with the US further emboldened India to demand NSG membership despite being a non-signatory of the NPT. Moreover, the deal also encouraged India to spearhead its aspirations to become a permanent member of the United Nations Security Council (UNSC) in its drive to become a global power. Most importantly, the strategic partnership with the US accelerated the modernisation of India's missile technology and space technology programmes.[7] The most alarming aspect of the cooperation is that India's capability of nuclear trade with NSG members also helped an increase in its nuclear weapons stockpile and its upgrade.

The existing studies on nuclear cooperation between India and the US do not cover the gaps in the implementation of the actual goals of the nuclear deal. Most of the studies have focused on the criticism of the deal and its implications for the nuclear non-proliferation in the world. Nevertheless, the dichotomy in stated and unstated gains from the deal has not been addressed. It is important to study how India remained at an advantageous position by entering into the international nuclear market through an NSG waiver, while the US has not been able to construct nuclear reactors in India so far.

It is in this context that this paper attempts to analyse the delay in the implementation of the stated goals of the Indo-US civil nuclear deal and the deal as a gateway for expansion of Indian nuclear programme for military purposes. After a brief historical background and theoretical perspective of the nuclear cooperation between the two states, it highlights the progress in the implementation of the 2008 Indo-US nuclear deal. It covers new developments in the implementation of the deal since 2014, the achieved goals, and varied implementation process. Furthermore, the paper examines how nuclear cooperation with the US enabled India to transform the civil nuclear deal for gaining advantages in redefining its nuclear position, nuclear arms build-up and its modernisation. The convergence of interests between India and the US to balance against rising China is highlighted as a major driver behind the deal and the strengthening of India's defence capabilities vis-à-vis China as an outcome. The paper addresses the major question that how the nuclear deal served the purpose of India and the US despite the delay in implementation of its stated goals.

Indo-US Civil Nuclear Deal: Converging Interests

The Indo-US nuclear cooperation—once suspended in 1974 due to India's so-called peaceful nuclear tests that had also led to the formation of NSG based on the technology export-control policy—was re-established due to convergence of interests between the two countries in the new millennium. Nuclear cooperation between India and the US dates back to 1950s when the US promoted India's use of atomic energy by building a nuclear reactor for India. The US not only provided nuclear fuel to India but also allowed Indian scientists to study at US nuclear laboratories.[8] India conducted a nuclear test after six years of the signing of the NPT in 1968, which prohibited nuclear weapons states (NWS) from trade with countries non-signatory to the NPT. In 1968, India refused to sign the NPT, claiming it was biased. The US was then legally bound to cut

cooperation in nuclear energy. However, it was not a permanent setback to their nuclear cooperation.[9]

Relations between India and the US remained estranged throughout the Cold War and rejuvenated from 1991 to 2001. The US policy vis-à-vis South Asia, particularly India, radically changed in the wake of the challenges of terrorism and China's economic expansion. The economic and commercial interests of the US also played a great role in forging new ties with India.[10] The US companies anticipated multibillion-dollar reactor-building contracts with India.[11] Hence, driven by it national interests, the US ended its longstanding non-proliferation orthodoxy by announcing the historic and controversial Indo-US civilian nuclear deal in a joint statement by former US president George W. Bush and former Indian prime minister Manmohan Singh on 18 July 2005.[12] The US Congress approved the deal on 1 October 2008. It was also popularly called 123 Agreement (123 was a section of the US Atomic Energy Act, which was revised by the Congress to permit nuclear trade with India). The deal not only facilitated nuclear cooperation between India and the US but also with others by getting an approval of the International Atomic Energy Agency (IAEA) and the NSG.

These arrangements enabled India to benefit from international civil nuclear trade after four decades of exclusion. India planned the expansion of its nuclear sector for civil use through high-capacity imported reactors and indigenous programmes. In the beginning, France, Russia, and the US facilitated their high-capacity reactor imports.[13] Later, India concluded nuclear cooperation agreements with Argentina, Australia, Canada, Czech Republic, Japan, Kazakhstan, Mongolia, Namibia, South Korea, United Kingdom, and Vietnam.[14]

The deal obliged India to separate its civil nuclear facilities from military ones and agreed to place 14 of its 22 nuclear reactors under the IAEA safeguards. India did not need to alter its nuclear

programme for military purposes but the deal only obliged it to maintain its self-declared moratorium on future nuclear weapons testing. As per US law, further tests would lead the US to pull out of the nuclear deal.[15] It is an exceptional case in which India continued with the nuclear programme for military purposes and received nuclear materials under the limited scope of IAEA safeguards from NSG members despite being a non-signatory to NPT.[16] Therefore, the attention and criticism it invited worldwide were inevitable. The deal was criticised for the reason that India had misused its nuclear cooperation with the US previously in 1974 when it conducted its first nuclear test at Pokhran. The critics feared that a similar deal might increase and modernise India's nuclear programme for military purposes.[17] Despite the US clarification on bringing India under the umbrella of the IAEA to foster cooperation in nuclear non-proliferation, the deal shows double standards and deviation from Article 1 of the NPT.[18] The deal undermined the global non-proliferation regime and also endangered strategic stability in South Asia for its discrimination against Pakistan for similar treatment. In later years, the deal was also criticised because India has not fully separated its civilian nuclear facilities from the military nuclear programmes. It has placed several of its nuclear facilities for civilian use under safeguards but it has retained many dual-purpose unsafeguarded facilities.[19]

Despite controversies and reservations, India and the US fostered strategic cooperation, while the sale and purchase of nuclear reactors were still in process. Progress remained slow because of India's Civil Liability for Nuclear Damage Act, 2010, that so far had dissuaded the US nuclear firms from any commercial investment in India.[20] However, the deal was a gateway to a strategically beneficial interaction between the two countries. According to a structural realist perspective, a special interaction of states with other states through special policies can add to its power, wealth, and influence.[21] Such

interaction may not yield equal material gains for both countries. Yet, the alliance forms due to the convergence of interests in certain areas with both explicit and implicit goals. It might be to warn the potential opponent or to use some states as balancers against opponents. The US entered into the civil nuclear deal with India not only to gain economic benefits but also to increase India's power against rising China. Similarly, India, in addition to an increase in its nuclear arms capabilities against China, also wanted to get acceptance for its nuclear programme, to become eligible to enter into the NSG, and potentially to become a member of the UNSC. Although the material gains from the civil nuclear deal are not symmetrical, owing to the delay in the implementation process, both states in terms of structural realist perspective have similar interests of balancing power against the common contender China. This deal also serves India's purpose of reinventing its relevant position in the international system.

India's Civil Liability for Nuclear Damage Act, 2010, and the Tracking Issue

India's appetite for energy is increasing with the growth of its economy and population. India requires diverse sources of energy to meet its electricity demands. One of the sources was nuclear energy but India demanded insurances from the suppliers of nuclear reactors. India had put in place liability laws against the consequences of a nuclear accident in a broader public policy interest keeping in view the incident of Fukushima nuclear disaster in Japan with huge losses. India itself had experienced consequences of the Bhopal disaster in 1984 in which 15,000 deaths occurred, resulting in complex legal battles for compensation.[22] Therefore, India's civil liability law provided a legal mechanism for compensation of victims of any nuclear accident.

Initially, the undetermined liability claims against the suppliers of nuclear reactors remained a major hindrance in the operationalisation of the 2008 civil nuclear deal.[23] The US could not proceed on the two designated sites by India in 2009 to build

nuclear reactors. To resolve this ambiguity, the Indian parliament passed Civil Liability for Nuclear Damage Act in August 2010.[24] But the US criticised this Act because of its incompatibility with the international liability regime.[25] The Act failed to balance the interests of both suppliers and operators in any nuclear accident. Although Indians set the Act in line with general international standards, in which the operator was responsible for nuclear damage arising out of a nuclear incident, some of its provisions were at variance with prevalent international standards. Therefore, it hindered progress for many years. After ratifying the Convention for Supplementary Compensation for Nuclear Damage (CSC) on 4 February 2016, India needed to bring its liability law in line with it. It is an international treaty on liability and compensation for nuclear damage, adopted on 12 September 1997.[26] India remained adamant on amending the 2010 liability legislation. It, however, created an insurance pool to indemnify the companies that will build reactors in India against liability in case of a nuclear accident.[27] The delay in overcoming the legal obstacles shows that India was not eager to buy nuclear reactors from the US, which was the stated purpose of the civil nuclear deal.

Another major obstacle and more difficult than liability was the issue of tracking and accounting of nuclear material supplied by the US or produced in the US-supplied reactors in India. The US had demanded an administrative arrangement under the Indo-US civil nuclear deal to provide necessary information regarding the supplied nuclear material. The US insisted that unless it knew where the material was located, it would not be able to provide physical security requirements and so would not be able to get a licence for nuclear reactor sale to India from the US Nuclear Regulatory Commission. India did not accept the tracking arrangement because it was of the view that the limited IAEA safeguards were enough to guarantee the peaceful use of the imported fissile material.[28]

Ending the Impasse in Nuclear Energy Cooperation Post-2014

The status of the stalled Indo-US nuclear cooperation radically changed after Narendra Modi came into power in India. Prime Minister Narendra Modi and former President Barack Obama, in their first bilateral summit on 30 September 2014, decided to end the impasse on the implementation of the civil nuclear cooperation agreement.[29] In their meetings in 2015, both countries reached a ground-breaking understanding on removing all hurdles in their nuclear cooperation. Both sides agreed to start work on the operationalisation of the civilian nuclear agreement between the two countries.

According to news reports, President Obama exempted India from the US inspection or a tracking condition. This was a big favour by the US to address the 'tracking clause in the administrative arrangements' in the same IAEA safeguards. According to this, India will be liable to share the same data with its international partners that it provides to the IAEA. Under this arrangement, the US would no longer be able to track the nuclear material to ensure its non-use for military purposes.[30] In return, Prime Minister Modi approved a publically-funded insurance pool to cover the liability under Section 17(b). This insurance pool untied foreign suppliers from nuclear damage compensation.[31] It would cover supplier liability of up to $244 million and additional costs of up to $300 million would be arranged from the International Monetary Fund (IMF).[32] In this regard, the state-owned General Insurance Corporation-Reinsurer (GIC-Re) and other Indian insurance companies will provide insurance services to Nuclear Power Corporation of India Limited (NPCIL) for covering liability under the provisions of the Act.[33]

After removing the legal obstacle, both governments focused on preparatory work for six nuclear reactors in June 2016. It was an icebreaker in reviving the nuclear deal in more than a decade.[34]

Despite ending the impasse and addressing legal barriers, the process delayed further due to financial difficulties with Westinghouse and Japan's procedural issues in ratifying the deal with India. The project remained in doubt when Westinghouse filed for bankruptcy in 2017. After Canada's Brookfield Asset Management bought Westinghouse from Toshiba in August 2018, Westinghouse was encouraged by the US Energy Secretary Rick Perry to build six AP1000 reactors in India in the state of Andhra Pradesh.[35]

Mutual versus Asymmetrical Gains

The Indo-US nuclear deal marks both mutual and asymmetrical gains for India and the US. The differences in the implementation process had hindered both India and the US from achieving the listed objectives of civil nuclear cooperation. The US, however, time and again argued that the purpose of the deal was to bring India under the nuclear non-proliferation safeguards and to enable it to produce clean energy from the civil nuclear technology. The US also had economic and commercial interests attached to the deal. By the mid of the 1990s, based on the assessment of technical experts, the Department of Atomic Energy in India had approved the purchase of eight imported reactors for the indigenous programme. It provided an opportunity for the US companies to win at least two nuclear reactors contracts out of eight.[36] According to Jeffery T. Bergner, Assistant Secretary of Legislative Affairs, "only the two could produce 3,000-5,000 direct jobs and 10,000-15,000 indirect jobs in America."[37]

The US has yet to create jobs from the nuclear reactors contracts with India. However, the Indo-US nuclear deal opened the doors for the US to make $15 billion worth of defence sale to India until 2018.[38] More recently, India and the US signed defence deals worth $3 billion on 25 February 2020 on President Donald Trump's visit to India. It includes the purchase of twenty-four MH-60 Romeo helicopters from the US for $2.6 billion for Indian Navy and another contract to acquire six AH-64E Apache helicopters for Indian Army for

$800 million.[39] That makes the US the second-largest arms exporter to India after Russia. One of the mutual gains out of these defence sales was to strengthen India against rising China. On the contrary, the so-called effort of the US to bring India under nuclear safeguards is not effective because India has not completely separated the nuclear facilities for civilian use from the military ones.

On the other hand, the delay in the operationalisation of the deal provided India with an opportunity to revisit the utility of the imported reactors to produce energy. In the last 10 years, India has also realised that the cost of generating electricity from foreign nuclear reactors was high as compared to those based on indigenous designs.[40] The existing low prices of electricity in India had also put in question the decision of buying expensive nuclear reactors from foreign markets that cost more by committing liability insurance. Keeping this in view, India was more interested in importing nuclear fuel for its indigenous nuclear facilities instead of opting for multibillion nuclear reactors in the last several years.

India's 3-stage nuclear programme can contribute 25 per cent or more electricity to the national electric grid by 2040. They can utilise the indigenously designed and built nuclear reactors by using India's abundant thorium fuel supply. Currently, however, the indigenously designed and built pressurised heavy water reactors (PHWRs) are in stage-1 for power production, that is, contributing only 2.5 per cent of the total electricity demand to the national grid. The enlargement of the stage-1 programme would require an optimal level of "balance in fuel supply, reprocessed fuel, nuclear waste, and the cost."[41] Therefore, keeping in view its interests, India wanted an unhindered fuel supply from the international market to expand its nuclear programme to stage-3 and to resolve its liability issue. This suggests that the delay in the implementation of civil nuclear deal did not cause any cost rather it provided an opportunity for India to expand its indigenous nuclear capabilities.

Achievement of Implicit Goals by India

The progress in the civil nuclear trade between the US and India occurred after more than a decade of the agreement in 2005. However, India achieved many of the implicit goals through special favours it leveraged from the US in the given period. India felt elevated in the region and globally after attaining distinctive treatment from the US and the nuclear export control regimes. Bilateral relations have moved very far after the signing of the agreement, even though India's liability law has remained a hurdle in the purchase of nuclear reactors from the US for more than a decade. The biggest achievement of India was the removal of sanctions on the import of the nuclear-related advanced technology and its entry into the global nuclear market. Another major development was a boost in trade between the two countries and the US becoming the largest trading partner of India after the deal. Not just commercial relations enhanced between them but people-to-people contacts also intensified after the deal. Defence cooperation was augmented and the US became the second-largest supplier of arms to India along with increasing cooperation on counter-terrorism and intelligence-sharing. The US also de-hyphenated its relations with India and Pakistan by refusing a similar deal with Pakistan and neutralised its position on Kashmir. America started viewing India as a parallel great power in Asia with China. It not only facilitated India to expand its nuclear programme but also boosted India's position globally as an important emerging power.[42]

The civil nuclear deal brought India under the limited scope of IAEA safeguards but, in return, India gained more incentives than obligations. India completed the Separation Plan ahead of the December 2014 deadline and ratified the IAEA "India-specific Additional Protocol" in June 2014. Resultantly, India got a strong US support in its pledge to become part of the NSG in June 2016.[43] India had formally placed the application for membership in the 48-nation group on 12 May 2016 with active support from the United States,

Britain, Russia, France, and other world powers. President Barack Obama cordially received India's application to join the NSG in his meeting with Indian prime minister in 2016 and established that New Delhi fulfils the criteria to join the group. The US also convinced other NSG members to support India's application at the NSG plenary session in 2016.[44] Had China not been adamant on opposing Indian application to NSG membership[45] by calling it discriminatory, India would have become a member.[46] In his trip to India in February 2020, President Trump reaffirmed US support for India's permanent membership on a reformed UNSC. He also extended strong US support for India's entry into the NSG without any delay.[47]

India sought NSG membership on the pretext of its ongoing nuclear business with NSG members. Hence, the nuclear deal enabled India to advance its efforts for becoming an NSG member without signing the NPT. On the other hand, the special treatment of India due to US support hinders Pakistan's NSG membership. Despite making NSG membership formula flexible that would not allow India to block Pakistan's eligibility for membership, Pakistan will require similar civil nuclear trade with members of NSG after getting exemption from its full-scope safeguards requirements.[48]

The Indo-US nuclear deal also facilitated India to become a member of Missile Technology Control Regime (MTCR), a 34-nation group on 27 June 2016. India failed to get NSG membership due to China's opposition but it made its entry into another important multilateral nuclear regime.[49] Admission to the MTCR will enable India to buy high-end missile and unmanned aerial vehicle (UAV) technology and enhance its joint ventures with Russia. It will also permit India to market weapon systems such as the BrahMos supersonic cruise missile, which will greatly help in the modernisation of nuclear weapons of India.[50] India also showed its willingness to join the other two regimes the informal Australia Group (Chemical and Biological weapons) and the Wassenaar Arrangement designed for

export control of conventional arms and dual-use goods and technologies.[51] The US economic interests and China's containment policy played a huge role in giving incentives to India. India, however, prudently turned the deal to its advantage with no tangible benefits to the US nuclear companies in the last several years due to a delay in the operationalisation and diverging interests in the implementation process.

Expansion of India's Nuclear Capabilities

Since India has retained much of its indigenous nuclear programme outside of the safeguards, it can stockpile large quantities of 'weapons-grade nuclear materials'.[52]

The Indian nuclear programme is the largest and oldest unsafeguarded nuclear programme in the entire developing world. India has maintained both the military and a substantial part of its civil nuclear programme outside of IAEA safeguards."[53] Besides its existing military programme, which is unsafeguarded, India is also pursuing several new unsafeguarded nuclear plants and facilities as part of its 3-stage nuclear power plan. Therefore, the unsafeguarded civilian nuclear facilities of India make it impossible to confirm that these materials are not used in weapons.[54] Two factors establish that the Indo-US nuclear deal can contribute to the expansion of India's nuclear capabilities. The first one is the flawed separation plan and the second is the usage of imported nuclear fuel in unsafeguarded civilian nuclear facilities.

Flawed Separation Plan

Despite India's pledge in the nuclear deal with the US to put the civilian nuclear facilities under safeguards, it has classified its nuclear programme into three streams, i.e., the civilian safeguarded, the civilian unsafeguarded, and the military. Due to lack of transparency and overlap between the three streams, some civilian facilities even working under certain provisions of IAEA can contribute

to India's stockpile of unsafeguarded 'weapon-usable material'. The separation plan is flawed because it only included some of India's nuclear power reactors associated with fuel production and spent fuel storage. The IAEA safeguards are mainly applied to the nuclear facilities and the material supplied by other states. A number of nuclear facilities, including eight of its India's Pressurised Heavy Water Reactors (PHWRs) that serve a civilian or commercial function, are unsafeguarded. According to a Belfer Center Report of 2016, India's PHWRs are used as sources of 'weapons-grade plutonium' for its military programme. The report also points out India's Fast Breeder Reactors (FBRs) and thorium fuel cycle programmes into the category of civilian unsafeguarded that are also capable of producing unsafeguarded 'weapons-usable material'.[55] However, those FBRs with the capability to produce plutonium for nuclear weapons operate outside of the safeguards because they function under the military facilities. A report of Project Alpha of the King's College, in its efforts to highlight the areas of concern in India's nuclear programme and its membership in NSG, found that even after "India's separation plan, there remains a high degree of connection between civil and military activity, especially in nuclear and missile sectors."[56]

Moreover, a Belfer Center report also highlighted the availability of "five plus or minus three tons of unsafeguarded separated plutonium (and considerably more unsafeguarded spent fuel) from the power reactors, which is available to its nuclear weapons programme and could hypothetically be used to significantly increase the size of India's nuclear arsenal." [57] This suggests that India might be deliberately accumulating some of this material to enhance its capability to increase the number of nuclear weapons anytime. As many of India's PHWRs for civilian purposes are allegedly provided weapon-grade plutonium for its military programme, "India's civilian unsafeguarded programme" is also a matter of concern.[58]

The purpose behind keeping fissile material production facilities outside the safeguards is to use the facilities for producing weapons-grade material at any time. Moreover, India's stockpile of the reactor-grade plutonium would continue to grow and remain outside of safeguards because of its strategic significance. According to a study by a Pakistani nuclear analyst Mansoor Ahmed for the Belfer Center of Science and International Affairs, US, India has a fissile material stock worth 2,600 nuclear warheads.[59] However, the figure can vary according to different methodical calculations. Similar claims by Mansoor Ahmed in Pakistani daily *Dawn* in 2014 that India had enough fissile material to produce 2,000 nuclear weapons were challenged by the Bulletin of the Atomic Scientists through a review of the math of the produced fissile material and its required quantity as per warhead. The study quoted the Institute for Science and International Security (ISIS), which estimates that until "the end of 2014, India likely possessed about 550 kilograms of weapons-grade plutonium, 100 to 200 kilograms of HEU intended for use in thermonuclear weapons, and 2.9 metric tons of separated reactor-grade plutonium. The study assessed that this fissile material was sufficient to produce about 75 to 125 nuclear warheads, with 100 nuclear weapons as the median estimate."[60] In contrast, another study titled *Indian Unsafeguarded Nuclear Programme* states, "India has enough indigenous uranium to cover its weapons and energy requirements of more than a century, placing Indian nuclear arsenal at around 500 warheads," which is still a big number.[61]

Imported Fuel in Unsafeguarded Nuclear Facilities

India has planned to produce a total of 14.6 Gigawatt electricity by 2024 and 63 Gigawatt by 2032 from a "combination of safeguarded and unsafeguarded reactors that would lead to 25 per cent nuclear share of electricity generation by 2050."[62] The 3-stage nuclear programme has envisioned utilising thorium that is abundant in India. However, technically it requires fissile material to sustain a

chain reaction upon the bombardment of neutrons. In this process, thorium can be transformed into a fissile radioisotope but cannot itself continue the chain reaction. In a thorium reactor, a fissile material like uranium or plutonium requires to be covered up by thorium. For this purpose, India can use imported uranium or plutonium to drive the chain reaction to produce energy while at the same time can transform the fertile-material into fissile-material."[63]

To continue the process, these reactors would have to produce excessive material of plutonium to fulfil its fuel needs.[64] Therefore, the process can also be used to produce both electricity and unsafeguarded-plutonium. This indicates an overlap between the civilian safeguarded stream and the civilian unsafeguarded stream with a potential to increase weapons-grade nuclear material. As India reprocesses spent fuel from its safeguarded power reactors, the quantity of separated plutonium under safeguards will rise. This shows that the use of safeguarded nuclear material in these reactors can also contribute to the weapons-grade material for military purpose. In this regard, FBRs with a dual function of using and producing large quantities of plutonium can become major proliferation concern.[65]

India has operated PHWRs for decades now. The 500 MW Prototype Fast Breeder Reactor (PFBR) at Kalpakkam has already commenced. Four more FBRs have been approved in 2016 two at Kalpakkam and two elsewhere. This would mark the entry of India's nuclear programme into the second stage. However, it will be a long process, requiring many more FBRs and at least another four decades before it develops an optimum quantity of fissile material inventory to start the third-stage. It is reported that India will not wait long. Therefore, it will prefer to obtain fissile material from the international nuclear market. Presently, there is no commerce in plutonium due to the lack of legal mechanisms. The NPT prohibits the transfer of fissionable-material that also includes unsafeguarded-plutonium. However, India can import the material under the legal cover for the

'safeguarded nuclear facilities'.[66] Besides, "the overlap between civilian and military nuclear activities is likely to intensify as India scales up its nuclear power programme and its enrichment and reprocessing industries."[67]

As suggested by the reports, India's strategic weapons programmes have benefitted from the technology and assistance acquired through the civil nuclear-trade channels.[68] Since the US also ended its check on the supplied nuclear material to India, through tracking it can reduce a chance of keeping accurate records of the fissionable-material under the 'limited safeguards of IAEA'. India also continues resistance in accepting additional non-proliferation commitments and obligations, including the safeguards and CTBT. A clear risk is indicated in a report by King's College, which states, "nuclear material trade with India will not only increase its nuclear weapons latency but also the capacity to scale up the quantity of nuclear weapons."[69]

Modernisation of Nuclear Weapons

To expand the horizon of its nuclear deterrence, India has stepped up to modernise its nuclear arsenal by arranging several new nuclear weapon delivery systems. According to an estimate by atomic scientists, currently, India has seven kinds of nuclear-capable systems including two aircraft, four land-based ballistic missiles, cruise missile air, and sea-based missiles, one sea-based ballistic. Reportedly, India is working on four more systems. The programme is actively pursued by producing long-range land and sea-based missiles for possible function within the next decade as given in Table 1.[70]

Table 1

Type	NATO Designation	Number of launchers	Year Deployed	Range (kilometres)	Warhead x yield (kilotons)	Number of warheads
Aircraft						
Vajra	Mirage 2000H	~16	1985	1,850	1 × bomb	~16
Shamsher	Jaguar IS/IB	~32	1981	1,600	1 × bomb	~32
Subtotal:		~48				~48
Land-based ballistic missiles						
Prithvi-2	n.a.	~24	~24	350[b]	1 × 12	~24
Agni-1	n.a.	~20	2007[c]	700+	1 × 40	~20
Agni-2	n.a.	~8	2011[d]	2,000+	1 × 40	~16
Agni-3	n.a.	~8	2014?	3,200+	1 × 40	~8
Agni-4	n.a.	n.a.	(2018)	3,500+	1 × 40	n.a.
Agni-5 *Subtotal:*	n.a.	n.a. *~60*	(2020)	5,200+	1 × 40	n.a. *~60*[e]
Sea-based ballistic missiles						
Dhanush	n.a.	2	2013	400	1 × 12	4
K-15	(Sagarika)	(12)	(2018)	700	1 × 12	(12)
K-4	n.a.	(4)	?	3500	1 × ?	(0)
Subtotal:		*(18)*				*(16)*
Total						130-140

Source: Indian Nuclear Forces, 2018

The expanded nuclear programmes of India, both the safeguarded and the unsafeguarded nuclear infrastructure or facilities, have significantly increased India's capability to produce a large number of nuclear warheads. India's planned six FBRs have increased its capacity to produce plutonium for weapons. According to a report produced by SIPRI in 2017, "India is also expanding its uranium enrichment capabilities with the construction of a new gas centrifuge

facility."[71] Moreover, India has planned to build new 'naval propulsion reactors' for which it expanded its centrifuge-enrichment capacity. This new facility shows India's intentions "to move towards thermonuclear weapons by blending the current plutonium arsenal with uranium secondaries."[72]

Another SIPRI report, produced in 2019 indicates that India currently possesses 130-140 nuclear weapons, that is expected to increase to 150 in 2020. According to the same report, Pakistan possesses 140-160 and China has 290 warheads.[73] The increase in the size of nuclear weapons is also pushing India to acquire 'advanced delivery systems' for nuclear warheads. As, currently, India has three tiers of the nuclear weapons delivery-systems including air, land, and sea-based ballistic missile systems. It continues to increase the range of its 'land-based ballistic missile system' in which the Agni model of 'land-based nuclear-capable ballistic missiles' is preferred. Since India's nuclear deterrence is focused on China, India also seeks to develop Agni-V inter-continental ballistic missile (ICBM).[74] It successfully conducted the third Agni-V test on 10 December 2018, that marks as a strategic nuclear deterrent against China. The "Agni-V, a three-stage solid-fuelled missile, has an approximate range of 5,500-5,800 kilometres and can carry a 1,500-kilogram (3,300-pound) nuclear warhead."[75] Furthermore, "India has reportedly also been working on multiple independently-targetable re-entry vehicles (MIRV) for Agni-V in order to ensure a credible second-strike capability."[76]

India is also keen on increasing its naval nuclear capabilities to ensure a second-strike capability. The SIPRI reports highlights that the "Indian navy inducted its first indigenously built nuclear-powered submarine, the INS Arihant, into service in 2016." [77] It will carry a two-stage 700-kilometre range submarine launched ballistic missile (SLBM). Moreover, India is also developing a more advanced SLBM with a range of up to 3500 km.[78] In March 2019, it signed a $3 billion contract for the lease of an Akula-1 class nuclear-powered attack submarine

from Russia for 10 years. Under the pact, Russia will deliver the Akula-1 class submarine also known as Chakra III, to the Indian Navy by 2025. Besides, India is also working on the indigenous nuclear-propelled submarine INS Arihant, which is equipped with nuclear-ballistic missiles would be ready in 2020.[79] The BrahMos supersonic-cruise missile is also India's joint project with Russia. Reported by NTI India, the BrahMos can travel at speeds up to Mach 3.0, is equipped with 'advanced satellite-navigation' with target range from 300-500 km. Its more categories including sea, air, and submarine-launched variants of BrahMos with an improved variant BrahMos-NG with speeds up to Mach 3.5 is under development. India is also working on its space programme and Missile Defence System with the help of Israel and Russia.[80]

The increase in size, capability, and advancement in Indian nuclear weapons and the delivery systems due to China factor would be detrimental to the regional strategic stability. Hence, the increase in India's plutonium production in its 'unsafeguarded nuclear facilities' with the help of the imported fissile-material and the import of advanced technology for the improved delivery-systems is creating a huge imbalance in the nuclear capabilities with Pakistan. In this backdrop, India's existing capabilities as well as the planned programmes over the next decade propel an arms race between the two South Asian rivals India and Pakistan. The continued arms race and imbalance in nuclear capabilities can also hamper peace endeavours between the two countries.[81]

Conclusion

There was an urgent need to satisfy the growing demand for electricity in India but business interests were at the centre of the US policy for nuclear cooperation with India. The basic objectives were to capture the huge Indian market and to make it a strategic partner in its efforts to counter China. In this regard, the business lobby of the US played a major role in determining the deal. In return for the 123

Agreement, the US sold 126 expensive jet-fighter aircraft to India. India also enjoyed all the privileges as did by the five de jure nuclear weapons states.[82] From 2016 onward, both the US and India signed several defence equipment exchange deals. Nevertheless, the nuclear deal could not materialise the purchase of nuclear reactors until 2019. The main hurdles created by India's liability laws were a definite setback to the US commercial interests. The deal, until now, is not in motion to address the electricity requirements in India. The two sites designated for the US reactors could not materialise. India is also aware of the price difference in procuring nuclear reactor from the US and other international suppliers, especially from Russia. According to reports, Russia has already built "two 1,000-megawatt reactors in the plant, and is under contract to install two more units there, which will bring up the total to 4,000 megawatts."[83]

India has so far failed to reach its goal of producing 20 gigawatts by 2020. On the contrary, "it has barely grown, from 3.3 gigawatts to the present 4.8, doing little to solve India's growing demand for electricity."[84] However, the deal graciously added to India's potential to expand its nuclear programme for its military purposes. After resolving the liability issue, it is observed that India would continue to go after its interests. India would press for importing more fissile-material for its 3-stage nuclear programme instead of accelerating the implementation on the resource-intensive imported reactors from the US.

The research findings show that India started the implementation process of the civil nuclear deal by addressing its liability and tracking issues on its terms. The research also finds that India can escape safeguards on many of its dual-use nuclear facilities and can also fulfil the increasing demand for fuel supply for its indigenous nuclear programme. It can also look for other options in the international market for the import of high nuclear technology other than the US. It would not yield the desired outcome for the US

and even the US dream of bringing India's nuclear programme under the international check is a vain attempt.

In its civil nuclear energy process, India can also produce large amounts of weapons-grade nuclear material, which would have dangerous consequences for strategic stability in the region. The civil nuclear deal empowered India to run its nuclear programme according to its own economic and strategic interests. It signals not only a breach of nuclear non-proliferation norms set by NPT but also set out a dangerous precedent to utilise the international market for importing fissile-material for 'unsafeguarded nuclear facilities'.

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