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Prospects for India-Japan Civil Nuclear Cooperation

by Rajaram Panda



India-Japan bilateral ties have shown signs of promise in recent years. Both countries have found convergence of

interests in security and strategic domains. Economic ties are also looking up. However, cooperation on the nuclear issue, an area of high potential, remains unexplored. While India is looking for various sources of energy to meet its increasing demand to sustain economic growth, Japan possesses expertise and specialised high technology in the nuclear field. Civil nuclear cooperation can add to the robustness of bilateral ties. Both countries hold different perspectives on nuclear issues because of past experiences and policies. However, there have been some signs of change in recent times.

Controlling the proliferation of weapons of mass destruction (WMD) provides a common platform for both India and Japan to speak with one voice. The series of Joint Statements and Declarations issued by the top leadership of both countries routinely stress this point. Japan has noted India's impeccable track record on non-proliferation. This became demonstrably clear as far back as the Joint Statement

of December 2001, when both countries not only agreed to "work as partners against proliferation" of WMD, but also agreed to cooperate in implementing rigorous export controls on sensitive and dual-use materials and technology.¹

In the global scenario, the current debate centres on two main areas of the nuclear issue, namely abolition of nuclear weapons and growing interest in the peaceful use of nuclear energy. Proponents of the first raise the demand for complete nuclear disarmament. The main votaries of this argument are the "have-nots" like Japan, NAM countries, Australia, Canada and New Zealand, who have "argued rather from an idealistic standpoint, emphasizing the inhumanity of nuclear weapons".²

There have also been recent moves towards nuclear disarmament by the "have" nations, led by the US, whose policy stance is determined by the security environment that has emerged in the post-Cold War era. In particular, President Barack Obama's speech in Prague in April 2009, that aimed to create a world without nuclear weapons, is significant. The US Nuclear Posture Review (NPR) released in April 2010 "moved Obama's nuclear disarmament policy a step further by declaring a reduction in the number and role of nuclear weapons in the national security of the US and its allies".³

The second trend, centred on growing interest in nuclear energy world-wide,

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including in developing countries, is driven by concerns about energy security and global warming. While this "nuclear renaissance" may be a welcome prospect, growth in nuclear power generation brings with it risks of safety, nuclear proliferation and nuclear security. There is an inherent risk of nuclear power being diverted towards military purposes instead of the originally intended peaceful uses. Therefore, securing this risk demands that necessary safety mechanisms, non-proliferation safeguards and nuclear security measures are put in place. In fact, the principle of the three "S's" was agreed upon by the G-8 countries and was included in the Leaders' Declaration of the G-8 Hokkaido-Toyako Summit in 2008. Here, the role of the IAEA becomes essential.

This paper attempts to address the issue of the ongoing debate in Japan, its dilemma on forging civil nuclear cooperation with India, and how this cooperation would help in bringing relations between the two countries closer. The possible impact of the Fukushima incident on Japan's nuclear future is also examined. The paper concludes that though the Fukushima incident has resulted in a temporary setback to the negotiations on civil nuclear cooperation between the two countries, neither country can do away with nuclear energy as an option for their energy security. On the contrary, Fukushima provides a lesson to countries to move towards stringent safety mechanisms to make nuclear energy a reliable and clean source of energy for the future.

Perspectives of India and Japan

On the issue of civil nuclear cooperation between India and Japan, differences do exist. Though several summit meetings have taken place, a breakthrough in this area has proved elusive. However, the fact that both strive for the ultimate goal of total elimination of nuclear weapons remains unquestioned.

India-Japan bilateral ties had retreated into a chill following India's 1998 nuclear tests at Pokhran. Japan suspended all economic aid to then on-going projects under its ODA. The move was seen in India as Japan's over-reaction and lack of understanding of India's compulsions. The 1998 nuclear tests had also invited sanctions from the UN and other countries like the US. Political relations, however, steadily improved from 2001 onwards.

As the only country in history to have been a victim of nuclear attack, Japan is ultra-sensitive to all things 'nuclear' and public opinion is vehemently opposed to nuclear proliferation and weapons in any form.⁴ Unsurprisingly, Japan has remained inflexible on issues such as the Nuclear Non-Proliferation Treaty (NPT) and Comprehensive Test Ban Treaty (CTBT). According to the Japanese perception, a public acknowledgement in India's favour on these issues would send a wrong signal to the world about Japan's future nuclear intentions.

This underscores the fact that India's refusal to accede to the NPT and CTBT remains an irritant in bilateral ties.

On its part, India, from the very beginning, has taken a consistent position that the NPT is discriminatory in nature and that the CTBT is a "flawed" pact.⁵

Even while negotiations on the civilian nuclear deal with the US were underway, there were reports in 2006 that Washington was putting pressure on India to agree to a future moratorium on testing of dual-use missile technology that could be used to deliver a nuclear payload and testing another atomic device as a quid pro quo for the civilian nuclear deal.⁶ India rejected such a commitment as a back-door entry to the CTBT, which it feels only came into existence after those who possessed nuclear weapons had developed the requisite know-how.

In view of the waiver granted by the 45-nation NSG to India in 2008 to conduct trade in nuclear materials and technology, India obviously expects Japan to re-examine its position in the specific context of bilateral civil nuclear commerce.

The ice was finally broken during former Japanese Prime Minister Yukio Hatoyama's visit to India in December 2009. In a joint press interaction with Indian Prime Minister Dr. Manmohan Singh, he publicly referred to exchanges with his Indian counterpart on CTBT and Fissile Material Cut-Off Treaty (FMCT) and expressed appreciation for the reassurances conveyed to him by Dr. Singh, indicating that both countries will be able to act on these understandings to ensure a "positive conclusion". Thus, even without a breakthrough, the seeds of progress on civil nuclear cooperation were sown.

India's quest for Nuclear Energy

India has a well developed and largely indigenous nuclear power program currently consisting of 20 civilian nuclear reactors. It expects to develop a 20 GWe

nuclear capacity on line by 2020 and 275 GWe by 2052, with the aim to supply 25 per cent of electricity from nuclear power by then.⁷

Currently, India's share of nuclear energy in its overall energy production is less than 3% but it has plans to increase this in the coming decades.⁸ It has also mastered some of the related technologies such as uranium exploration, mining, fuel fabrication, heavy water production, reactor design and construction and operation, besides reprocessing and waste management. In addition to the fast breeder test reactor (40 MWth) at Kalpakkam, it plans to build a 500 MWe reactor (PFBR), which is likely to be operational by late 2012. India is also developing technology to utilize its abundant resources of thorium as a nuclear fuel in the third stage of its three-phase nuclear programme.⁹

Japan's compulsions

Even as energy-starved India is keen to woo Japan's highly capable nuclear power industry, Tokyo has held back. In view of the entering into force of the India-US nuclear agreement in December 2008 and further nuclear agreements signed by India with countries like France, Russia, Canada, Kazakhstan and South Korea, Japan finds itself now in a relatively awkward position.

Though still non-committal, Japan understands the strategic importance of India and the significance of meeting its energy demands. There is a greater appreciation in Japan that nuclear power would also help India fight global warming. Both the countries held the first round of talks aimed at sealing a

bilateral civilian nuclear cooperation pact on June 28, 2010. Under this pact, Japan would export its nuclear power generation technology and related equipment to India while banning India from using them for military purposes or transferring them to another country.¹⁰

The Japan Forum on International Relations (JFIR) has strongly urged Japan to forge civil nuclear links with India.¹¹ Supporting as it does India's economic growth momentum, Japan is cognizant of the fact that India's greatest challenge to maintain growth is to secure sufficient energy supplies, especially for the generation of electricity. Japan's technology and expertise in generating and ensuring the safety of nuclear power is among the best in the world and therefore the JFIR urged Japan to cooperate with India. In particular, the JFIR identified specific reasons why Japan should cooperate with India, including (1) the political significance of such cooperation; (2) the need for India to deal with its lack of energy resources; (3) the growing threat of global warming; (4) the advantages of promoting cooperation in science and technology; and (5) the contribution by Japanese corporations involved in nuclear power.¹² The JFIR recommendations said: "...we call on the Japanese government to cooperate with India on this issue, while at the same time showing initiative in the global campaign for nuclear disarmament."¹³

Japan, as on date, is one of the few nations to possess technologically advanced nuclear power reactors. Toshiba alone possesses over 30 per cent of global civilian nuclear reactor building capability.¹⁴ If Japan relaxes its policy and agrees to cooperate with India, the Indian nuclear market will unfold growth potential to the tune of \$100 to \$150 billion within a decade. This provides a huge incentive for Japan to

reconsider its position. Japan's experience in Kazakhstan could also be an appropriate guide.¹⁵ This will propel engagement by Japanese corporations in Indian economic activities, giving a tremendous boost to dormant economic ties between the two countries.

When India obtained the NSG waiver, it had agreed to let the International Atomic Energy Agency inspect 14 of its 20 reactors. To enter into the nuclear deal with the US, India agreed to separate its civil and military nuclear facilities and to place its civilian facilities under IAEA safeguards.

The US and France have strong interest in encouraging Japan to enter into a civil nuclear agreement with India in order to facilitate their own nuclear commerce through the construction of nuclear power plants in India.

On June 18, 2010 the Japanese Cabinet adopted a new 10-year growth strategy, which included promoting export of nuclear power generation facilities.¹⁶ Kan Naoto's plan to "rebuild the country" through his New Growth Strategy aimed "to promote ties with emerging economies in Asia and encourages exporting infrastructure – including nuclear technology – to the region by cooperating with governments and the private sector".¹⁷

On October 22, 2010 a consortium of thirteen Japanese companies¹⁸ joined hands to establish International Nuclear Energy Development of Japan Co. Ltd. (JINED), headquartered in Tokyo, to support nuclear power plant projects in emerging countries.¹⁹ The mission of JINED is to present proposals to countries that are going to build their first

nuclear power stations. JINED President Ichiro Takekuro (from Tokyo Electric Power Co.) announced his aspiration to “prepare best proposals that are comprehensive packages of the know-how accumulated over the last 50 years (by Japan) in areas such as advanced technology and fuel procurement”.²⁰ Currently in collaboration with the Ministry of Economy, Trade and Industry (METI), JINED is aiming to win nuclear power plant project orders in Ninh Thuan province, Vietnam.²¹ JINED has determined a behavior code centered around the following three pillars: (a) to see that a safety culture that accords top priority to the three S’s (safety, security and safeguards) takes solid root in the company; (b) to engage in proposal activities adapted to the needs in the concerned country; and (c) to earn and keep the trust of stakeholders and society as a whole.²²

Subsequent to the NSG waiver in September 2008, the US, Russia and France quickly concluded commercial nuclear agreements with India. Though the political leadership in Japan realized the futility of remaining aloof, obtaining the approval of the domestic constituency on policy reversal for India remained difficult. French and American reactor vendors have complex tie-ups with leading Japanese nuclear engineering companies for the supply of major components. The French company Areva and US-based corporations Toshiba-Westinghouse and General Electric-Hitachi were initially not allowed to engage in nuclear commerce with India unless Japan had formalized an agreement for nuclear cooperation with India.

Since then, licence agreements between the Japanese companies Toshiba and Hitachi and their US subsidiaries, Westinghouse and GE respectively, have been liberalized or flexibly interpreted. This has enabled Westinghouse Electric Company to sign a memorandum of understanding for an “early works agreement” (EWA) with Nuclear Power Corporation of India Ltd (NPCIL) on June 13, 2012 aimed at supporting the future construction of AP1000s at the Mithivirdi site in Gujarat. The agreement represents significant progress toward the realization of the India-US Civil Nuclear Agreement signed in 2008. The EWA will include preliminary licensing and site development work. Westinghouse hopes to complete negotiations on the EWA by autumn 2012. According to Gary Urquhart, vice president and managing director of Westinghouse India, this “agreement is an important step which will allow Westinghouse and NPCIL to continue the work necessary for keeping the Mithivirdi project moving forward”.²³

Also, GE-Hitachi Nuclear Energy (GEH) announced on June 13, 2012 that it expects to sign an EWA with NPCIL in the near future, to bring its Economic Simplified Boiling Water Reactors (ESBWR) to India. Site preparation for the ESBWR units is under way near Kovvada in the state of Andhra Pradesh.²⁴ For more than 50 years, GE-Hitachi has been designing and building the most advanced boiling water reactors on the planet. The planned agreement with NPCIL will facilitate efforts to bring the world’s best reactors to India.

With the above agreements, GE-Hitachi and Toshiba-Westinghouse are no longer constrained to sell nuclear plants and technology to India with or without the Japanese Diet giving its formal approval.²⁵ Japan’s role in India-US and Indo-French nuclear cooperation is at stake.

Nobumasa Akiyama of Hitotsubashi University has observed: “This (civil nuclear) deal is important in a symbolic way. But there are some other areas in which the two countries could strengthen their ‘strategic partnership’, as there could be a potential to complicate the bilateral relationship in the course of negotiating a nuclear cooperation agreement.”²⁶ He further says: “without Japanese involvement, American and French nuclear businesses could be denied opportunities in the Indian nuclear market. Also, India could face a delay in its nuclear energy program. In this respect, India may push this agenda in its relationship/partnership with Japan.”²⁷

There is a growing realization in Japan that indefinitely postponing a decision will displease both the US and France apart from hindering business prospects in India being pushed by METI. At the same time, some analysts of the nuclear issue take the view that granting India an exemption from NSG guidelines was a mistake and some of the harm done to the non-proliferation regime could be reversed if Japan holds firm on extracting a no-testing pledge by India.

This basically implies that even if current Prime Minister Yoshihiko Noda is favourably inclined, he will have to await an opportune moment to move civil nuclear cooperation with India forward.

Impact of the Fukushima disaster

Given the widespread anti-nuclear sentiment following the meltdown at the Fukushima Daiichi power plant, PM Kan announced Japan’s plan to gradually phase out the operation of all nuclear reactors and thereby eliminate dependence on nuclear energy completely. This was done in a rather hasty manner without giving due consideration to alternatives

and without taking the Cabinet into confidence. All of Japan's 52 nuclear power plants had been shut down by May 2012, leaving it without nuclear power for the first time in 40 years. The Noda government has recently moved to restart two reactors at the Oi nuclear power plant under intense pressure from businesses concerned about summer power cuts, even though METI Minister Yukio Edano candidly admitted that the government failed to build a public consensus before ordering the two nuclear reactors back online on June 16, 2012.

The Oi plant in Fukui prefecture was the first to pass stress tests introduced in 2011 to address public concerns about safety.²⁸ The impact of the Oi restart will not be felt immediately, however. Both reactors must go through a series of safety checks before they can be brought to full capacity. This process is expected to last about six weeks. The end of Japan's self-imposed nuclear hiatus could pave the way for restarts at other plants and the likely candidates include Ikata in southwest Japan and Tomari in the far north. The *Mainichi Shimbun* has harshly criticised Noda and observed in an editorial that Japan's energy future must be decided by its people.²⁹

In the meanwhile, a ten-member Diet-appointed panel, comprised largely of scientists, lawyers and academics, investigating the accident in Fukushima released its findings in a 640-page report on July 5, 2012 condemning the country's atomic-energy industry and regulators alike. The report said that the regulators and Tepco "failed to correctly develop the most basic safety requirements,"³⁰ leaving the Fukushima Daiichi plant vulnerable to the earthquake and tsunami that hit on March 11, 2011. Using harsh language throughout

the report, the panel exposed the nexus between the regulators and regulated in Japan's nuclear industry, concluding that this powerful industry group had pressured its overseers to loosen regulations or postpone greater stringency. The panel also found that the Fukushima No. 1 nuclear plant disaster was "man-made" and not natural, fundamentally the result of a corrupt regulatory system that allowed Tepco to put off critical safety measures.³¹ Panel Chairman Kiyoshi Kurokawa observed: "Its fundamental causes are to be found in the ingrained conventions of Japanese culture: our reflexive obedience; our reluctance to question authority; our devotion to 'sticking with the program'; our groupism; and our insularity."³²

The panel called for a complete revamp of Japan's nuclear industry and regulatory structure, issuing a series of recommendations, the creation of a permanent parliamentary committee to monitor a new nuclear regulator to be created later in 2012, and a rewriting of rules to "meet global standards of safety, public health and welfare."³³

Though the government is not required to take into account or implement the panel's findings and recommendations, its weight cannot be overlooked as it will be considered more objective than the enquiry being undertaken by the government itself. Demands are going to mount on the Noda government to take the conclusions of the parliamentary-mandated panel into account when Japan reviews nuclear-safety standards and revamps its regulator later this year.

It is possible that the government might seriously consider the panel's suggestion to set up an agency appointed by the Diet — separate from the government's nuclear

regulator—that would monitor and inspect power-company operations, including risk management, governance and safety standards. The report also recommends consolidating and rewriting existing nuclear laws and regulations to bolster safety and set criteria for aspects such as decommissioning nuclear reactors. If the government does so, restarting other reactors which remain shut could become smoother as public confidence rises.³⁴ But in the short term, there is a fear that the panel findings could fuel complaints that Japan is restarting nuclear reactors before key reforms are in place.³⁵ The *Mainichi Shimbun*, in an editorial exhorting the government to take the panel report seriously, has observed: "... the government must not allow power suppliers to resume operations at their idled nuclear plants without closely studying the report's valuable conclusions."³⁶

Japan's Indian dilemma

It is not surprising that the Japanese government as well as public seem confused on what stance to adopt towards India. While there is no sharp division either in the LDP or the DPJ that would threaten a split in either party on the issue of civil nuclear cooperation with India, the average public is uninterested in this as a foreign policy issue. Yet, there is no denying the fact that the Hiroshima experience, and now the Fukushima accident, lurk constantly in the Japanese consciousness and thus shape Japanese

thinking. This tendency is unlikely to be erased anytime soon.

The DPJ finds itself in the midst of defining a course that would not abandon Japan's stated policy on nuclear disarmament, while at the same time facilitating nuclear commerce with India. Even though the forging of a 'strategic and global partnership' has already received the strong endorsement of the foreign policy community in Japan, the country is struggling to find a middle path on the vexed nuclear issue that would enable it to meet both ends.

If Japan continues to prolong its deliberation on this issue, India will surely not hesitate to enter into civil nuclear cooperation agreements with other countries in order to satisfy its energy needs. During his visit to South Korea in June 2010, External Affairs Minister S.M. Krishna recognized "Korean capabilities in civil nuclear energy" and exchanged drafts for inking an Inter-Governmental Agreement on Peaceful Uses of Nuclear Energy.³⁷ South Korea is the world's fifth largest atomic energy producer which accounts for 40 per cent of South Korea's power generation.³⁸ The Korea Electric Power Company has secured a \$40 billion nuclear deal to build and operate four nuclear reactors (1000 MWe each) in UAE and has announced similar deals with Turkey as well. The India-South Korea civil nuclear pact was inked during Indian President Pratibha Patil's state visit to that country in July 2011. Japan cannot afford to watch silently as such developments take place in its neighbourhood.

Though the importance of forging a strong economic and political relationship between India and Japan remains undisputed, Japan's "policy of denial" of a nuclear agreement because of its own domestic constraints will not

undermine India's interests in a major way as India has several options at its disposal. Sourabh Gupta of Samuels International Associates in Washington D.C. holds the view that "India could still access Russian and South Korean technologies, though the range of options and quality of such technologies might retard India's own progress in developing industry technology standards that could make its civil nuclear sector globally competitive someday in the future ... if ever."³⁹ While India looks for some positive signal from Japan, Tokyo seems to be avoiding sending the wrong signal.⁴⁰

India-Japan relations do not carry any historical baggage and the 'strategic' character of the relationship will receive a huge impetus if Japan sheds some element of inflexibility on the nuclear issue despite its extremely sensitive nature. The ability to make mutually beneficial compromises is the key to a strategic partnership. Going by this spirit of accommodation, a demonstration of flexibility towards its strategic partner (India) on the issue of nuclear commerce would be "a powerful statement of Japan's investment in the bilateral strategic relationship".⁴¹ This is a challenge before the incumbent centre-left DPJ.

If one follows the DPJ's trade policy carefully, there is a slow but careful shift towards promoting exports and investments in emerging markets. India fits into this Japanese framework perfectly. In June 2010, METI unveiled the government's new "Industrial Structure Vision" strategy.⁴² Modestly recognizing the "deadlocked position" of Japanese industries that have struggled to keep pace with the world's major players and market changes, the "Vision" identified "Four Shifts" in the government and the private sectors.⁴³ In a message to the Japanese people in June 2010, METI

minister Masayuki Naoshima explained the "Vision" of the government.⁴⁴ He said that Japan needs to formulate and implement a strategy that allows it to be a winner in the global scenario by traversing the boundary between the government and enterprises, between ministries, as well as the national and local governments.

Nuclear commerce between India and Japan will be consistent with Japan's vision for a future industrial structure in which nuclear power plants are an integral part of a larger package.

In the context of India-Japan relations, it is important to note that the presidents of Hitachi, Toshiba and Mitsubishi Heavy Industries accompanied Naoshima when he visited India in April 2010. The leaders of these companies form the core-lobbying group which is encouraging the government of Japan to work out a civil nuclear deal with India. During this visit, it transpired that both sides agreed to put aside past differences on the nuclear issue, and work towards a civil nuclear treaty with the establishment of a Joint Working Group (JWG) on civil-nuclear cooperation. The decision to establish a JWG was taken in a meeting between Deputy Chairman of the Planning Commission, Montek Singh Alhwalia and Naoshima during the fourth ministerial-level meeting of the India-Japan Energy Dialogue.⁴⁵

The JWG can prove useful for both sides. While India will stand by its commitment to

core global non-proliferation principles, the DPJ will be in a better position to explain its stand to the Japanese electorate. India is unlikely to change its position on the CTBT which was reiterated by Singh to Hatoyama in December 2009. In order to make a civil nuclear agreement possible, Japan may reinterpret its stance in order to assuage the sentiments of the Japanese public by laying stress on strong export controls and non-diversion clauses, to which India is unlikely to object.

For the DPJ, the threshold for possible nuclear commerce with India is high. For progressing the transaction, India needs to make a strong commitment to Japan, similar to what it made at the NSG in 2008, for which a modality can be found. Even thereafter, it will require a great deal of political skill on the part of the DPJ and Noda in particular to win over the Japanese electorate.

India's challenges

India will face a huge absorption capacity problem once civil nuclear commerce unfolds a vast new arena of business in the country. Mere agreements for setting up new nuclear reactors are not enough; execution of projects entails a host of issues. Addressing these issues will be important as the agreements themselves. Issues such as land acquisition, rehabilitation and resettlement, environmental permits and water usage, electricity pricing and liability are all extremely contentious. There is the inherent risk of getting entangled in legal gridlock.

While Japan will face ideological hurdles, India may find it difficult to select sites for new plants due to environmental issues. With discontentment already brewing in rural areas, further miscues by

policy makers in Delhi have the potential to destabilize the system. The Indian government thus faces a major challenge in satisfying disgruntled constituents without disrupting the development of its nuclear sector.

Post-Fukushima pressures

The crippling of the Fukushima Daiichi nuclear power plant raised fundamental questions worldwide about the future of the global nuclear energy industry and led to calls for higher international standards on nuclear safety.⁴⁶ This development casts a shadow on possible future nuclear cooperation between India and Japan.

Prior to Fukushima, Japan's nuclear power industry was on the cusp of a new period of growth and the DPJ government's roadmap had called for increasing the share of nuclear energy to 50% by 2030. Japan was forging uranium supply deals from Kazakhstan to Namibia. It had also moved closer to launching its controversial nuclear fuel recycling system and restarting the Monju fast breeder reactor.

The Fukushima incident only strengthened the anti-nuclear lobby and the Japanese government was forced to revisit its nuclear energy development programs.

While Japan cannot afford to simply abandon nuclear power as a source of energy, the Noda government will remain under intense pressure to assuage public concerns regarding safety regulations designed to prevent another Fukushima-type accident. In July 2012, Tokyo has witnessed Japan's largest anti-nuclear rally since the Fukushima disaster. Over 100,000 protestors, reportedly the biggest such gathering in Japan's history, urged the government to completely halt restarting of the

nation's reactors.⁴⁷ Prime Minister Noda is going to face increasing public pressure. His choices are limited.

Conclusion

In the post-Fukushima scenario, Japan is faced with critical choices in its energy policy: whether to continue with its partial dependence on nuclear energy by significantly upgrading regulatory mechanisms or to increase reliance on renewables due to mounting anti-nuclear sentiment in the country. In either case, the role of nuclear energy as a key source of power is likely to be circumscribed, despite the huge economic cost.

The importance of future cooperation between India and Japan in the civil nuclear field lies in the fact that a recession-hit Japan can ill afford to derail the economic benefits from nuclear commerce with a strategic partner.

Moreover, METI will find it hard to convince major companies like Toshiba, Hitachi and MHI to simply abandon the nuclear industry as a source of the nation's energy needs. Noda's decision to restart two reactors, with possibly more to follow in the coming months when better regulatory standards are in place, is a cautious step in the right direction.

The signing of a MOU between Westinghouse and NPCIL on June 13, 2012 with another between GE-Hitachi and NPCIL to follow, provide some impetus for an India-Japan civil nuclear cooperation

agreement in the coming months. Even though a fast-tracked deal is not on the cards, it has not entirely been written off. From India's side, Japan needs to be given the space to proceed at a pace it is comfortable with as the government in Japan has to take the domestic constituency on board before framing its nuclear policy towards India. That has precisely been India's approach on this sensitive but important bilateral endeavour since negotiations on civil nuclear cooperation began. India can wait a while longer, but not indefinitely.

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- ❖ *Dr. Rajaram Panda, a leading expert on East Asian affairs, was formerly Senior Fellow at the Institute for Defence Studies and Analyses, New Delhi. He can be reached at rajaram_panda@yahoo.co.in*

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8. India has a flourishing and largely indigenous nuclear power program and expects to have 14,600 MWe nuclear capacity on line by 2020 and 27,500 MWe by 2024. It aims to supply 25% of electricity from nuclear power by 2050. Because India is outside the Nuclear Non-Proliferation Treaty due to its weapons program, it was for 34 years largely excluded from trade in nuclear plant or materials, which has hampered its development of civil nuclear energy until 2009. Due to these trade bans and lack of indigenous uranium, India has uniquely been developing a nuclear fuel cycle to exploit its reserves of thorium. Now, foreign technology and fuel are expected to boost India's nuclear power plans considerably. All plants will have high indigenous engineering content. India has a vision of becoming a world leader in nuclear technology due to its expertise in fast reactors and thorium fuel cycle. <http://www.world-nuclear.org/info/inf53.html>
9. Gupta and Sastry, n.,7.
10. <http://search.japantimes.co.jp/print/nn20100701f4.html>
11. "India's Leap Forward and Japan", *The 29th Policy Recommendations*, The Policy Council, The Japan Forum on International Relations, Tokyo, September 2007, pp. 18-19.
12. Ibid, p.4
13. Ibid, p.4
14. Indeed, there are two US companies- General Electric and Westinghouse – are taken over by Hitachi and Toshiba respectively. Also, the French company, Areva, has close technical cooperation agreement with Mitsubishi and is dependent for certain advanced materials and machine tools. Japanese companies produce technologically the most advanced civilian nuclear reactors.
15. Kazakhstan's Kazatomprom acquired 10 per cent of Westinghouse Electric Corporation from Toshiba for \$540 million in October 2007. As a result, Westinghouse gained access to Kazakh uranium and potentially more fuel fabrication capacity and in return, Kazatomprom gained access to the world nuclear fuel market. For Japan-Kazakhstan nuclear cooperation, see Togzhan Kassenova, "Kazakhstan's nuclear ambitions", *Bulletin of the Atomic Scientists*, 28 April 2008, <http://www.thebulletin.org/print/web-edition/features/kazakhstans-nuclear-ambitions>
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18. The 13 Japanese companies consist of nine electric utilities, three manufacturers, and the Innovation Network Corporation of Japan. These thirteen companies are: Hokkaido Electric Power Co., Tohoku Electric Power Co., Inc., The Tokyo Electric Power Co., Inc., Chubu Electric Power Co., Inc., Hokuriku Electric Power Company, The Kansai Electric Power Co., Inc., The Chugoku Electric Co., Inc., Shikoku Electric Power Co., Inc., Kyushu Electric Power Co., Inc., Toshiba Corporation, Hitachi, Ltd., Mitsubishi Heavy Industries, Ltd, and Innovation Network Corporation of Japan.
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Core 6A, 4th Floor

India Habitat Centre

Lodhi Road

New Delhi-110 003

Phone:

91 11 43112400 X 402 /435

Fax:

91 11 24620180

Website:

**WWW.ICRIER.ORG/ICRIER_WADH
WANI**

E-Mail:

uschair@icrier.res.in

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