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pISSN 2321-5453
eISSN 2347-5722

Available at: <http://itirj.naspublishers.com>

INNOVATIVE THOUGHTS

INTERNATIONAL RESEARCH JOURNAL

Volume 5
Issue 5 April 2018

A REFEREED JOURNAL

Listed In



PERILS OF INDIA'S QUEST FOR NUCLEAR ENERGY: IMPERATIVES OF RETHINKING

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Abstract

Energy policies have been on the agenda of international politics since 1973 and have emerged as one of the most essential factors to shape the world. Now there is a strategic shift from a fossil fuel- based world energy order to a nuclear based energy order, with focus on the developing countries. India government is also on the process to take up generation of nuclear energy in an accelerated manner. All legal instruments have been put in place for the flow of nuclear fuel and related technologies and materials. The post nuclear deal era shows the capitalist notions of India's energy policy. The criticism emerged at the time of the deal were declined after two or three years. After the deal, India signed a number of energy engagements with several countries like France, Mongolia, Namibia, Argentina, Canada, Kazakhstan, South Korea, Australia and even Japan. Therefore, it reveals the signing of Indo-US nuclear deal has the potential to open up a Pandora's Box of similar deals and agreements. However India's nuclear policy and the nuclear trade get an increased momentum after the deal. This has occurred, defeating the intent of the India's Civil Liability for Nuclear Damages Act, all the liability would now be carried by the Indian side. The government is transferring the nuclear suppliers' liability on to itself, essentially letting providers completely off the hook for supply of any substandard or defective equipment. The lack of any liability is a perverse incentive to the suppliers to build substandard plants and risk the lives of Indian people. Recent news on accidents in nuclear plants raises doubts in this context. Even though it is advertised as a clean cheap energy, nuclear critics constantly raise issues of radiation, nuclear waste, accidents, financing, regulatory processes, industry-wide deterioration of skills, and transparency. In this context this paper tries to examine India's quest for nuclear energy and evaluate the potential risks from it.

Keywords: *Energy policy, Nuclear deal, Nuclear energy.*

INTRODUCTION

One of the most significant developments in the twenty first century is the revival of global interest in the use of nuclear energy for generating electricity. Since 2000, several trends began to convince many observers that the coming years would witness a so-called nuclear energy "renaissance." These have included the urgent need for "decarbonizing" the world's energy supply to mitigate global warming; the huge energy demand of China, India and other emerging economic powerhouses; the call for energy security; the new profitability but rapid ageing of the existing reactors; the promise of new reactor technologies; and the challenges facing traditional energy sources, particularly recurrent hikes in the price of oil and natural gas and fears about their availability over the long term. Many states, including

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developing countries, have even expressed interest in nuclear energy and some have announced plans to acquire it. Several existing nuclear energy states, notably in Asia, are already building new reactors, while others are studying the possibilities of installing the same. There is certainly a revival of interest in terms of acquiring nuclear energy.

INDIA'S ENERGY PROFILE

India is the fourth largest energy consumer in the world after the United States, China and Russia. The demand for energy in the country has been growing at a rapid rate and is expected to grow further in the years to come. The diversified energy depends of India also can't afford the enhancing energy demand of the country. India's heavy dependence on coal has environment and social cost. Petroleum and other fossil fuels are finite and possess climate change issues. The import dependence, distorted pricing mechanism, underutilization of domestic resources and environmental and social impacts renewed the policies of India's towards clean energy. There is high potential for generation of renewable energy from various sources- wind, solar, biomass, small hydro and cogeneration bagasse. Our country has an estimated renewable energy potential of about 1096 GW. The Wind – 302 GW, Small Hydro – 21 GW, Bio-energy - 25 GW and 750 GW solar power (MNRE, 2017). However, so many limitations during the time of implementation led the country a nuclear energy aspirant and now India became third in the world by the number of nuclear reactors being installed. In this backdrop that the Indian government's outlook of mooted nuclear energy as the 'cheapest' and the 'best' source of zero carbon emission be critically evaluated.

India and Nuclear Energy: Evolution

In the case of India the past decades shows a tremendous growth in the quest for nuclear energy. The primary efforts about nuclear energy started at earlier. The first step was taken by Dr. Homi J Bhabha in March 1944 when he submitted a proposal to the Tata Trust to found a nuclear research institute. This led to the creation of the Tata Institute of Fundamental Research (TIFR) on 19 December 1945 with Bhabha as its first Director. The nuclear debate has been at the spirit of Indian political discourse from soon after its independence in 1947. The new government of India passed the Atomic Energy Act, on 15 April 1948, leading to the establishment of the Indian Atomic Energy Commission (IAEC) not quite one year after independence, and six years later, the Department of Atomic Energy in 1954. Prime Minister Nehru and Bhabha were clear on the requirement to develop nuclear weapons.

In the 1950s, the United States helped India develop nuclear energy under the Atoms for Peace program. The US helped to build a nuclear reactor in India, provided nuclear fuel and allowed Indian scientists study at U.S. nuclear laboratories. Nuclear energy programme in India, although it was kept as a dream, it has been divided into three stages. The first stage comprises of building pressurized heavy water reactors (PHWRs) and using natural uranium. The second stage includes setting up "Fast Breeder Reactors (FBRs) backed by reprocessing plants and plutonium-based fuel fabrication plants. The route to the third stage is characterized by the accelerator-driven systems and the advanced heavy water reactor

(AHWR) (Jain, 2012). The complexities associated with the three-stage programme portrays the struggle of India's nuclear complex, which managed to attain relative success in the first stage, but was not capable to progress towards the later stages owing to numerous constraints – shortage of fissile materials, delay in maturing of new reactor and recycling technologies and technology restrictions imposed by export-control mechanisms and the non-proliferation regime at large.

In 1968, India refused to sign the Nuclear Non-proliferation Treaty, claiming it was biased. In 1974, India tested its first nuclear bomb. It revealed India could develop nuclear weapons with technology transferred for peaceful purposes. As a result, the United States isolated India for twenty-five years, refusing nuclear cooperation and trying to convince other countries to do the same. America's refusal to give critical nuclear fuel for the Tarapur Atomic Power Station on the grounds that it had not signed the Nuclear Non-proliferation Treaty, and rejected to accept full scope safeguards, further tensed the relations. Indo-US relations reached their lowest ebb when India carried out the 'Shakthi' series of nuclear tests in May 1998 and announced itself to be an obvious nuclear weapon state. This was followed by a sequence of economic sanctions and restrictions on sensitive technology exports to India for over three decades. But since 2000, the United States has encouraged to build a "strategic partnership" with India (Jangir, 2011). US President George W. Bush signed the legislation on the Indo-US nuclear deal into law on 8 October 2008. The law, now titled, "United States-India Nuclear Cooperation Approval and Non-proliferation Enhancement Act," is a result of the March 2006 agreement between India and the US on civil nuclear cooperation based on the joint statement between President Bush and Prime Minister Singh on 18 July 2005 (Rajagopalan, 2008).

Indo US Nuclear Deal: An Overview

The Indo-US civilian nuclear cooperation agreement was a broad framework agreement. The agreement is not a single document and it acts as a facilitative one that stimulates engagement in nuclear commerce. Therefore, after the introduction of the deal, both India and the US will have to sign more specific agreements. However, to enable the two countries engage in nuclear commerce, a few conditions had to be met, including a change in US domestic laws, an NSG (Nuclear Suppliers Group) waiver and an India-specific safeguards agreement with the IAEA (International Atomic Energy Agency). Only after the conditions of an India-specific IAEA Safeguards Agreement, had been met would India be authorized to do business with the US or any other country in the nuclear arena (Chari, 2006). After the July 2005 statement to engage in civilian nuclear cooperation, President Bush and Prime Minister Singh signed a Civil Nuclear Cooperation Agreement in March 2006, during Bush's visit to New Delhi. Accordingly, in May 2006, a separation plan was proclaimed by the Indian government, separating its military and civilian facilities. As per this separation plan, eight plants would be left outside international safeguards. Upon finalization of the separation plan, the US decided to build into the bilateral 123 Agreement, fuel supply assurances; help consult with the IAEA, an India-specific Safeguards Agreement; help

develop a strategic reserve of nuclear fuel to “guard against any disruption of supply”; and in case of disruption, the US and India agreed to put in place alternatives - countries like France, Russia and UK, which might be able to restore fuel supply to India (Kazi, 2009). After the separation plan was agreed upon, the Hyde Act was signed into law by President Bush in December 2006. The Hyde Act, considered the parent act of the 123 Agreement, provides the legal basis for nuclear commerce between India and the US, since India is not party to the NPT. Whatever is the controversy surrounding the Hyde Act, the 123 Agreement that was signed in August 2007. Once the 123 Agreement was finalized, the next steps involved the conclusion of an India-specific IAEA Safeguards Agreement, which was attained in July 2008 and a waiver of NSG rules that came through in September 2008. On October 1, 2008 the U.S. Senate approved following the path of US House of Representative, the civilian nuclear agreement allowing India to buy nuclear fuel and technology from the United States U.S. President, George W. Bush, signed the legislation on the Indo-US nuclear deal, accepted by the U.S. Congress, into law, now called the United States-India Nuclear Cooperation Approval and Non-proliferation Enhancement Act, on October 8, 2008. The accord was signed by then Indian External Affairs Minister Pranab Mukherjee and his counterpart then Secretary of State Condoleezza Rice, on October 1 (Kazi, 2009). However there was no transaction in the case of nuclear reactors between India and US. During 2014 Narendra Modi and Barak Obama discussed the matter. In 2016 they agreed to build 6 nuclear reactors by American firm Westinghouse. Obama promised to support India to enter into the NSG.

Liability

The Civil Liability for Nuclear Damage Act, 2010 or Nuclear Liability Act is a greatly discussed and controversial Act which was passed by both houses of Indian parliament. The Act aims to afford a civil liability for nuclear damage and prompt compensation to the victims of a nuclear incident through a no fault liability to the operator. Legal liability for nuclear damage exclusively resides with operator. This is essential to attract the US companies to involve in the nuclear commerce. The liability bill is also necessary to these private companies for getting insurance cover in their home state. The Act puts the burden of responsibility for nuclear damage on the operator of nuclear installation (Balachandran, 2010). The liability of the operator of the Nuclear Installation shall be strict and shall be based on the principle of No Fault Liability and not liable if it is caused by natural disaster. The Act defines ‘operator’ as a person designated by Central Government as operator of nuclear installation. By this Act, private parties can be operators of nuclear installation unlike the prevailing situation now, where only the government operates such installations. Thus it opens up huge market for private industries and investors, in India and outside India. So the Act became a controversial issue and a hurdle in the US India nuclear deal (Cherian, 2010). But in January 2015, during the US President Barak Obama’s visit and the later discussion with Indian Prime Minister Narendra Modi concluded the Administrative Arrangements for implementing the deal and settled all the issues of liability. However the settlement is not for

the ordinary citizens but for the partners of nuclear commerce. The current arrangements have lot of insufficiencies.

NUCLEAR AGREEMENTS WITH OTHER NATIONS

India tried to emerge as a nuclear power subsequent to the waiver of the NSG. It opened the gate for the international companies to have a share in the huge nuclear market of India. France signed agreement on 30 September 2008 after the complete waiver provided by the NSG. It is for the setting up of third-generation European Pressurized Reactor (EPR) reactors of 1650 MW each at Jaitapur, Maharashtra by the French company Areva. Russia helped in India's efforts to design a nuclear plant for its nuclear submarine. A new accord signed in December 2009 with Russia gives India freedom to continue with the closed fuel cycle, which includes mining, preparation of the fuel for use in reactors, and reprocessing of spent fuel. It allows uninterrupted uranium supply of nuclear technology (Kesavan, 2016). India and Mongolia signed a vital civil nuclear agreement on 15th June, 2009 for supply of Uranium to India, which is rich in the metal. India and Namibia signed five agreements, on 2nd September, 2009, including one on civil nuclear energy which permits for supply of uranium from the African country. Namibia is the fifth largest producer of uranium in the world. India and Argentina also signed an agreement on civil nuclear co-operation. India and Canada signed a civil nuclear co-operation agreement in Toronto on 28th June, 2010. Canada's nuclear industry wants to get access in India's expanding nuclear market and also fuel for India's reactors. Canada is the world's largest exporter of uranium. India and Kazakhstan signed an inter-governmental agreement for cooperation in construction and operation of atomic power plants, exploration and joint mining of uranium, exchange of scientific and research information, reactor safety devices and use of radiation technologies for healthcare. South Korea became the recent country to sign a nuclear agreement On 25th July, 2011 India and South Korea signed a nuclear agreement, which will offer for constructing nuclear power plants in India. Uzbekistan mining company Navoi Mining & Metallurgy Combine, which is the world's top ten uranium and gold producers, has signed up to supply 2,000 metric tonnes of Uranium ore concentrate to India over the next four years (2014-2018). In 2014, India and Australia signed a civil nuclear agreement which allows the export of uranium to India. This was signed on 4 September 2014. Australia is the third largest producer of uranium in the world. The present Modi government revitalizes all the delayed deals likes with Canada, France etc. India signed agreement with Japan in 2017.

PERILS OF NUCLEAR ENERGY AND THE NUCLEAR DEAL

- Nuclear energy itself is harmful and creates huge social and environmental cost. Apart from risk of an accident, radioactive materials are regularly being discharged into the air and water during normal operations. During mining, transportation, and enrichment of radioactive materials, radioactive dumps at factories and nuclear fuel facilities are also very high. Chernobyl, Three Mile Island, Fukushima etc provide examples for the catastrophic loss
- The cheapness of nuclear energy as an illusion. Because of the huge subsidies they became cheap. The government offers to the nuclear power industry in the form of heavy water

subsidy, fuel fabrication subsidy, waste management subsidy, and many other hidden and unknown subsidies. The cost of reprocessing the radioactive waste and the cost of insurance liability are not accounted. The disposal waste material as well as decommissioning of the reactor is very costly and unhealthy.

- In the case of nuclear deal, India agrees to permit inspectors from the International Atomic Energy Agency (IAEA), the United Nations' nuclear watchdog group, access to its civilian nuclear program. By March 2006, India assured to place fourteen of its twenty-two power reactors under IAEA safeguards permanently. India has also guaranteed that all future civilian thermal and breeder reactors shall be placed under IAEA safeguards permanently.
- The Hyde Act states that while exporting nuclear fuel or technology to India the US has to allow principles including that the American President will report and certify annually to the US congress that India's foreign policy is congruent to that of the United States and more specifically India joining US efforts in isolating and even sanctioning Iran (Mattoo & Jacob, 2010).
- The United States will cease nuclear cooperation if India conducts a test. And all materials including reprocessed, material will be returned (Hyde, 2006).
- This act demands that India participate and ultimately support the PSI, which enables the US to interrupt ships in international seas (Hyde, 2006).
- The advisory in the act wants to bind India into various US initiated treaties and regimes of which India is not part, including the MTCR, Fissile Material Cut off Treaty etc (Hyde, 2006).
- India works toward negotiating a Fissile Material Cut off Treaty (FMCT) with the United States prohibiting the production of fissile material for weapons purposes. India agrees to stop the spread of enrichment and reprocessing technologies to states that don't possess them and to support international non proliferation efforts.
- American companies have already started capturing world market for a new partnership in nuclear trade. A consortium consisting of Exelon Nuclear, Energy Corp, Constellation Energy, Southern CO and EDF International, and manufacturers such as Westinghouse, General Electric, Toshiba, etc. are set to reap from this nuclear commerce
- The Indian business giants like Tatas, Reliance Infrastructure L&T, Gammon India, Rolta India, Hindustan Construction Company and Crompton Creaves are working in nuclear industry and interested for the liberalized settings of nuclear technology.
- The long term economic and technological benefits of this deal will be experienced by nuclear 'haves', the Nuclear Industrial Complex (Seethy, 2008).
- Capital for all the technology and hardware needed is a huge amount. These are mobilized through foreign direct investment and commercial loans. It also affects the financial sector of India and its strategic autonomy.
- The nuclear liability is also weak. The operators' no fault liability and suppliers' no liability are the main features. The insurance pool is also a misapprehension, because the major liability share holds by government. That means the burden ultimately resides with taxpayers.
- In the recent Modi Obama meeting made the liability possible for the players in nuclear commerce. Section 17(b) which gives the operator a "right to recourse" i.e. suing the supplier.

Now it will be possible only if under section 6a, if it is written in the contract between NPCIL (Nuclear Power Corporation India Limited) and the supplier.

- Section 46, which refers to the right of victims to sue in case of a nuclear accident according to 'tort' law. But the supplier cannot be liable under this kind of "class-action suit".
- The nuclear liability also weak. The operators no fault liability and suppliers no liability are the main features. The insurance pool is also a misapprehension, because the major liability share holds by government. That means the burden ultimately resides with taxpayers
- If there is a nuclear incident, which will be capped at \$300 million SDRs or Rs. 2610 crores. In addition, the operator NPCIL is only liable up to Rs.1500 crores, and the Union government from the insurance pool, would pay the balance RS 1110 crores. Any damages above this would come from an international fund, once India ratifies the international Convention on supplementary compensation for nuclear liability or CSC. This effectively means that the supplier will not be liable, and even the operator will be liable only for a small fraction of what victims will need, given the recent example of \$200 billion for the Fukushima disaster (Hyder, 2015).

CONCLUSION

India's per capita energy consumption is only 1075KW/h that is very low compared to the developed countries. So the huge amount of energy production is need of the time for India's internal needs. But the quest for nuclear energy is not only way to achieve energy security. It will reduce carbon foot print, but the environmental and social cost is very huge in the case of nuclear energy. The production of nuclear energy is very low in worldwide after Fukushima incident. In India also the production of nuclear energy is below 7000 MW and that is very short with the targeted 14.6 GW by 2020. The risk factors like the environmental effects, livelihood issues, radio- active waste management, maintenance of closed reactors and the actual cost of installation without subsidy are the major hurdles to implement the nuclear energy programmes. So there is a need for rethinking about this aspect. There are so many traditional energy resources are available here and recently there is a huge drop in solar and wind energy's technologies. And it is better for human beings and the ecosystem. Technical and commercial losses in transmission and distribution should be addressed and this energy efficiency will help for an energy secure future. Hence clean energy and energy efficiency are the ways to achieve economic growth and for improving the quality of development.

ACKNOWLEDGEMENT: Researcher is thankful to her Ph.D. supervisor Dr. K. Jayaprasad, Central University of Kerala, Kasaragod for his valuable supports and encouragements.

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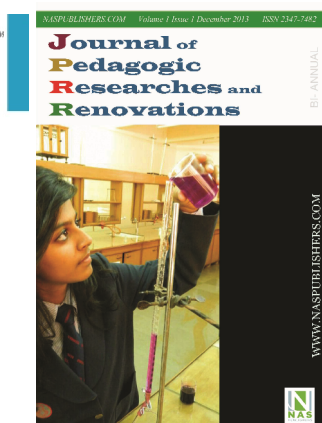
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