INDIA AND THE UNITED STATES: REINVIGORATING THE 'ENERGY' RELATIONSHIP

STUTI BANERJEE

INTRODUCTION

For nearly the entire duration of the Cold War, India and the United States struggled to find common grounds on which they could base a successful relationship. The geo-political conditions prevailing during this period undermined the potential for sustained bilateral engagement. The fall of the Soviet Union opened the diplomatic arena for new collaborative initiatives between India and the United States. The Indian position was supported by the US during the Kargil War (1999). Prior to the visit by President Clinton in 2000, the US removed sanctions applied on India following its 1998 nuclear tests. The visible thaw in the relationship started when Prime Minister Atal Bihari Vajpayee famously stated that India and the United States were "natural allies".

Since 2004, the two countries have pursued a "strategic partnership" that incorporates numerous economic, security, and global initiatives. Geo-political realignments have dramatically increased India's visibility and

Dr. **Stuti Banerjee** is a Research Fellow at the Indian Council of World Affairs, New Delhi. She is engaged in research on the US and Latin America. Her research interests include: nuclear security and risks, Indian foreign policy, US foreign policy, defence and strategic studies.

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potential value in the US' security calculations, from a "growing global power with common interests" (as described in President Bush's 2002 National Security Strategy) and "the relationship as one of the defining partnerships of the 21st century, rooted in common values and interests," (as President Obama told the Indian Parliament in 2010), to a "lynchpin" of the US' strategy extending from the Western Pacific and East Asia into the Indian Ocean region and South Asia (as described in a June 2012 speech by Defence Secretary Leon Panetta). In his address to the people of India, President Barak Obama, on his second visit to India and the first by a US president as guest of honour for the Republic Day parade, said, "...India and the United States are not just natural partners.... America can be India's best partner."[1]

The partnership today is based on certain common factors that the two countries share. Within their security relations, they have similar views on regional security and the fight against non-state actors. In the economic sphere, India and the United States want to establish partnerships that would increase economic productivity in both countries and propel growth. They are both competitors and collaborators with China, however, both are equally suspicious of China's ambitions. Politically, they have a common foundation of their political system, which is rooted in democracy and the constitutional division of power.

The United States is promoting its 'rebalancing' policy for Asia in which India plays an important role as an emerging international player with a thriving political system and a stable economy. The energy relationship is one of the core elements of the strategic partnership. India and the United States have largely similar energy security concerns such as stable global energy

1. The White House, "Remarks by President Obama in Address to the People of India." Accessed on February 6, 2015, URL- http://www.whitehouse.gov/the-press-office/2015/01/27/remarks-president-obama-address-people-india

supplies, controlled prices, diversification of energy resources, promotion of renewable energy and environmental sustainability, and developing technology and investments for new sources of energy.

This paper would be a brief study of the energy relationship between the two countries, through the civil nuclear deal and renewable energy sources, as part of the larger strategic relationship they share.

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Growing strategic relations between the two countries have implications for the energy relations as well. India's continued economic growth and security are intrinsically linked to energy and the secure supply of energy resources. India has been developing a policy to diversify its energy resources, achieve better energy efficiency and minimise losses. For developing countries, every one per cent growth in Gross Domestic Product (GDP) requires a 1.5 per cent growth in energy supply. Major growth areas in the next 50 years will be the developing countries where economies and population are increasing rapidly. The world population will grow from 6 billion in 2000 to 10 billion by 2040. Energy demand will double and perhaps treble from its 1990 value by the year 2050. 'Clean energy', that is a mix of renewable and nuclear energy will become the way ahead.[2]

THE NUCLEAR AGREEMENT

The civil nuclear agreement or 123 Agreement[3] generated considerable interest in both India and the US. The agreement was first announced in a joint statement[4] by Prime Minister Manmohan Singh and President G.W. Bush in 2005, ending the nearly three-decade-old US moratorium on

2. Ian Fell, "Clean Energy", *RSA Journal,* vol.148, no. 5493, 2000, p.86.
3. The text of the agreement is available at URL- http://responsiblenucleartrade.com/keydocuments/india_123_agreement_text.pdf.
4. The Joint Statement by President G H Bush and Prime Minister Singh is available at URL-http://georgewbush-whitehouse.archives.gov/news/releases/2005/07/20050718-6.html.

nuclear trade with India, imposed on account of the nuclear tests conducted by India in 1974 and reinforced after its nuclear tests in 1998. The landmark agreement was signed by India and the US in 2008 and cleared by the Nuclear Suppliers Group (NSG) in 2008. It was successfully voted by the Indian Parliament and also ratified by the US Congress. The US government passed the Hyde Act (2006) to facilitate the implementation of the deal by exempting India from certain provisions of the US Atomic Energy Act (1954). The agreement provides India access to US nuclear technology and other assistance for the civilian nuclear energy programme, and expands cooperation between the two countries in energy and satellite technology. The deal also allows India to buy US dual-use nuclear technology, including materials and equipment that could be used to enrich uranium or reprocess plutonium, potentially creating the material for nuclear weapons. It would also receive imported fuel for its nuclear reactors.

Energy security is an essential part of India's national security apparatus and diversification in the energy mix is a step in that direction. Nuclear energy is an option that India has decided to explore. Despite the sanctions, Indian nuclear scientists have been able to develop indigenous technology to continue operations; however, they need to collaborate with their foreign counterparts. The deal with the US helps India to acquire new technology as also to participate in its development. Nuclear fuel is an important aspect of this deal; India still needs to import uranium to rapidly expand its capacity to generate nuclear energy. The Civil Nuclear Agreement was the centrepiece of a transformed relationship, which demonstrated new trust. It also created new economic opportunities and expanded the option for clean energy.[5]

Why did the US Sign the Deal?

The question that arises is: why did the US decide to sign the agreement, marking a sharp departure from its nuclear non-proliferation commitments? After the nuclear tests by India in 1998, it was apparent to the international

5. The White House, "Statements by President Obama and Prime Minister Modi of the Republic of India". Accessed on February 6, 2015, URL- http://www.whitehouse.gov/the-press-office/2015/01/25/statements-president-obama-and-prime-minister-modi-republic-india

community that neither did the sanctions have the desired effect nor was India willing to renounce its nuclear weapons programme. It was not in the US interest to isolate India through sanctions; rather, it was in its interest to bring India within the ambit of the rules and regulations of the International Atomic Energy Agency (IAEA) and NSG, thereby strengthening the non-proliferation regime. It was also realised that sanctions had not had the desired effect on India. The agreement is expected to lead to nuclear technology cooperation in developing safer reactors that would also be cost-effective and have higher efficiency. It is also expected to lead to greater transparency in India's nuclear sector, which will reduce the risks of proliferation, nuclear accidents, and nuclear meltdowns.

The agreement is also important for the United States' nuclear industry. On the basis of the 2008 bilateral agreement, US companies—most importantly Westinghouse and GE-Hitachi—plan to build nuclear power plants in India. A US-India trade group claims that this business may ultimately be worth US $130 billion by 2030. William J Burns, under-secretary for political affairs, gave a more modest figure of 3,000-5,000 new direct jobs and about 10,000-15,000 indirect jobs in the US if US firms won two bids for new nuclear plants in India.[6]

There was also the possibility that India might favourably view the Comprehensive Test Ban Agreement (CTBT) and Fissile Material Treaty (FMCT), the two agreements it has refused to sign due to its own security concerns. It was also anticipated that, given the depth of the relationship, the US could hope to have India's support on various international issues such as sanctions against Iran. The deal was viewed as an incentive for India to refrain from nuclear testing in the future.

Strategically, partnering with India could help the United States to reduce the cost of exercising its political, military or economic power to limit the growth of China as a possible rival. The United States policy-makers view Asia as the gravitating point that shall in the future become the centre of international politics and finance, as has been repeatedly decribed in the US'

6. Mark Hibbes, "Moving Ahead on the US-India Nuclear Deal", Carnegie Endowment for International Peace. Accessed on August 27, 2013, URL- http://carnegieendowment.org/2010/04/05/moving-forward-on-u.s.-india-nuclear-deal/25yl

For India, the deal allows it to emerge out of the cycle of decades of nuclear isolation while providing it an opportunity to reduce its energy deficit. It is one step in a series of agreements in equally sensitive areas such as defence technology, which would bring India and the US closer.

'pivot' to Asia policy. To be able to maintain a measure of influence, the United States needs strong regional partners and allies. With the widespread criticism of its invasion of Iraq and the problems it faces in Afghanistan, it needs friends and allies more than before. The US Department of State and Department of Defence hold the view that India can play a substantial role in sharing the regional security burden. Officials from both the US State Department and Defence Department agree there is a natural convergence of India's "Look East Policy" and the "Asia-Pacific Rebalance" of the US.[7]

This safeguards US interests, while allowing it to take a few steps back from active engagement. The US is conscious of the anti-US sentiments widespread in the region, with India perhaps, being the only exception. It wants to leverage India's good relations and influence to help stabilise a region which is witnessing a rise in radical politics, growing influence of non-state actors and terrorist organisations, and a relatively declining influence of the US.

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The deal is *de-facto* recognition of India's emergence as a nuclear weapons state, though critics claim that it does not comprise recognition in the international arena. It is also a vindication of New Delhi's self-imposed moratorium on nuclear weapons testing and a testimony to the

7. NDTV, "Stronger India is Beneficial For World Peace: US". Accessed on September 12, 2014, URL-http://www.ndtv.com/article/india/stronger-india-is-beneficial-for-world-peace-us-585519

non-proliferation record the country has been able to maintain, and its consistent stand on the nuclear Non-Proliferation Treaty (NPY), CTBT and nuclear disarmament, unlike Iran, North Korea and Pakistan.

The joint statement states, "India will have the same benefits and advantages as other leading countries with advanced nuclear weapons technology, such as the US." The deal provides India with much needed advance nuclear technology, reactor technology and, more importantly, access to fuel to power its reactors, to both sustain and expand its nuclear energy programme. Despite the best efforts of the Department of Atomic Energy (DAE), it has been unable to generate large quantities of nuclear energy and would benefit from the much needed export of technology. The other major issue crippling the DAE is the question of securing sufficient supply of uranium to fuel the nuclear reactors. India does not have vast reservoirs of uranium and in the wake of the sanctions, was unable to secure its import. Shortage of nuclear fuel would have led to a shutdown of the nuclear reactors and, by extension, the nuclear, programme. The nuclear deal is the pathway that India has followed to gain access to the international uranium market.

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India is aware of the pressures that are being exerted upon it to be part of the CTBT and the NPT regimes. While the deal does not curtail India from future tests, it has become increasingly difficult to do so because of existing international norms, and, more importantly, international opinion against nuclear testing. The nuclear deal could possibly have been acknowledgement of India's stand in ensuring recognition of its non-

proliferation efforts, its nuclear capacity and need for nuclear deterrence in the face of the threat from two nuclear weapon states on its borders. The deal marks the acceptance by the US of the long standing Indian demand for lifting international sanctions on India for nuclear cooperation.

The deal provides India with the opportunity to reduce its energy deficit while not compromising on its strategic sovereignty. It also provides India with an opportunity to forge a new strategic relationship with the US. By the turn of the 21st century, balancing China's growing power is becoming a strategic imperative for the US. The US views India as a possible balancer to China because of its sheer size, geography, military capabilities, industrial potential, economic strength and democratic political values. The nuclear deal can provide the edifice for a robust security relationship between the two states centred on balancing Chinese power. However, India has made it clear time and again that its foreign policy would be influenced by its national security and interests, and would be anchored in independence.

The nuclear deal has become the centrepiece of the new Indo-US partnership, which also focusses on other issues like economic prosperity, closer military and strategic ties, intelligence sharing, and cooperation on fighting terrorism. If the nuclear deal is implemented as described on paper, it will benefit India, the US, and the countries of the NSG that engage in nuclear trade with India. However, the US and India will make strategic gains in addition to economic ones. In theory, the deal is not just between India and the US but between India and all the NSG countries. After the deal was cleared by the US Congress, India signed nuclear cooperation deals with France, Russia, and Canada. It is even free to engage in nuclear cooperation with countries like China.[8]

Challenges

While both states are keen to implement the agreement, in the past five years there has been little progress. Much of the interest that it generated has dissipated, especially among foreign policy thinkers within the two

8. Prashant Hosur, "The Indo-US Civilian Nuclear Agreement What's the Big Deal?", *International Journal (CIC)*, vol. 65, issue 2, Spring 2010, pp. 435-448 (London: Sage Publications, 2010), p.446.

countries, who feel that the agreement has failed to meet expectations. However, the recent joint statement released during President Obama's visit (January 2015), stated that the two countries are moving towards commercial cooperation, consistent with their respective laws, international legal obligations, and tactical and commercial viability. President Obama has also given assurances of US support for India's full membership of the four international export control regimes.[9] Speculations have arisen about the assurances given by the Indian government on the contentious liability issue, which had been a major concern of the US companies. The Government of India has yet to clarify about the nature of 'understanding' it has reached with the US but the news that the civil nuclear deal would be implemented soon has brought renewed interest in the relationship.

There is a number of impediments that need to be cleared for the agreement to be implemented. The Civil Liability for Nuclear Damage Bill (2010)[10] passed by the Parliament has caused a rift between the Indian entities and the US nuclear suppliers. The Bill seeks to create a mechanism for compensating victims of nuclear damage arising from a nuclear incident. The US had opposed two of the provisions that stemmed from the legislature's refusal to indemnify foreign suppliers from accidents caused by faulty equipment. Section 46, which allows ordinary citizens to file claims for damages, is seen by the US nuclear industry as exposing its companies to unlimited liability in the event of an accident. Washington's second objection is to Section 17(b), which grants Indian operators the right of recourse against nuclear suppliers if an accident results from the "supply of equipment or material with patent or latent defects or sub-standard services." It allows for the supplier to be penalised if he had accepted liability in a written contract, and limits their exposure in the event of faulty equipment to accidents which occur in the first five years of the reactor's operation.[11] India is unwilling to implement the deal without the safety factors in the liability Bill. However,

9. The White House, n.5.
10. The text of the Bill and all relevant related documents are available at URL- http://www.prsindia.org/billtrack/the-civil-liability-for-nuclear-damage-bill-2010-1042/
11. "New Rules Give Some Relief to Suppliers", *The Hindu*, November 16, 2011. Accessed on August 27, 2013, URL- http://www.thehindu.com/news/national/new-rules-give-some-relief-to-nuclear-suppliers/article2633545.ece

Given India's past experience of sanctions, questions have been raised on the reliability of the US as a supplier of raw material and technology. India has on its own accord halted but not renounced its rights to test nuclear weapons in the future.

the Attorney General of India, Goolam Essaji Vahanvati has stated that it is for the operator of a nuclear plant in India to decide whether it wished to exercise the "right of recourse" provided to it under Section 17 of the Civil Liability for Nuclear Damage Act. The attorney general's opinion effectively paves the way for the Nuclear Power Corporation of India Ltd. (NPCIL), which will operate any nuclear plant using imported reactors, to repudiate a right that Parliament explicitly wrote into Section 17(b) of the law to ensure that foreign suppliers are made liable if a nuclear accident is traced back to "equipment or material with patent or latent defects or sub-standard services."[12] His views were expressed in an opinion to the DAE query seeking clarity on the law. It is likely that the attorney general's view would be challenged by the opposition parties in the Parliament.

The US has to understand that the liability Bill has emerged as a result of India's democratic processes and also, to a large extent, the changed perceptions about the safety of nuclear energy after the Fukushima accident in Japan. Around the time the liability Bill was being debated in the Lok Sabha, the decision on the Bhopal gas tragedy was released. Almost 30 years later, the victims of this infamous industrial tragedy still suffer greatly due to lack of proper compensation and medical rehabilitation. The timing of the decision brought the disaster into the forefront of the Indian public's mind and arguably bolstered the push for strong supplier's liability.

Given India's past experience of sanctions, questions have been raised on the reliability of the US as a supplier of raw material and technology. India has on its own accord halted but not renounced its rights to test

12. Sandeep Dikshit and J. Venkatesan, "Manmohan May Carry Nuclear Liability Dilution as Gift for US Companies", *The Hindu*, September 19, 2013. Accessed on September 19, 2013, URL-http://www.thehindu.com/news/national/manmohan-may-carry-nuclear-liability-dilution-as-gift-for-us-companies/article5142882.ece?homepage=true

nuclear weapons in the future. Prime Minister Manmohan Singh in his statement to the Parliament on August 13, 2007, had made it clear, "The agreement does not in any way affect India's rights to undertake future nuclear tests, if it is necessary in India's national interest."[13] There is nothing in the agreement that legally curtails India from testing a device. According to the agreement, it can be terminated by either party for any reason with a one year's notice. It does not specifically mention nuclear testing, but the parties agreed to consider whether the triggers for cessation stem from a changed security environment or similar action by other states (i.e. a nuclear test by Pakistan). The agreement provides the US support for an Indian effort to develop a strategic reserve of nuclear fuel in order to guard against any disruption of supply for the lifetime of India's reactors. However, it is too early to predict the US behaviour in the event of nuclear testing by India. Given India's deepening nuclear ties with other countries, there is a possibility that US actions would have a modest impact. The other factor that has to be kept in mind is the strength of India and US relations. Sanctions were imposed on India during the Cold War, when the geo-political and geo-strategic needs of both countries were different; today, however, they face an entirely different international environment. There is a strong possibility that, given the depth of the relationship, the US may have limited options in the event of a nuclear test by India.

The nuclear deal is part of the strategy of India and the US to establish 'energy' as an important pillar in consolidating and strengthening their relationship. They also share similar concerns on securing energy supply lines and the cost of energy imports.

The nuclear deal was never only about India buying a few reactors from the US; the agreement was a step in the assimilation of India into the international nuclear trade and technology regimes as also a step to leverage economic, strategic and political dividends for the country. For the US, the agreement had similar benefits.

13. Prime Minister of India, Government of India "Speech—PM's Statement in the Lok Sabha on Civil Nuclear Energy Cooperation with the United States, August 13, 2007". Accessed on September 18, 2013, URL-http://pmindia.nic.in/speech-details.php?nodeid=550

The nuclear deal is part of the strategy of India and the US to establish 'energy' as an important pillar in consolidating and strengthening their relationship. They also share similar concerns on securing energy supply lines and the cost of energy imports. Both countries have a common interest in weakening the nexus among economic growth, energy demand and environmental degradation.[14] It is for this reason that the cooperation is robust in the renewable energy component as well.

INDIA-UNITED STATES RENEWABLE ENERGY COOPERATION

The United States and India are competing with each other to become the largest consumer of energy in the world, with China included in this race as well. The United States Energy Information Administration (EIA) projects that China will surpass the United States as the largest net oil importer by 2014, in part due to China's rising oil consumption, roughly between six to seven million barrels per day.[15] The *BP Energy Outlook 2014* has very similar findings. It shows global energy demand continuing to increase at an average of 1.5 per cent a year to 2035. Growth is expected to be moderate over this period, climbing at an average of 2 per cent a year to 2020 and then by only 1.2 per cent a year to 2035. Ninety-five per cent of this growth is expected to come from non-OECD (Organisation for Economic Cooperation and Development) economies, with China and India accounting for more than half of the increase. This increase in energy is across energy sources of oil, natural gas, coal and nuclear energy (China, India and Russia will together account for 96 per cent of the global growth in nuclear power). Similarly, in the renewable sector, especially hydroelectricity, India and China along with Brazil would be responsible for nearly half of the growth predicted.[16]

Energy and the need to develop sustainable and renewable sources of energy has been part of India's relationship with the United States. If

14. Vikram Singh Mehta, "Energy: A Solid Pillar Upon Which to Build India-US Relations" in *The Modi-Obama Summit; A Leadership Moment for India and the United States* (Brookings: Brookings University Press, 2014), p.49.
15. US Energy Information Agency, "International Energy Outlook 2014". Accessed on October 14, 2014, URL-http://www.eia.gov/forecasts/ieo/
16. BP Energy Outlook 2035. Accessed on October 14, 2014, URL-http://www.bp.com/en/global/corporate/press/press-releases/energy-outlook-2035.html

one were to simply study the joint statements issued at the end of each of the five India-United States strategic dialogues, energy is an important aspect of the strategic partnership that the two countries envisage to build for themselves. They have accorded "...critical importance of energy to sustaining economic growth and securing prosperity, and acknowledged the robust and full range of cooperation under the US-India Energy Dialogue, co-chaired by the Secretary of the United States Department of Energy and the Deputy Chairman of India's Planning Commission. The United States and India plan to continue their ongoing efforts to expand partnerships in clean energy and energy efficiency through the US-India Partnership to Advance Clean Energy (PACE) and under the multilateral Clean Energy Ministerial. Since 2009, PACE–Deployment has mobilised approximately USD 2 billion in clean energy financing to India and PACE–Research has created innovative public-private consortia through the USD 125 million Joint Clean Energy Research & Development Centre..... India has welcomed additional efforts aimed at financing clean energy investments, promoting the development of smart grid technologies, energy efficient buildings, solar power, smart and efficient air conditioning and space cooling, and expanding off-grid access to clean energy."[17]

The Need for Joint Cooperation

The question that needs to be answered is: why do India and the United States need to cooperate in developing clean energy?

Globally, there is a trend in renewable energy investments, currently worth US$ 244 billion. Of this, the close to 45 percent of investment in 2012 was in the developing countries which was 19 per cent higher than in 2011. India and the United States have investments worth US$ 40.5 million which accounts for about 16.5 per cent of global investments in this sector. According to Ernst & Young, India is the world's third best investment destination for renewables.

17. Office of the Spokesperson, US Department of State, "Joint Statement: Forth US-India Strategic Dialogue". Accessed on October 14, 2014, URL-http://www.state.gov/r/pa/prs/ps/2013/06/211084.htm

The two countries are positioned to collaborate in the renewable energy sector given their already existing strategic partnership, converging energy interests, technological prowess, and the vast majority of bilateral mechanisms that allow them the opportunity of close consultation and policy coordination. Both countries can allow their technical knowhow to drive investments and innovation in affordable and efficient renewable energy technologies. The United States, private and public sector investments have an opportunity to expand their foothold in India in the solar energy sector. India allows 100 per cent foreign direct investments in renewable energy generation and distribution and is a favourable case for solar energy. The United States has taken advantage of this and nearly 40 per cent of India's first 1,000 MW of installed solar power was financed in partnership with the Overseas Private Investments Cooperation, Export-Import Bank of the United States, US Agency for International Development (USAID), US Department of Commerce and US Trade and Development Agency.[18]

Both India and the United States have recognised that climate change is an important challenge which cannot be overcome until countries cooperate with each other. Climate change problems and consequences are not restricted to the territory of only one country but affect humanity as a whole. Thus, the solution also needs to be international in nature. However, domestic compulsions are driving the policies of the two countries. The United States' domestic resistance has often prevented steps from being taken such as the recent 30 per cent reduction plans, as proposed by President Obama. In India, the pressures are on increasing access and meeting the already growing demands, which are also linked to economic development. In such a situation, India is not in a position to accept binding targets and penalties. Nonetheless, the business as usual attitude would need to be dispensed with and new solutions in terms of technology and energy services and management have become critical.[19]

18. Vineeth Atreyesh Vasudeva Murthy, *India's Solar Energy Future* (Washington DC: Centre for Strategic and International Studies, 2014), pp.1,3.
19. Rahul Tongia, "India-US Energy Cooperation", in *The Modi-Obama Summit: A Leadership Moment for India and the United States* (Brookings: Brookings Institute Press, 2014), p.53.

The United States and India are also aware that they have divergent views on the role that the developed and the developing economies of the world have in achieving emission norms. Close cooperation would help both nations to understand each other's compulsions better while working towards an economy that doesn't grow at the cost of the environment. It could also bring the two countries to agree to and advocate for, certain global environmental/ climate change related norms.

Renewables have become increasingly essential for the 'energy portfolio' of all countries, not only for protecting the environment but also for diversifying their energy resources for long-term energy security. As resources become scarce and prices increase, renewables become an important aspect of the economic sustainability calculations of countries.

While energy security is not just restricted to supply of raw material, but also includes expansion and security of electricity infrastructure systems, repel attacks on production structures, and proper transmission and distribution, for this paper, it is limited in scope to security of supply of fuel. For India, the economic development that it wants needs significant growth in its energy supply: in such a situation, renewables can provide alternative, and usually indigenous, sources of electric power, allow the diversity of electricity sources through local generation, and contribute to the flexibility of the energy sector, and provide resistance to central shocks. Renewables can reduce geo-political security risks by contributing to fuel mix diversification. Their risks are different from those of fossil fuel supply, and they can reduce the variability of generation costs. In addition, indigenous renewables reduce import dependency.[20] Thus, renewables have the potential to not just contribute to energy security but also to assist in achieving environmental objectives on the national, regional and global levels.

According to the "Vision Statement for the Strategic Partnership"[21] released during Prime Minister Modi's visit to the United States, American

20. Samantha Ölz, Ralph Sims and Nicolai Kirchner, *Contribution of Renewables to Energy Security* (Washington DC: International Energy Agency, 2007), pp. 7,9,11.
21. Office of the Press Secretary, The White House, "US-India Joint Statement". Accessed on October 1, 2014, URL-http://www.whitehouse.gov/the-press-office/2014/09/30/us-india-joint-statement

As per the 12th Five-Year Plan, the future expansion in power generation capacity in India is planned around 88GW. In order to meet this capacity, investment in the the transmission sector needs to be increased.

industry is keen to be the lead partner in developing smart cities in Ajmer (Rajasthan), Vishakhapatnam (Andhra Pradesh) and Allahabad (Uttar Pradesh). The cooperation should be to build smart but sustainable cities that implement binding energy efficiency standards and regulations, proper distribution infrastructure. India and the United States need to pool in their expertise on technologies and policy regulations and exchange knowledge on the implementation of just projects.

The United States has extensive technological expertise in building smart grids, which are more robust and better suited for renewables produced energy. A smart grid means "computerising" the electric utility grid. A key feature of the smart grid is automation technology that lets the utility adjust and control each individual device or millions of devices from a central location. USAID is supporting the Government of India in monitoring and implementing the US$ 150 million worth 14 smart grid pilot projects that have been initiated by the Ministry of Power. At the same time, the US Trade and Development Agency is working with the private sector to support smart grid development. Cooperation in this area would be beneficial, as the average loss in Transmission and Distribution (T&D), according to the Ministry of Power is 23.65 per cent (2011-12). As T&D loss is not able to account for all the losses in the network, losses are also calculated on the basis of Aggregate Technical and Commercial (AT&C) losses, which are considered to be a better indicator of total losses in the system. Technical losses are inevitable and are due to flow of power in the transmission and distribution system. However, in India, the commercial losses, due to theft of electricity, faulty meters, misuse of power, etc are very high. According to the Ministry of Power report, AT&C losses are at 27 per cent (2011-12).[22] Private organisations

22. Central Electricity Authority Ministry of Power, Government of India, "Executive Summary Power Sector February-2014". Accessed on October 13, 2014,URL- http://www.cea.nic.in/reports/monthly/executive_rep/feb14.pdf

that have commissioned similar reports give considerably higher figures.

As per the 12th Five-Year Plan, the future expansion in power generation capacity in India is planned around 88GW. In order to meet this capacity, investment in the the transmission sector needs to be increased. Overall, an addition of 90,000 ckm of 765-220 kV lines, 154,000 MVA of sub-station capacity and 27,350 MW of national grid capacity is required in order to meet the 12th Five-Year Plan. For this purpose, an investment of US$ 35 billion is planned in the power transmission sector. Of this, about US$ 19 billion is planned to come from the Power Grid Corporation of India Limited. The remaining US$ 16 billion, or 46 per cent of the total investments, needs to be secured from private players.[23] In an interview to *The Economic Times*, Minister for Power, Coal and Renewable Energy Mr. Piyush Goyal said that the Indian government is "...looking for investment of US$100 billion in the next five years".[24] India is open to the United States' investments in not just infrastructure but also technology.

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Collaboration is required in research and development in all aspects such as supply, storage, conversion, consumption. The United States has considerable expertise in storing energy via pumped hydropower which is rare in India. Yet this method is cost-effective and highly efficient and could be an area for cooperation. Areas of new cooperation also include new technology for insulations, batteries, high energy efficiency products, etc.[25]

23. FICCI, "Power Transmission The Real Bottleneck: An Overview of the Indian Power Transmission Sector, Its Challenges, and Recommendations". Accessed on October 13, 2014, URL-http://www.ficci.com/spdocument/20311/power-transmission-report_270913.pdf, p.02
24. Anindya Upadhyay, *The Economic Times*. Accessed on October 20, 2014, URL-http://articles.economictimes.indiatimes.com/2014-09-19/news/54108858_1_piyush-goyal-renewable-energy-energy-minister
25. Tongia, n.19, p.54.

The other main reason for collaboration would be the economic benefits. Renewables could be used to provide electricity to smaller household units that make the setting of large scale transmission and distribution systems financially ineffective. Electrification could also help in the health and education sectors in the rural areas. Collaboration could also infuse new players into the renewables industry and also help in innovation of technology by Non-Governmental Organisations (NGO), start-ups, small scale enterprises, etc. These small businesses and innovators require government assistance. The renewable energy industry is a principal supplier of technologies that make the global economy less reliant on non-renewable fossil fuels by producing a wide range of new, innovative products and services, and by continuing to reduce costs to make new and existing technologies cost competitive. Increased investments in the renewable energy sector would also lead to such dividends as job creation, economic growth along with energy security and insulations for oil price shocks.

Challenges for Green Energy

The challenges that the renewable energy sector faces are in the form of "green protectionism" which covers two types of trade barriers: tariff and non-tariff. Under the former, a country taxes imported wind, solar or other renewable parts or units. In India, for example, renewable energy components are levied a 7.5 percent tariff. Under non-tariff barriers, overseas companies have to set up joint collaborations with local companies. Currently, the US Trade Representative Michael Froman has filed a case against India in the World Trade Organisation stating that Indian policies ensure that Indian solar developers use locally made equipment, discriminating against US producers.

The other is the competing cost of other sources of energy. Coal and oil based thermal power is preferred over renewables due to its short gestation period, marginal physical displacement of people and pressure of donor agencies. The high initial costs, the generally slow build up of loads and high transmission and distribution losses of conventional energy production

and utilisation were accepted as a trade-off in centrally planned public sector operations. Although subsidies and financial incentives were given liberally to the renewables sector and its technology development, they remained marginalised in the overall energy scenario. The total investment in renewables has to be increased and the source of energy popularised. The larger the demand for renewables, the more investments would be attracted by the sector and the cheaper they would become. It has to be pointed that while the initial cost of renewable energy may be higher, in the long term, or in the life cycle cost, it is cheaper. The environmental costs also add to its benefit. However, government subsidies and dependency on non-renewables ensure that renewable technology continues to cost more.

What has compounded the problem for renewables is the very fact that they were initially subsidised. Now there is an expectation that they will comprise subsidised power only. In India, power tariffs are highly underpriced and subsidised, especially for the rural sector and in some notified industrial areas. While considering the cost benefits of renewables, such direct subsidy on the cost of power and indirect subsidy by way of subsidy on freight and coal are never calculated, hence, conventional power costs are always more attractive and affordable than those of renewable power.

There is no legislation in India which deals exclusively with renewable energy. This sector is governed by the provisions of the Electricity Act, 2003[26] which is the principal statute governing the electricity sector in India.

Another main barrier as perceived by some is the government policy. To popularise and promote renewables, nodal agencies were set up in each state. In addition, the government has set up rigid guidelines for equipment to be eligible for a subsidy. This has led to the formation of a closed circle in manufacturing with a few manufacturers cornering the entire market. In the name of "standardisation" and "registration", innovation has been totally crippled and even if we search, we are not likely to get low cost or cheap renewable resources. For example, unless supplied by the government, an

26. Details of the Act can be accessed at URL-http://powermin.nic.in/acts_notification/electricity_act2003/preliminary.htm

NGO, or a voluntary agency, it is almost impossible to find a poor household making use of solar water heating systems or solar cookers.

There is a multiplicity of departments that look after renewables. There is duplication, overlapping and lack of coordination in the implementation of renewable energy programmes. A bureaucratic structure with a target oriented approach has led to rigidity in instructions and a centralised planning process is virtually choking the growth and spread of this source of energy.

Another barrier to growth and popularisation of renewables is that there is no university offering an exclusive degree/diploma course in the subject. Even in schools and at homes, environment and renewables are not given due importance or acceptance.[27]

India and the United States can collaborate on renewable energy sources through the various institutions and dialogue processes that they have already set up. Energy cooperation, especially in renewable energy, would also not attract political opposition. In fact, the close working relationship would help build trust and friendship that would help dissipate the misgivings that have been a part of the relationship.

CONCLUSION

As India and the United States move to explore 'non-traditional paths' to strategy, energy security has become paramount. Ample energy is a prerequisite not just for economic growth but a requirement for the overall development of any country – for its stable political environment, strong social growth, economic development and robust defence. Thus, an energy strategy is parallel in importance to the economic strategy and military strategy.

The current Indian strategy involves diversification. India is a net importer of energy resources from very volatile regions of the world, the transportation of this precious resource is through piracy affected sea routes and the burden on the exchequer is enormous. In such a situation, it

27. Renewable Energy Occasional Paper Series, "BARRIERS? To Renewable Energy Development in India". Accessed on October 23, 2014, URL-http://www.climateparl.net/cpcontent/Publications/RE%20Occasional%20Paper%202%20Barriers%20in%20India.pdf

is imperative for India to explore and employ all energy options available to it. And to build a strategy for energy that would project long-term recommendations that would enhance our security and advance prosperity, while protecting the environment.

For India, two significant developments in Asia are helping it in evolving its strategic contours and its security concerns One is China's rise in the Asia-Pacific region, and the other is the United States' policy towards Asia. We have to learn from the example of China, which is establishing relations with countries across the world to secure energy resources for the future. Energy diplomacy is now part of India's strategic thinking through diversification and overseas acquisitions. India's energy outreach also has broader foreign policy benefits as it helps India advance its influence and establishes it as a global investor in international peace and stability.

Unlike in the case of China, the United States views India as a longer term partner rather than a challenger. In explaining the "shift in its pivot" President Obama stated, "With most of the world's nuclear power and some half of humanity, Asia will largely define whether the century ahead will be marked by conflict or cooperation, needless suffering or human progress."[28] Within this strategy, then Secretary of State Hillary Clinton had stated, "India's greater role on the world stage will enhance peace and security, that opening India's markets to the world will pave the way to greater regional and global prosperity...."[29]

India and the United States are committed to enhancing energy cooperation due to the central role energy plays in a wide range of priority issues – from climate change and energy security to energy access, economic growth, trade and investment as well as in strengthening security and military cooperation, boosting economic growth and cooperation on various regional and global issues.

28. Office of the Press Secretary, The White House, "Remarks By President Obama to the Australian Parliament", November 17, 2011. Accessed on October 14, 2014, URL- http://www.whitehouse.gov/the-press-office/2011/11/17/remarks-president-obama-australian-parliament
29. Hillary Clinton, "America's Pacific Century", *Foreign Policy November 2011***.** Accessed on February 05, 2015, URL- http://foreignpolicy.com/2011/10/11/americas-pacific-century/