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Girijesh Pant *Editor*

India's Emerging Energy Relations

Issues and Challenges

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Chapter 1
Introduction: India's Emerging Energy Relations: Issues and Challenges

Girijesh Pant

India, the third largest economy (PPP terms), is the fourth leading consumer of oil (EIA 2014). Being a growing economy, it is emerging as major market for energy product, technology and services. Estimates suggest that its demand for hydrocarbon will increase as it moves to high growth trajectory more so when it proposes to augment the share of manufacturing in its growth profile. It is calculated that the demand will grow by 183 % in case of gas, by 121 % for oil and for coal 108 % by 2035. What is significant that the growing demand is expected to be met by external supplies because the domestic production of energy to consumption is likely to decline from 61 to 56 %, Thus imports are estimated to grow up by 163 % this will indeed enhance its import dependence (BP Energy Outlook 2035 2014). The Planning Commission calculations are that India's oil imports account for 78 of total oil demand and may go up by the end of twelfth 5 year plan to 90 %. Similarly the coal dependence is expected to grow from 18.8 to 22.4 % by end of twelfth plan and 25.9 % by the end of thirteenth 5 year plan. The critical importance of imports need to be appreciate in the context of the high incidence of energy poverty in the country. Its per capita energy consumption is one third of the global average. Apparently to meet its growth targets and overcome energy poverty, India needs to develop a pro active energy regime. It is reported that the NDA government is likely to bring out institutional changes by establishing Energy Commission with a fairly long term vision of energy security aiming at energy independence (Economic Times 2015a).

Given the energy resource endowment and growing demand, the Indian energy regime has to be conceived on the dynamic synergy of domestic and external supplies. This would not only imply greater global energy engagement to augment investment for its own energy resources on all components of energy mix but a radical change in its composition itself. The need for change in energy mix is needed not only to augment the energy supplies but also to meet the global obligations for low carbon growth. India is reported as fourth largest carbon emitter after China, US

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and EU though in per capita terms it is far behind many leading emerging markets (Ge Mengpin Johannes Friedrich and Thomas Damassa 2014). Thus besides ensuring energy supply, India has to have a proactive global engagement to change its energy mix also. Clearly Indian energy stakes are increasingly becoming high on global energy order. It is for the wide range of global energy engagement that India needs an integrated foreign energy policy. Even a cursory glance of contemporary profile of India's bilateral relations makes it clear that energy has become its vital part, yet it cannot be argued that India has a vision in terms of global energy engagement hence policy. However over the last few years more particularly since opening of the economy in the nineties, as the present volumes brings out, incrementally energy security anxiety has become the concern of India's foreign policy. The present volume profiles and analyses the changing dynamics of India's emerging energy relations.

Today energy is not a national but global concern. The UN declaration to dedicate the decade from 2014 to 2024 to sustainable energy for all underlines the growing significance of energy for sustainable development. The global intervention to save the environment by changing energy mix is going to be a game changer for geopolitics of energy. The state, market and civil society relations are going to be redefined by changing profile of energy relations. The market is witnessing structural transformation with the coming up of new consumers in Asia, the trans-border integration of infrastructure and the dispersal of energy producing sites. The state is under obligation to promote complimentarity between energy and environment interface and the civil society is having responsibility to contribute in changing the mind set and public opinion in favour of energy transition. The global dynamics of energy is changing dramatically, posing new challenges and opportunities to both the producers and consumers. This is eloquently reflected in global energy flows and commercialisation of shale gas and tight oil. Indeed the strategic map of energy market has changed. A new power dynamics, is defining the energy relations among the nations.

Energy defines economic relations within the society as well. The fact that energy security debate carries with it the component of accessibility at reasonable price, implying its subsidization underlines, the market-social interface of energy relations. Energy subsidy has been central to sustainability debate. In countries with high poverty incidence, subsidy is a part of social contract. Further the extractive nature of energy (hydrocarbon) has been raising the issue of conflict of interest between corporate and the local communities. Today in many locale of hydrocarbon, clash between the two are acquiring dangerous proportion leading to violence and suppression. The issue of governance thus has become one of the major concerns of the energy discourse. Moreover a new facet has been added to it by the centralizing nature of hydrocarbon based energy contributing to uneven distribution of energy supplies. Evidences across the globe show that hydrocarbon based centralising energy regime does not promote an inclusive development. On the contrary renewable energy supports inclusiveness. In other word energy security discourse has to address the issue of whose energy security the regime is ensuring?

Energy has power connotation too. Evidently the global energy dynamics shows that those who control it, enjoy strategic advantage hence as the history suggest

there has been a race to acquire control over it. Countries have been crafting their foreign policy to secure energy endowments across the globe to promote areas of influence. From British colonial engagement with the Gulf countries to American-Saudi Arabia, energy-security trade off, are rich account of energy defining bilateral relations and foreign policy. The genealogy of their interface shows the strategic salience of coal and oil in projecting power of Britain and USA during the inter war and post war period, making energy an important component of strategic doctrine. Later it was the eloquent text of President Carter's state of nation speech that led to its securitization in substantial term. Energy security became integral part of the national security concerns. Energy has been one of the two cardinal components of America's West Asia Policy. Energy security became more visible and comprehensive concept of foreign policy debate when the new consumers from Asia started asserting their market power. The discourse seemingly reached its climax with American resolve to give up its energy addiction and launch a proactive search for energy independence after nine eleven. The doctrinal clarity of the later was neatly expressed by President Obama by recognizing the leverage that the energy independence has accrued in redefining his West Asia Policy. Ironically American revision of its West Asia policy has contributed to insecurities of the region thereby to energy supply.

With non western nations becoming the leading consumers of energy, the debate has move to new terrain but remains largely drawn from the Western experiences. This was best illustrated when Asian countries started acquiring overseas energy assets and building strategic reserves. The arrival of new countries enhanced the intensity of competition sometimes leading to commercial conflict. Further a new dimension has been added with western decreasing dependence on energy imports and increasing dependence of Asian and others on external supplies. The latter need energy but have no adequate capacity or capabilities to influence and defend their overseas supply. The significance of the new context lays with the fact that largest share of energy resources are in the region where regional security has been the part of American security engagement with the region. In view of high intensity of threat to regional security since 2011, the energy importers from the region are under pressure to include regional security in their relations with the region. In other words consumers like India, China, Japan, Korea have to factor regional security in their foreign policy to ensure energy supply from the region.

With globalization of energy market and technological breakthrough leading to structural changes, the geopolitics of energy has moved much beyond the OPEC-IEA binary. The producers and consumers are recognizing the need to move away from conflictual mode to cooperation. Not only the two are engaged in dialogue to ensure supply and demand security but have institutionalised it by establishing International Energy Forum with the motto to ensure 'Global energy security through dialogue'. It manifests the departure from conflict to cooperation in energy security that too not for a country or region but globe. OPEC, IEA and IEF meet annually to reflect upon for collective engagement on future global energy concerns. Similarly, to push energy transition collectively, countries have established inter governmental organisation ie International Renewable Energy Agency (IRENA) to promote

renewable energy in various forms namely "bio energy, geothermal, hydropower, ocean, solar and wind energy in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity" (IRENA).

With energy–environment interface becoming the part of global common, a new concern has been added, pushing energy to foreign policy making. Given the ecological consequences of present form of energy consumption threatening the security in various forms, it has become imperative that a global consensus is arrived at for a regime of energy transition ensuring sustainable development. The UN has placed energy central into global discourse by declaring the decade as sustainable energy for all. The proposed global agreement on climate change in Paris December 2015, involves commitment from countries with diverse stakes. Apparently it involves negotiations where countries have to take position. Environ security and energy diplomacy are two distinct component of foreign policy in the present times. The countries have to resort to change their energy mix by mainstreaming renewable in the energy security matrix. From solar, wind, nuclear to bio-fuel, algae and earth material a range of possibilities are unfolding, compelling the countries to diversify their external energy relations beyond hydrocarbons.

The trans-national and trans-border potential of energy trading is impinging on foreign policy in subtle and nuanced way. For the new energy consumer the issue of security of transport logistics be on land pipeline or offshore marine ways, energy security demand a corresponding expanded profile of security. It may be mentioned that at one stage of negotiation on IPI pipeline project, the contending approach of energy and foreign office impacted the progress of the project. Similarly, Chinese energy needs has compelled the country to proactively promote energy routs in central Asia as well as in Indian Ocean. This involves engagement with countries at different level and scale. The Silk route and road connectivity initiatives of China are projects putting high demand on its foreign policy to secure energy supplies. Similarly renewal energy promotion has become vital in EU foreign policy making. The point made here is that in the global age, energy security and foreign policy interface is determined by dynamism of interdependence constantly redefined by energy technological changes. The market power in global energy market is no more confined with those who are richly endowed with resources but also with those who on the strength of their technological power can change the very material base of energy resources. Thus energy dialogues across the globe are becoming central in bilateral and multilaterals.

1.1 Factoring 'Energy Security' in the Indian Foreign Policy

'Energy security' has perceptibly created a niche for itself in the Indian foreign policy. The controversial moves by India of signing civilian nuclear energy cooperation agreement with USA and vote against Iran in IAEA, illustrate that in divergent ways energy security has had bearing on Indian policy. If it was the large volume of Iranian hydrocarbon that has provided new dynamism to age old Indo-Iranian ties,

it is the promise and potential of the nuclear energy that has been one of the key driver in evolving India-US relations. However it would be naïve to explain Indian voting on Iran in UN Security Council exclusively on account of energy factor but its consequences on Indian energy supply have been obvious. The episode clearly underlines the strategic salience of energy security in Indian foreign policy making but it simultaneously also raises fundamental question about the vulnerability which needs to be hedged by foreign policy. This becomes vital in view of the fact that nearly 65 % of import comes from GCC and Iraq and Iran. Thus it is not only the high import dependence but the dependence on a few countries that poses challenge of its kind. Clearly high import dependence for hydrocarbon opens the possibilities of encountering many uncertain situations including price volatility and supply security

Energy enters into the Indian foreign policy domain for more than one reason. The growing demand for energy and corresponding deficit makes it clear that India needs to work on domestic and overseas energy resourcing simultaneously on equal vigour. Indian domestic exploration needs a regime which attracts foreign investment in big numbers because about 75 % of country's sedimentary basin remains to be explored. It is reported that only seven sedimentary basins are producing oil and gas out of known 26 basins. Projecting India as destination for foreign investment may not be the principal task of Indian missions but certainly economic diplomacy has a role to promote Indian interest in this case energy interest. Similarly to augment supplies from overseas sources, foreign policy plays nuance, mediating role by creating grounds for energy transactions. Further initiatives to acquire assets abroad both equity participation in developed fields and obtaining exploration and production contracts in different parts of the world, entering into long-term LNG supply contracts; pursuing transnational gas pipeline proposals; and promoting partnerships with foreign entities in the downstream sector, have become part of Indian foreign policy concerns. With increasing number of new energy consumers in the global market, the competition is becoming tougher, leading to the possibility of creating rivalries spilling over to bilateral relations. Energy being strategic commodity requires strategic intervention and it is here foreign policy engagement becomes imperative. Recognising the diverse nature of engagement the ministry of external affairs has created a separate division on energy security. However in the absence of a coherent framework and mechanism, the returns have not been in commensurate with the needs despite the fact that energy security is seen next to food security in national priority. A synoptic review of energy security in defining India's bilateral relations clearly demonstrates the strategic salience that it enjoys in India's foreign policy making.

An overview of India's energy engagement with overseas market shows that it has been determined by the nature of Indian energy mix. Though coal has the largest share, the import dependence is highest on oil therefore the thrust of India's foreign energy engagement has been on hydrocarbon. Persian Gulf, as observed earlier is the life line of India's energy security. Of India's total oil imports from the Gulf region, excluding Iran, 19 % comes from Saudi Arabia, 13 % from Iraq, 10 % from Kuwait, 9 % from UAE, 6 % from others, which amount to total 63 %. The GCC is

the largest trading partner of India. Besides oil, the region is the principal contributor of remittances and is employer of 5–6 million Indians. With Look East shift in GCC global vision, India has acquired distinct strategic credibility and confidence in the region. This is best illustrated by the fact that India was one of the five places where Saudi Arabia and Israel met sharing their concern on Iranian nuclear ambition. Interestingly reports also suggest that it was leading Shia personality from Lucknow who played the backchannel role (Times of India 2015).

The high energy stakes have elevated the strategic significance of the region known as extended neighbourhood in Indian foreign relation discourse. Apparently stability of the region is in Indian interest. The growing tension between Saudi Arabia and Iran poses serious challenge to protect and promote Indian interest in the region. Both countries have been the principal supplier of energy. India has good relations with both the countries. Polarisation of regional strategic space is not in the Indian interest. Though the American sanctions did impact of Iranian oil export to India and the latter did respond to US sanction demands against Iran, yet the two countries always maintained that their mutual strategic interest demand continuity of cordial relations. In 2003, President of Iran was the chief guest of the Republic day parade, in 2006 it was the King of Saudi Arabia.

Energy acquired significant factor in Indo-Iranian relations following the Iraqi invasion of Kuwait. Iran became India's second largest oil supplier in 2009 with a 12% share in India's oil imports. The idea of India-Pakistan Iran gas pipeline gave new fillip to energy relations. It was expected to be the game changer as peace pipeline. It is important to note that when Indo-Pak factor seemed to be affecting, India and Iran even explored the possibility of off shore deep water pipe line. To further strengthened the energy ties the two countries agreed to develop Chabahar port as bilateral cooperation project. With the prospects of Iran returning to the region, the regional power balance will be changing having bearing on energy supply and energy relationship. Iran would be asking for its quota possibly compensation that would put country like Saudi Arabia into discomfort because it has been the beneficiary of sanctions on Iran. Moreover being Saudi the major beneficiary, it will have to adjust supplies to accommodate the Iranian interest in OPEC.

Moreover with the commercial arrival of shale gas, the geopolitics of the energy is changing, making the leading stake holders to reposition their policy and approach. It is argued that: "In oil production, in 5 years [the United States has] added the equivalent of a new Kuwait to global oil production, 2.5 mbd [million barrels per day]. Shale gas production has increased more than ten-fold in the last 5 years from 2.5 bcf [billion cubic feet] a day to nearly 30 bcf a day, with U.S. annual output equivalent to more than two times Japan's annual natural gas consumption" (Ryan and Gillispie 2014, p. 2). This has dramatically changed the nature of energy market. Not only the OPEC lost its leverage in price determination, the direction of energy trade also started shifting to East. The decision of OPEC to pursue a policy to protect its market share is said to be the Saudi Arabian move to take away leverage of shale gas from the market. Though in short run Saudi Arabia has been able to push OPEC to its oil policy but it cannot deny the role of shale gas in long term. While oil importing countries like India have been benefited by the oil price decline

but the prospects of more volatility and uncertainity due to Saudi-Iran rivalry, return of Iraqi Libyan oil demands that the nature of engagement moves beyond mercantile frame.

The Gulf countries are aware of the emerging energy dynamics hence are rationalising their domestic policy. They are investing heavily on the renewable energy sources. According to a study, all the GCC countries have huge potential for solar energy and their insolation level are suitable for both photovoltaic and solar thermal technologies (Bachellerie 2012, p. 23). With suitable policy support solar could be significant source of power. The governments are making huge investment and plan to substitute solar with hydrocarbons. Saudi Arabia has allocated $109 billion on solar energy to get one third of its power from it by 2032 (Bollier 2014). The demand for renewable energy coming from this region is, largely, to retain the leverage in the hydrocarbon market, especially the oil market. This opens new possibilities of energy engagement. The region could become an important player in renewable market. Recognising that the race for renewable is going to be controlled by those who control the technology, the region is working for creating regional renewable energy hub. Chinese and Saudis have created a joint venture on renewable energy research centre. Similarly, Armco and Japanese have created a joint venture to cut down the CO_2 emissions in the energy sector. MASDAR in Abu Dhabi symbolises the lead that the region intends to take in the field of energy technology. India with its lead in this sector can be partner in promoting knowhow and capacity in the field of renewable both in India and in the Gulf countries. Apparently widening of energy relations would impinge upon foreign policy making towards the region.

Indian search to diversify its energy relations are reflected in its policy towards the Central Asia and Russia. India's Connect Central Asia policy is premised on comprehensive engagement with the region with energy as its pivot. After the disintegration of the Soviet Union, Central Asian states have been keen to build their energy ties beyond Russia. Given the hydrocarbon reserves in the region for a few years the region did witness a race among energy consumers to cultivate energy relations with them. America and China predominantly tried to have control over theses resources. American and Chinese investment did come in a big way. Today China has developed good infrastructural linkages to situate the region as one of its leading energy life line. India too has been trying to cultivate the region to build robust energy ties but its limited financial capacity and the land locked nature of the region has made the access a difficult proposition. Despite the high profile visits and sentiments of civilizational ties Indian entry foot print are not very visible. OVL made its entry in Kazakhstan by signing agreements with KazMunaiGas (KMG), the National Oil Company of Kazakhstan for acquisition of 25% participating interest in Satpayev exploration block on 16th April, 2011. It is a flagship project of India's energy diplomacy. However logistics has been restraining India to have dynamic energy ties. This is being attempted by pipeline infrastructure. The construction of an Turkmenistan Afghanistan Pakistan India TAPI) connecting the Caspian gas fields in Turkmenistan to India has been yet another initiative to build energy ties but faces the challenges of insecurities in the terrain. Indian energy relations

with central Asia thus remain a challenge to its foreign policy specially when Chinese have built their architecture successfully.

Ironically despite high sentiments and comprehensive bilateral relations and placing high premium to energy in its foreign policy, energy has not figured as significant component of their relationship. Sakhalin-1 in 2000 was the major breakthrough but since then it has been a story with no major advances. In 2009 OVL acquired the UK-listed Imperial Energy Corporation Plc for $2.1 billion but the failure of the compay to raise its production impacted Indian initiatve adversely. Reportedly a parliamentary panel has questioned Oil & Natural Gas Corp's $2.1 billion acquisition of Imperial Energy. India has also been exploring interest in Russia's western-Arctic region, nothing concrete has materialised. Appaprently the leadership from both the countries are keen to expnd energy relations. This was eloquently observed by India's External Affairs Minister, Salman Khurshid, when he expressed hope for the North-South Corridor and the TAPI (Turkmenistan Afghanistan Pakistan India) pipeline. During 14th India-Russia summit in October 2013 the two countries agreed to construct a $30 billion oil pipeline through China's restive Xinjiang province. If successful, the pipeline will be the most expensive in the world. Reportedly China has extended its support to the project. Similarly, attempts are being made to organise long-term supplies of LNG to India from the Grazprom portfolio. It is proposed that the Gazprom, Russia will supply 2.5 million tonnes of liquefied natural gas to India for a 20-year period.

1.2 Changing Energy Mix in Indian Foreign Energy Policy

India recognises that the present energy mix does not enable it to meet the demands of energy poverty hence has been attempting to diversify its energy mix. However to do so it required a proactive engagement with countries who can contribute in developing capacities and finance besides making it part of select group as it happened in case of nuclear energy. Nuclear energy has been part of India's nation building project. Much before the energy crisis, India has been pursuing research and development to develop capacities with the help of leading nuclear power countries. However its progress received a setback when India went for nuclear explosion. Under the sanctions it was denied of international collaboration. But India transformed it into opportunity by developing indigenous infrastructure and technology. Yet it cannot be denied that sanction did restrict high end research and technological engagement with global community. Indian foreign policy had to invest heavily to get place in global nuclear club. It is estimated that fourth largest source of electricity comes from nuclear but its share in energy mix remains only 3.7%. India proposes to enhance it to 25% by 2050.

Interestingly Energy security used as central argument in clinching Indo-US Nuclear deal. Apparently it has had visible impact on bilateral relations even on the orientation of Indian foreign policy and positioning in world affairs. It can be

argued that energy has emerged as defining factor in India-America relations. Further the deal rescued India from technology denial regime and elevated bilateral relations to Indo-US strategic partnership. The deal also opened the nuclear facility market in India. Following the waiver granted by the Nuclear Suppliers Group on September 2008, India got the permission to carry pure nuclear commerce with the world. Consequently agreements were signed with USA, Russia, France, UK, South Korea, Canada, Argentina, Kazakhstan, Mongolia, and Namibia. Clearly nuclear energy added a new profile to India's foreign energy relations. The point is made to demonstrate that imperatives of change in energy mix have potential to expand the energy relations with adding new energy partners. Further it can also enhance the status of bilateral relations.

India Canada nuclear energy relations could be traced back to 1955 when India and Canada had signed their first nuclear cooperation agreement. However when India went for nuclear weapon power programme, the relation went low to the extent that talks were suspended, all military export to India were banned, Canada opposed permanent seat for India in United Nation Security Council. However 9/11 transformed the context, threat perceptions and global security scenario started changing. Consequently Canada's position started changing. In 2010, India and Canada signed an agreement for cooperation in peaceful uses of nuclear energy, thereby ending the prolonged "diplomatic ice age". On the basis of the agreement, a bilateral safeguards agreement was signed in April 2013 between the Department of Atomic Energy (DAE) and the Canadian Nuclear Safety Commission, allowing trade in nuclear materials and technology for facilities which are under IAEA safeguards.

Nuclear energy has engaged India's relations with Japan too. With a view to arrive at a new understanding the two countries started formal negotiation for an agreement in 2010 on the pattern of India US deal of 2008, allowing India to import nuclear fuel and technology without giving up military nuclear programme. Japan though agreed to sign it but has been insisting on inclusion of termination clause. Both countries have established a working group to expedite the signing of the deal. Nuclear energy has its foot print on India Australia relations as well. Richly endowed with uranium, Australia is natural partner in this domain. The two countries had announced their intention to engage in talks on cooperation in civil nuclear energy during Prime Minister Julia Gillard's visit to India in October 2012. This was the follow up to lift a long-standing ban on the sale of uranium to India (Economic Times 2014).

In the changing context, renewable energy is becoming important component of India's energy security and bilateral relations. In the emerging agenda of India's relations with Europe specially the Nordic countries and USA, renewable energy has become a significant factor. In the fifth EU-India summit held on November 2004, a political decision was taken to start energy dialogue with focus on clean technology and efficiency as priority area (Ebtc 2010, p. 11). A working group was established leading to a separate joint declaration on energy cooperation at the 12 India-EU Summit in 2012. As the text of the declaration says, "Acknowledging that the EU and India share common objectives as regards enhancing energy security,

promoting energy efficiency and energy safety, and the pursuit of sustainable development through, inter alia, the development of clean and renewable energy sources" (Europa.eu 2012).

A more dynamic role of energy can be seen in India's South Asia policy. It can be argued that energy could play role in conflict resolution in the region because most of these countries are energy deficit despite huge potential of hydro energy. Regional engagement on energy cooperation has been part of intra regional agenda but has not moved to a level that it could realise its potential. At bilateral level hydro power has been defining relations with countries like Bhutan and Nepal. Indian contribution to hydel projects in Bhutan has been rated as case study for promoting bilateral relations. Similarly power trade has been playing critical and sensitive role in India-Nepal relations. This was presented in a dramatic manner by the Indian Prime minister, "Nepal can free India of its darkness with its electricity,----- Just by selling electricity to India, Nepal can find a place in the developed countries of the world" (Firstpost 2014). The two countries are working proactively to promote power trade to strengthen their relations by signing an agreement. Energy trade and cooperation has been an issue of consideration in India's relations with Bangladesh and Pakistan as well. The proposed 'power corridor' envisaging linking the north eastern and north western part of India by electrical transmission line passing through Bangladesh is said to be the game changer in promoting bilateral relations (Hossain 2014). "This is the third concrete step between the two nations to strengthen energy cooperation since the Awami League-led Grand Alliance government came to power in January in 2009 in its last term. The first inter-country power grid in South Asia was commissioned in October 2013 between Baharampur (India) and Bheramara (Bangladesh) to facilitate the transmission of 500 MW electricity from India to power-deficit Bangladesh. The second initiative came in 2013 when under a joint venture, Bangladesh and India set up a 1320 MW coal-fired power plant at Rampal Upazila in Bagerhat district" (Hossain 2014). Power trade could be vital factor in India-Pak relations as Pakistan facing acute power crisis. Exploratory talks have been going on to examine its feasibility. Reportedly Pakistan has expressed the desire to import up to 2000 MW from India though the Indian sources mention that the initial transmission could be of 500 MW (Economic Times 2013).

1.3 Integrated Energy Security Policy: Critical Gaps and Transition Path

From the synoptic account of India's emerging energy relations out lined above, it is clear that incrementally energy security has become important part of the Indian foreign policy concerns. However a closer scrutiny will reveal that it remains more a piecemeal component of India's energy needs than the reflection of an integrated understanding of energy security. Though the Planning Commission of India did come out a document on Integrated Energy Policy providing prognosis of Indian energy future, pointing out critical gaps and the challenges in holistic frame but it

has not indicated a frame work of transition path to ensure sustainable energy security. Prior to 1991, there was very little awareness of the issue. It was only after economic reforms were put in place and economy started growing that the country was compelled to look into issues of energy balance sheet, showing deficit that search for energy became an anxiety called energy security. In 2000, the first document titled "Hydrocarbon Vision 2025", looked at energy security issues. However as the title suggests its scope was limited to hydrocarbons. In 2006, the Planning Commission came with more comprehensive account with Integrated Energy Expert Committee report. In 1994, ONGC (2014) Videsh (OVL) was set up as a subsidiary of ONGC to acquire energy assets in overseas market. By the time India started going overseas in search for energy, the market had become highly competitive and distorted simultaneously. Dominated by oil corporate, it was more than transparent commercial transaction Energy is not like any other commodity traded by the rules of the market. Called as strategic commodity its transaction involves many considerations before clinching a deal. A few episodic accounts indicate the challenge that the Indian diplomats faced in approaching to overseas contracts. "Why do we need the Indians? We have Chevron and other US and Western companies as partners." Kind of sentiments that India has to encounter in approaching Central Asian Republics. The story of diplomatic efforts to introduce Indian energy interests to the government of Kazakshtan underlines the need of a diplomacy which is aggressive, persistent and nuanced. It may also be added that the personalized nature of energy transactions in oil exporting countries and democratic practices of the Indian government also impacted upon some times in pursuing India's energy interest in overseas markets. The a restricted autonomy and space at times have delayed decision making adversely impacting in defining terms and conditions of negotiation.

This is pointed out to be the case with the organizational structure of OVL. Besides the institutional handicap, occasionally the man on the spot do play critical role in making judgment which could provide the leverage in negotiating a deal. One such episode is illustrated by Indian diplomat in Kazakhstan, where efforts to promote Indian energy interest in Russia was tempered by playing safe response by another Indian diplomat. Experience suggest that a dynamic and informed bureaucracy, and a more knowledgeable political class play vital role in making breakthroughs which India needs in the field of energy.

Indian account of promoting energy security over the years brings out two fundamental issues one of vision and policy and the other of institutions. Energy today is not hydrocarbon alone and energy security is not confined international supply. In the era of energy transition, energy moves substantially beyond hydrocarbon and energy security is defined in terms of sustainability. Further despite the high incidence of energy poverty India as responsible member of global community cannot rationalise its carbon emission on the strength of its per capita carbon foot print. With energy security defined in conjunction with environment security, the Indian vision and narrative of energy security has to be redefined. The Indian state has to factor the twin concerns by engaging market and community in its policy making and executing. Further the terms of transition could be made to Indian advantage only if energy regime is extended beyond mercantile transaction. Indian energy

regime has to be highly supportive to knowledge intensity of energy deals. This expands the scale and dimension of energy relations. The NDA government view to establish an Energy Commission would facilitates the mutually contesting approach of different component of energy mix but it will fail to reach the target of sustainable energy if the decentralising component of it is not adequately recognised (Economic Times 2015b). As India moves on its growth path, the imperatives of meeting energy needs will be expanding the global engagement, thereby the profile of emerging energy relations.

The present volume draws its material from selected papers presented in a Seminar organised by the Energy Studies Programme of the School of International Studies Jawaharlal Nehru University. It underlines the recognition of the growing significance of energy in India's foreign policy making and its manifesting in India's Emerging energy relations. From global powers to regional players, energy has emerged as critical component of bilateral relations and multilateral concerns. If invention of Shale gas is reshaping the US-Saudi Arabia bilateral relations, the call by the UN Secretary General for sustainable energy security is redefining the global energy regime by pressing for transition from hydrocarbon domination to more diversified energy mix. Thus in the global energy game along with hydrocarbon producers, innovators in renewable are becoming visible. India a leading consumer of energy and its importer is bound to be impacted by these developments having implications for its emerging energy relations. The volume is an attempt to capture the trend and tendencies and analyse its foreign policy import.

Subscribing the proposition that the domestic reflects in foreign relations, Dr Powell in the first chapter makes an attempt to look into the facts and fallacies in domestic energy security discourse by asserting that "that India's dominant discourse on 'energy insecurity' framed by the narrow context of India's natural energy resource endowments and addressed through grand external strategies that primarily seek to make up for poor domestic resource endowment through acquisition of resources around the world are inadequate to meet the goals of energy security. It will argue that mundane domestic constraints in the production and supply of coal, oil and gas in the recent past have undermined India's energy security far more than any inadequacy in resource endowment." This certainly does not undermine the import dependence of India's energy security and the drive to cultivate energy relations with major energy exporters. What is emphasised is the nature of discourse which inadequately factors the domestic failures. She concludes, "Domestic policy initiatives required to secure energy are well known but they are not implemented as coherent pathways towards a long term energy security goal. Most domestic policy initiatives are conceived and implemented in such a way that they end up as incremental decisions made to serve short term purposes, often unrelated to energy. This must change so that every domestic policy decision in the energy sector is aligned with clearly articulated goal for energy security."

The significance of energy in India's relations with USA is the subject and scrutiny of the next chapter authored by Prof. Chintamani Mahapatra. Putting the subject in historical perspective, the author provides the trajectory of energy dialogue between the two countries. Recognising the shadow of nuclear deal on growing energy relations, the chapters provides a comprehensive account of the controversies of

civil nuclear engagement between the two countries. It is significant to note that the energy relations between the two are not confined to trade but also in capacity building by technology transfer. Further it draws the attention to growing profile of partnership in the field of clean energy. During President Obama's visit to India in January 2015, emphasis was made on promoting the role of energy in India-US relations with special reference to renewable. A two billion dollar investment by US in renewable was announced which will be a catalytic factor in pushing India's drive to meet its energy security by mainstreaming renewable on its agenda. Thus the chapter rightly concludes, "India's objective to diversify its energy imports, develop clean technologies and make a useful energy mix in its developmental priorities cannot be fulfilled by keeping the United States out. But closer cooperation with the US should not lead to over-dependence of India on one country and the policy makers need to watch out to prevent that probable eventuality."

The next chapter is on potentials and the possibilities of India's energy relations with EU. Expanding on the growing energy appetite of the country to meet high growth rate, the chapters makes a strong case for diversifying the energy mix and energy relations. Europe specially Germany and Nordics are successful case of energy transition by twinning energy efficiency and green energy. It effectively argues a case of technological collaborative based energy engagement with EU as the two are strategic partners. India-Russia energy relation is the subject studied in the following chapter. Titled as Emerging Energy Power Russia and Energy Security Of India! Prof Gidadhubli underlines the growing significance of hydrocarbon in Russian foreign policy and its meaning for bilateral relations between India and Russia. He argues that a new synergy of interest has emerged due to the strategy of the two countries to diversify their energy trade, India as consumer and Russia as producer. This interdependence is going to further consolidate the strategic ties between the two countries. It may be pointed out that during the visit of President Putin to India in December 2014, energy was high on the agenda. It was crafted as a component of Russian strategy as energy supplier to Asia in the context of declining demand of energy in Europe and deteriorating Russian relations with the West due to the Ukrainian crisis leading to sanctions. The joint statement at the end of the visit clearly spells out the intent by, "Acknowledging natural complementarities in the area of energy and India's quest for energy security, the sides will expand manifold bilateral cooperation in the field of energy, including oil and gas, electric power production, nuclear energy, renewable energy sources, and energy efficiency."

The leading supplier of hydrocarbon namely the Persian Gulf countries are the subject of analysis in next chapter by Sima Baidya. India has old civilisational ties with the region but it was in the nineties that when India embarked on high growth regime that energy became the defining factor. Energy deficit India had no choice but to import oil and gas. The GCC, Iraq and Iran emerged as the major hydrocarbon supplier to India. While US policy in Iraq and Iran adversely affected energy supplies from these two countries they did continue to be the major energy partners. Among the GCC countries Saudi Arabia is the principal exporter. Profiling India's hydrocarbon sector the chapter underlines the emergence of India as major petro product supplier and designate it as game changer. Recognising the Indian efforts

to diversify its sources of import, the chapter underlines the continuance of dependence on very few suppliers thus not reflecting major change in the vulnerability of the country. The next chapter by Dr. Nalin Mohapatra, focuses **'**Geopolitics of Energy Security in Central Asia: Implications for India.' Following the disintegration of Soviet Union, Central Asian countries became the energy players but their landlocked status have been restricting their freedom of action. Both in terms of geography and technology, the Central Asian countries are heavily dependent on others for their energy supplies. Contextualising their significance in the geopolitics of the region, the chapter draws heavily from theory and literature. On prospect of India's energy relations, the chapter underlines the limitation mentioned above as constraining factor. Sharing some of the scholars view the author argues that, "In evaluating, India's energy diplomacy in Central Asia, it must be acknowledged that though Chinese are gaining an upper hand in the energy sector vis-à-vis India, however, the latter enjoys more acceptability at the local level. In this regard the traditional bonhomie can be nurtured further to make the relationship more substantiate which will be beneficial to both the sides." African continent is of late emerging a vital source of hydrocarbon. In the following chapter Dr Bhupendra Singh looks at India's energy engagement as its strategy to diversify sources of supply. Though India has been latecomer in this market yet its energy diplomacy has been fairly effective in obtaining energy assets. The chapter also provides suggestions for a more roboust and dynamic presence of energy sector in the continent. Next chapter Sourcing Energy from Latin America: Indian Quest for Energy Security provides detailed account of energy endowment in Latin America and its growing place in global energy market. It examines the impact of shale gas on regional market and outlines the global energy engagement of the region. The chapter draws the attention to growing Chinese presence in the region and makes a strong case for invigorating India's energy relations with the region by proactive energy diplomacy.

The last chapter by Prof. Pant, is an attempt to locate the subject in a larger frame of global energy transition. From securitisation to sustainability, the energy discourse is moving to the agenda of global common, much beyond the bilateral frame between the nations. It does not look at bilaterals in juxtaposition to multilaterals but as complementary possibly as point of convergence. This necessitates to bring the contour of global energy regime into the debate. In a context where global energy mix has to be transformed to meet the energy needs/poverty and environmental consequences, the contesting nature of different energy component could militate the process and pace of transition. Thus a case of global regime and governance becomes imperative specially when energy consumption is highly skewed along with income distribution. The chapters argue that leading energy consumer and supplier has a distinct role in making of the new energy regime. India as leading energy consumer cannot be oblivious o this responsibility. The papers, as the synoptic description suggests, provide a very comprehensive account of India's energy relations. Since these chapters are from seminar, some overlap with reference to India's energy profile could not be avoided. Hence the readers might find a few pages with identical tables but when read as the backdrop of the main theme these overlap certainly enrich the significance of the main content and focus of the chapter.

Last but not the least I wish to thank all the contributors to make the volume possible despite their heavy engagement. I wish to thank Dr Nalin Mohapatra in particular for his support in sending gentle reminders to authors and organising the script. Well a volume of this kind could become possible only with the zeal and support of our publisher. I thank Ms Sagarika Ghosh for taking keen interest in the project and her colleagues for meticulously going through the manuscript.

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Chapter 2
Domestic Constraints to India's Energy Security

Lydia Powell

India's energy security 'problem' has traditionally been framed as one of absolute scarcity. The gap between the large and growing need for energy on the one hand and dwindling domestic energy resources on the other is often used to illustrate ever increasing scarcity. This narrative of scarcity assigns blame for India's energy insecurity primarily on nature. The basic premise of this narrative is that geology and geography that denied India key energy resources such as oil and gas make India energy insecure. Many of India's energy policy documents reflect this line of thought. The Integrated Energy Policy report observes that 'India's reserves of oil, gas and uranium are meagre' and that 'even though coal resources are relatively abundant it is regionally concentrated, it is of low calorific value and high ash content and the amount of coal that could be extracted with available technology is limited' (Planning Commission 2006). It further adds that 'even though hydro power potential is significant, it is small compared to India's energy needs and that its contribution to India's basket is likely to remain small' (ibid.). The section on energy in India's 12th five year plan (2012–2017) begins with the statement that 'India is the fourth largest consumer of energy after the USA, China and Russia but it is not well endowed with abundant energy resources' (Planning Commission 2012).

These statements are not factually incorrect but the implied message that poor resource endowment is among the most important reasons for India's energy insecurity is less accurate today than it may have been three decades ago. More importantly, the framing of India's energy insecurity as a problem of absolute scarcity and measuring it solely in terms of its share of imported energy has not facilitated progress. India is as insecure as it was five decades ago even if measured narrowly in terms of share of imported energy in India's energy basket. In fact India's vulnerability to even small shifts in the global energy market, especially in terms of the price of globally traded energy sources has increased. In this light, this paper will argue that India's dominant discourse on 'energy insecurity' framed by the narrow context of

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India's natural energy resource endowments and addressed through grand external strategies that primarily seek to make up for poor domestic resource endowment through acquisition of resources around the world are inadequate to meet the goals of energy security. It will argue that mundane domestic constraints in the production and supply of coal, oil and gas in the recent past have undermined India's energy security far more than any inadequacy in resource endowment.

2.1 Brief Energy Profile

India matches China in population size but its energy consumption is only about a fourth of that of China and it is likely to be just about half that of China even by 2035 (International Energy Agency 2013). Given the relatively low base, growth in energy demand in India in the next two decades is likely to be faster than the growth in energy demand in China, the world's largest energy consumer (ibid.).

Like China, India's energy profile is dominated by coal and this trend is likely to continue for the next two decades (Fig. 2.1). Coal accounted for about 50 % of commercial energy generation in 2001 and its share is likely to increase to 57 % by 2022 (Planning Commission 2012). The share of oil in commercial energy is expected to decline from 37.5 % in 2001 to 23.3 % in 2022 and the share of natural gas in commercial energy supply is expected to increase from 8.5 % in 2001 to 13 % by 2022 (ibid.).

Overall the share of fossil fuels in India's commercial energy supply is expected to fall marginally from 93 % in 2001 to 90 % in 2022 on account of an anticipated increase in nuclear power (ibid.). While renewable energy is expected to grow ten-fold in the next decade, its share in total commercial energy supply is expected to be less than 2 % and its share in total primary energy supply (commercial plus non-commercial energy supply) is expected to be less than 1 % (ibid.). India's imports consist mainly of oil but the import of coal and natural gas are growing rapidly (Fig. 2.2).

India's per person energy consumption of 614 kg oil equivalent (Kgoe) in 2011 is 109th among 137 countries listed in the World Bank's database (World Bank 2011).

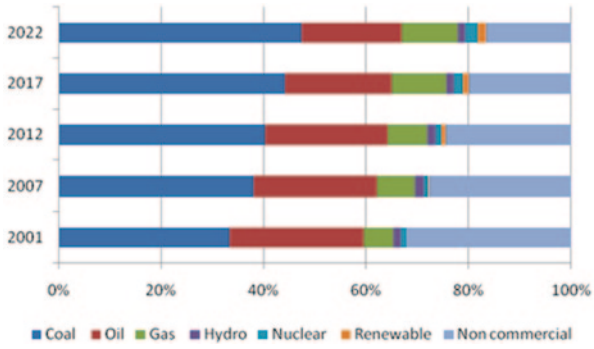

Fig. 2.1 Primary energy shares 2001–2022. (Planning Commission 2012)

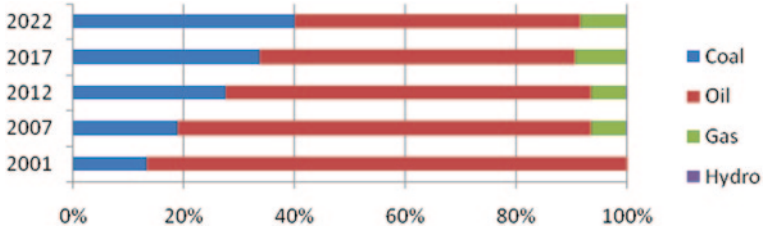

Fig. 2.2 Share of imports in India's commercial energy basket. (Planning Commission 2012)

Though 67% of rural households in India are officially connected to the electricity grid, average consumption of electricity is only 96 kilowatt hour (kWh) per person per year in a rural household (Planning Commission 2012). This is less than a tenth of the 1000 kWh per person per year said to be required for decent living standards (United Nations 2010). Two observations can be made at this point. India's energy profile at the national level is large enough to put it among the top five energy consumers, but its profile at the individual level is small enough to put it among the poorest few nations. This is an important distinction that influences policies on energy. The large share of people who do not have access to modern forms of energy such as electricity and liquid petroleum gas (LPG) make State led redistributive policies inevitable in the energy sector. But the large volume of India's energy needs make market led institutions a necessity especially in the light of the fact that most of it has to be procured from the global market. This puts the market in continuous conflict with the State. This conflict between the pursuit of equity by the State and efficiency by the market is not unique to India but the scale and intensity of the conflict in India sets it apart from similar conflicts around the world. Those that require State intervention in accessing energy resources and energy related services such as electricity and transportation outnumber those who can access these services through the market by a huge margin. This gives rise to two conflicting demands: one for the exit of the State by those who benefit from instruments of the market and the other for continued intervention by the State by those whose ability to procure services through the market are limited. Institutions of democracy have thus far resolved the issue in favour of the State but ironically this has only increased the pressure of the market.

2.2 Constraints in Primary Fuel Supply

2.2.1 Coal

Coal is the primary energy source as well as the primary fuel for power generation in India. Coal accounted for about 59% of installed capacity for power generation but it accounted for about 77% power actually generated in 2011–2012 (Fig. 2.3) (Central Electricity Authority 2013b). About 74% of coal produced in India is consumed by the power sector (Planning Commission 2011).

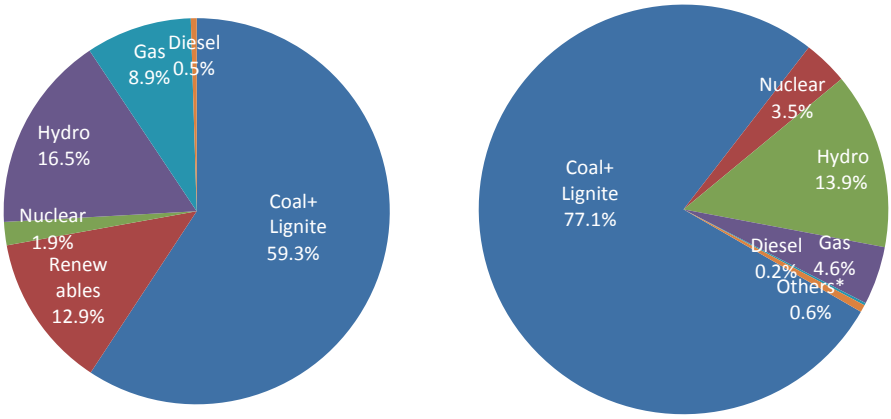

Fig. 2.3 Fuel-mix in power generation 2013–2014. All India installed capacity (245393.5 MW) 31.3.2014. Gross electricity generation (967.15 BU): 2013–2014. (Central Electricity Authority 2014)

Coal reserves in India may not be as abundant as they were originally believed to be, but India is still among the top five countries in which most of the coal reserves are concentrated (International Energy Agency 2012). Estimates of coal reserves vary widely depending on the source and on how resources and reserves are defined.

As per estimates quoted in the 12th Plan document cumulative (including coal mined so far) reserves of coal in India are 119 billion tonnes (BT) which doubles to almost 290 BT if prospective reserves are added (Planning Commission 2012). However estimates by international agencies such as the one by the German Federal Institute for Geosciences and Natural Resources (BGR) used by the International Energy Agency (IEA) put reserves at a more conservative 60 BT (International Energy Agency 2013). Even if we go by more optimistic estimates of the Indian Government, we can see that reserves to production ratio for coal has fallen from over 200 years to about 100 years (Fig. 2.4) when reserves already produced are accounted for and remaining reserves are qualified on the basis of technical and eco-

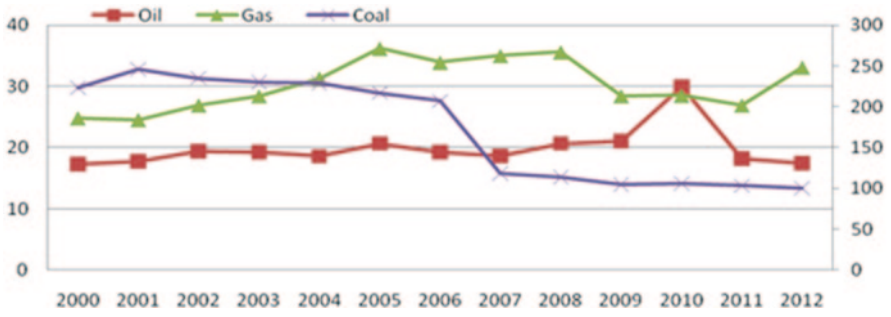

Fig. 2.4 India reserves to production ratio 2001–2022. (Right vertical axis for coal, left axis for oil and gas). (British Petroleum 2014b)

nomic recoverability under the United Nations Framework Classification (UNFC) of energy and mineral resources. By some estimates India's coal reserve estimates are less than 30 BT which gives a reserves-to-production ratio of 19 years (Chand and Batra 2011). This is alarmingly low compared to the 100 years that is quoted in the 12th Five Year Plan report. Where the truth lies as far as India's domestic coal reserve estimates are concerned appear to be less important in the short term when compared to constraints that hold up domestic production of coal as the following section will illustrate.

India is currently the world's third largest coal consumer and the world's second largest coal importer (International Energy Agency 2013) as well as the third largest coal producer in the world (Coal India Limited 2014). Coal India Limited (CIL) is the largest coal producing company in the world by volume of production (ibid.).

However in the last 10 years, coal production has not kept up with coal demand from the power sector on account of a wide range of domestic constraints that are unrelated to India's coal resource endowments. The result is perennial shortages of coal which manifests itself as electricity shortages. Electricity shortages and black-outs are the most visible illustration of India's energy insecurity today. The short-term solution to this energy insecurity problem has been to import coal. Perversely, import of any primary energy resource (including coal) which has been traditionally portrayed as the cause of India's energy insecurity has now become one of the key solutions to energy insecurity. Without coal imports, power generation would suffer leading to longer power outages thus making India less energy secure. This highlights two key points that the paper aims to make. First, there is a need to revisit the narrative that frames the share of imported energy as a source of energy insecurity. Second, importing energy is not necessarily the result of scarcity of domestic energy but rather the result of systematic problems in the domestic production of energy (Fig. 2.5).

Import of coal (thermal and coking coal) has steadily increased from 20.9 million tonnes (MT) in 2000–2001 to over 130 MT in 2012–2013 (Central Statistical Office 2013). In 2012–2013, thermal coal imports touched 97 MT including about

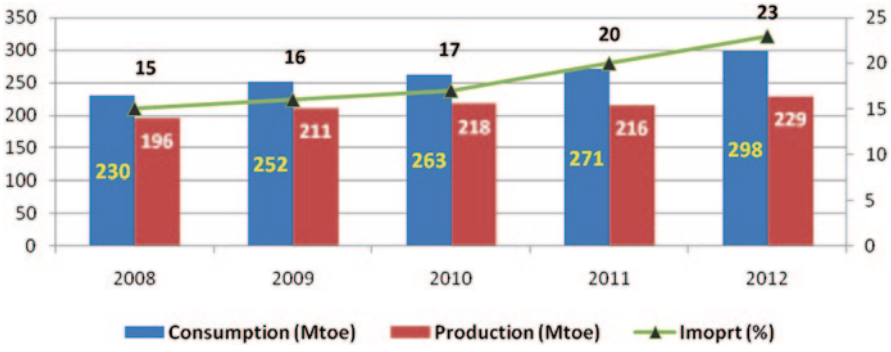

Fig. 2.5 India coal supply, demand and imports in Mtoe (including coking coal). (British Petroleum 2014b)

24 MT of coal imported for generating plants which were specifically designed for imported coal which is an increase of 40 % over the previous period (Central Electricity Authority 2013). Coal imports accounted for 3 % of total imports in terms of value in 2012-13 and this figure is expected to increase substantially in the future (Reserve Bank of India 2013).

Forecasts for coal imports in 2013–2014 anticipate a significant increase. Power producers are expected to import 82 MT of coal in 2013–2014 as per a statement by the Government (Press Trust of India 2013). By 2016–2017, the gap between supply and demand for thermal coal is projected to increase to 230 MT (Ministry of Coal 2011). Domestic constraints that keep India from reaching theoretical possibilities for coal production include but not limited to (1) monopoly status of Coal India Limited (CIL) and the presumed inefficiency in production (2) inadequacies in policies implemented to bring in the private sector (3) access to coal bearing areas on account of environmental and social constraints and corresponding regulatory hurdles (4) inadequacy of transport links that connect coal mines to coal demand centres (5) lack of reform in the distribution end of the power sector which limits ability to absorb changes in the price of primary fuels such as coal used for power generation (6) lack of transparency and independent regulation in the sector (Khanna 2013; Russell 2013).

Obviously the endowment of abundant coal resources within the country have not automatically led to security of coal supply as domestic governance of the sector that create institutions and processes to convert resources beneath the ground into fuel above the ground are both inadequate and inappropriate. If the key parameters of governing the coal sector do not change, import of coal will remain the 'solution' to India's energy security problem. In this context there is a need to seek answers to three questions. The first is about the physical availability of imported coal; the second is the logistical capacity to import coal and third is the country's ability to absorb this additional economic burden.

The physical availability and access to global coal resources is unlikely to become an energy security threat as some observers have predicted (Gupta et al. 2011). Coal is the most abundantly available fossil fuels worldwide accounting for 55 % of fossil fuels reserves (International Energy Agency 2013). Coal resources are more than 20 times larger than reserves and this makes up 90 % of global remaining fossil fuel resources (ibid.). Coal is far more accessible than oil and gas because coal resources are widely distributed around the world. Thirty-two countries have reserves of more than 1 BT and 26 countries have resources of over 10 BT (ibid.). In all major producing countries including India, proven reserves exceed projected cumulative production even by 2035 and in theory cumulative production in several of these countries can be met by drawing solely on the reserves of existing mines (ibid.).

However the import of coal could be constrained, once again, on account of domestic infrastructural and technological inadequacies. The import of 40 MT of coal would require 28 railway rakes per day which is a 17 % increase in demand over current levels (Jacob and Singh 2014). This is in addition to 160 rakes per day that would be required to transport increase in domestic coal production (ibid.). As

of 2013 (March) an average of 228 rakes were loaded from CIL mines per day (PIB 2013b). If railway rakes to carry domestic coal from mines or ports to consuming centres do not double in the next decade it could pose a challenge to electricity generation. In addition, the supply of fuel for power generation will suffer if railway corridors that transport coal do not increase proportionally. The contracts for the eastern arm of the dedicated freight corridor which was expected to absorb bulk of the domestic coal traffic from coalfields in Chhattisgarh, Jharkhand and Orissa was awarded only in 2013 after years of delay on account of regulatory issues concerning acquisition of land, environmental clearance etc (Inamdar 2013). Then there is the question of port capacity. Though there is optimism that port capacity to handle import of coal would increase in proportion to increase in demand, many expect the 'last-mile' transport of imported coal from the port to the hinterland to remain a constraint (Drewry Maritime Associates 2011).

Even if all logistical constraints that inhibit import of coal are removed, technological specifications could limit the role of imported coal. The replacement of domestic coal with imported coal is not straightforward as one would assume. Blending of imported coal with domestic coal changes the aggregate quality of coal to be fired which requires technical changes to be made in boilers used by power generators. Typical boilers procured from Bharat Heavy Electricals Limited (BHEL) are designed for Indian quality coal (Central Electricity Authority 2012). While it is possible to use a blend of domestic and imported coal in existing boilers the volume of imported coal in the blend has so far been limited to 15–20 % (ibid.). This sets a limit on the extent to which imported coal can make up for shortfalls in domestic coal availability in the short term. Last and possibly the most important issue is India's economic ability to absorb additional pressure on its fragile external account which is addressed in the section on oil.

Most of the domestic challenges highlighted above are not unique to the energy industry. India faces similar challenges in other sectors as it matures into a full-fledged industrial economy. However the questions that must be raised at this point are (1) is the continued emphasis on India's poor energy resource endowment status as the single most important reason for India's energy insecurity justified and (2) has this emphasis facilitated India's move towards greater energy security?

2.2.2 Oil

As for oil which remains at the centre of India's energy security discourse, India's resource endowments are definitely poor. India's oil reserves estimated at 5.8 billion barrels (billion bbls) in 2012 is less than 0.3 % of global reserves (British Petroleum 2014b). Oil production is more or less stagnant and India is expected to meet over 78 % of demand for crude oil through imports by 2017 (Planning Commission 2012).

In the longer term, domestic oil production is expected to decline at a rate of 1.7 % from 900,000 barrels per day (bpd) in 2012 to 600,000 bpd by 2035 (International Energy Agency 2013). On the other hand, demand for oil is expected to

grow at the rate of about 3.6% a year representing the largest absolute increase after China (ibid.). India's domestic oil reserves would last for less than 20 years (Fig. 2.3) at a production rate of roughly 763,000 barrels per day (bpd) (Planning Commission 2012). This would mean that the share of imported crude will increase to 90% by 2035 (International Energy Agency 2013). Initiatives to increase domestic production have failed to have an impact (Fig. 2.6). In the 11th plan period (2007–2011), India had set itself a target of 800,000 bpd but only 711,000 bpd was produced, a slip of 14% (Planning Commission 2012). India's oil imports are expected to increase from 2.5 million barrels per day (mbpd) to over 6.9 mbpd by 2035 (International Energy Agency 2012).

The import of crude oil is seen to be associated with two key external risks for India's energy security. The first is the volume risk which originates from the fact that most of the global conventional oil reserves and most of India's oil imports are concentrated in the Persian Gulf. The political and social volatility in the Persian Gulf region gives rise to the possibility of deliberate oil supply disruptions by state or non-state actors. The second is the price risk which is the probability of a dramatic increase in the price of oil in the international market on account of, among other things (a) instability in oil producing regions (b) reduction of supply on account of policies adopted in producing countries (c) international sanctions against oil procurement from specific countries.

With regard to the first (volume risk), the prospect of the United States withdrawing from the position of net security provider in the Persian Gulf and its security consequences in the region has gained importance in national security platforms. The argument is that the United States is unlikely to remain a guarantor of security on account of falling volumes of oil imports from the Persian Gulf region in the next two decades. Domestic production of oil in the United States is increasing while demand is stagnant (International Energy Agency 2013). As new discoveries in the North American continent come on-stream, the United States is likely to source most of its imported oil closer to home. Overall United States' oil import is expected to fall from 9.5 mbpd in 2011 to about 4.5 mbpd by 2035 (International Energy Agency 2012). If the United States implements policies for increasing fuel efficiency and emission reduction, the extent of imports is likely to fall to 3.4 mbpd

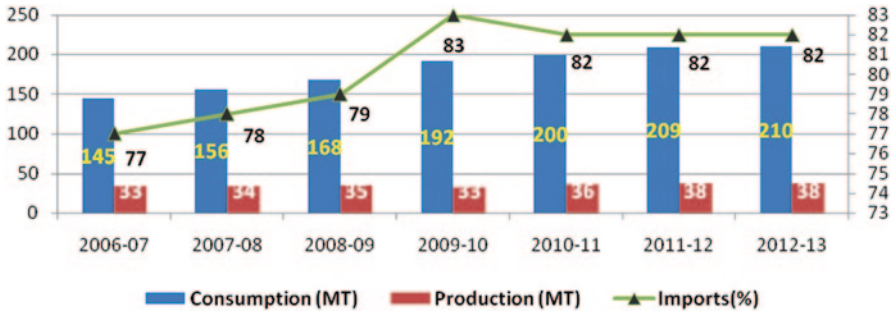

Fig. 2.6 India oil supply, demand and imports in MT. (British Petroleum 2014b)

by 2035 by some estimates (ibid.). Other sources project that total oil imports of the United States is likely to fall to just 1 mbpd by 2035 (British Petroleum 2014a). In the next 10 years, oil imports of the United States from the Persian Gulf are expected to fall to just 0.3 mbpd or less (International Energy Agency 2012).

Currently the overwhelming power of American maritime forces not only underwrite the stability of oil production in the Persian Gulf but also ensure the security of oil supply lanes in the region. The provision of security and stability in oil producing regions subsidises the global oil market as it reduces overall cost of oil production and supply. It also allows all other nations including affluent oil importing nations in Europe to 'free-ride' on the global public good of security that the United States provides. The fear among Indian observers is that continued reliance on oil imports from the increasingly insecure Persian Gulf region would worsen 'energy security' especially if the United States reduces its engagement with the region. This concern is not new. India's maritime security document (Ministry of Defence 2004) called for strengthening of maritime defence capabilities to protect crude supply lines in an effort to replicate or counter China strengthening its maritime capabilities. The integrated energy policy called for diversifying oil supply sources to include greater number of 'secure sources' to provide additional insurance against future supply disruptions in the Persian Gulf region. It is very unlikely that either of these response strategies will increase security of oil supplies (Planning Commission 2006).

First, the United States is unlikely to disengage from the region even if it imports no oil from the region as the 'marginal' barrel of oil is likely to be produced in the Persian Gulf irrespective of an increase in North American oil production. The marginal barrel decides the price of oil in the global market and the price of oil is unlikely to fall off the list of American priorities. Second, in the event of a major global military conflict, it will be almost impossible for India to unilaterally ensure the safety of its oil shipments. Third, when there is a threat of disruption or instability in the Persian Gulf, the price of oil would rise sharply well before the crisis actually unfolds and the globally integrated oil market would make no distinction between oil from the Persian Gulf and oil from relatively secure places such as Norway. A disruption somewhere is a disruption everywhere as far as the oil market is concerned and this will be reflected in the global price of oil. This means that diversification of India's crude supply basket with safe sources is unlikely to deliver energy security (Fig. 2.7). In other words, strategies that are designed to hedge against the efficient and well functioning oil market are likely to fail.

Overemphasis of these high-risk, high-cost and low-impact external strategies for securing oil imports conceals more immediate domestic threats to India's energy security arising from the volume and price of India's oil imports. India is among the few large oil importing countries that also have a large trade deficit. The trade deficit effectively puts a ceiling on how much oil India can import and at what price. If oil prices continue to increase in the medium term, the pressure on India's current account deficit could potentially deteriorate rapidly to the extent that it reaches the limit. This is a high-probability, high-impact event for which India is not fully prepared.

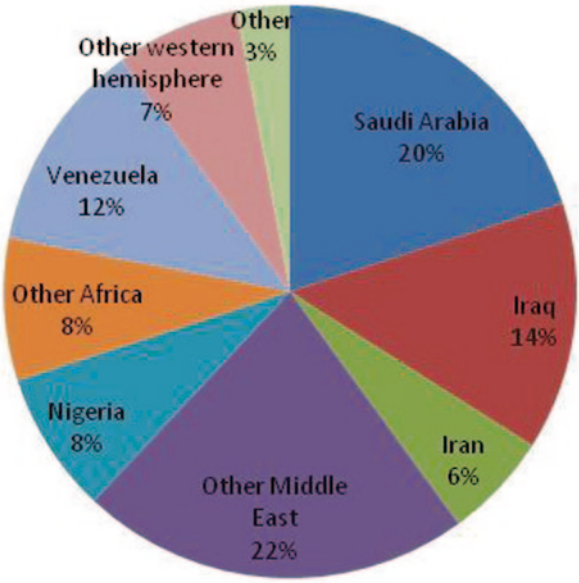

Fig. 2.7 Source of India's crude imports 2013. (Energy Information & Administration 2014)

The share of crude in India's total imports (in terms of value) has fluctuated in the last four decades reflecting changes in the global and local economy (Reserve Bank of India 2013). In 1970, it was less than 10% but increased to more than 40% during the oil crises of the late 1970s (Reserve Bank of India 2013). It has remained above 25% over the last 10 years. India's current account deficit touched a high of 4.2% of GDP in 2011–2012 and is expected to remain above 3.6% of GDP, which exceeds what has traditionally been seen as sustainable during the 12th plan period (2012–2017) (Planning Commission 2012).

An increase in India's oil import bill puts a downward pressure on the rupee. The depreciation of the Indian rupee further adds to the burden of oil imports as it increases the price of oil. In June 2013, the price of crude oil was equivalent to $ 150/barrel for India (also for Brazil, South Africa and Turkey) on account of the rapid depreciation of the rupee. Effectively, India's oil import bill increases by roughly INR 100 billion for every rupee depreciation against the US dollar. This means that an INR 10 depreciation of the rupee against the dollar will translate into an increase of INR 1 trillion in India's oil import bill if the depreciation of the currency is sustained and all other factors remain constant.

In the absence of abundant domestic resource endowments, having the economic resources to access global markets is an equally potent instrument for securing energy. In this context, India is one of the most vulnerable countries among all large oil importing countries/regions. Though India imported less than 28% of its energy needs its import bill was roughly 7% of GDP (at market exchange rates) in 2012 which is very high compared to that of Japan whose energy import bill accounted for only 4.7% of its GDP (market exchange rates) even though it imported almost

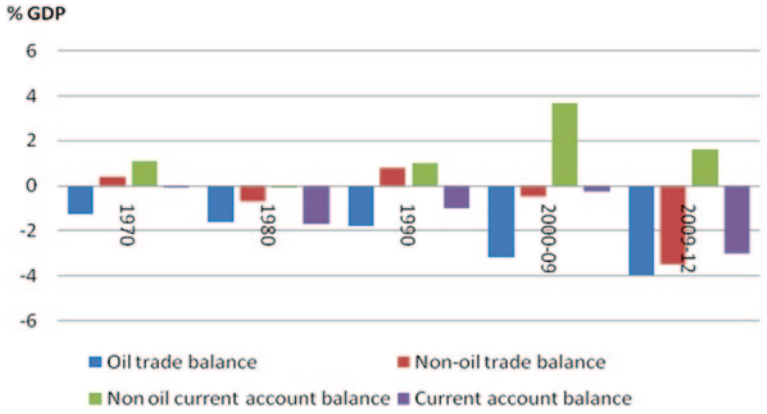

Fig. 2.8 Composition of India's current account balance. (Fattouh et al. 2013)

all its energy needs or the European Union whose import bill was only 3.2% of its GDP which also imports a significant share of its energy needs (International Energy Agency 2013).

In January 2014, India's Petroleum Secretary commented that India would have had to seek a loan from the International Monetary Fund (IMF) to finance its oil import bill but for the unexpected fall in global oil prices (Thakkar 2014). Such a development could have taken India back to 1991 when India suffered a severe balance of payments crisis. In 1991 the value of petroleum imports increased by $ 2 billion to $ 5.7 billion as a result of an increase in oil prices combined with an increase in volume of oil imports (Cerra and Saxena 2002). In terms of value it was a more than a 100% increase. In comparison, non-oil imports increased only by 5% in value terms and 1% in volume terms.[1] The rise in oil imports led to a sharp deterioration of the trade account which was already under pressure on account of the fall of the Soviet Union, one of India's important trading partners. If India is not able to finance its growing trade deficit through stable capital inflows, history could repeat itself, most probably as a tragedy.[2]

Once again, India's trade deficit is part of India's broader economic challenges but oil imports make by far, the largest contribution (Fig. 2.8). In this context it is understandable that poor resource endowment is seen as the source of the problem. However having one's own resources is only the first step. As pointed out in the context of coal, having a resource does not automatically translate into production and production is what counts when it comes to energy security. Between resource endowment and production there are many investment intensive steps and these investments will not materialise without appropriate domestic policies for governing the sector.

[1] Values quoted in the article cited in the reference were calculated from RBI data.

[2] As Karl Marx observed in a different context.

Exploration and assessment of hydrocarbon resources is an investment heavy high-risk venture but Indian E & P companies do not have the resources to indulge in this exercise. The result is that only 44% of India's sedimentary basins have been explored well (Directorate of Hydrocarbons 2013). It is believed that 1 million square kilometres that are to be explored hold significant prospect for hydrocarbon finds (ORF-IEF, 2013). India's exploration and production (E&P) companies were able realise only $ 40 per barrel of oil produced in the first quarter of 2013 while production cost was about $ 42 per barrel after accounting for the myriad tax and subsidy burdens imposed on the company (ibid.). If domestic companies which meet roughly 25% of India's oil needs are forced to offer the country a 50% discount on oil prices (when compared to international crude prices) and in addition suffer a loss of $ 2 on every barrel of oil produced the companies will naturally not have adequate resources to invest in exploration which, as observed earlier, is a high-risk and high-cost venture. If investment surpluses of E&P companies are appropriated by the State for social and economic purposes, then it is not rational to expect these companies to invest in geologically and geographically complex new areas to discover and produce more oil so as to improve the country's energy security. This takes us back to the persistent conflict between equity and efficiency that influences India's strategies for energy security.

2.2.3 Natural Gas

India's natural gas resource endowments are not very significant when seen in a global context. India is estimated to have about 1.4 trillion cubic meters (TCM) of gas reserves in 2012 which is only 0.7% of the global total (British Petroleum 2014b). India produced about 111 metric million standard cubic meters per day (mmscmd) of gas or about 40 BCM of gas in 2012–2013 compared to 143 mmscmd in 2011–2012 (MoPNG 2013). India has been importing gas in the form of LNG since 2004 through LNG re-gasification terminals in the west coast of India (Fig. 2.9). In 2011–2012 India imported about 12 BCM of natural gas and volumes of LNG imports are expected to increase in the future on account of shortfalls in domestic production. In 2012 domestic production fell by 20% compared to production in 2011 (British Petroleum 2014b).

One of the most important reasons cited for the reduction in natural gas production is the unanticipated geological and technical complexity that has inhibited production from new gas discoveries (The Hindu 2013). Policy obstacles in pricing natural gas along with the lack of an integrated pipeline network to evacuate gas produced from offshore prospects are seen as constraints that inhibit investment in natural gas production by prospective producers of natural gas (ORF-IEF 2011). One of the key reasons for the policy uncertainty is the contradiction between the nature of the hydrocarbon discovery and extraction business and the domestic regulatory environment that prioritises redistributive objectives.

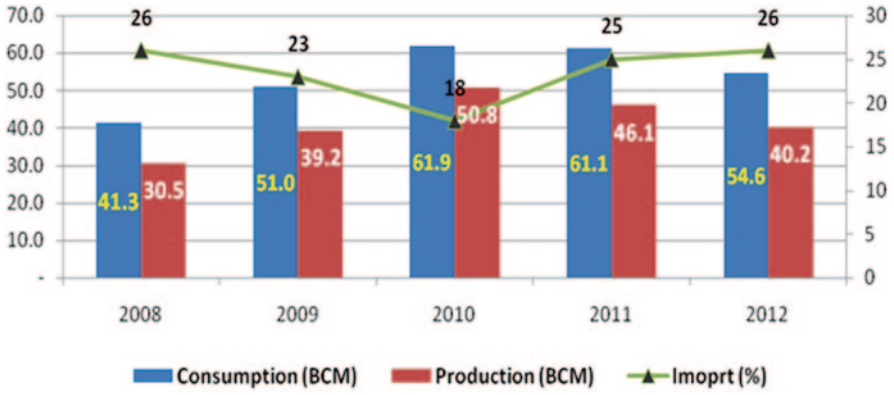

Fig. 2.9 India's natural gas supply, demand and imports in BCM. (British Petroleum 2014b)

Coal, oil and natural gas industries were all born vulnerable to market instability and thus were subject to regulation world-wide. While interventions in the coal industry were originally demanded by coal workers and interventions in the oil industry demanded by the oil industry, interventions in the natural gas sector were always demanded by consumers of natural gas given its status as a natural monopoly at the point of sale. India is not an exception to this rule. Since production of natural gas began almost three decades ago, the industry has been subject to continuous compensatory regulation skewed in favour of consuming segments. As a result, a host of distortions in resource allocation have been created within and outside the sector. The 'permanent receivership' status of the fertilizer and power sector, the anchor consumers of natural gas, is a product of market distorting interventions and this is one of the major factors that inhibit investment in the natural gas sector. Price control in natural gas and its key consuming sectors such as power and fertiliser has been similar to that of rent control and the effect has been no different from rent control on urban rental housing—shortages. It has simulated demand without helping supply.

Exploration for oil and gas does not follow a utility function in the sense that an increase in investment does not necessarily mean an increase in supply as it is in other industries. Exploration for hydrocarbons is a game of chance and probability that requires a large appetite for risk. Hydrocarbons beneath the ground are depleting resources and therefore the marginal cost of bringing additional supplies into the market almost always exceeds the average costs. The Indian approach to pricing gas has not taken into account the marginal cost of bringing in additional supply and this has stifled risk taking and discovery. Under a controlled price regime, the gap between revenues and replacement costs has widened and this has become a disincentive for producers to commit new reserves to purchase contracts for fear of getting locked into an inflexible pricing regime.[3]

[3] This section of the argument by the author has been used in the weekly energy news monitor edited by the author.

Such distortions do exist in most areas of economic activity. Though market distortions are undesirable on efficiency grounds they may be justified as a means of attaining other legitimate social goals of policy. In the case of natural gas it is hard to find legitimate social policy goals. Regulation in the gas sector has consisted merely of incremental decisions influenced heavily by existing patterns of gas consumption that were set in the era of planning.

Those industries which have preferential access to natural gas such as the fertilizer industry and some power plants are using natural gas in a manner that is economically inefficient because the price signals they receive are misleading. Those industries without access to gas but willing to pay higher prices such as merchant peaking power plants remain stranded without fuel. This has distorted the market for primary fuels such as coal and gas and also the market for electrical power. In 2013, gas based power generating capacity in India was about 18 GW (Central Electricity Authority 2013). At a Plant Load Factor (PLF) of 90 % this would require about 87 mmscmd of gas while availability is limited to about 28 mmscmd on account of dramatic fall in domestic production (PIB 2013a). Not surprisingly access to additional supplies of gas at higher prices does not solve the problem. Even if all these stranded gas based power plants are linked by pipelines to LNG terminals where supplies are available, they are unlikely to use re-gassified LNG at prices above $ 6/mmbtu as power generated from gas at this price becomes unattractive for utilities which are the largest buyers of electricity in India (Ravichandran et al. 2013).

In the short run, those sectors with government regulated access to natural gas have benefitted but in the long run all consumers suffer because of the reluctance of prospective suppliers to bring gas to the market. Furthermore the bargaining process created by regulation has resulted in higher price expectations rather than what would have been required under competitive conditions. Allocation and price control have become worse than interventions in the form of subsidies as subsidies could potentially disappear from public minds as it does not require ongoing political process. Controlling prices and access on the other hand must be done again and again and thus more visible and more accessible to political interests. In such a regime, business entities irrespective of whether they are private or public are placed in an uncomfortable position of fighting for a position of preference with the Government rather than competing with each other to bring additional gas supplies at the lowest possible prices. In the long run, this will reduce the country's capacity to attain the very goals on behalf of which the system is established, to assure plentiful supplies of energy at the lowest possible cost over the longest possible time.

As in the case of coal, domestic constraints that inhibit domestic gas production could mean increasing reliance on gas imports to make up for shortfalls subject to constraints on the trade account. A number of projections show a huge gap between demand and supply of gas in the future. As per one such projection based on plan document data, sectoral demand growth rates and the growth of regional market based on the development of national gas grid demand in India is likely to be roughly 272 BCM by 2030 (Petroleum & Natural Gas Regulatory Board 2013). This represents a five-fold increase over current demand. Domestic gas production

is estimated to touch only about 83 BCM which would mean LNG imports of 78 BCM (ibid.). This could be reduced by 10 BCM if trans-border pipelines such as the TAPI from Turkmenistan are completed (ibid.). Some of the more optimistic sources expect roughly 28 BCM of coal bed methane (CBM) and 35 BCM of shale gas to add to domestic supplies by 2035 (International Energy Agency 2013).

It would be unwise to read too much into these projections that anticipate a huge gap between demand and supply. As noted earlier, the demand for gas was created in the 1970s and 1980s through policy interventions that allocated gas to specific consuming sectors such as power and fertilisers at specific prices. Domestic projections for natural gas demand interpret the 'need' for gas on the basis of planned capacities in gas consuming sectors such as power and fertilisers as 'demand' for gas (Jain 2011). The need for gas from planned capacity is very different from market 'demand' for natural gas as it has to be qualified by economic rationality.

Policy makers in India have proposed a new formula based on weighted average of gas prices in the different regional natural gas markets around the world to be used for calculating domestic gas prices. The recommendation is based on the presumption that a higher regulated price will incentivise domestic gas production. However the idea is likely to trip on legacy policies entrenched in the power and fertiliser segments and end up destroying the presumed demand for gas. Unlike oil for which there is no viable substitute (at least in some end use segments such as transportation), natural gas has a substitute both in the power and fertiliser segments. It can be substituted with coal for base load power generation and with hydro-power for peak-load power generation. In the Fertiliser segment naphtha is a substitute for natural gas. Though the price of naphtha is generally higher than that of natural gas, this is not a concern for the fertiliser manufacturing sector. Higher input prices in the manufacture of fertilisers can be passed on to the Government as claims for higher subsidy compensation.

Given the significance of price sensitivity in deciding gas demand, any effort to regulate prices to a higher level so as to serve as an incentive for domestic production of gas is unlikely to succeed. In fact the policy move that aims to increase domestic gas supply may actually destroy 'demand' that is required to sustain production. Unfortunately the complex web of incremental decisions concerning gas and gas consuming sectors are likely to constrain the government from appropriating two distinct energy security benefits that could accrue from increasing the use of natural gas.

The first is an economic benefit that addresses the trade deficit problem. Instead of importing crude at over $ 106/bbl. India can import Liquid Natural Gas (LNG) at say $ 14 per million British thermal units (mmbtu) which is $ 3.5/mmbtu lower than the price of crude on heating value basis. At a price of $ 120/bbl for crude oil import, this substitution alone would reduce India's oil import bill by roughly $ 100 million per day as we go towards 2030 (ORF-IEF, 2011). Cheaper natural gas can substitute for Liquid Petroleum Gas (LPG) extensively used as fuel for cooking. This will could lead to an unintended benefit of lower subsidies on LPG. Natural gas could also replace diesel and petrol in urban public and private transport with the added benefit of lower pollution.

The second benefit is more long term in terms of outcomes as it concerns a reduction in carbon emissions. Globally more than 40% of reduction in carbon emissions by 2035 is likely to be achieved by change in energy intensity which is a product of both an improvement in energy efficiency as well as a change in the composition of the global economy (British Petroleum 2014a). About 7% of the reduction in emissions is expected from the world switching to cleaner fuels. Though the switch from fossil fuels to renewable energy is high on the agenda of every nation that wants to score points in climate responsibility, the reality is that a simple switch of 1% of coal based capacity to natural gas would offer as much carbon saving as an 11% increase in renewable energy capacity (ibid.). Given the low plant load factors and high capital cost of renewable energy, an increase of 11% in global renewable energy capacity would be very expensive compared to a 1% switch from coal to natural gas. This is an important input for India as more than 65% of carbon emissions originate in coal based power plants (Raghuvanshi et al. 2006).

In the event that domestic gas resources do not materialise as anticipated, India could potentially access abundant global resources as it comes with lower price risk than what was anticipated at a time when natural gas resources were assumed to be dwindling. Technically recoverable natural gas resources (including unconventional resources) estimated at 810 trillion cubic meters (TCM) can sustain production at current rates for another 235 years (International Energy Agency 2013). The resources are geographically well spread out which suggests low probability of geopolitical surprises. 23% of the resources are in Eastern European/ former Soviet Union countries led by Russia, 17% in Asia-Pacific, 16% in the Middle East and 13% in North America. Attributes of abundance, affordability and access associated with gas also characterise India's energy security. Unfortunately legacy policy burdens limit India's ability to appropriate positive attributes of natural gas towards its energy security goals.

2.3 Conclusions

India's disproportionate focus on its resource endowments as the source of its energy insecurity and the consequent use of the share of imported energy as an indicator of energy insecurity has led to a narrow and static narrative on energy security. The focus on imports has facilitated emphasis on grand external strategies such as investment in equity energy and the security of sea lanes of supply. Consequently supposedly mundane domestic economic, logistical and technical issues that are vital to maintain energy supplies have been marginalised in terms of policy priority and investment. This is despite the fact that most of the domestic constraints to energy security are well known and are discussed in details in key policy documents such as the Integrated Energy Policy Report and the last three plan documents. External strategies such as scouting the high seas around the world for oil and gas have been more attractive in terms of articulation and consequently also budget allocation. However these strategies have not produced the desired outcomes.

The case of Japan is both informative and illustrative in this context. The share of imports in India's commercial energy basket is about 28% (Planning Commission 2012) compared to over 90% for Japan (International Energy Agency 2013). Even by 2022, energy imports as a share of total commercial energy use in India may be limited to 37% (ibid.). On the basis of the share of imported energy we may conclude that Japan is more energy insecure than India. However when nearly 30% of power generation capacity based on nuclear energy was removed overnight after the 2011 Fukushima disaster, Japan did not experience proportionate shortages of electricity (The Economist 2012). Many reasons have been cited for Japan's resilience but the most important are that Japan (1) had sufficient flexibility in its energy system to switch to alternative fuels for power generation (2) was well integrated with the global energy market and consequently it was able to access global markets for alternative fuels such as natural gas and coal (3) had the economic capacity to absorb higher fuel import costs and (4) was able to maximise efficiency of energy use to minimise demand for energy through the application of technology and policy (Dodson 2012).

The key point to note here is that Japan had developed certain domestic capabilities that enhanced its ability to cope with large shifts in global energy markets. This meant that Japan was more energy secure than India despite the large share of imported energy in Japan's energy basket. On all of the above four attributes, India seems to be at a disadvantage. India's inability to extract adequate quantities of coal and gas domestically was responsible for about 11% loss of power generation in 2012–2013 (Central Electricity Authority 2013). There is no record of India having suffered similar shortages on account of global energy supply challenges.

Four observations may be made at this point. First, the contextual framing of energy security has made energy security a static problem. This has curtailed adjustment to changing geopolitical, economic and technological contexts that constantly influence the global energy context. Second, the focus on resource endowments which is only one of the many means available to solve the problem of energy insecurity, has limited scope of possible solutions that could address the problem of energy insecurity. Third, the use of the share of imported energy, particularly of oil, as the key indicator of energy insecurity has led to disproportionate focus on reducing the share of imported energy as a means to energy security.

Four, the narrative of poor resource endowment that underpins India's energy security discourse has also led to implicit justification of scarcity of energy in India especially among the lower levels of the society and economy and has diverted attention from other more relevant domestic political, administrative and economic inadequacies that keep the nation and its people in perennial energy insecurity and energy poverty. The emphasis on scarcity has also facilitated the allocation of exclusive privileges to agencies in the public and private realm which seek to find, produce and supply energy. This has led to loss of trust in the Government which has the fiduciary responsibility of using the nation's resources for the benefit of the people.

There have been global consequences as well. India's search for energy resources outside India's borders through its national oil company is often interpreted as a

deliberate attempt by India to disregard global energy markets as a means to energy security (Advisory Council on International Affairs 2005).

Energy security particularly oil security is an idea constructed through the twin lenses of national security and national economic strategy. The nation is the master discourse which is expected to legitimise other discourses on energy security. The task of legitimising other discourses such as the one on domestic constraints which is lower down in the strategic hierarchy is complex. When articulated, they appear to be far removed from India's strategic goals and so do not catch the imagination of the nation and its policy makers.

Domestic policy initiatives required to secure energy are well known but they are not implemented as coherent pathways towards a long term energy security goal. Most domestic policy initiatives are conceived and implemented in such a way that they end up as incremental decisions made to serve short term purposes, often unrelated to energy. This must change so that every domestic policy decision in the energy sector is aligned with clearly articulated goal for long term energy security.

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Chapter 3
India's Drive for Energy Security and Relations with the US

Chintamani Mahapatra

In the long history of Indo–US relationship, energy has been one of the key components of bilateral cooperation as well as friction. While energy security did not preoccupy the security planners and strategic analysts until after the use of oil as a weapon by the Arab oil producing countries in early 1970s, search for energy sources to boost industrialization has been an important aspect of foreign relations of many countries in the world.

India has been dependent on imported energy, particularly oil, from the early years of its independence, but the cost and other considerations encouraged Nehru to look for alternative sources of energy. One of the significant outcomes of it was Indo–US agreement in early 1960s to promote civil nuclear cooperation. The United States transferred two reactors to India for the Tarapur power plants and agreed to supply enriched uranium fuel for the reactors. The US also agreed to supply heavy water to moderate a Canadian supplied reactor.

This good beginning of bilateral energy cooperation, however, was enormously threatened when India conducted a peaceful nuclear explosion in 1974. While fuel to Tarapur reactors, suspended under American sanctions, continued to flow through an amicable arrangement with France, Indo–US nuclear energy cooperation halted for about three decades (Milholin 1984).Since the 1974 nuclear test, it became non-cooperation, US punitive measures and erection of international structures to prevent India from nuclear trade and imposition of technology denial regimes. The United States a series of nonproliferation regimes targeted India's nuclear trade, forcing India to leverage its domestic scientific and technical abilities to expand its civilian nuclear programme.

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3.1 After the Cold War

Throughout the Cold War period, confrontation related to nuclear energy on the basis of proliferation concerns and US non-proliferation initiatives marked one of the signature differences between India and the United States. While the Soviet collapse and the termination of the Cold War had no immediate effect on US nuclear policy towards India and the Clinton Administration's "cap, freeze and roll back" approach continued to be a stumbling block in the bilateral relationship, Washington's initiatives and Indian acceptance in forging cooperation in other areas of energy fields have been remarkable.

Energy cooperation with India became a flagship programme of the Clinton Administration to reach out to India for a new kind of relationship in the new context of the post-Cold War era and India's decision to open up its economy to the rest of the world. Washington's initiative in 1994 to engage India in energy trade was handled by an array of executive agencies, such as the State Department, Commerce Department, Agency for International Development or AID, US Trade & Development Agency or USTDA and the Environmental Protection Agency (US/India Energy Cooperation 2006, p. 7). The focus this cooperation was on improving the efficiency of India's coal-fired power plants, use of clean fuels, such as natural gas, wind and solar energy. Moreover, the US sought to promote public-private partnership in enhancing energy efficiency in the industrial sector, which was expected to create the investment climate for US energy firms (US/India Energy Cooperation 2006, p. 7).

While India's second round of nuclear tests in 1998 disrupted cooperation for some time, energy cooperation bounced back during the Atal Behari Vajpayee-led NDA government. The strategic partnership initiative taken by President George W Bush and Prime Minister Vajpayee was expansive and well-rounded and it put energy as one of the central themes of mutual collaborations. In November 2001, Bush-Vajpayee initiative put energy issue as one of five pillars of Indo–US economic dialogue.[1] This scheme launched direct contact between the US Department of Energy and the Indian Ministry of Petroleum and Natural Gas. After about 4 years, in May 2005, the two countries set off a new energy dialogue and instituted five working groups to carry it forward. These included Civil Nuclear Working Group, Coal Working Group, Oil & Gas Working Group, Power and Energy Efficiency Working Group, and Working Group on New Technologies & Energy Efficiency and Diversified Imports of Energy.

These dialogues encompassing enlargement of domestic resources, use of clean energy technologies and fuels, restructuring the power sector and enhancing foreign investment in the energy sector of India were quite useful. The US in the meantime began to assist India in improving coal mining processing, instituting mine safety measures, developing coal methane and using situ coal gasification (US/India Energy Cooperation 2006, p. 8).

[1] Other pillars were trade, investment, commerce and environment.

As US-India relations took a more positive turn in 2005 with announcement of a civil nuclear deal and conclusion of a defence framework agreement in 2005, opportunities for deeper tie-ups in the energy sector were wide open. In April 2006, India became the first country to join the US on the FutureGen Government Steering Committee. With a view to joining the FutureGen Industry Alliance, India also committed an amount of $ 10 million towards this goal.[2] A few months later, an MOU was signed between US Minerals Management Service and India's Oil Industry Safety Directorate for mutual collaboration in operational safety, inspection issues, and investigation of offshore oil and gas operations. In addition, "Methane to Market Partnership" was also initiated for developing CBM or Coal Bed Methane in India. The US Trade and Development Agency and Environmental Protection Agency came forward to assist India by establishing a CBM Clearing House Information Centre.

While the two countries intensely debated the issues related to civil nuclear cooperation agreement since a nuclear deal was announced in 2005, mutual cooperation in a host of energy areas continued to grow. The non-nuclear energy cooperation between the two countries has been relatively less controversial, more inclusive and mutually beneficial. Indo–US non-nuclear energy cooperation can be seen in possibly every conceivable area in the energy sector. Without going into the chronological details about it, one may just summarize the initiatives and areas of cooperation between India and the US in the following list:

- Domestic production of oil and gas in India
- Marketing within India—Methane to marker initiative
- Environmental Regulation or Regulatory framework
- Research and Development & Deployment
- Shale Gas exploration
- National Gas Grid Construction
- Distribution and management in power sector
- Technology sale related to clean coal
- Research and deployment of renewable sources of energy
- Thermonuclear Reactor research
- Coal Based Methane (CBM) and shale Gas—Unconventional energy
- FutureGen Alliance for zero-emission coal fired power
- Multilateral initiatives—Asia Pacific
- Regional Energy cooperation-South Asia-Central Asia
- Nuclear Power generation

[2] In 2006, India and the US signed an agreement that made India the first country to join the U.S. on the government steering committee for the FutureGen Initiative. That aims at building and operating the world's first coal-based power plant that removes and sequesters carbon dioxide (CO_2) while and hydrogen. "Adding India to our list of partners is an exciting step for the FutureGen project," Secretary of Energy Samuel W. Bodman said. "The success of FutureGen will lead to the environmentally clean use of coal to power economies around the globe" (Energy.Gov, http://energy.gov/articles/us-and-india-sign-historic-agreement-futuregen-project%20EU%20Commission%20Strategy%20(2014)).

- Data and information collation
- Energy Efficiency
- Cool Roof energy

Besides the above areas of mutual collaborations, one can highlight certain significant aspects of energy cooperation that can have implications for India's future energy security. One of them is collaboration in energy research and export of US clean energy technology to India. This has ramifications for the country's environmental security, particularly in the backdrop of India's dependence on domestic coal and growing import of coal. Chinese experience in environmental degradation resulting from unrestrained industrialization has lessons for India. In this respect, the US-India Partnership to Advance Clean Energy (PACE) initiative is a welcome development. It aims at fast tracking transition to low carbon economies through joint research and deployment of clean energy technology.

As part of this initiative, in June 2012, the USAID launched a new 5 year technical assistance program in partnership with Indian Ministry of Power and the Ministry of New & Renewable Energy. The goal of speeding up India's transition to high performing and low emission energy secure economy cannot be achieved quickly, but the step in the direction is a salutary development. With representatives from Department of Commerce, State, Energy, AID, USTDA, Export-Import bank and OPIC, the American centre in New Delhi now houses a Clean Energy Finance Centre.

While India and the US have differences over certain environmental issues, they share a commitment to fight climate change, by addressing Sort-lived Climate Pollutants (SLCP); expounding alternative to HFCs or hydroflurocarbons; seeking methane abatement and propping up black carbon research programmes. In addition, both are committed to programmes, such as Reduce Emissions from Deforestation and Forest Degradation (REDD). The USAID provides technical assistance to India's land use science programme and Green India Mission aiming at reducing emissions and enhancing carbon sequestration through Indian forests.

3.2 Nuclear Energy Cooperation

Ever since India conducted its first nuclear test explosion in 1974, Indo–US cooperation in this field drew a blank and, in fact, turned negative due to Washington's creation of a non-proliferation regime denying India the benefit of trading in nuclear equipment and technology. India's decision against making nuclear bomb and only keeping the nuclear option open did not convince the successive US administrations enough to relax the restrictions on India to enable it expand its civil nuclear programme.

However, India continued to develop its indigenous nuclear capability and was able to draw at least 3% of its energy mix from nuclear power plants. In the absence of adequate domestic uranium sources and difficulties of outsourcing it due to the technology, resources and equipment denial regime, India has been trying to develop a nuclear fuel cycle based on its huge thorium deposits.

After more than three decades of Indo–US non-cooperation in civil nuclear programmes, President George W. Bush and Prime Minister Manmohan Singh broke new ground in 2005 by announcing an innovative nuclear deal. It took 3 long years to both the governments to convince their domestic opponents of the deal that Indo–US cooperation in civil nuclear energy sector will be economically and diplomatically beneficial and simultaneously promote the cause of non-proliferation as well.

US Secretary of State Condoleezza Rice told the Senate that it would advance energy security, further environmental protection, and foster economic and technological development in both the countries, bolster international security, and strengthen the global non-proliferation regime (US/India Energy Cooperation 2006, p. 4). The two countries finally signed the 123 agreement in 2008, allowing India to trade in nuclear energy equipment and technology in the international market. As a result of this agreement, India continued to be a non-signatory to the NPT, was allowed to keep its existing nuclear arsenal, and yet begin trading in the international nuclear market. Both the IAEA and the NSG endorsed the Indo–US agreement. The Obama administration subsequently proposed to support India's membership in the non-proliferation regimes, including the NSG.

Mostly due to Indo–US cooperation in this field, India could aspire to acquire "14,600 MWs nuclear capacity on line by 2020" and generate "25% of electricity from nuclear power by 2050" (Nuclear Power in India, 2014). India's vision to become "world leader in nuclear technology" by harnessing its ability to develop "fast breeder reactors and thorium fuel cycle" would not be possible but for this paradigm shift in Indo–US nuclear cooperation agreement (Nuclear Power in India 2014).

However, a new nuclear liability legislation approved by the Indian Parliament has created hurdles for India's nuclear trade to take off. While the US nuclear energy companies are yet to be able set shop in India, Russia and France, with whom India was able to sign nuclear trade agreements, have raised questions about the Indian liability act.

3.3 Multilateral Cooperation

Indo–US energy cooperation is not confined to bilateral dimensions alone. Their participation in multilateral efforts to ensure sustained, secured and uninterrupted energy trade, maintain environmental safety and develop and deploy newer technologies is equally significant. One of such cooperation is their participation in Clean Energy Ministerial. It brings energy and environment ministers of the world's major economies to promote policies and programmes that encourage low-carbon energy production and consumption (Clearenergy ministerial 2013). It has recently taken initiatives, such as equipment and appliance standards, energy management, and cool roofs demonstration projects.

Other areas of international collaboration include their participation in International Energy Agency's efforts to handle difficulties arising out of global supply disruptions. In January 2006, the US and India joined with Australia, China, Japan

and South Korea to launch the Asia Pacific Partnership on Clean Development and Climate. The US support was instrumental in invitation given to India by the ITER (International Thermonuclear Experimental Reactor) partners to participate as a full partner in the research project on fusion power (US/India Energy Cooperation 2006, p. 9). In addition, Washington has welcomed Indian participation in it its regional programme on South Asia Regional Initiative for Energy (SARI/Energy) linking South Asia and Central Asia (US/India Energy Cooperation 2006, p. 15).

Besides, the US actively encouraged the proposal of Turkmenistan-Afghanistan-Pakistan-India pipeline. This is expected to guarantee "access to secure, reliable and affordable energy supplies". But it is not feasible without peace and stability in areas containing sources of hydrocarbon resources. India and the US thus have a common interest in regional security. However, the differences in the details do make it a complicated issue, as for instance, the US opposed Iran-Pakistan-India gas pipeline project on the ground that it would dilute efforts to discourage Iranian nuclear ambition. The US sanctions against Iran related to its nuclear programme did bring to the surfaces US-Indian differences in approach.

3.4 Benefits for India

Does India need US help in ensuring diverse aspects of its energy security?

First of all, international cooperation in maintaining energy security is not a choice for India. Significantly, most major global economies are also dependent on imported oil and gas for their sustenance. Since India is not energy independent, it is an imperative for India to forge cooperation with other countries.

In its quest for achieving energy security, India has been experimenting myriad options, such as efforts by ONGC to the tune of billions of dollars to explore oil abroad by investing in Vietnamese gas fields, energy projects in Algeria, Kazakhstan, Indonesia, Venezuela, Libya and Syria and in many other countries in Africa and the Middle East. India also has been exploring building gas pipe lines involving Iran, Turkmenistan, Burma and Bangladesh. But most of these proposals have serious geopolitical problems involving geopolitical rivalries and constraints.

India's drive towards establishing close energy cooperation with the United States in this context thus has assumed added substance.

A cursory glance at India's energy sector profile can provide an answer. India is anything but energy secured. High prices of energy, oil, gas or electricity, in India is responsible for non-optimal industrial growth, inadequate agricultural performance, and poor standard of living for millions of Indians. Two-thirds of population do not have access to electricity. Old equipment, subsidized prices, and bloated payrolls have already increased the cost of electricity and India is in search of increased use of renewable sources, such as wind, biomass, hydro and solar sources. This in turn entails external funding and technologies, where the role of the US seems sizeable.

India simply does not have enough power for the industrial and the agricultural sector. Inefficient power distribution, power theft, and high subsidies are as such

problematic, but the condition of about two-thirds of Indian people is worse since they do not even have access to electricity. National economy of India remains vulnerable to large trade deficit due to volatility of international oil market and the resultant adverse balance of payment. By 2004, India was the fifth largest consumer of energy in the world behind US, China, Russia and Japan. This outpouring in demand posed colossal challenge to because of rising cost of oil and refined products adding to its trade deficit and creating balance of payment problems.

Reliance on less than clean domestic coal has long term consequences on the country's environment. India, third largest coal producer, uses coal for 53 % of its energy mix. India's coal has twice the ash content of US coal resulting in environmental problem and affecting human health. Cooperation with the US in acquiring clean coal technology is undoubtedly of considerable help.

Rapid urbanization is responsible for rising demands for power in Indian cities and towns. India's dependence on oil and gas imports is well known, but unfortunately India has also become a net importer of coal. About 33 % of India's energy consumption is derived from oil. Most of it is imported and that too from politically volatile regions. As Indian economy expands, its energy demands are certainly going to rise in geometrical proportions. India has to keep confronting political turmoil in the heartland of hydrocarbon resources. Geopolitical obstructions and uncertainties surrounding energy cooperation with immediate and extended neighbours is likely to jeopardize India's energy security more and more in the future. India needs to diversify its energy imports, efficiently use its available energy resources and develop and deploy its renewable and alternative sources of energy.

In all these aspects, cooperation with the United States can be a benefit-multiplier. According to some estimates, Indian State Electricity Boards that are on government subsidies and power utilities lose about $ 7 billion per year and that means such loss increases by about 15–20 % per year. Indo–US joint efforts to promote cost-effective practices in power sector, and expand electrification of rural areas and improve billing and tariff collection systems through USAID's new Distribution Reform, Upgrades, and Management (DRUM) activity are remarkably productive. Furthermore, the US has agreed to sell shale gas to India and through the support of USTDA, the Indian Ministry of Petroleum and Natural Gas has been exploring the feasibility of a National Gas Grid for reaching all areas of India.

3.5 Difficulties and Obstacles

Indo–US energy cooperation in the non-nuclear sector has been relatively less controversial, although the Enron project in Maharashtra and the recent dispute between the two countries on the domestic content issue of solar panel were notable exceptions.

However, the United States has put considerable political and diplomatic capital on the nuclear energy sector and failure to implement the 123 agreement may have wide ranging ramifications for the health of the strategic partnership in the future.

Constituencies within the US domestic sphere who vehemently opposed civil nuclear cooperation with India would get an upper hand with slow pace of resolution of the differences arising out of the Indian nuclear liability act. Earlier concerns in the US domestic debate that nuclear deal with India could lead to spread of weapons grade material, unleash a regional arms race with China and Pakistan, make it more difficult for the US to win support for sanctions against nuclear renegades like Iran and North Korea would be revisited casting influence on other dimensions of the relationship.

In fact, one of the outcomes of the Indo–US civil nuclear cooperation agreement is the US proposal to make India a member of the NSG. Its diplomatic fallout is reflected in a recently reported Sino–Pak secret agreement to set up additional nuclear power plants in Pakistan. While it has sparked controversy, it has given ammunition to those Americans who opposed Indo–US nuclear deal. Pakistan in the mean time has gone on diplomatic offensive to oppose India's membership in NSG and has succeeded in encouraging Ireland, Switzerland, Netherlands and China and a few other countries to oppose India's membership. If the 123 agreement remains unimplemented, will Washington itself take a u-turn?

The domestic opposition to establishment of nuclear power plants, intensified by the Fukushima Disaster in Japan, has posed yet another challenge for implementation of the 123 agreement.[3] Popular movements in Koodankulam (Tamil Nadu), Jaitapur (Maharashtra), Mithi Virdi (Gujarat), Kovvada (Andhra Pradesh), Gorakhpur (Haryana), Chutka (Madhya Pradesh) and Haripur (West Bengal) against nuclear power on the grounds of safety as well as loss of hundreds of acres of fertile land and displacement of people cannot be brushed aside[4] (Sagarmedianic 2013).

These protest movements are increasingly coming into clash with 'local' stakeholders' livelihoods and land rights (Singh 2013; Ramana 2013). As with power plants, local people are also becoming restive about uranium mining and milling. Unlike popular ignorance about deposits in Singhbhum and Jaduguda, more recent projects in Meghalaya, Andhra Pradesh and Karnataka have faced local's fury resulting in "disastrous delays and cost-overruns" (Singh 2013; Ramana 2013).

However, all problems are not just found in India alone. Many Indians who opposed doing nuclear trade with the USA based their arguments on doubtful reliability of the US as a supplier country. And others were critical of the US nuclear industry that produced no new reactors for about 30 years after the 1979 Three Miles Island nuclear accident. Although the USA is the world's largest producer of nuclear power, accounting for more than 30% of worldwide nuclear generation of electricity, and owns 104 nuclear reactors producing over 19% of total electrical output, most of them are old reactors. There is little doubt that the US is expected to develop 4–6 new units by 2020, with 16 license applications made since mid-2007

[3] Post-Fukushima, nuclear concerns have affected both Indians and the Americans. Anti-nuclear sentiments, apprehensions and opposition to nuclear power are spread across society, including scientific community.

[4] A public appeal from the people of Gujarat struggling against proposed nuclear power plant can be found in (Sagarmedianic 2013).

to build 24 new nuclear reactors. But the Fukushima disaster had an impact on the US debate over nuclear power as well. More recently, discovery of huge amount of shale gas and the jubilation over the prospect of US acquiring energy independence and probably fast becoming a net exporter of energy may also have an impact on the country's nuclear industry.

3.6 Conclusion

India's energy crisis is visible to the naked eyes. Millions of Indians have no access to electricity. India's dependence on imported fuels is huge. Like myriad developed and fast developing countries, India's quest for energy security today faces Himalayan obstacles.

Actually trade in energy resources and technology is just not transactional, it has enormous geopolitical dimensions. Lessons are to be learnt from the threat the European countries have been facing in the recent times with regard to their energy, particularly gas, imports from Russia in the wake of the Ukrainian crisis. The European Commission is now busy preparing a new strategy report to address the huge energy dependence on Russia that has used its leverage to score geopolitical points. The European Energy Security Strategy, according to the European Commission, would "outline how the EU could lower its dependency on imported energy, increase domestic energy production and conserve energy" (EU Commission Strategy 2014).

Lessons from the American use of its economic leverage to promote its foreign policy and national security interests should also be instructive. Washington's pressure on India to follow its non-proliferation agenda on Iran is well known. Thus while charting out its strategy for ensuring energy security; India has to factor the possible implications of energy tie-ups with the US.

A little before the Parliamentary elections, M. Veerappa Moily, Minister of Petroleum under the UPA Government, announced a plan to make India energy independent by 2030 and said that the target was to reduce crude oil imports by 50% by 2020, 75% by 2025 and energy independence by 2030 (Livemint 2014). While this plan appears ambitious, the new Government under the leadership of Narendra Modi has also emphasized the goal of maintaining energy security in its early days of administration. There are signs that there will be a strong and integrated energy ministry to improve efficiencies across the energy chain and coordinate and rationalize an effective "follow-through action in power, coal, petroleum and national gas, renewable and non-conventional sources".

India, China and the European Union are in search of credible mechanisms for ensuring their respective energy security at a time when the United States is celebrating its shale gas reserve findings and preparing to make use of its perceived energy independence in coming years to promote its interests abroad. There is no doubt that India can benefit a great deal from energy cooperation with the United States. India's objective to diversify its energy imports, develop clean technologies

and make a useful energy mix in its developmental priorities cannot be fulfilled by keeping the United States out. But closer cooperation with the US should not lead to over-dependence of India on one country and the policy makers need to watch out to prevent that probable eventuality.

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Chapter 4
Indian Energy Security and the Role of Renewables: Possibility of Cooperation with the EU

Gulshan Sachdeva

Since 1991, India is making a successful transition from an excessively inward-oriented economy to a more globally integrated economy. As a result of new policies, it has become one of the fastest growing economies of the world. Despite some serious challenges like global slowdown, energy security, poverty, infrastructure, regional disparities and internal security, there are strong indications that rapid growth will continue. Apart from expansion, the Indian economy is also being diversified significantly. Traditionally, the economy was dependent on markets in Europe and the US. In the last two decades, there has been rapid integration of the Indian economy within Asia which has been reinforced by India's Look East policy that was initiated in the early 1990s. This is clearly evident from rapidly increasing India-China as well as India-ASEAN trade. Despite liberalization, the broader Indian development strategy is still guided by long term plans prepared by the Indian Planning Commission. The 12th Five Year Plan (2012–2017) targets faster, more inclusive and sustainable growth. The focus is on creating human, physical and institutional capabilities to achieve a targeted 8.2 % growth in the next 5 years. Although rapid growth in the last 10 years has raised expectations, domestic and global circumstances are less favorable today. Still, the overall aim is to bring 9 % growth back by the end of the 12th plan. As a result of these changes, India is adapting itself simultaneously to the economic globalization and to the emerging balance of power. The strategic consequences of its economic performance are clearly evident. Growth and outward orientation has helped India to reorient its traditional partnerships with the developing world and forge new relationships with all major powers.

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4.1 Energy Security

The era of high economic growth in the Western world between 1945 and the first oil crisis of 1973, coincided with a period of cheap oil prices. The second oil crisis, triggered by the Iranian revolution of 1979, further complicated the situation. Recent years of high economic growth in countries like India and China have coincided with periods of increased oil price uncertainty. India's oil requirements for its 8–9 % growth every year since 2003 have been financed at increasing global oil prices. The oil shock of July 2008 when oil prices reached a record high of $ 147 a barrel, sent alarm signals among Indian policy makers and reminded them of the earlier crises. Being a country depended on oil imports for about 80 % of its requirements, India scrambled for a response as high oil prices resulted in inflation and threatened to undo the gains of high economic growth achieved in the last two decades. Immediate fire fighting responses also exposed weaknesses of a still developing national energy strategy.

Just before the global economy went into recession, the US Energy Information Administration had (EIA) projected that global energy consumption would increase by 50 % from 2005 to 2030. It was evident that emerging economies are going to account for much of this projected growth over the next 25 years. Among the emerging economies, the highest demand was expected to occur in Asia, particularly in China and India. Despite slowdown in the last few years, their economic projections remain high in the medium to long term. During this period, fossil fuels (oil, natural gas, and coal) will continue to supply much of the energy, with oil continuing to be important.

Despite fairly low per capita energy consumption, India is fourth largest energy consumer after the US, China and Russia and is likely to become third largest by 2030. The country is also a major producer and is currently world's seventh largest producer of energy. Primary commercial energy demand grew almost three-fold at an annual rate of 6 % between 1981 and 2001. To catch up with the rest of dynamic Asia and to remove poverty, it has become essential for India to continue growing at about 8–10 % or more in the next 25 years. Its energy requirements for a sustained 8–9 % annual growth pose a major challenge. According to the government integrated energy policy, India needs to increase its primary energy supply by three to four times, its electricity generation capacity/supply by five to six times of its 2004 levels. With 2004 as the base, its commercial energy supply needs to grow at 4.3–5.1 % annually. By 2030, power generation capacity must increase to nearly 800,000 Megawatts (MW) from the 2004 capacity of around 160,000 MW. In addition, requirement of coal, the dominant fuel in India's mix will also need to expand to 2 billion t a year (Integrated Energy Policy 2006, XIII).

India's energy basket has a mix of all the resources available including renewable. The importance of oil in India's energy mix can be seen from the fact that it accounted for about 33 % of India's commercial energy consumption alongside other sources like coal (54 %), gas (9 %), nuclear (1 %), hydro (2.5 %) and wind (0.25) (Planning Commission). According to the US Energy Administration in total

energy consumption, the shares were petroleum (21%), natural gas (8%), coal (41%) solid biomass and waste (23%) and nuclear and renewable were only 5%. (EIA) The government's *Hydrocarbon Vision 2025* released in 2000 indicated that in 2025 India's energy mix would probably be dominated by coal coal (50%), with the rest being made up of oil (25%), gas (20%), hydro (2%) and nuclear (3%) on the other hand Wind is less than 0.5% (India, Hydrocarbon Vision 2025 2000; Pant 2008, p. 43). Estimates show that India's energy consumption between 2007 and 2035 growing at an average annual rate of 2.2%; with consumption of natural gas and nuclear energy averaging higher annual increases of 4.1 and 9.5% respectively (US Department of Energy 2010).[1] Since India is relatively poor in oil and gas resources, it has to depend on imports to meet its energy supplies. With already about 80% of its crude oil requirements met by imports, its oil import bill was close to US$ 140 billion in 2012–2013.

The Indian economy relies heavily on coal, which also accounts for about 70% of its electricity generation. After China and the US, India is the world's third-largest coal user. As a result of government policy of diversifying energy mix the share of natural gas has increased up to just over 9%. Other sources, such as wind, solar, and nuclear power, still account for very small shares. Although coal will still be a very important source of energy, the alternative policy scenario of the government visualizes reduction in its demand by 2030. In the alternative scenario, coal demand will grow much slower and oil demand will also decrease somewhat due to introduction of Compressed Natural Gas (CNG) and fuel efficiency. Similarly, the role of nuclear power is envisaged to increase still further. Even if all these changes are implemented, India will still be importing between 29 and 59% of its total commercial primary energy from outside. Latest government projections, the *Five Year Plan 2007–2012*, indicate that by 2030, India may be importing 90–95% of its oil, half of its gas and one third of its coal requirements (Planning Commission 2008, p. 343). Although India is a net oil importer since the 1970s, LNG imports started only in 2004. Currently, India imports oil from about 25 countries, nearly two-thirds of imports used to come from four countries viz. Saudi Arabia, Nigeria, Kuwait and Iran. In the last few years, Iranian imports have somehow declined (Table 4.1).

According to the US Energy Administration in 2012 India's sources of crude oil included Saudi Arabia (19%), Western Hemisphere (18%), Africa (17%), Iraq (12%), Kuwait (10%), UAE (9%), Iran (6%), other Middle East (6%) and other sources (about 4%). According to the 12th Five Year Plan (2012–2017), share of coal in total Coal remains the dominant source of primary energy. Domestic production of coal and lignite account for two-third of total production of commercial energy in 2000–2001 and is projected to be about the same in 2021–2022. The combined share of oil and natural gas in total commercial energy supply was s about 40% in 2011–2012 and is expected to be about the same in 2021–2022 (Table 4.2).

[1] US Department of Energy, *International Energy Outlook 2010*, Washington DC: Department of Energy, 2010. These projections may change depending on higher or lower growth than the reference rate. Upward or downward prices of energy may also change these scenarios (US Department of Energy 2010).

Table 4.1 Sources of India's oil imports 2004–2005 and 2011–2012. (Source: Integrated Energy Policy: Report of the Expert Committee 2006, p. 59)

Middle East				Other regions			
	2004–2005		2011–2012		2004–2005		2011–2012
Country	Oil imports (mmt)	% of total imports	% of total imports	Country	Oil imports (mmt)	% of total imports	% of total imports
Iran	9.61	10.03	10.5	Angola	2.44	2.55	5.3
Iraq	8.33	8.69	14	Brazil	0.29	0.30	2.2
Kuwait	11.46	11.85	10.3	Brunei	0.81	0.84	0.6
Neutral Zone	0.15	0.15		Cameroon	0.35	0.36	0.3
Oman	0.14	0.14	1.5	Congo	0.14	0.14	
Qatar	1.19	1.24	3.8	Egypt	2.12	2.21	1.7
S. Arabia	23.93	24.96	18.9	Equator	0.15	0.16	0.3
UAE	6.43	6.71	9.1	Eq. Guinea	1.66	1.73	0.5
Yemen	3.51	3.66	3	Gabon	0.28	0.29	
				Libya	1.47	1.53	
				Malaysia	3.43	3.58	1.4
				Mexico	2.28	2.38	1.3
				Nigeria	15.08	15.73	7.7
				Russia	0.16	0.16	0
				Sudan	0.33	0.34	
				Thailand	0.27	0.28	0
Sub total	64.64	67.43	71.1	Sub total	31.23	32.57	28.9

Table 4.2 Share of each fuel in total energy production and consumption in India (in %). (Source: Government of India, Twelfth Five Year Plan: 2012–17, Vol. 2, p. 134)

	2000–2001	2006–2007	2011–2012 (provsional)	2016–2017 (projected)	2021–2022 (projected)
Share in commercial energy production					
Coal and lignite	66.38	70.65	68.53	67.52	66.82
Crude oil	16.18	12.91	11.55	8.87	6.70
Natural gas	12.14	10.52	12.60	15.80	16.04
Hydro power	3.10	3.71	3.30	2.68	2.65
Nuclear power	2.14	1.86	2.48	3.52	4.67
Renewable energy	*0.06*	*0.33*	*1.36*	*2.23*	*3.12*
Share in commercial energy supply					
Coal and lignite	50.36	53.32	53.45	55.41	56.90
Crude oil	37.45	33.41	31.41	26.04	23.29
Natural gas	8.49	6.99	10.32	13.46	13.17
Hydro power	2.17	2.53	2.17	1.79	1.73
Nuclear power	1.49	1.24	1.57	2.26	2.95
Renewable Energy	*0.04*	*0.22*	*0.98*	*1.43*	*1.97*

The share of renewable energy sources in total commercial energy supply was less than 1% in 2011–2012 and likely to be less than 2% in 2021–2022. Even though domestic production of energy resources is projected to increase, import dependence will continue at a high level. The main area of import will be crude oil, where nearly 78% of the demand will have to be met from imports by 2017. Import dependence for coal is also estimated to increase from 19% in 2011–2012 to 22.4% in 2017 and 26% 2022.

According the Planning Commission, in 2011–2012, India's domestic production of domestic commercial energy was about 340 mtoe including 5 mtoe in renewable. In 2021–2022, total production is likely to be 642 mtoe and renewable will increase to about 20 mtoe. In 2011–2012 Indian imported energy sources equivalent to about 200 mtoe which is likely to increase to about 375 mtoe in 2021–2022 (Table 4.3). Main imports were petroleum products, LNG and coal.

Most analysts in India believe that the West Asian region will remain the source of overwhelming proportion of India's oil and gas imports, accounting for around two-thirds of Indian exports. In addition, every oil shock in this region has had an adverse impact on the Indian economy (Dietl 2004). Due to this dependence, Indian policy makers are worried about oil price volatility, and its impact on inflation,

Table 4.3 Trends in supply of commercial energy in India (in million tons of oil equivalent). (Source: Government of India, Twelfth Five Year Plan: 2012–17, Vol. 2, p. 133)

	2000–2001	2006–2007	2011–2012	2016–2017 (projected)	2012–22 (projected)
Domestic production					
Coal	130.61	177.34	222.16	308.55	400
Lignite	6.43	8.76	10.64	16.80	29
Crude oil	33.4	33.99	39.23	42.75	43
Natural gas	25.07	27.71	42.79	76.13	103
Hydro power	6.4	9.78	11.22	12.90	17
Nuclear power	4.41	4.91	8.43	16.97	30
Renewable energy	*0.13*	*0.87*	*5.25*	*10.74*	*20*
Total domestic commercial energy	206.45	263.28	339.72	481.84	642.00
Non commercial energy	136.64	153.28	174.20	187.66	202.16
Total	*343.09*	*416.56*	*513.92*	*669.50*	*844.16*
Imports					
Coal	11.36	24.92	54.00	90.00	150.00
Petroleum products	77.25	98.41	129.86	152.44	194.00
LNG	0	8.45	12.56	24.80	31.00
Hydro power	0	0.26	0.45	0.52	0.60
Total net imports	89.01	132.04	196.87	267.76	375.60
Total commercial energy	295.46	396.32	536.59	749.60	1017.60
Total primary energy	*432.01*	*549.60*	*710.79*	*937.26*	*1219.76*

economic growth and foreign exchange reserves. In addition, overwhelming dependence on the Gulf region has its own political implications. Compared to other major states in the world, India is more vulnerable any disruption in oil supplies from the Gulf. However, it could be argued that that India's dependence should not be seen as a vulnerability; but through encouraging growing interdependence between India and the Gulf it contributes to stability to energy markets.

4.2 Government Energy Policy

As over half of the country's population does not have access to electricity or any other form of commercial energy, availability and access to energy is considered crucial for sustained economic growth by the government (Planning Commission 2008, p. 343) The government of India's expert committee on integrated energy policy argued that India would be "energy secure when we can supply lifeline energy to all our citizens irrespective of their ability to pay for it as well as meet their effective demand for safe and convenient energy to satisfy their various needs at competitive prices, at all times and with a prescribed confidence level considering shocks and disruptions that can be reasonably expected" (Planning Commission 2006, p. 54). According to the 12 Five Year Indian "energy security involves ensuring uninterrupted supply of energy to support the economic and commercial activities necessary for sustained economic growth". The major issue discussed in the context of Indian energy security by the expert committee were reducing energy requirements, substituting imported energy by domestic alternatives, diversifying supply sources, expanding resource base and developing alternative energy sources, increasing ability to withstand supply shocks and increasing ability to import energy and face market risks. Overall, it is believed that India's energy security can be increased by (a) diversifying both energy mix and sources of energy imports; (b) seriously perusing overseas acquisitions of energy assets; and (c) initiating policy reforms to attract foreign investment as well as improving domestic production, distribution and consumption. In order to safeguard against short term supply disruptions, the Indian government as also set up 5 million t (36.6 million barrels) strategic crude oil storage reserves at Manglore, Vishshapatnam and Padur. This strategic reserve will be in addition to the existing storages facilities of various public sector oil companies. These stores are located along the coast so that reserves could be easily exported during disruptions. In 2011, the government announced new plans to reach a crude reserve capacity of 132 million barrels by 2020.

In 2013, India's petroleum minister Veerappa Moily declared that India would work on an an action plan to make India energy independent by 2030. On the issue of energy, the BJP's election manifesto realizes that "the need to focus on generation and distribution of power as a national security issue, so that the growth is not negatively impacted due to supply issues in the energy sector." It promised that "steps will be taken to avoid over-dependence on any one fuel and ensure supplier diversity, to avoid reliance on one supplier, country and developing indigenous

capacities to meet the emerging needs". The BJP has promised that it will come out with a responsible and comprehensive 'National Energy Policy'. It would "focus on the development of energy infrastructure, human resource development and upgradation of technology and take steps to maximize the potential of oil, gas, hydel power, ocean, wind, coal and nuclear sources. It also considered that "energy efficiency and conservation crucial to energy security". It would set up small-hydro power generation projects, take Steps to increase the domestic coal exploration and production, oil and gas explorations would also be expedited and give a thrust to renewable sources of energy as an important component of India's energy mix. It has also promised to expand and strengthen the national solar mission (BJP Election Manifesto 2014, p. 34).

4.3 Energy diplomacy

In the last decade, "energy diplomacy" has also become one of the main agendas of country's foreign and security policy. India is seriously considering its nuclear energy option as well as importing sources beyond the Middle-East. Bilateral nuclear agreements with the US, France, Russia and Canada; as well as consistent engagements with the countries of Eurasia, Africa and Latin America could be seen from this perspective. The external dimension of energy efforts by India include; (1) acquisition of assets abroad through acquiring equity participation in developed fields, and obtaining exploration-production contracts in different parts of the world; (2) entering into long-term LNG supply contracts; (3) pursuing transnational gas pipeline proposals; and (4) promoting partnerships with foreign entities in the downstream sector, both in India and abroad (Ahmad 2005).

In an attempt to diversify oil and gas imports, Indian companies are trying hard to get a strong foothold in the Eurasian region. Investment in Russia's Sakhalin-1 field, and the purchase of Imperial Energy by the Indian public sector company Oil and Natural Gas Corporation (ONGC) in 2009 are efforts in this direction. India views Kazakhstan as an important energy player in Central Asia. Competition in this region is very fierce as China is also pursuing the same strategy. At the same time, rapidly growing trade and economic relationship between India and China may also compel them to talk of building partnerships in other areas. Earlier both declared their intentions of cooperation in oil and gas biddings. India also mooted the idea of Asian regional cooperation in energy, and initiated a dialogue between principal Asian suppliers (Saudi Arabia, UAE, Kuwait, Iran, Qatar, Oman) and principal Asian buyers (India, China, Japan, Korea). These efforts showed some results when China National Petroleum Corporation (CNPC) and India's ONGC mounted a successful $ 573 million joint bid to acquire Petro-Canada's 37% stake in the al-Furat oil and gas fields in Syria. Earlier they worked as joint operators in Sudan. India and China may be cooperating in other areas, but when it comes to Central Asian energy, cash rich China has shown that it can outmaneuver India in energy deals. This was clearly illustrated in late 2005 when China outbid India to acquire

PetroKazakhstan, Kazakhstan's third-largest oil producer with CNPC raising its bid to $ 4.18 billion. In 2013, the ONGC again lost another $ 5 billion deal for the kashagan field to China.

The Indian government has encouraged Indian companies to aggressively peruse equity oil and gas opportunities abroad. According to the Ministry of Petroleum and Gas, currently India's oil companies are present in 22 countries namely Vietnam, Russia, Sudan, Myanmar, Iraq, Iran, Egypt, Syria, Cuba, Libya, Mozambique, Brazil, Kazakhstan, Gabon, Colombia, Trinidad and Tobago, Nigeria, Venezuela, Oman, Yemen, Australia and Timor-Leste. The total investment by oil PSUs (OVL, OIL, IOC, HPC, GAIL and BPRL) overseas is ₹ 64,832 crore (about ₹ 650 billion). In 2010–2011, ONGC Videsh produced 9.4 million t of oil and oil equivalent gas (equal to 22 % of domestic oil production) from its assets in Sudan, Vietnam, Venezuela, Russia, Syria and Colombia. The ONGC Videsh which has been active in overseas acquisitions, has made investments in Russia (Sakhalin 1, Imperial energy about $ 3.5 billion); Vietnam (about US$ 460 million); Kazakhstan (25 % stake in Satpaypev block about US$ 110 million); Myanmar (about US$ 385 million); Cuba (US$ 100 million); Venezuela (US$ 190 million) and Nigeria (about US$ 260 million). The company has alos made investments in Iraq, Brazil, Columbia, Syria, Sudan, South Sudan and Libya. OMEL also had exploration blocks in Turkmenistan which it has surrendered due to limited hydrocarbon potential. Similar efforts are being persuaded in Latin America and Africa as well.

4.4 Gas Pipelines

India is also exploring the possibility of importing gas through pipelines from Turkmenistan, Iran, Myanmar and Bangladesh. In the last 15 years, there has been a lot of discussion on the Turkmenistan-Afghanistan-Pakistan-India (TAPI) gas pipeline. Earlier, analysts highlighted many uncertainties concerning the project. These included gas reserves in Turkmenistan; security situation in Afghanistan; and strained relations between India and Pakistan. Despite all these challenges, all parties have considered the proposal very seriously. In the last couple of years, the project has been discussed at almost every major international meeting concerning Afghanistan. This has been one of the main agenda at every Regional Cooperation Conference on Afghanistan (RECCA). As per latest reports, the proposed 1700 km pipeline will run from the South Yolatan Osman fields in Turkmenistan to Afghanistan, from there it will be constructed alongside the highway running from Herat to Kandahar, and then via Quetta and Multan in Pakistan. The final destination of the pipeline will be to Fazilka in Indian Punjab. The project can transport up to 30 billion cubic meters of natural gas annually from Turkmenistan to South Asian countries. The agreement signed by the countries envisage delivery of 90 million cubic metres per day (mmcmd) of gas from Turkmenistan to participating countries with 38 mmcmd each going to Pakistan and India and 14 mmcmd for Afghanistan. India was formally invited to join the project in 2006. Earlier India was participating in the talks

as an observer along with the ADB, Turkmenistan, Afghanistan and Pakistan. The ADB has acted as the TAPI Secretariat since 2003. In the last 10 years, it has also played a useful role in coordinating and facilitating the TAPI negotiation process, mainly through its small Technical Assistance (TA) projects costing a few million dollars. Initially when concerns were raised about gas reserves, the Turkmen government in 2006 informed the members that an independent firm, De Golyer & McNaughton, had confirmed reserves of over 2.3 trillion cubic meters (TCM) of gas at Dauletabad field. With major discoveries at South Yolotan (located in the southeastern Murgab Basin north of the Dauletabad field), however, many of these concerns subsided. Although instability in Afghanistan has been one of the main obstacles for the project, international attention on Afghanistan has kept the project alive in all these years.

In the last few years, all four countries involved in the project have already signed most agreements required for its commencement. These include: an Inter-Governmental Agreement (IGA), a Gas Pipeline Framework Agreement (GPFA) and Gas Sales and Purchase agreement. A broad agreement on transit fee has also been agreed upon. Early last year, India and Pakistan agreed on the principle of a 'Uniform Transit Fee'. Basically, it meant that Pakistan will accept whatever transit fee India and Afghanistan agree upon. Later, the Indian government approved the payment of 50 cents per million metric British thermal units as the transit fee to Pakistan and Afghanistan. To accelerate the project, parties have formed a ministerial level Steering Committee and Technical Working Group. In February this year, the Indian government approved the formation of the Special Purpose Vehicle (SPV) for the TAPI project and permitted Gas Authority of India Ltd (GAIL) to join the SPV. With initial $ 20 million contribution, Dubai-based SPV, TAPI Ltd, would take up the feasibility study and design work as well as search for a consortium lead. All four countries have agreed to the concept and Indian GAIL has made commitment for the initial investments of $ 5 million in TAPI Ltd. In July 2013, Petroleum and energy ministers of four countries agreed for the registration of TAPI Ltd by September. In addition, Afghanistan and Turkmenistan signed a separate gas sale-purchase agreement.

Recently, even Bangladesh has shown interest in joining the project. Knowing the history of the project, significance of these developments cannot be underestimated. It means that the ground work for the project is ready. Now it is time to commit serious finances for it. According to an earlier pre-feasibility study done by Penspen, the estimated cost of the project is about $ 7.6 billion. Many recent reports quote the figure of about $ 9–12 billion. According to the ADB, the estimated design and construction period for the project is about 4 years. Since this is a large complex project, it was thought by all partners that they will need to attract a major energy company to lead the consortium, which will facilitate investment, manage construction and operate the pipeline.

To attract potential project partners, three road shows were organized in Singapore, New York and London in September-October 2012. These road shows were coordinated by the ADB and attended by representatives from all four participating countries. The Singapore road show was attended by many companies and financial

intuitions including Petronas, Temasek and State Bank of India. In New York, many leading firms such as Chevron and Exxon Mobile, CITI Group and US Exim participated. Among others, British Petroleum, Shell, British Gas and Morgan Stanley attended the London road show. All these companies have shown keen interest. Still, no one is willing to commit resources at the moment due to the uncertain Afghan situation.

Although the whole US administration is pushing for the project, the US Energy Information Administration feels that: 'the likelihood of such a pipeline coming online in the next few years is very slim due to the logistical and security challenges.' It is also reported that many oil majors may become interested in the project if they are given a stake in the upstream fields in Turkmenistan. Earlier Turkmenistan had given a stake to a Chinese company in its gas fields for the Turkmenistan-China gas pipeline. The Turkmen government now says that its new law does not allow stakes in gas fields. After lack of success in finding a lead partner, at the recent steering committee meeting in Ashgabat there were reports that the participating countries have agreed to appoint ADB as a transaction advisor were ready to sign a transaction advisory agreement with the ADB to raise funds for the project. The strategic significance of the project is great. If implemented, the TAPI gas pipeline can become a 'game changer' in regional geo-politics and regional economic integration. It has the potential to smoothen the 'Decade of Transformation' for Afghanistan. The time has come to commit serious finances for the project. In the absence of any major energy company coming forward, international financial organizations like the ADB has to take a serious look at the project and commit finances for TAPI.

Despite many security and political difficulties, India continues to be engaged in discussions on the TAPI as well as Iran-Pakistan-India (IPI) gas pipeline projects. The Indian state owned Oil and Natural Gas Corporation (ONGC) has now started floating the idea of bringing Russian hydrocarbons to India via Kazakhstan, Uzbekistan, Afghanistan and Pakistan. The idea is already under serious discussion at official and unofficial meetings. It seems that the ONGC Videsh Ltd. (OVL), the international arm of the ONGC, is awaiting political clearance to announce concrete technical details. The idea was first floated during the Kazakh foreign minister's visit to India in March 2013 and later on the sidelines of the "Heart of Asia" ministerial meeting in Almaty. The issue was also discussed during the Indian External Affairs Minister's visit to Moscow in late April. It was initially suggested that the pipeline would start in the southern Kazakh city of Shymkent, an oil refining hub, and then run south through Uzbekistan and reach Afghanistan. From Afghanistan it may follow the TAPI route. Since extensive energy linkages already exist between Central Asia and Russia, the proposed route was further extended north to open Russian hydrocarbon exports to South Asia. From the Gazprom Central Asia-Centre pipeline, built during the 1960s, linkages have previously existed to Mazar-e-Sharif in Afghanistan and these could be revived again. The distance to the Indian border from Mazar-e-Sharif is about 1200 km. The ultimate idea is to establish an energy corridor of gas and oil pipelines linking South Asia to the Eurasian region. If needed, parallel road corridors could also be constructed. Another pipeline project,

importing gas from Myanmar, is also struck due to regional geopolitics. India and Myanmar signed a deal in 2006 to build a 900 km pipeline that would have crossed Bangladesh. Indecision from Bangladesh delayed the project and another pipeline proposal between Myanmar and China further complicated the matter. There were also reports of India and Myanmar discussing alternative proposals linking the pipeline directly with Indian northeastern States. Since the beginning of 2010, there are reports that the new Bangladesh government has agreed to a tri-nation gas pipeline (Bhaskar 2010). In this case, the Myanmar-Bangladesh-India gas pipeline may materialize in the next couple of years.

For more than a decade, India has also been exploring the possibility of importing gas through pipelines from Turkmenistan, Iran, Myanmar and Bangladesh, albeit with little success. Although India is geographically relatively close to four major gas producing nations, Russia, Iran, Turkmenistan and Qatar, the country is not receiving any gas from these exporters via pipelines. India has negotiated a long term agreement with Qatar to supply LNG but this seems to be a relatively expensive proposition. There are also discussions on a deepwater transnational gas pipeline from Oman for transporting natural gas sourced from Turkmenistan, Iran and Qatar to India. Overall, it is quite clear that apart from the economics of the project, almost every pipeline plan to India must be weighed against security issues (Afghanistan/Pakistan), political issues (India-Pakistan relations, the U.S.-Iran standoff) and solid geo-political and economic competition (China). Hence, if India is serious about obtaining energy through pipelines, it needs to put solid political weight behind these proposals and must also work out a grand strategy to deal with these related issues simultaneously. The present energy outlook makes clear that Indian policy makers do not have the option of waiting. Thus, along with TAPI and IPI India will also be pushing for Russia-India hydrocarbon pipelines.

4.5 Role of Renewable Energy

As part of domestic energy security debate as well as broader national and international climate change discourse, the issue of renewable energy is becoming important in India, Although from a very small base, India has tripled its renewable energy capacity and now ranks fifth in the world in total installed renewable energy capacity. India is also trying to establish legal and regulatory framework for this sector. The Indian government has also set an ambitious target of generating renewable energy by 40–55 GW by 2022. According to a recent study by the World Bank India has 150 GW of renewable energy potential, about half in the form of small hydropower, biomass, and wind and half in solar, cogeneration, and waste-to-energy. If this potential is realized, it can obviously improve India's energy security as well as its standing in renewable energy industry (Sargsyan et al. 2012). Different department of the government have come out with their own ambitious plans. The National Action Plan on Climate Change (NAPCC) has set its goal of a

Table 4.4 Changing structure of fuel for electricity in India 2012–2030. (Source: Government of India, Twelfth Five Year Plan: 2012–17, Vol. 2, p. 147)

	Capacity (%)			Generation (%)		
	2012	2017	2030	2012	2017	2030
Coal	56	57	42	70	60	58
Oil	1	1	0	0	0	0
Gas	9	6	3	7	5	3
Hydro	20	15	13	14	12	11
Renewables	*12*	*17*	*33*	*6*	*9*	*16*
Nuclear	2	4	9	3	5	12
Total clean energy (4+5+6)				23	26	39

1% annual increase in renewable energy generation. To fulfil this target, it would require about 40–80 GW of additional capacity in renewable energy capacity by 201. The Jawaharlal Nehru National Solar Mission (JNNSM) had set its own target of adding 1 GW of capacity between 2010 and 2013. It aims to increase combined solar capacity from 9 MW in 2010 to 20 GW by 2022. It is argued that renewable energy will not only new capacity but also address climate change concerns and open up a huge market for renewable energy products. As seen from the following table (Table 4.4), more than 75% of electricity generation in Indian depended on coal and gas. So improvement in renewable energy in electricity generation will make India more self sufficient and environmentally friendly.

It is argued that renewable can also improve balanced regional development as many less developed states have more renewable potential. As renewable is also seen as an emerging big new technology industry, it can also provide tremendous opportunities for many Indian companies to become world leaders.

One of the major hurdles of switching to renewable energy is high unit cost compared to other conventional sources. Even though it has come down in the last few years, still it is likely to remain high in the near to medium run. There are however, some indications that in the next 10 years, it may come down to sustainable levels. Since India has large potential of solar and wind energy, it is going to be part of a long term strategy. After thoroughly studying all aspect of new and renewable energy, the Planning Commission has identified the following major issues concerning renewable in India (Twelfth Five Year Plan, pp. 183–184):

1. Regional Concentration of Renewable Energy Potential
2. Insufficiency and High Cost of Evacuation Infrastructure:
3. Regulatory Issues
4. Financial Barriers
5. Low Penetration of Renewables for Urban and Industrial Applications

Despite these problems, by March 2012, about 15,000 MW additional power capacity additions was made through renewable power (Table 4.5). This included 10,260 MW in wind, 1419 MW in small hydro, 939 MW in solar, 626 MW in Biomass, 1370 MW in bagasse cogeneration and 46 MW in waste to energy.

Table 4.5 Eleventh Plan (2007–2011) power capacity addition through grid interactive renewable power. (Source: Government of India, Twelfth Five Year Plan: 2012–17, Vol. 2, p. 185)

	Target (MW)	Actual (MW) as on 31 March 2012
Wind	9000	10,260
Small hydro	1400	1419
Biomass power	500	626
Waste to energy	80	46
Bagasse cogeneration	1200	1370
Solar power	50	940
Total	*12,230*	*14,660*

Table 4.6 Estimated initial capital cost and cost of electricity generation through renewables in India. (Source: Government of India, Twelfth Five Year Plan: 2012–17, Vol. 2, p. 186)

	Estimated initial capital cost Rs in crore/MW	Estimated cost of electricity generation (financial) Rs/KWh
Small hydro power	5.50–7.70	3.50–4.88
Wind power	5.75	3.73–5.95
Biomass power	4.0–4.05	5.12–5.83
Bagass cogeneration	4.20	4.61–5.73
Solar power	10.00–13.00	10.39–12.46

Although targets have been met still there are plenty of issues, particularly with wind and solar energy related to connectivity, price and land issues. Private investments in wind energy has also increased, still they face issues concerning economies of scale. The cost of per MW of power in the wind sector has actually increased (Table 4.6) from 4.3 crore/MW in 2003 to about 5.7 crore/MW in 2010. Land acquisition costs and legal issues has made project cost more complicated. Even small hydro projects are also facing similar issues. Although costs of solar power is coming down, still it is quite high. It is only hoped that with newer technologies developed in China and other countries may bring costs down so in the medium to long run one can witness a trend moving towards renewable. Till that time, it has be based on some kind of subsidization regime.

Overall, the twelfth Plan strategy concerning new and renewable is as follows:

1. Grid interactive and off-Grid/Distributed Renewable Power
2. Renewable Energy for Rural Application
3. Renewable Energy for Urban, Industrial and Commercial Applications
4. Research, Design and Development for New and Renewable Energy
5. Strengthening of Institutional Mechanism for enhanced deployment and creation of public awareness (Planning Commission 2012, pp. 187–193).

Physical targets for renewable for the 12th Plan are given below (Table 4.7):

Table 4.7 Physical targets for renewables for the 12th Plan (2012–2017). (Source: Planning Commission 2012, p 194)

	Programme	Proposed Twelfth Plan
1.	Grid-interactive renewable power(MW)	30,000
	Grid interactive solar	10,000
	Grid connected wind	15,000
	Other renewable sources	5000
2.	Off-grid/distributed renewable power (MWe)	3400
	Cogeneration from bagasse	2000
	Solar off-grid applications	1000
	Waste to energy	200
	Bio gas based decentralised power	50
	Others (Biomass gasifiers, Micro-hydel)	150
3.	Renewables for rural applications (cooking)	
	Biogas plants (million)	0.7
	National Biomass Cook stoves Programme (million)	3.5
	Solar cookers (box type + dish type)	3.5
	Solar cooking in schools for mid-day scheme (schools in lakhs)	5.0
4.	Renewable energy for urban, industrial and commercial applications	
	Solar water heating systems (million sq.m. of collector area)	6
	Solar air heating system (sq.m.)	
	CST based systems for community cooking (sq.m.)	50,000
	CST based system for air-conditioning	40,000
	(125 systems, 30TR)	37,000
	CST based systems for process heat	
	(225 systems, 250 sq.m. area each)	53,750
5.	Solar cities	
	New solar cities in addition to existing target of 60 cities and pending liabilities	15
	Model and pilot solar cities	
	Green townships	25
	Tourist/religious/important places	150
		100
6.	Alternate fuel vehicles (in numbers)	275,000
7.	Power generation from hydrogen	
	Stationery power generation (KW)	4000
	Hydrogen/H-CNG stations (nos)	10
	Demonstration projects for hydrogen/H-CNG vehicles	500
8.	Power generation from fuel cell	10.0
	Stationery power generation (KW)	10/2000
	Back-up units for telecom towers (MW/nos)	
	Fuel cell vehicles	100

4.6 Cooperation with Europe in Renewables

Despite different levels of development, both India and Europe are facing some similar challenges related to their energy security. In Europe, energy has been a fundamental factor in the construction of EU project (ECSC/EURATOM). Europe as a major energy consumer faces a number of challenges. These include rising global demand and competition for energy resources from emerging economies; persistent instability in energy producing regions; and growing need to shift fuels in order to address climate change policy. There are serious gaps between intentions and outcomes in the energy sector in the EU. The evolving common energy policy has achieved only a limited success. Still from the mid-1980s, the Commission has been able to establish a place in Member States's energy policies. A key element of the EU's energy supply strategy has been to shift to a greater use of natural gas. This however will increase its dependence further on Russia. The 2007 energy policy of Euopre has three facets (1) sustainability: common European response to global warming; goal of 20 % reduction in greenhouse gases from 1990 level, by 2020 (2) security: need to diversify supplies of natural gas—new hubs in CEE, Baltics, new gas pipelines etc (3) internal energy market. Another aspect of new policy has been € 1 trillion of infrastructure investments in the energy sector by 2020. Out of this around € 200 billion is required for the construction of gas pipelines and electricity grids. Energy 2020 strategy (2011) and Energy roadmap 2050 have also provided different targets. The EU energy policy is supported by market-based tools (taxes, subsidies and the CO2 emissions trading scheme); developing energy technologies (especially technologies for energy efficiency and renewable or low-carbon energy); and Community financial instruments.

In 2007, the EU endorsed a binding target of a 20 % share of renewable in total energy consumption by 2020. In addition, the EU also agreed for 10 % binding minimum target by individual countries for the share of biofuels in overall petrol and diesel consumption. Further directives in 2009 also worked plans to achieve these targets. In 2012, already about 12 % share of energy consumption within the EU came from renewable (see Table 4.8). The largest increase in its share has come

Table 4.8 Share of renewable energy in selected EU countries, 2004–2020 (percentage share of total gross consumption of energy). (Source: Eurostat News Release 2014)

	2005	2012	2020 (target)
EU	*8.5*	*11.6*	*20.0*
Austria	22.7	32.1	34.0
Denmark	14.5	26.0	30.0
Finland	29.2	34.3	38.0
France	8.3	14.2	23.0
Germany	5.8	12.4	17.0
Italy	5.7	13.5	17.0
Spain	8.3	14.2	20.0
Sweden	38.7	51.0	49.0
Portugal	19.2	24.6	31.1

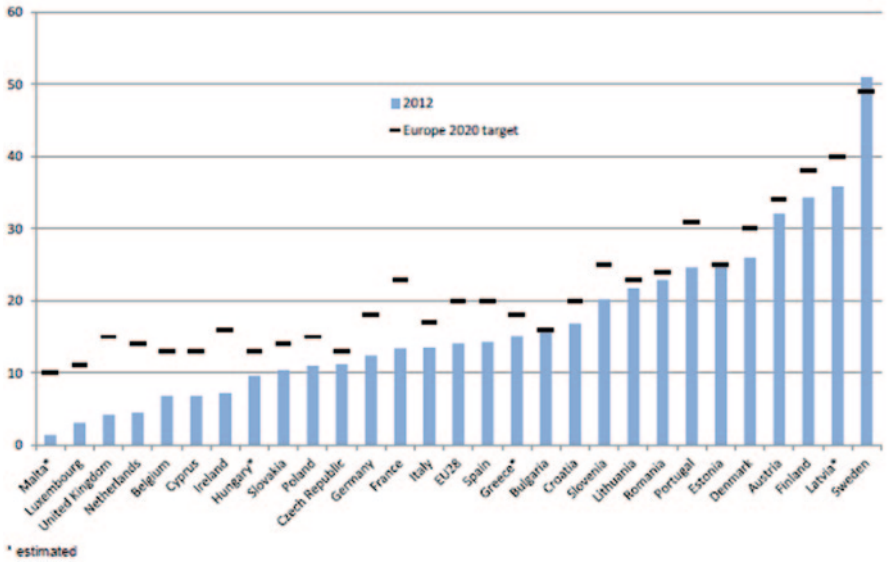

Fig. 4.1 Share of renewable energy per EU member state and 2020 target. (Source: Eurostat News Release 2014)

from countries like Sweden, Denmark and Austria. Share of renewable in every country and 2020 target is shown in Fig. 4.1.

Since Europe is investing significantly in the renewable sector with binding committmnets, there is tremendous scope for cooperation (EU-India Renewable Opportunities 2010). Despite some common challenges and tremendous opportunity to work together, there is a perception here that EU and India somehow have diametrically opposite views on global norms concerning energy security and environment. So the major challenge is to change this perception. Already in some areas, bilateral cooperation is happening. At the 5th EU-India Summit (2004) an energy dialogue was established. In 2005, working groups in coal, clean coal technologies, energy efficiency etc were established. At the 12 India-EU Summit (2012) a separate joint declaration on energy cooperation was issued. For bilateral cooperation India and EU have identified six areas. These include clean coal; energy efficiency of products; energy efficiency in buildings; grids (including integration of renewable); cost-effective ways to promote renewable energies; safety (off-shore and nuclear). So now the scope of the energy dialogue established with India in 2004 has been extended further with special focus on renewable.

4.7 Conclusion

At this stage of economic modernization, India is adapting to economic globalization and to the emerging Asian and global balance of power. Its accelerated economic performance has impacted upon its foreign policy and its engagement within

Asia and with great powers. Accelerated growth has also forced India to synchronize its energy security issues within its foreign and security policy. In the coming years, actions and commitments on the energy front will shape India's relations with countries like US, Russia, China and Iran. In the past, external energy policy meant securing reliable supplies from the Gulf. More recently it included multiple strategies of diversification, acquiring assets abroad and pipeline politics. In future, protecting supplies from different sources as well as assets abroad will also become part of national security. Despite all these efforts, coal will continue to be India's main energy source and the Gulf region will continue to be its main source of oil and gas. India and Russia have been cooperating in the field of energy for more than a decade now. If proposed Russia-China gas pipeline is extended to India, it will usher a new era of cooperation between these three major countries. In the domestic front, we can witness major policy changes in the area of coal production with private sector participation, power sector reforms, rationalization of fuel prices, efforts in the direction of energy efficiency and demand management. Within emerging dynamics, it is also expected that nuclear and hydro power as well as renewable will be playing a relatively bigger role. A major action will be creation of legal and institutional framework to implement all these policies. Although from a very small base, India has improved its renewable energy capacity and the government has set very ambitious targets. Since more than three fourths of electricity generation in India depended on coal and gas, improvement in renewable energy in electricity generation will make India more self sufficient and environmentally friendly. Since India has a large potential of solar and wind energy, it is going to be part of a any long term strategy. Apart from small hydro projects, at the moment this sector is facing various problems due to high cost, connectivity infrastructure and land issues. It is also concentrated in few states and away from urban areas. So achieving government targets may also need significant subsidies in the years to come. Despite these problems, the policy makers are committed to provide significant boost to renewable in the coming years.

According to *World Energy Outlook*, China will add more electricity generating capacity from renewable sources by 2035 than the U.S., Europe, and Japan combined. Hydro power and wind power will be the two main sources of China's renewably sourced electricity, with solar photovoltaic cells coming in a distant third (Coy 2013). China has already become leader in manufacturing of renewable energy equipments. It has become one of the world's top producers of small hydropower equipment, solar water heaters, and solar photovoltaic panels. If China is able to bring equipment costs, particularly of solar panels, this could have major impact on Indian renewable sector. As China has heavily invested and clearly emerged as a global leader in renewable energy equipments, India can also benefit due to economies of scale and technological up-gradation happening there. This is clearly an area where there is limited competition and possibility of more cooperation because of "common goal and same challenges" (Liming 2007, pp. 1739–1757). As far cooperation with Europe is concerned, the general perception is that somehow India and Europe have different views on global norms concerning energy security and environment. This has been reflected in recent past on global negotiations concerning climate change and environment. However, on renewable, there is a clear

possibility of cooperation. As many European countries have significantly increased their renewable energy consumption, India could clearly benefit through technology transfer and creating mechanisms for switching towards renewable. This is also an area in which it seems European policy makers are seriously committed to help developing countries. As a strategic partner of the EU, India should take advantage of these emerging opportunities.

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Chapter 5
Can 'Emerging' Energy Super-Power Russia Facilitate Energy Security of India?

R. G. Gidadhubli

Russia has enormous energy resource potentialities in the world. So far as hydrocarbon resources are concerned, in global terms the share of Russia is about 10–12 pc of oil and one-third natural gas. Russia with about 30–32 pc of proven natural gas reserves overtakes other energy rich countries–Iran 15 pc, Qatar seven pc, Saudi Arabia and the UAE each four pc and the USA and Algeria each about three pc. Huge domestic energy resource potentialities provided a basis for Russia to emerge as a major energy power. Hence the objective of this paper is to examine how Russia has been trying to 'Emerge' as Energy Super Power and how Russia can facilitate energy security of India.

5.1 Energy Resource Potentialities

At the outset it needs to be stated that even during the Soviet era, Russia was the main republic in terms of energy potentialities as compared to other republics such as Azerbaijan, Kazakhstan, Turkmenistan, which are also endowed with huge hydrocarbon resources. Russia also has the second largest coal reserves in the world and eighth largest oil reserves. Moreover, the country has been endowed with uranium resources, which has enabled the country to develop nuclear energy technology and even to become a major power producer of nuclear energy.

Russia's hydrocarbon resources are located in various parts of the country namely Volga-Urals, West Siberia, East Siberia, Sakhalin region, Caspian Sea region and the latest is the Arctic region. Russia's proven oil reserves were 80 billion barrels as of January 2013, according to the *Oil and Gas Journal*. Most of Russia's resources are located in Western Siberia, between the Ural Mountains and the Central Siberian Plateau and in the Volga-Urals region, extending into the Caspian Sea. Before the

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Soviet breakup these were considered as the major regions from the perspective of exploration and exploitation of hydrocarbon reserves.

During the last about two decades, Russia has paid attention to develop new oil and gas fields. Hence East Siberia, Sakhalin Island and Arctic region are assuming importance with huge hydrocarbon energy potentials. Analysts opine that Eastern Siberia holds some reserves, but the region has had little exploration in the past. There are several reasons for the growing importance of these new energy regions. Firstly, as a result of intensive exploitation of oil resources for decades, there has been some depletion of hydrocarbon resources from the old energy fields. Secondly, after the Soviet breakup, Russia cannot afford to depend upon energy potentialities of Central Asia and Azerbaijan. Thirdly, with growing global demand for oil and natural gas and rising international prices, Russia saw an opportunity to develop new energy fields to sustain its role in the global market and earn much needed petro dollars.

It is also important to note that Russia has been able to attract advanced western technology and foreign capital in its energy sector. Hence the potential oil reserves of Eastern Siberia, the Russian Arctic, the northern Caspian Sea, and Sakhalin Island are attracting attention. This is evident from the fact that during the last one and half decades a number of international oil companies have secured acreage and are investing heavily in exploration and development of hydrocarbon-rich East Siberian and Sakhalin Island. After many Western oil giants made significant success in their task of exploration and exploitation, they were forced to face a situation when the Russian government started pushing for a greater role for domestic companies in these projects. For instance, Gazprom acquired control of the Sakhalin-2 project from Shell, and it is seeking control of the marketing of gas supplies from the Sakhalin I project, led by Exxon Neftegas Limited, a subsidiary of ExxonMobil. Russian companies are also expanding into the Arctic and Eastern Siberian regions, spurred on by tax holidays and lower oil export tariffs. As opined by some analyst, while several new fields have come on line since 2009, bringing additional fields into production will take time and may require a reformed oil tax regime from the government.

In the case of the Arctic region which has assumed global significance, according to western analysts in 2008 there were reports which reinforced fears that Moscow intended to annex “unlawfully” a vast portion of the ice-covered Arctic, beneath which scientists believed up to 10 billion t of gas and oil could be buried. It is opined by Sean Rayment that the Russian ambition for control of the Arctic has provoked Canada to double to $ 40 million (£ 20.5 million) funding for work to map the Arctic seabed in support its claim over the territory.

While Russia has been actively pursuing its interest in the Arctic region, Western analysts claim that no country owns the Arctic Ocean or the North Pole even as under the 1982 UN Law of the Sea Convention, each country with a coast has exploitation rights in a limited “exclusive economic zone”. On ratification of the convention which America has yet to ratify it, each country has 10 years to make claims extending its zone.

As stated earlier apart from oil, Russia has huge resource potentialities of natural gas. According to the report of *Oil and Gas Journal*, Russia held the world’s largest

natural gas reserves, with 1688 -trillion cubic ft (Tcf), as of January 1, 2013. Russia's reserves account for about a quarter of the world's total proven reserves. The majority of these reserves are located in Siberia, with the Yamburg, Urengoy, and Medvezh'ye fields alone accounting for more than 40 pc of Russia's total reserves, while other significant deposits are located in northern Russia.

5.2 Oil and Natural Gas Production

In the background of the update of resource potentialities of hydrocarbon resources, an effort has been made to analyze the trend in the production of oil and natural gas in the country. According to Russian official data, the Production of oil has increased from 323 million t in 2000 to 518 million t in 2012 which is about 60 pc rise in 12 years. Export of oil also increased by 70 pc during this period. In fact sharp rise in production and export was evident since 2002 when international price for oil started increasing from about $ 49 per barrel to over $ 145 per barrel in 2007. Even as subsequently there was decline in oil prices, production level was sustained and that Russia has emerged as the major exporter of oil and gas in the world overtaking other exporting countries including Saudi Arabia, Iran etc. The importance of energy sector for the economy is evident from the fact that in 2011–2012 it accounts for about 30 pc of Gross Domestic Product. Equally significant is the fact that about 65 pc of Russia's exports comprised of oil and natural gas.

So far natural gas is concerned the state-run Gazprom dominates Russia's upstream, producing about 74 pc of Russia's total natural gas output. Gazprom also controls most of Russia's gas reserves, with more than 65 pc of proven reserves being directly controlled by the company and additional reserves being controlled by Gazprom in joint ventures with other companies. In 2012, Russia produced an estimated 10.4 million bbl/d of total hydrocarbon liquids, of which 9.9 million bbl/d was crude oil. Russia consumed roughly 3.2 million bbl/d and exported over 7 million bbl/d in 2012. Major oil producing fields are—Rosneft, Lukoil, TNK-BP, Surgutneftgaz, Gazprom Neft. (See Tables 5.1 and 5.2) (Fig. 5.1).

A substantial portion of Russia's oil production continues to originate from West Siberia, notably from the Priobskoye and Samotlor fields. The Sakhalin group of fields in the Far East contributes about 3 pc of Russia's total production, although it has yet to fulfill the expectation that it would contribute significantly to Russia's total oil production. In the longer term, however, Sakhalin, along with the untapped oil reserves in Eastern Siberia and the Russian Arctic, may play a larger role. Several international oil companies are actively working in this area. The Russian sector of the Caspian Sea and the undeveloped areas of Timan-Pechora in northern Russia which also hold large hydrocarbon reserves have been other major producers of oil. According to some reports any decline in Western Siberia's oil production in the near future will be offset by growing production in green field projects in newer oil provinces. These include projects in Eastern Siberia, Yamal Nenets and Sakhalin in the Far East.

Table 5.1 Russia's oil production by company, 2012. (Source: Eastern bloc energy)

Company	Thousand bbl/d
Rosneft	2448
Lukoil	1670
TNK-BP	1493
Surgutneftegaz	1223
Gazprom Neft	626
Tatneft	518
Slavneft	356
Gazprom	314
Bashneft	307
Russneft	295
PSA operators	283
Novatek	85
Others	697
Total	*10,315*

Table 5.2 Russia's gas production by company, 2012. (Source: Eastern bloc energy)

Company	Bcf/d
Gazprom	47.1
Rosneft	1.2
LUKoil	1.6
Surgutneftegaz	1.2
TNK-BP	1.3
Others	1.6
ITERA	1.2
Novatek	5.5
PSA operators	2.6
Total	*63.4*

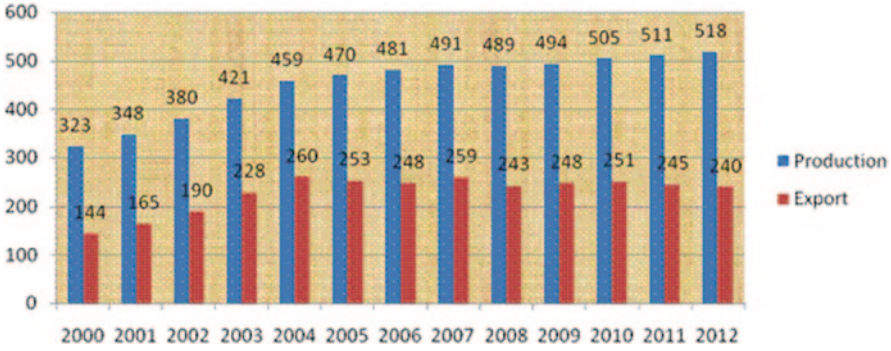

Fig. 5.1 Russian oil production and production (million tonnes). (Source: Ministry of energy of the Russian federation)

In terms of oil production status, Russia has been competing with Saudi Arabia during the last over two decades as one of the highest ranking countries at the global level. In fact Russia surpassed Saudi Arabia as the world's largest oil producer in September 2009 for the first time since the collapse of the Soviet Union. While independent producers have gained importance, with producers such as Novatek and LUKoil contributing increasing volumes to Russia's production in recent years, upstream opportunities remain fairly limited for independent producers and other companies, including Russian oil majors. Gazprom's position is further cemented by its legal monopoly on Russian gas exports, although according to some analysts its monopoly on gas exports may be contested in the long run. This is due to the fact that the Russian government has announced that it intends to liberalize liquefied natural gas (LNG) exports starting in January 2014, breaking Gazprom's absolute export monopoly.

From what is stated above, it is evident that there has been extensive and intensive effort made in exploration and production of hydrocarbon resources since the country became independent. For instance, several state-owned and private sector energy firms are playing a crucial role in the energy sector. Mention may be made of Gazprom, Lukoil, Sibneft, Rosneft, Yukos, Surgutgas, Tatneft, Slavneft etc. (Table 5.3). As per western sources, information about the ranking of Russian oil-natural gas companies in terms of market capitalization, proven oil and gas reserves in 2010 can be had from the data given provided in Table 5.3. From the data it may be stated that Gazprom is the largest company with market capitalization of about $ 348 billion and it has the largest proven natural gas reserves. Rosneft, Lukoil are important companies in terms of market capitalization by virtue of their huge proven oil reserves exceeding 15 billion barrels.

Thus many Western energy analysts contend that the state-owned natural gas producer Gazprom has been the poster boy of Russia's energy industry for years, standing head and shoulders above all other Russian producers. The world's largest natural gas company accounts for 83 pc of Russia's natural gas production and 17 pc of global gas production. With the exception of Gazprom, most other companies in the sector are predominantly oil producers, with natural gas comprising only a portion of their proved reserves.

Table 5.3 Market capitalization and reserves of oil and gas of major companies. (Source—EIA 2011)

Rank	Company	Market[Image] cap (USD)	Proved crude oil[Image] reserves	Proved gas reserves
1	Gazprom	$ 348 billion	5.9 bln barrels	18,200 bln m^3
2	Rosneft	$ 73 billion	15.9 bln barrels	701 bln m^3
3	Lukoil	$ 65 billion	15.7 bln barrels	765 bln m^3
4	Surgutneftegas	$ 36 billion	Does not disclose reserves	–
5	TNK-BP holding	$ 28 billion	10.3 bln barrels	–
6	Gazprom neft	$ 28 billion	6.9 bln barrels	–
7	Novatek	$ 15 billion	–	690 bln m^3
8	Tatneft	$ 10 billion	5.9 bln barrels	37.4 bln m^3

It is important to note that in the long term, the development of unconventional resources has major potential. Oil from shale formations in Western Siberia and projects in the largely unexplored Arctic offshore are two prominent examples. However, according to experts offshore and unconventional projects are often substantially more difficult to develop, primarily due to various factors such as remote locations, harsh environments, lack of infrastructure and less understood geology and so on.

5.3 Pipeline Issues

Russia being a major producer of oil and gas has been a leading exporter of oil and gas to several countries for which network of pipelines connecting oil fields of Russia with markets of the world assume importance. Russia's major pipelines that facilitate export of oil and natural gas are-Druzba 2400 km; Baltic Pipeline System 1 and 2 which together account for 1350 km; North-West Pipeline System 500 km. These pipelines build during the Soviet era connect Russian oil fields to several East and West European countries. Apart from these Caspian pipeline Consortium (CPC) of 940 km starts from Kazakhstan's Tengiz field connects Novorussik port on Black sea passing through Russia. In addition to Kazak oil, Russia's oil fields also benefit from this pipeline. In addition to these Baku-Novorussisk pipe line of 830 km connects Azerbaijan port of Baku to Russia's port of Novosussisk. After the Soviet breakup there has been lot of controversy and differences between Russia and Azerbaijan with regard to this pipeline which Russia wants to utilize for oil exports while Azerbaijan does not benefit to that extent. Russia has been giving importance to meet oil market of China and hence promoted East Siberia-Pacific Ocean (ESPO) pipeline of over 300 km. Russia as a part of 'Look East' policy has been involved in meeting growing energy needs of China. For that in addition to developing energy fields of Eastern regions of Siberia and Sakhalin, network of pipelines are developed linking Russian and Central Asian oil and gas fields with China. (Blagov 2006)

It is important to note that during the last over a decade and half even Russia has been aggressively pursuing its policy to emerge as energy super power with regard to politics of pipeline with the USA and the West European counties. But in the process Russia has been an active participant in the Great Game being played in certain parts of its southern underbelly, particularly in Central Asia. For instance, to counter the US supported Baku Tbilisi Ceyhan (BTC) pipeline and Nabucco pipelines, Russia has proposed South Stream Pipeline to reach out to West European countries in the South and NORD stream pipeline via the Baltic Sea in the North.

Even as the geo-political and geo-economic game has been going on with regard to energy sector, Russian leaders have been trying hard to convince European countries to stick to Russian gas, notwithstanding the transmission risks involving some of its troubled neighbors such as Georgia and the Ukraine. This underlines the importance of the proposed Nord Stream and South Stream gas pipeline projects,

which when completed, would transport Russian gas to Germany and Italy, bypassing the Ukraine.

5.4 Policy—Measures and Strategy

The growth of energy sector has been possible thanks to policy measures adopted by the Russian president Vladimir Putin, who has been holding the political power in Russia during the last about one and half decades. In fact he has set the objective for Russia to ensure that the country emerges as Energy 'Super Power'. For achieving this objective, strategy has been reviewing policy measures to be adopted from time to time to sustain the dynamic growth of this sector. Thus realizing the significance of resource potentialities, the policy was adopted giving due importance to energy sector in economic development of the country.

Looking back, taking over presidency of Russia in 2000, Vladimir Putin's policy priority was to help political stability of the country and consolidate the energy sector under state control. This meant radically reversing the liberal policies being pursued during the previous decade by Boris Yeltsin who was the president of Russia. Hence so far as the energy sector is concerned, the government effectively nationalized the majority of the energy firms under three state behemoths: Gazprom, Rosneft and Transneft. Moreover, the Kremlin leadership became more aggressive in negotiating supply contracts with the former Soviet states and even with the West and East European states, locking them into large volumes at extraordinarily high prices because these customers had no alternative energy supplies. As opined by some analysts, the Kremlin also began cutting energy supplies to certain markets—blaming troublesome transit states such as Ukraine—in order to give shape other political negotiations.

From Russia's perspective though Moscow's energy strategy became fairly aggressive, it helped bring about a stronger and more stable Russia. This is evident from the fact during the period 2002–2007 Russian energy revenues soared also partly due to prevailing rising global oil prices and hence the high natural gas prices being charged for European customers. Thus Russia was able utilize abundant funds to pump into its political, social, economic and military sectors. Energy politics also helped Russia leverage its influence in its former backyard and forced Europe to step back from countering Russia's resurgence. At the same time, in contrast to that when the financial crises swept Europe and Russia in 2008, it reminded Russia of the need to revise its policy when oil prices starting declining and demand also began declining.

Notwithstanding these changing global dynamics, Russia's strategy has been to regain its status as global power and in that geopolitical and geo-economic significance of energy sector has played a key role. Thus in the second half of 2010, the Russian government announced the launch of a $ 32-billion privatization of state-owned assets thus reversing policies being pursued earlier. For instance, among those companies listed for privatization was Rosneft, which was 75 pc owned by the

Russian government. The government also proposed to offer an additional 15 pc of the company's shares between 2011 and 2013. In fact these developments augured well for foreign companies as well that were seeking to invest in Russia.

It needs to be noted that energy giants such as Gazprom and Rosneft have been instrumental in this policy priority of Russian leaders during the last over one and half decades to emerge as energy super power. Aleksei Millar, the chief of Gazprom is close to Putin in translating his policy priorities into reality. Igor Sechin, Rosneft's chairman, has also played a major role in the company's recent rise. For instance, Time magazine has identified Sechin as the "Oil Titan" in its list of the 100 most influential people in the world in 2013. Needless to state that Sechin's policies have been an important factor in the company's surging growth, including its acquisition of the biggest share of the world's petroleum reserves.

Secondly, the Russian government adopted the policy of giving priority to energy sector by providing huge domestic investment in this sector. Moreover, after the Soviet breakup there has been considerable investment by many foreign Western oil giants such as Exxon-Mobil, TNK-BP etc. More importantly as stated earlier they also brought latest technology in exploration and production which was badly needed by Russia that has enabled the country to enhance the information about the quantum of potential resources.

Thirdly, Russia has sustained and expanded its role as energy exporter from the Soviet times, having emerged as a major alternative source of energy for many West European countries, particularly Germany, France, apart from Poland, Czech republic etc. which are major customers of Russian oil and gas. During the last few years, Russia has over taken Saudi Arabia as the largest exporter of oil in the world. In fact this was a part of Russia's 'Look West' policy. Hence in return these countries have evinced keen interest in the energy sector of Russia to meet their own energy needs. For instance, about one-third of natural gas consumption of Germany is met by Russia. Similarly, France and other West European states are linked by gas pipelines from Russia passing through Ukraine, Belarus, Poland etc. To meet this growing demand, Russia has been able to increase production of oil and gas from various oil fields both for domestic needs as also for exports.

It is important to note that to meet growing demand for energy, there was a policy priority when apart from its known and explored energy fields in Siberia, as stated earlier during the last over a decade emphasis has been on intensive exploration of oil and natural gas in the Arctic Sea and also enhancing the Northern Sea Route to reach out to the West European markets and specially Germany which is Russia's major trading partner. To implement this policy realizing the fact that Russia needed Western capital and advanced technology, Vladimir Putin who was Russia's Prime Minister in September 2009 met executives of international energy companies such as Royal Dutch Shell and ExxonMobil and sought their cooperation to develop natural gas fields in the Arctic region. The response was positive and the two energy companies expressed their interest to take part in the project. To take advantage of the situation, the Russian government offered favorable fiscal terms and the administration suggested that Russian and foreign companies could swap assets to promote co-operation. From this it is evident that Western investment

and technology has played an important role in promoting Russia's energy sector. According to a report from the Financial Times in 2011, the country desperately needed the expertise of foreign companies to tap the promising gas fields located in the Yamal Peninsula. Hence Russia's leadership partly succeeded in their objective by entering into partnership with Exxon-Mobil to develop Russia's Arctic Shelf resources which might bring billions of dollars of investment. Further during the meeting held in the summer of 2011 in which Russian governors of these regions including Roman Kopin governor of Chukhota, high level Central ministers dealing with energy, environment and transportation from Moscow and business executives both from Russia and the West participated. It is also important to note that according to some analysts, Russia wants to make the importance of this Northern route like Suez Canal in the South and there is considerable progress in this regard since major tanker loads of oil products, gas condensate and mineral ores have been passing through this route already.

Fourthly, to achieve the objective of becoming energy super power, Russia utilized petrodollars earned over about a decade and made investment to acquire stakes in energy sector specifically in oil fields in many countries of Asia, Africa and Latin America. Holding about one-third of global natural gas resources, Russia's oil giant Gazprom has played an important role. As stated earlier Gazprom holds a quarter of all the world natural gas reserves and controls about 90 pc of Russian output of natural gas. By virtue of this by exporting natural gas to a large number of countries in the world, Gazprom is the largest earner of hard currency for Russia and also enhancing its position in the world energy sector.

Russian leaders have succeeded in their strategy to a great extent by increasing their global influence in the energy sector of Central Asian states of Kazakhstan, Turkmenistan and Uzbekistan. This is done by pursuing duel policy of investing in some oil fields and in laying pipeline network linking them to pipelines of Russia. In this regard it is important to note that under the leadership and initiative of Vladimir Putin, Eurasian Economic Union is likely to be formed by 2015 jointly with energy rich Kazakhstan and Belarus. If it materializes then Russia's potentiality to play global role in the energy security will further increase. With that perspective Russia has made a proposal to invest about $ 75 mln. for exploring natural gas in the Kyrgyz republic which will immensely increase its geopolitical and geo-economic role in Central Asia which is its Southern underbelly. Thus all these policy measures are a part of 'Great Game' being played by Russia to contain growing role of the USA and Western powers in Central Asia.

Fifthly, increase in the global demand and consequent rising price for oil during the period 2002–2007 substantially increased the importance of energy sector for the Russian economy. It is important to note that the significance of energy for the Russian economy has increased for various reasons. The energy sector contributes about 40–45 pc of the export earnings for the country. During the last two decades as the country has been struggling to overcome economic problems and trying to achieve sustained economic development, petrodollars earned by energy exports were the major source of revenues boosting the state budget as also increasing per capita income of the population leading to Putin's popularity in the country.

Sixthly, as a part of Look East Policy, Russia has been focusing significant attention to Asian countries. This is done by adopting multiple policy measures—(a) by providing necessary financial support for developing connections to the growing East Asian energy markets and (b) by diversifying its export portfolio should challenges in the European market continue intensifying.

One aspect common to all the strategies Russia is set to pursue for the next decade is the high capital needed to complete them; the Eastern Siberia-Pacific Ocean oil pipeline alone is set to cost nearly $ 15 billion. Despite the effects of the financial crisis in 2009, Russia still has vast capital reserves earmarked for these large-scale projects, but these funds are not infinite.

Thus Asia-Pacific has been gaining importance in Russia's exports of oil and natural gas which will shoot up from 6 pc in 2012 to 22–25 pc by 2030. This is a part of Moscow's strategy to increase national revenues while promoting economic development in East Siberia and the Russia Far East, and, as well as to stem these regions' chronic emigration problem. According to some analysts Rosneft has emerged as a major energy giant overtaking Gazprom in this region. It is a global player holding 46 licenses and having signed agreements on cooperation with the US oil and gas giant EXXON Mobil and Italy's ENI and Norway's Statoil. Thus Russia's 'Look East' policy has strengthened political and economic ties with China which has emerged as a major trading partner apart from securing oil and gas from Russia. At the same time to serve its own national interest Russia has been cozying up to its neighbors both East and West to ensure its predominant position in natural gas exports.

Seventh, Russia is an exporter of liquefied natural gas (LNG). The Sakhalin Energy's LNG plant has been operating since 2009, and it can export up to 788 MMcf of LNG per year on two trains. The majority of the LNG has been contracted to Japanese and South Korean buyers under long-term supply agreements. In 2012, as reported by an energy analyst, Sakhalin LNG exported about 76 pc to Japan, 20 pc to South Korea, and 3.5 pc to China. This shows growing importance of LNG in Russia's role as energy exports to the East Asian countries.

Eight, it is important to note that there is a growing realization in Russia not to be over dependent on non-renewable hydrocarbon energy resources. Hence efforts are made to give attention to renewable energy such as solar energy and wind energy which at present account for just about 0.8 pc of total power generation in the country. For that in September 2013 as many as 39 clean power ventures with combined capacity of 504 MW which have been offered subsidies to enhance energy production in the country. This is the first ever subsidy offered for renewable energy units. This may further boost the status of Russia as energy super power.

Ninth, shale oil has been assuming growing importance during the last few years thanks to new technology. This has generated debate and controversy among the global energy producers and consumers and particularly between the USA and Russia. For instance, the International Energy Agency (IEA) in its annual report in November 2012 on World Energy Outlook has stated that by 2020 shale oil boom in the United States may turn the country into the world's largest oil producer overtaking Saudi Arabia. Being concerned with this development, but disagreeing with this

contention, the Rosneft chief Igor Sechin has stated that the US shale production will be high cost and not competitive in global market and hence offers no threat to Russia. At the same time it needs to be noted that currently, only the United States and Canada are producing shale oil and shale gas in commercial quantities. Hence in Russia's own interest in the long run, there is need to focus on shale oil. (Novosti 2013a, 6 October).

Tenth, in fact the global financial crisis during 2008–2012 turned out to be a blessing in disguise for Russia as it helped the country realize the need to reduce its reliance on energy commodity exports. The then Prime Minister Putin frankly stated that he wanted to make use of the crisis to overhaul Russia's infrastructure and reduce the government's presence in the economy by selling stakes in state-owned companies including those in the energy sector. This shows that policy decisions have been revised and even reversed to achieve the major objective of making Russia Energy Super Power and at the same time using this sector for promoting the larger interest of economic development of the country.

5.5 Challenges and Constraints

In the background what is stated above, it is worthwhile to analyse several challenges and constraints facing the leadership of Russia in achieving the objective to make Russia energy super power. Firstly, Russian economy is over dependent upon two sectors namely energy and defense. They account for over two-third of hard currency earning of the country. Hence sharp decline and fluctuations in international prices during the last few years for oil and natural gas together with global financial crisis have adversely affected the Russian economy. Therefore, reducing this overdependence on only two sectors is a necessity and a major challenge for the Russian policy makers. There is realization of this issue which is evident from the fact that speaking at the same Forum, Russia's deputy prime minister, Igor Shuvalov admitted that Russia's dependency on oil and gas revenues was "huge", and that this needed to change in the near future. This statement assumes significance as Russia's economic growth came down to 1.6 pc in the first half of 2013 which was the lowest since 2009. The government has been facing a widening budget deficit because of slowing growth and lower oil prices. Hence reducing Russia's dependency on energy exports is a key priority and challenge for the government, along with the need for modernizing the country's aging infrastructure. Hence Russia might reduce its investment in energy sector in the years to come.

Secondly, according to some analysts the aggressive manner in which Gazprom has taken several policy measures has created conflict of interest between Russia and some of post-Soviet sovereign and independent states. For instance, during the last over a decade and half, Russia and Ukraine have a history of disputes over supply and pricing of natural gas deliveries by Russia to Ukraine. It is worth noting that in September 2013 Russia's Gazprom presented Ukrainian state energy company Naftogaz Ukrainy with a $ 7 billion bill insisting that Ukraine should pay

for gas irrespective whether natural gas was used or not in 2012. This problem has persisted and even aggravated even as Ukrainian firm disagreed with this claim. In fact prevailing unending conflicts due to crisis in Ukraine since the fall of 2013 may aggravate the situation between Russia and Ukraine causing further challenge for Russia's energy sector. Hence this might have serious impact since Ukrainian leaders have warned that the country might stop importing gas from Russia in the near future which might affect Russia's interest in the long run. It is important to note that during the last couple of years having realized the disadvantage of over-dependence on Russia for oil and gas supply, both Ukraine and Georgia have proposed to diversify their energy supply sources to strengthen their energy security. Efforts are also made by them to explore oil and gas in their own territories jointly with other European countries and pushed them close to Western Europe and away from Russia. Hence this could become a challenge to the Russian leadership which needs to be addressed. At any rate it seems to have caused some political loss for the country apart from problem of sustaining exports of oil and gas to these countries in the future. (Ellyat 2012).

Thirdly, as stated earlier during the last couple of years shale oil has assumed considerable importance competing with oil and natural gas as provider of energy. In fact the shale "revolution" in the U.S. has forced down energy prices globally and increased competition for Russia as a supplier of energy. Hence Maria Van der Hoeven, executive director of the International Energy Agency was candid in her statement at the St. Petersburg International Economic Forum in 2012 that Russia needed to recognize the changing drivers for energy intensive industries and products. An equally important challenge for Russia is to improve its efficiency in the use of energy in manufacturing and infrastructure of the economy. (Novosti 2013a, October).

Fourthly, Russia's policy pursued during the last over a decade of reducing the share of foreign oil companies such as TNK-BP in Russian oil sector seems to be intended to maximize control over domestic energy resources and strengthen the status of Russia as energy super power. But this has resulted in some negative consequences. Hence many international oil companies operating in Russia's energy sector are unhappy with such inconsistent policies pursued by the Russian government. Moreover, TNK-BP which has been reduced to a minority share holder in Rosneft has been bitterly critical of Rosneft's standards of corporate governance. (Novosti, 31 July 2013b). Hence as foreign companies have become less attracted to the Russian market, it has already adversely affected investment climate of the country further aggravating prospects of economic growth. This is evident from the fact that Putin's special address in August 2013 to invite foreign capital has made limited impact. These challenges and constraints might have potentiality to negatively impact Russia's quest to emerge as Energy Super Power.

Fifthly, highly fluctuating price factor has been a major challenge for Russian leaders. Russia's top concern is its vulnerability to fluctuations in the price of energy. With half of the Russian budget coming from energy revenues (of that, 80% is from oil and 20% comes from natural gas), the Russian economy has been badly hit when energy prices have fallen as in 2008–2011. In 2013 the Russian govern-

ment had already decreased in its budget projections for oil prices to $ 93 per barrel instead of $ 119 though even at that price, the government was playing a game of chance. This holds good for price for export of natural gas. Hence according to energy experts who are specializing in forecasting oil prices, there is historical pattern which shows that major international crises and fluctuations in global consumption and production patterns repeatedly have had sufficient impact on oil prices and that has adversely affected Russia's income from oil exports which have tendency to destabilize the country.

Sixthly, in view of these prevailing uncertain conditions, Russia's energy sector is under tremendous strain. The consolidation of the sector mostly under two large state firms namely Gazprom and Rosneft had many benefits for the country, but after a decade of consolidation the disadvantages are also piling up. With little competition for Russia's natural gas giant, Gazprom, the firm is lagging in technology and is considered unfriendly to outside investment. Russia's oil giant, Rosneft, recently began evolving into a larger monopoly like Gazprom, which could lead it to fall into a similar trap. With future energy projects in Russia requiring more advanced technology (due to their location and environment) and more capital, both Gazprom and Rosneft need modernization and foreign investment.

Seventh, as candidly opined by some analysts, corruption is also a major factor, with varying estimates of 20–40 % of Gazprom's revenues lost to either corrupt or inefficient practices. Rosneft has similar problems. This loss would be sustainable with Moscow's previous high energy revenues, but it will not be sustainable in the future should energy prices fall or the maintenance and expansion of the energy sector become more expensive. As opined by some western analysts the Kremlin is probing Gazprom, although with a culture of corruption rampant throughout Russian history, there is little the Kremlin will be able to do to eliminate wrongdoing within the natural gas firm.

Eighth, Europe's dependence on Russian energy is decreasing. The natural gas shortages experienced throughout Europe during the Russian-Ukrainian crises of 2006–2009 were a stark reminder of how vulnerable European nations were because of their dependence on Russian natural gas exports. Both unilaterally and through the European Union, European countries began developing strategies that would allow them to mitigate not only Europe's vulnerability to disputes between Moscow and intermediary transit states, but also its general dependence on energy from Russia.

Ninth, unending Ukrainian crisis since the end of December 2013, annexation of Crimea by Russia and continuing protests for separation in the Eastern regions of Ukraine have further been posing a challenge for Russia to export oil and gas to West Europe for which pipelines are passing through Ukraine.

Tenth, some critics contend that Russia's attempts in the past decade to shift away from dependence on energy exports by focusing on industrial development have not been particularly successful and keep the country tied to the fate of its energy sector. Russia's strategy of using its energy exports as both a foreign policy tool and a revenue generator has been contradictory at times. In essence, to use energy in foreign policy, Russia must be able to lower or raise prices and threaten to

cut off supplies. But this is anathema to the revenue-generating aspect of this sector. Hence how to deal with such contradictions and yet achieve its major objective will be a challenge to the Russian leadership in the years to come.

5.6 India-Russia Energy Cooperation

In the background of Russia's energy scenario, it is worth considering how Russia can facilitate India's energy security. India being energy deficient and importing country has strong legitimate interest in promoting cooperation with Russia which has enormous energy resources and is a major exporting country. There is mutuality of economic interest on the energy issue which can be facilitated by virtue of close and cordial political relations between the two countries having close historical roots.

Looking back, Soviet assistance in the past was highly beneficial to India's energy sector. Mention may be made of setting up hydropower plants, contributing in the development of coal mining industry and carrying out exploration of oil and gas through ONGC in different parts of India. The former Soviet Union was also one of the major exporters of oil to India even as it was mainly through its controlling share and holdings in countries such as Iraq, Iran etc. But this is not the case so far as post Soviet Russia is concerned.

The lack of geographical contiguity between India and Russia offers some constraints in energy linkages and cooperation between the two countries. Notwithstanding this constraint, in bilateral economic ties, energy issue does constitute an important component of policy decisions during the last over one and half decade. As rightly stated by the former Indian prime minister in January 2012, energy cooperation between India and Russia was at the centre of bilateral economic and trade cooperation, which radically transformed the nature of bilateral economic ties. Some measures are already taken up in this regard which is evident from the following.

Firstly, India has taken initiative in enhancing its cooperation with Russia in the energy sector by investing $ 2.8 billion in the Sakhalin-1 project, controlling 20% stakes in the venture and has purchased Imperial Energy, a London-listed oil major in the Tomsk region. It needs to be stated that India's ONGC has also participated in the exploration and exploitation of oil and natural gas in the Sakhalin region. These are India's largest investments abroad. Cordiality of bilateral ties was reflected with the reciprocal gesture by Russia's Gazprom firm of considering a swap deal of supplying liquefied natural gas (LNG) in exchange for India's stake in Sakhalin-1.

Secondly, some Indian analysts opine that having compatibility between India's needs and Russia's resources, there is scope for adopting a policy to implement the experience of Sakhalin-1 to other oilfields in Russia. For instance, India has proposed an exploration venture with Russian gas majors Gazprom and Rosneft and sought a stake in the Sakhalin-III oil and gas project in Russia's Far East region.

Moreover, India has proposed joint venture to work on gas liquefactions projects in Russian offshore fields for shipment to India. Hence India's energy sector firms have scope for investments in downstream petroleum units in Russia in return for a stake in petroleum refineries there. It is to be seen how these initiatives ultimately translate into benefits for meeting India's domestic energy needs. At present India seems to have geared-up its energy diplomacy and is moving quickly to penetrate in the Russian energy market. At the same time India's policy is to promote and offer Russian companies the opportunity to participate in Indian oil and gas projects, both upstream and downstream, as well as to undertake joint exploration in other countries too.

Thirdly, according to some reports ONGC, GAIL were also exploring the possibility of investing about ₹ 8000 crores (about $ 1.5 billion) in Yamal Peninsula which has enormous natural gas reserves. In the Yamal-Nanets region India has the option to market that LNG or even bring it back to India.

Fourthly, Reliance Industries Ltd (RIL) has taken a lead in setting up a joint working group to develop strategic partnership in oil refining and petrochemical sector with Tatarastan, which is one of the energy rich regions of Russia. Tatarstan and RIL have agreed to set up a joint working group of specialists to develop strategic partnership in petrochemical and oil refining sectors, especially in crude oil refining. The agreement was reached during the visit of a high-profile delegation led by Tatarstan's President Rustam Minnikhanov to Jamnagar in Gujarat (India) on March 2013.

Fifthly, Russia has played an exceptional role in providing technology and assistance in setting up nuclear power plants in India even when there was reluctance on the part of other major countries including USA in this regard. Equally important is the fact that according to India's official sources as regards Russian construction of two nuclear power plants in Kudankulam, nuclear power technology was internationally competitive. Hence the Indian prime minister stated in 2010 "Since we have major plans to increase the share of nuclear power in our energy mix, there are concrete opportunities for cooperation in this area. We would also like this cooperation to expand in years to come." India's close cooperation with Russia in the nuclear energy sector is further evident from the fact that in 2010 India proposed to join Russia's nuclear center of a low-enriched uranium (LEU) reserve project in Angarsk. It is hoped that problems facing this project due to public protests and criticism carried out in India in 2012–2013 will be overcome to ensure that this project materializes ensuring and facilitating energy needs of Tamil Nadu and other parts of South India.

Sixthly, notwithstanding some achievements, there is need for Russia, which has set the objective to emerge as Energy Super Power to adopt 'Look South Policy' with major focus on Indian energy market. This is relevant considering the fact that in Russia's energy policy and strategy towards Asia it is clearly mentioned that India is one of the important target countries along with Japan, China, and Korea. India has been a major energy importer in the world amounting to about 120–150 million t in 2012. India's oil imports are expected to go up to 200 million t by 2015. Hence according to the International Energy Agency, India would be the third

largest energy consumer in the world by 2025 after the US and China. As reported by Alexandra Katz in the Economic Times on 16th April 2014, Asia's need for imported energy continues to expand and by 2035, the Asian continent will account for 70 pc of net global imports. Hence it is rightly stated that since the demand in India is likely to rise exponentially, the country is likely to become a crucial market for Russia. It is precisely for this reason, Igor Sechin who visited India recently assured that Russia will meet growing need of India and also mentioned the possibility of setting up new pipeline infrastructure.

For achieving this objective of Look East and South Policy, the constraint of absence of geographical contiguity between India and Russia can be overcome by exploring various alternatives in building energy linkages and cooperation between the two countries:

A. As opined by some analysts, both Russia and India should explore the option of transporting Russian crude to India through a pipeline link from Xinjiang to India. Hence if that materializes, then Russia can export crude oil through a pipeline that can be laid linking Russia, Kazakhstan's Atasu region and China's Xinjiang province connecting India's Kunlun Mountain. This project needs joint efforts and agreement between all the concerned states.
B. There is a strong viability in India's ONGC proposal of constructing a Russia-China-India (RCI) pipeline. The RCI is supposed to stretch from Russia through Turkmenistan, Uzbekistan, Kazakhstan, to Kashgar in Chinese Xinjiang. It will enter India via Laddakh, crossing the Siachen glaciers and the India-China Line of Control or alternatively through Himachal Pradesh to supply gas to Northern India. According to ONGC (India) officials, the economic and technical aspects of the proposal remain undetermined. The proposed pipeline would extend over an extremely long stretch of varied terrain (construction of the pipeline may cost somewhere up to $ 15 Billion, or slightly less if connected through already operating pipelines)
C. The concept of North-South corridor linking oil-rich Caspian Sea with Arabian Sea in the south has been mooted more than a decade back. This will directly link energy exporting Caspian countries of Russia, Azerbaijan, Kazakhstan, Turkmenistan and Iran with India and South Asian countries. There will be some hurdles which need to be overcome with Russia's strong support for the project. The contention of pressure from the USA on Iran does not hold good any more with qualitative improvement in US-Iran relations after the recent regime change in Iran. In fact during the last few months India has already been importing oil from Iran on rupee payment basis. Hence Russia being a major power in the region with close and cordial political relations with all the Caspian Sea States can play a crucial role to ensure that the North-South Corridor will become a reality facilitating energy security of India.
D. Russia can export oil to India under swap deal with Iran till North –South corridor materializes. In other words, Russia can export oil to northern regions of Iran and in turn Iran can deliver equivalent quantity of oil to India from its southern part of the country. Swap deals are already assuming importance as a part of foreign trade transactions. India should actively pursue this with cooperation of Russia.

E. There is also a challenging option as proposed by Russian analyst Grigory Birg to ship Russian oil to India either from Kozmino, an oil port located near Nakhodka, in the Russian Far East, after transporting it via the ESPO pipeline or from the Novorossisk port in the Black Sea. In his opinion Black Sea and ESPO options are suitable for India even as the cost of transportation needs to be evaluated.

5.7 Conclusion

Thus in conclusion it may be sated that with huge potentiality of energy resources, Russia has been leading the rest as the major producer and exporter of oil and natural gas in the world enabling the country to emerge as a major energy power. Notwithstanding speculation among critics, the focus of the Russian leadership under the presidency of Vladimir Putin in cooperation and collaboration with the Russian energy giants has been to make Russia Energy Super Power. For achieving this objective aggressive policy decisions have been taken during the last about a decade and half both in Russia's domestic energy sector and abroad. At the same time Russia faces several challenges for achieving this objective.

Various policy decisions and proposals are in the offing intended to strengthen India-Russia cooperation in the energy sector and that Russia can facilitate India's energy security. While at present the share of India in Russia's export is negligible, India has to learn lessons from China in pursuing dynamic policy and persuade Russia to adopt 'Look South policy' for mutual benefit. With these developments there is scope for India-Russia energy cooperation to scale new heights.

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Chapter 6
Energy Security and India's Foreign Policy: The Persian Gulf Region

Sima Baidya

This paper makes an attempt to understand energy security from the perspective of non-traditional security and human security. It shows the linkages between energy and foreign policy, hitherto not much visible in India's foreign policy discourse. Being the largest supplier of hydro-carbon energy, Persian Gulf region plays the most important role in India's energy security. The paper focuses on the changing dynamics of India's energy relations with the region, critically understands the concept of energy security once again beyond the matrix of demand and supply. Last but not the least a brief analysis of various policy documents is also included.

6.1 India's Energy Scenario

Despite slow economic growth for the last couple of years, India's energy consumption is not less. Since independence, India's economy has undergone a change. Conventional argument of industrialization and urbanization are not the only factors for India's insatiable demand for energy. India's service sector has grown by leaps and bounds and urban aspirations to connect to the world have its imprint in the energy consumption. It would be more so, if new govt's announcement to make India a manufacturing hub in the world is materialized. India is changing. Shopping malls are standing tall in every nook and corner of the Indian cities. BPO is not a new term any more. Concept of fixed office hours i.e. 10 a.m.–5 p.m. is gone. India is working round the clock. Fully air conditioned offices are not treated as luxury. People are using multiple gadgets, from smart phone to tab to laptop etc. At the same time there are semi-rural semi-urban areas, where permission is required for the purchase of ACs for the households. Roads are not well lit even in the capital. While growth is visible, there is no 100 % coverage of rural electrification. To calculate BPL (Below

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Poverty Line), per capita energy count is negligible. In country's respect, per capita energy consumption is calculated as an average. Due to the faulty calculation, the real number of people deprived from energy is not known. Per Capita energy consumption (PEC) is calculated by total energy consumption of a given year divided by the estimated mid year population of that year. As per Govt. of India statistics, PEC has been increased by 1204.3 KWh in 1970−1971 to 6419.53 KWh in 2011–2012, with cumulative average growth rate of 4.06% (Govt. of India 2013). While growth in energy intensity i.e. total energy consumed divided by per unit of GDP is very low. It has been increased from 0.128 KWh in 1970−1971 to 0.165 KWh in 1985–1986 and decreased to 0.148 KWh in 2011–2012(Govt. of India 2013). As per World Bank Development Research Group study, energy poverty in rural India is 57% and in urban areas half of it i.e. 28% (Khandekar et al 2010) households are energy poor. In world scenario, 18% households are without electricity and fall in the bracket of energy poverty (International Energy Agency 2014). Depriving a large number of people from accessing the required energy for their daily life would mean keeping them out of the domain of the human security. Most of the developing countries including India don't align the concept of providing energy to the people as their human security. People still spend long hours without power both in rural and urban areas. Long power cut is a regular phenomenon in rural areas. In India's growth trajectory, energy needs to be treated as an integral part of human security; which is not the case so far. Lack of energy and clean energy leads the deterioration of health condition with different types of lung and other diseases. It means the violation of human security.

At the same time, climate change is taking its toll in India. "Hottest day in 48 years" does not only make headlines, its fallouts are faced and felt by the people day and night. There are substantial changes in many Indian cities' climate condition just for the last few years. Smog overshadows days in winters. In Indian policy circles these changes do not make themes and sub-themes of meeting agenda. No clear policy is visible to check the level of people's energy consumption and providing them the required pollution free clean energy. There is a long list of measures taken by government of India. But ground situation is not much different.

In 2011–2012, India was the 4th largest energy consumer (IEA 2014) in the world. Though, total energy consumption is much behind US and China. India consumes 4% of world energy, while US consumes 20.5% and China 11.5% of world's energy (IEA 2014). Already Paris based International Energy Agency had a forecast that by 2030 India will be the third oil importer in the world only behind US and China (IEA 2014). At present India's GDP target has been kept at the moderate level of 5.4–5.9% (Budget Speech, Finance Minister Arun Jetley, Government of India 2014). After a high in the GDP growth rate, this moderate GDP growth would keep middle class aspirations at check for some time. In the recent announcement of Indian Prime Minister (Independence Day Speech by Prime Minister 2014) to make India as a manufacturing hub would be certainly a big boost to the energy producers. But to make India as Shanghai, inclusive growth is necessary to cover India's billion plus population (Table 6.1).

From Table 6.1, the gap between India's production and supply is visible. In India's energy mix coal gets the largest share and second largest share goes to oil,

Table 6.1 Share of each fuel in total energy production and supply (in percentage). (Source: Twelfth Five Year Plan, Government of India (2012–2017) Economic Sectors Volume II. Planning Commission, Govt. of India)

	2000–2001 Actual	2006–2007 Actual	2011–2012 Provisional	2016–2017 Projected	2021–2022 Projected
Share in commercial energy production					
Coal and lignite	66.38	70.65	68.53	67.52	66.82
Crude oil	16.18	12.91	11.55	8.87	6.70
Natural gas	12.14	10.52	12.60	15.80	16.04
Hydro power	3.10	3.71	3.30	2.68	2.65
Nuclear power	2.14	1.86	2.48	3.52	4.67
Renewable energy	0.06	0.33	1.55	2.23	3.12
Share in total commercial energy upply					
Coal and lignite	55.35	53.22	53.45	55.41	56.90
Crude oil	37.45	33.41	31.51	26.04	23.29
Natural gas	8.49	6.99	10.32	13.46	13.17
Hydro power	2.17	2.53	2.17	1.79	1.73
Nuclear power	1.49	1.24	1.57	2.26	2.95
Renewable energy	0.04	0.22	0.98	1.43	1.97

approximately 23%. Share of gas in India's energy mix is less than 10%, as India still is unable to make the conversion from oil to gas in the consumption pattern (Table 6.2).

From Table 6.2, it is clear that India has been producing some oil over the years and in future also its production won't be stopped. Does that mean that India's production of oil is sufficient to meet its demand? Answer is of course in negative and complex. Even if India's produces own oil and gas, no way it can fulfil its demand. So, to ensure energy security, India is highly depended on the foreign sources and India becomes a net energy importer. A look at the India's crude oil import from destination shows the dominance of West Asia region. India is highly dependent on the Persian Gulf region for its energy security. As India is dependent on other regions for its security of supply, naturally India's energy policy towards these countries is important. From the perspective of energy importer, main purpose of India's energy policy is to ensure its security of supply. Security of supply at affordable prices is the main component to ensure energy security for any country including India (Fig. 6.1).

Table 6.2 Projection of oil production in Twelfth Five Year Plan Period (in MMTPA). (Source: Indian Petroleum and Natural Gas Statistics, 2013–2014.Ministry of Petroleum and Natural Gas, Economics and Statistics Division, Government of India)

	2012–2013	2013–2014	2014–2015	2015–2016	2016–2017	Total
ONGC	25.045	28.27	28.002	26.286	25.456	133.059
OIL	3.92	4.00	4.06	4.16	4.20	20.34
Pvt./JV	13.34	13.30	12.70	12.10	11.50	62.94
Total	42.305	45.57	44.762	42.546	41.156	216.339

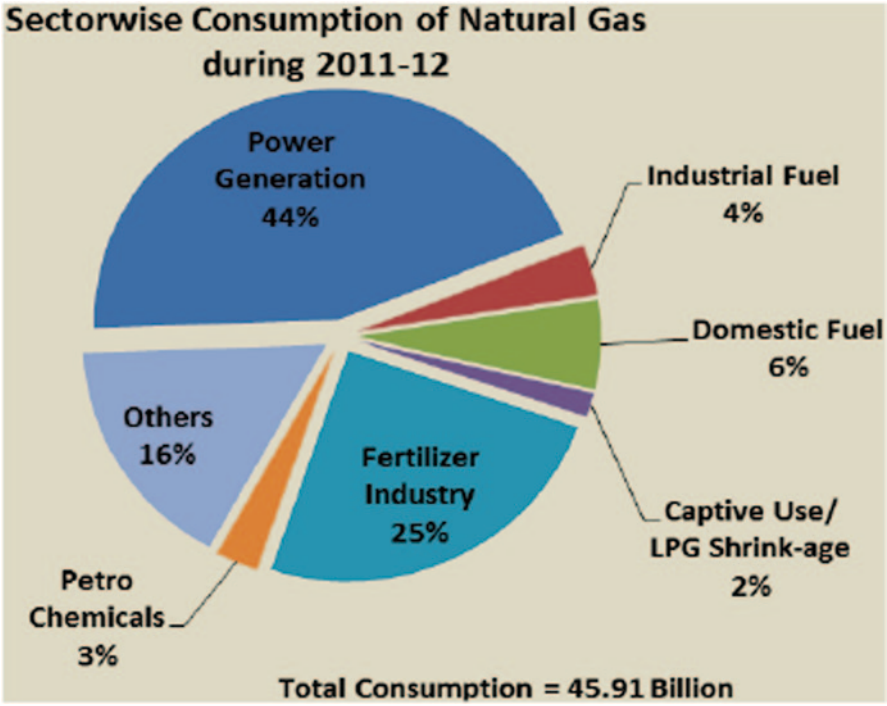

Fig. 6.1 Sectorwise consumption of Natural Gas (2011–2012). (Source: Energy Statistics 2013, Twentieth Issue Central Statistics Office, Ministry of Statistics and Programme Implementation, Government of India, New Delhi)

Natural gas has been regarded as the future energy. Natural gas is clean energy and environment friendly. Both developed and developing countries are trying to increase the share of natural gas in its energy mix. In India also, people started thinking about it. But nothing has been done at the policy level. It is not so easy to change the pattern of consumption of the people. Figure 6.1 shows sectorwise consumption of natural gas in 2011–2012. Power generation consumes 44 % and fertilizer industry's consumption is 25 %. While only 2 % of natural gas has been used as industrial fuel. If India is preparing itself to start its journey from developing country to developed country, it is absolutely necessary to change its pattern of natural gas consumption. Moreover, to maintain environment eco friendly, consumption pattern should be changed and needs to be directed towards more consumption of natural gas, instead of coal and oil. It required policy level intervention. The way once it was done in Delhi to convert public vehicles into CNG mode.

Energy is the necessity of the society and it is so much intermingled with the basic necessities of the people, it is difficult to single out energy as a independent factor. Twelfth Plan document recognized that oil and gas are the critical challenge of development to the Indian economy (Twelfth Five Year Plan, Government of India, vol. II 2013)

While calculating India's energy demand growth, developmental factor has been taken into account along with inefficient use of energy as well. GDP is not the only measurement to calculate the health of the Indian economy. India's economic growth and development are not inclusive. Large number of people is outside the bracket of standard leaving. Poverty estimate has become a controversial issue. While projecting the demand growth or consumption of energy, India's large number of population are excluded from the basic necessities of life. Ming Li has highlighted this aspect both in the case of China and India (Ming 2007). Li looked for the way out, either they will be included and be part of the middle class or excluded by the society/state, which would eventually lead to either agitation or revolution.

Indian economy has always prioritized energy security to ensure interrupted supply of security. Nevertheless, it would not be wrong to say that India has never put forward its energy doctrine. Energy is critical in any country's development. More so, in India's case as India has to provide energy to its huge population. India's indigenous production of oil never surpasses its demand. India was never got the opportunity to claim itself as energy self sufficient or energy exporter as the case with China. There are discoveries of new gas basin or even production growth in oil. Though, this growth is not at all commensurate with consumption. India's production growth in energy has always kept itself as low and fulfils only a small percentage of its demand. In this scenario, let's have a look in India's energy security structure.

India ensures its security of supply from different sources as follows (Energy Information Administration, India, Country Analysis Brief 2014):

Saudi Arabia—20%
Iraq—14%
Iran —6%
Other West Asia—22%

[Kuwait–10% and UAE− 9% as in EIA 2013]

Venezuela—12%
Nigeria—8%
Other Africa—8%
Western Hemisphere—7%
Other—3%

India imports 70% of its energy from different sources. It has been observed that India's most of the oil imports come from a particular region, West Asia and North Africa region. Within this region, specifically, Persian Gulf region is the major supplier of oil to India. India gets 62% oil from West Asia region. This is not a desirable condition in any country's economic scenario to be over dependent on a particular region. Nevertheless, this tradition continues and simultaneously India's import bill shoots up. In 2012–2013 India's oil import bill was $ 164 billion, out of total import bill of $ 491 billion. But the net import bill was $ 98.14 billion due to positive export of petroleum product at $ 58.84 billion (Indian Express 2013). As an emerging economy India has been grappling with the problem of oil and gas deficit

for decades. Former Finance Minister P. Chidambaram expressed his anguish that being a developing country, India cannot afford such a huge import bill (New Indian Express 2014). In 2012 India imported 177.1 million tonnes of oil equivalent (BP Statistical Abstract 2013).

This is worrisome in Indian economy and to tackle this problem, former Prime Minister even thought of coal based energy security. How far this is feasible to go back to the earlier period is certainly a matter of debate and backward movement might not be commensurate to India's changing growth scenario.

6.2 Game Changer

Some changes are visible in India's energy sector. India became net petroleum product exporter from 2001 (Energy Information Administration, India Country Analysis Brief 2013). This year due to petroleum product, net energy import bill has been reduced. This has been possible due to India's world class refining sector. At this backdrop, export of Petroleum can act as the game changer in the Indian petroleum sector. Here, it is important to note the scenario in India's refinery sector—see Table 6.3. Table 6.3 clearly shows the capacity of India's different refineries in 2012–2013. India occupies fifth position in the world for refineries. It is important, because it has the potential to become a game changer in the energy security and convert India's vulnerabilities into advantages. As per the estimate, India's capacity to refine would increase by 43 % taking from the current capacity of 216–310 million tonnes per year in 2017 (Business Standard 2012). Private players also play important role in the refineries and de-licencing of the refinery sector in 2001 was a boost to the private sector industries. Nevertheless, Indian Oil Corporations' capacity is the largest, 54.2 million t of refining capacity (Business Standard 2012).

India has been gaining advantage in variety of petroleum products. Figure 6.2 below provides a detailed account of it. Some of the products, e.g high speed diesel and motor gasoline are important petroleum products. No doubt India can get leverage out of these products in the market, irrespective of being a net energy importer. In many energy producing countries, refinery sectors are not developed with latest technology. As a result of that, many countries import petroleum product for their domestic consumption. Iran is a case in point. The surge in the gasoline product pushed Iran to go for gasoline import even from the country, which are not richly endowed with hydro-carbon. Iran used to import gasoline from India for its domestic production prior to 2012. Substantial increase in the petroleum product would provide much needed respite to India's oil and gas sector, no doubt.

Some changes are visible in the mindset also. It could be a good beginning of new thinking in the India's energy sector. To avoid disruption in time of political turbulence or conflict etc.; India now has put more emphasis on the strategic reserve. Strategic reserves stations in Vishakhapattanam, Mangalore and Padur have come up. At present India has the capacity of only 15 days reserve in case of any

Table 6.3 Name, location and capacity of refineries. (Source: Indian Petroleum and Natural Gas Statistics 2013–2014, Ministry of Petroleum and Natural Gas, Government of India)

Sr. no	Refinery location	Name of the company	Name plate capacity [a](MMTPA)
		PSU refineries	
1	Guahati	Indian Oil Corporation Limited	1.00
2	Barauni	do	6.00
3	Koyali	do	13.70
4	Haldia	do	7.50
5	Mathura	do	8.00
6	Digboi	do	0.65
7	Panipat	do	15.00
8	Bongaigaon	do	2.35
9	Mumbai	Hindustan Petroleum Corporation Limited	6.50
10	Vishakhapatnam	do	8.30
11	Mumbai	Bharat Petroleum Corporation Limited	12.00
12	Kochi	do	9.50
13	Manali	Chennai Petroleum Corporation Limited	10.50
14	Nagapattanam	do	1.00
15	Numaligarh	Numaligarh Refinery Ltd.	3.00
16	Mangalore	MRPL	15.00
17	Tatipaka, AP	ONGC	0.66
	Total		*120.066*
		JV refineries	
18	Bina	Bharat Oman Refinery Ltd.	6.00
19	Bhatinda	HPCL Mittal Energy Ltd.	9.00
	Total		*15.00*
		Private sector refineries	
20	Jamnagar	Reliance Industries Limited	33.00
21	SEZ, Jamnagar	do	27.00
22	Vadinar	Essar Oil Limited	20.00

Total 80.00
Grand total 215.066
[a] million metric tonne per annum

crisis. But the aim is to make it for 90 days. India understood to increase the capacity to ensure uninterrupted supply.

Diversification is still not very successful in India's oil and gas sector. But some of the changes are worth mentioning. India has started giving more emphasis to Latin American oil especially Venezuelan oil. It has been estimated, volume of oil import might increase in future, due to its cheaper rate compare to West Asian oil. This approach is more reality based approach and a departure from setting unachievable goal of self sufficiency and energy independence.

India's energy relations are not only demand and supply relations. As per the Govt. of India document, different Indian oil companies [ONGC Videsh etc.] acquired oil assets outside the country, while among West Asian countries, only Syria

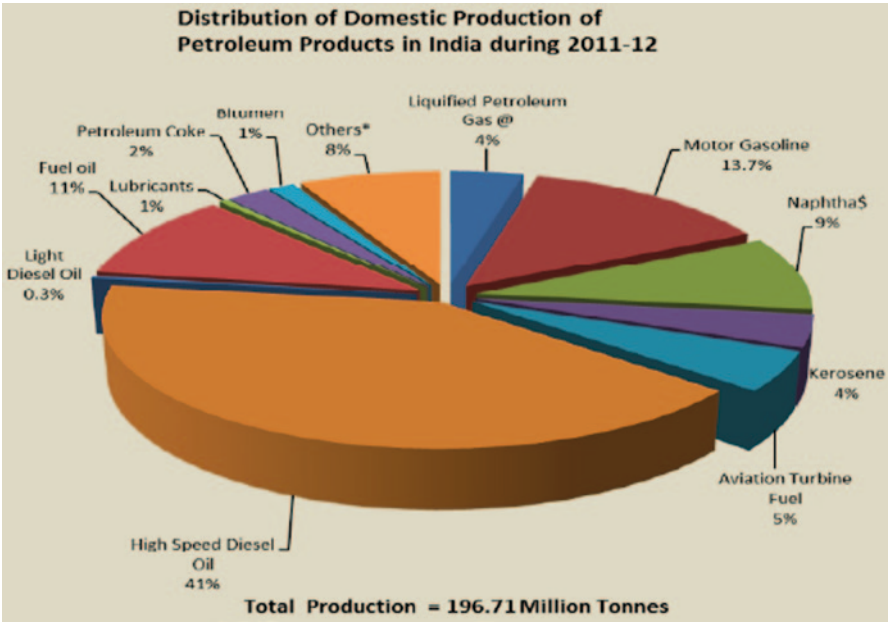

Fig. 6.2 Distribution of domestic production of petroleum products in India (2011–2012). (Source: Energy Statistics 2013, Twentieth Issue Central Statistics Office, Ministry of Statistics and Programme Implementation Government of India New Delhi)

has been referred to have Indian Oil Company's stake at present. From overseas oil and gas blocks India gets 10.22% of its domestic production (Business Standard 2012). India's stake in Sudan and Russia's Sakhalin-1 block is important. Equity oil makes India's position beyond buyer of oil and energy relations become two way relations.

6.3 Energy and Foreign Policy: Non-Traditional Security Approach

Energy as a factor has attained criticality, as it is directly linked with the import dependency. India's energy consumption and import act as the important factor in its foreign policy (Pant 2007). If a country is not energy importer country, energy might not play critical role in the country's foreign policy. India's current net oil import dependency reached 71%, much beyond 38% as was in 1990 (Energy Information Administration, India Country Analysis Brief 2014). During Eleventh Plan period, India imported 76.6% of oil. There will be slight increase in India's oil import at 77.8% at the end of twelve plan period in 2017 (Twelfth Five Year Plan Document, vol-11, Govt. of India 2013).

As India is not an energy exporter country, energy cannot define its foreign policy goal like other energy rich countries. In energy rich countries, 70–80% export earnings come from energy and by virtue of rentier state (most of the cases), energy can define its foreign policy goals. In case of energy importer country(s), situation is different. Securing uninterrupted supply of energy at the affordable prices is one of the main developmental concerns in India, no doubt. So far energy concern does not play ubiquitous presence in the foreign policy making. India keeps its eye on ensuring energy security without much talk and possibly planning; mostly based on good friendly relations with the energy rich region. Internal energy scenario reveals the failure of Indian government's policy to diversify its energy supply sources. Bulk of its energy comes from the Persian Gulf region. If it can be considered as the case study, question is whether energy plays determining role in shaping India's foreign policy towards this region. It is difficult to assess, whether energy shapes India's Persian Gulf policy or not. There are other inter related factors involved to shape India's foreign policy towards this region. Indian migrant workers` presence in the region is the major deciding factor in India's Persian Gulf policy. Interplay of different factors cannot be denied, but whether India's policy towards this region is energy centric or not needs to be examined. India needs to come out of the idea that just to ensure the security of supply means energy security. India's foreign policy objective towards the region is to maintain peaceful atmosphere towards this region. So that its political turmoil and other conflict situation cannot disturb the smooth functioning of the energy sector. A brief look at the different policy documents does not show a clear picture of the method and planning to ensure energy security. To be precise a rather well charted energy policy is not in sight. Not only energy policy, need of the hour is to chalk out foreign energy policy. In absence of comprehensive foreign energy policy; India becomes more vulnerable. Being an energy importer country, it is not India, which is in a position to chart out its own path to secure energy. It depends on other energy rich countries, which supply energy to India.

In foreign policy spectrum, energy has been factored as the non-traditional security. Non-Traditional concept of security emerged out of the shortcomings of the concept of realism based traditional security (Tsuneo 2005) Due to the indifferent attitude towards the non-traditional factors of non-traditional security, virtually it has relegated to the 'low politics'. Concept of non-traditional security is often related to the concept of human security. In case of energy, it is both human security and national security are involved. Lack of energy can cause huge loss in the national production, at the same time it can lead to the mass agitation. In case of energy both political and economic questions are intertwined. The question of Persian Gulf energy is a question of national security to the United States, while US gets only 17% of its energy from this region. China and Japan also prioritized their non-traditional security. As Japan faced the wrath of tsunami and Japan is almost 90% import dependent for its energy. It has been observed that non-traditional security is the source of insecurity rather than the external factors. Energy as one of the central components of non-traditional security encompasses a holistic approach towards security. Energy security cannot be treated differently from national security.

Thus, peculiarity of the India's energy scenario created a situation, where energy becomes not only a critical factor in development, but foreign policy as well. Being a net energy importer country in the world, India needs to ensure its energy security. As developing country's point of view, energy security means security of uninterrupted supply of energy at the affordable price. Energy security is the non-traditional security, nevertheless, if it has been disrupted, security of the country is disrupted. In foreign policy discourse, non-traditional security is often neglected area. But it can create havoc in national security, if not tackled. Like India, China is also depended on imported oil. In China's foreign policy, it has occupied the central position as China gives foremost priority in its foreign policy to secure its energy. It is not the conscious effort on the part of the Indian govt. to make energy as a critical factor in its foreign policy. Import dependency of Indian economy made energy as the critical factor in India's foreign policy. Now it is up to India to see, how govt. can deal this factor in the arena of the foreign policy.

A glance in the literature of US national security paradigm shows that energy occupies important position and non-traditional security is an integral part of national security. In India's foreign policy arena, energy has remained as the low key affair, so far policy is concerned. Energy as a non-traditional security can destabilize the whole system, if not tackled properly. This paper would like to focus on the non-traditional security aspect. Steve Smith in his article has shown the dichotomous position between the two. He referred to the definition of security propounded by Jessica Tuchman Mathews. In her 1989 article she strongly advocated, "Global development now suggests that the need for broadening the definition of national security to include resource, environmental and demographic issues" (Smith 1999). Even if there are people, who support all inclusive nature of the concept of security, there are other contenders to opposite inclusive vision of the security and instead appeal to focus on the hard security. Concept of hard security or military security is so widespread that often states just ignore any alternative concept of security beyond it. It has not been done only at the conceptual level, but related costs to make it a part of national security has to be taken into account. At the governmental level if military security doctrine is the official doctrine, annual outlay of the money would also be accordingly. It is assumed that defence department is being formed to carry forward the objective of the state's security interests. Nonetheless, other departments may be there to look into the matter of traditional security aspects as different domains certainly not as the matter of security but mostly as social problems; e.g. environmental problem, water problem, energy problem etc; while most of the third world countries have been suffering from these non-traditional security problems (Smith 1999). In has been observed that most of the cases, these non-traditional security causes a huge loss in the country's exchequer. Due to the lack of proper planning and due importance in the national security agenda; many discrepancies and contrasts become the regular phenomena. In case of developing countries, these are like double jeopardy.

On the contrary, most of the developed countries, non-traditional security aspects are tackled at the national level. Government plays important role to check it and saves the country from huge loss. Thus in a way, developed countries deal

with the question of both traditional and non-traditional aspects properly without divorcing one from another. The question of Persian Gulf energy always gets a place in the United States' national security doctrine. In China, question of energy security gets utmost importance in its foreign policy. China's burgeoning economic growth is commensurate with its huge population. China's quest for energy can be perceived as the threat to world peace by many analysts. As securing uninterrupted supply of energy is the main objective of China's energy security doctrine, China has never hesitated to align with any country which can be termed as rogue state by US. China's energy relation with Iran is a case in point. It has been researched and calculated that before 2012 sanctions on Iran was ineffective due to the quantum of oil China used to import from Iran. And later, there was loss in the energy earnings, but Iranian economy did not collapse because of huge oil import from Iran. In developing countries, neglect on the energy aspect, not only creates insecurity in its security doctrine, but country's huge resources are paid to make up the loss.

Unless due importance is given to the non-traditional security in the security doctrine of the developing countries; present scenario is not going to change. India should get a wake up call and take more initiative to confront the question of energy as it is not an isolated matter. It is linked with the overall attitude and the trajectory of the concept of security.

6.4 New Direction in India-Persian Gulf Energy Relations

This paper does not aim to provide a detailed account of India's energy relations with the Persian Gulf countries, rather the focus is on the last few years, where some visible changes have been observed and possibility is there to change the course of direction of the relations. Recently, it has been observed that most of the Gulf countries started speaking in the language of strategic relations. Aim of the paper is to understand the nature and the potentialities of the relations. In simple term, all the relations cannot be termed as the strategic relations. But some have the potential to convert it to the strategic relations and move it to another level. But definitely some are not.

6.5 Saudi Arabia

Signing of 'Riyadh Declaration' between India and Saudi Arabia during the visit of the then Prime Minister Manmohan Singh to Saudi Arabia in 2010 is a milestone in their relations. Several agreements cemented the relationship, where energy plays the central role. It encompasses from energy to investment and focuses on the strategic partnership as well. Nevertheless, it must be looked into whether relationship has reached to the strategic level or not. Saudi Arabia's importance in India's energy

is growing day by day as at present Saudi Arabia is the largest crude oil supplier to India. Saudi crown Prince Al Saud's visit this year is a sign of change between Indo-Saudi relationships. India and Saudi Arabia signed MOU on defence co-operation (Panda 2014). Both Delhi Declaration and Riyadh Declaration are way forward in their path together. Trade with Saudi Arabia has been increased threefold. Nevertheless, there are many neglected areas too. Saudi investment in India is not at the expected level. Saudi side has contemplating to explore it more. India needs to chalk out policy towards Saudi Arabia, as it is the biggest supplier of oil to India. Saudi Arabia's Nitaqat policy spread shock wave to the Indian workers, though it has been managed by Indian govt. carefully. India cannot afford any more to become only the buyer of Saudi oil.

6.6 Iraq

It has been observed that India-Gulf relations are no more demand and supply relations. Gulf has been the steady and trusted supplier to India. India now has started looking beyond energy relations with these countries in the region. Indian President Shri Pranab Mukherjee's visit to Iraq is the clear example of it. President Mukherjee has given a call to take India-Iraq ties to the strategic level (Indian Embassy, Baghdad 2014).

In a Joint Statement, India and Iraq agreed to sign MOU to look after all aspects of energy, i.e. down stream, up stream and infrastructure (The Hindu Business Line 2013). India has given proposal to Iraq for long term contract [10 years] and Iraq has been looking into the matter. As India steadily reduced its oil import from Iran from 16 to 11% to the present level of 6%; Iraq's position has been strengthened in India's energy security and Iraq became India's second largest oil supplier after Saudi Arabia. Both the countries' decision and eagerness to convert their relations into strategic relations and willing to go to the upper level is a welcome move, no doubt. Former foreign minister Salman Khurshid visited Iraq in 23 years. Iraq foreign minister Hosheyar Jabari articulated the importance of Iraq-India relations, when he said, 'I agree with the minister that Iraq-India relations should not be buyer-seller relations. It should be beyond that'. During Iraqi Prime Minister Nouri al Maliki's visit to India, four agreements were signed. Iraq offered three oil blocks in Middle Furat Oil Field, i.e. Kifil, West Kifil and Merjan (New Indian Express 2013). Iraq has been facing political turmoil, in this situation, how far it is wise to depend on Iraqi oil, is a big question.

6.7 Kuwait

Of late it is a recurrent theme in Indo- Persian Gulf relationship and in a recent visit to Kuwaiti Prime Minister Sheikh al Jaber al Mubarak Al Hamad Al Sabah to New Delhi echoed it. Kuwait contributes 10% of its oil to India. Both expressed their willingness to take it to the next level. India can be a reliable trade partner of

Kuwait. CEO of Kuwait Petroleum Corporation Farook al Zanki signed renewable contracts with Hindustan Petroleum and Bharat Petroleum in September 2012 to supply four types of oil to India at the tune of $ 10 billion for 5 years (Hindustan Times 2013). Five pacts are signed during Prime Minister's visit to India. More emphasis was given on the joint ventures of the project in the arena of petrochemical, fertilizer etc. India wanted to convert the relationship into a long term one and mooted several proposals towards that direction (Sandeep Dikshit 2013). Several Indian companies are awarded different energy projects in Kuwait. Larsen and Toubro got $ 840 million worth of one of the Gas Gathering Centre's project (Kuwait Times 2014). Punj Loyd got $ 236 million KNPC project of revamping Ahamadi fuel depot. TERI is already involved in doing a $ 39 million project of soil remediation for Kuwait Oil Company (Kuwait Times 2014). On the other hand, Kuwait Investment Authority has invested $ 5.37 million in India's Power Grid Corporation in December 2013 (Kuwait Times 2014).

6.8 UAE

In a visit to UAE in 2008, the then foreign minister Shri Pranab Mukherjee outlined mutual relationship with UAE. With two pronged policy in mind, he said energy security and infrastructure are the foundation of the relationship (Pranab Mukherjee 2008). Pointing out clearly that main goal is to ensure India's energy security, while India can be a reliable partner of UAE's food security. India and UAE are each other's largest trading partners touching total bi-lateral trade at $ 75 billion. There were issues regarding the UAE investment in India. India values Gulf region's investment in different sectors of Indian economy. In December 2013, India-UAE signed Bi-lateral Investment Promotion and Protection of Agreement (Gulf News 2013). Indian President Pratibha Patil's visit to UAE added impetus to their relations. Both the countries want to scale up the trade and combat terrorism jointly (Indian Consulte in Dubai, India Matters 2010). Vice President and Prime Minister of UAE visited India last year. Their discussion focussed on wide ranging issues. Security and combating the finance of the terrorist were important among many issues (Indian Consulate in Dubai, India Matters 2010). In his message to India Today conclave, Vice President of UAE said, 'UAE will not be only a country to export crude oil, but seeking to play a vital role in the economy of knowledge.'

6.9 Iran

India's energy relations with Iran witnessed a reverse trend. India in a well calculated manner reduced Iranian oil in India's energy sector due to US pressure. India used to import 16% of Iranian oil. From 16%, it has been reduced to 11 to 8.3% to at present 6%. Indian oil companies have stakes in Iranian oil wells. Like other

Persian Gulf countries, India and Iran started talking about energy relations. Iranian President Md. Khatami was the Chief Guest on India's Republic Day in 2003.

India and Iran have historical and civilizational linkages. It is not difficult for both the countries to make an attempt to convert it into strategic relations. India took the initiative to have co-operation at the domestic level. Unfortunately, almost at the same time, after the revelation of Iranian secret nuclear programme, Iran came under much pressure from the International Atomic Energy Agency [IAEA] and cold water was poured on the India-Iran defence co-operation. At present Iran-India energy relations are at stake due to US pressure, so all plans are dropped to make their relations strategic and it would remain so, if situation does not change on the ground. Whether energy discourse is impinging on India's foreign policy, is a matter of debate and introspection; nevertheless foreign policy imperatives and priorities have taken a toll on India-Iran energy relation, no doubt. Often this reverse trend is more visible; as it is visible in shelving Iran-Pakistan-India gas pipeline project. Being an energy importer, India's priority could have been first to ensure its energy from the favourable energy producer, rather than getting involved into other powers' rivalry. Deng Jio Ping once commented regarding economy and the market, i.e. the colour of cat is not important until it catches rats. And China's energy policy exactly follows that psychology unlike India. Due to US pressure, Iranian share of oil has been reduced in the Indian market from 16 to 11% to 8.3 to 6%. This gap has been filled up by Iraqi oil and Saudi Arabia is always ready to export more oil to India. It has been possible due to the internal rivalry as well as acrimonious relations among Persian Gulf states. Moreover, strangely enough, decision to reduce oil never came from the oil producing countries, rather it came from India.

6.10 Qatar

India's relations with another Persian Gulf state Qatar have been flourished in recent years. Qatar has the third largest reserve of natural gas in the world and largest LNG producer in the world. India and Qatar signed MOU in 2005 in the energy and industrial sector (Embassy of India, Qatar 2005). Qatar supplies LNG to India through Dahej terminal in Gujarat and Kochi in Kerala. In 2005 India's ONGC Videsh signed first agreement with Qatar Petroleum for 'appraisal development and production sharing' in the Najwat Najem oil field (Embassy of India, Qatar 2005). India and Qatar signed defence agreement in 2008. In the last 6/7 years; relations have expanded manifold. Indian Ambassador in Qatar rightly said that India values Qatar's contribution in India's energy security and it marked its imprint in LNG, oil and petrochemical sectors (Gulf Times 2014). India has long term security co-operation with Qatar and agreements on defence and security were signed during the then Prime Minister Manmohan Singh's visit.

During Prime Minister Manmohan Singh's visit to Qatar in 2008, security and defence related agreements were signed. Most probably, it was the first time, India signed such an elaborate defence pact with any Persian Gulf country. It is strikingly

similar language with relations to other Persian Gulf countries, India echoed, 'we want to get over the current buyer-seller (gas) relationship and upgrade it to a more sustainable partnership.' (Economic Times 2008). Already Qatar is the largest supplier of LNG. And Qatar is the only Persian Gulf country to have security relations with India (Economic Times 2008).

6.11 Oman

India–Oman relations got a boost after the then Indian Prime Minister Man Mohan Singh's visit to Oman in November 2008. India does not get much oil from Oman. But India was third trade destination for Oman. Spot buying of oil and gas from Oman is important in India's oil demand. There are some joint projects launched by both India and Oman. Among a plethora of bi-lateral visits; India's Renewable Energy Minister's visit to Oman and Omani minister for oil and gas are important. In 2011 Bharat Oman Refinery Ltd. has been established by the initiative of Bharat Petroleum Corporation Ltd. and Oman Oil Company Ltd. in Sagar district of Madhya Pradesh (Ministry of External Affairs, India 2012).

Indo-Oman Joint Investment Fund was established with the initial investment of US $ 100 million. Many Indian companies are involved in many Omani projects. Among them Larsen and Toubro got a contract worth of US $ 150 to establish a gas processing facility in Lekhwair gas field in 2011 (Ministry of External Affairs, India 2012).

In this backdrop of India-Oman relations, both the parties started talking about the strategic relationship. It has been agreed upon that 'the historical connections should be transformed into strategic partnership' (Ministry of External Affairs, India 2012). This trend has been observed especially in case of India's relations with the Persian Gulf countries. Most of the countries, where energy occupies the central position and now Indian govt. are thinking in this line to convert the relations into strategic relations.

6.12 Strategic Relations?

The possibility of converting energy relations into strategic relations is marked by the changing pattern of India- Persian Gulf energy relations. India has been taking utmost care to cement the relations and make it more deep rooted. It cannot be said that the nature of the relations with each Persian Gulf country has been strategic. But current relations are certainly a departure from supplier and consumer relations. Lately, it has been observed in India's relations with the Persian Gulf that India talks about mutuality and more complementary relations; pointing out the specific areas of co-operations and need based relationship. This marked a shift in India's policy toward the Persian Gulf. India's attitude to perceive itself beyond the prism of

vulnerability is important to the growing relations. Positive outlook to make India also a reliable partner pays back, as it is visible in the bilateral trade and other statistics. India has been forged good relationship with all the Persian Gulf countries and converted it into a sustainable partnership, most probably that could be the reason that less Iranian oil import in Indian soil did not create any kind of crisis situation, as the vacuum has been fulfilled by other partners, e.g. Iraq. Nevertheless, one trend is visible in India's import graph. No doubt this region is conflict prone and any time, conflict can break out and political turmoil can be widespread. Despite this tendency, it has been observed that other actors come forward to fill up the vacuum of other countries. This trend is true in case of world oil scenario as well as in Indian oil scenario. Libya's 3 % of oil was off the market, but world did not face oil crisis, as mainly Iran compensated the gap. It is true, India is not very successful to diversify its supply sources beyond the Persian Gulf region, one of the pre-condition to ensure energy security. Nevertheless, at least within the Persian Gulf region it has been diversified and India is capable to maintain multifaceted relationship.

Keeping in view of the buzzword "strategic"; let's have a look at the potentialities and sustainability in this concept. India as an emerging economy in the world is in a position to forge strategic relations with other countries. With the talk of strategic relation, if it consolidates India's energy security, there is no harm. As in the case of Saudi investment in India, it has been observed that if the relations are of strategic nature; Saudi side is more interested. Though it has to be examined, whether the nature of relations is really of strategic nature or not. In many countries, base of their relations is historical and civilizational. And countries should not face difficulties to explore another level of co-operations.

Situation in the Persian Gulf countries are not like other region. Whether these countries are really interested to have strategic relations is a matter of debate. As these countries are highly depended on the security matter to the United States, their position is not going to change. So, bi-lateral strategic relations are functional or not that is a big question. Security analysts C. Raja Mohan commented energy certainly plays important role in the foreign policy perspective of South Asia (Raja Mohan 2009). Whether it is in the discourse of India's foreign policy needs to be examined. From Indian perspective, if India would forge strategic relations with the energy Persian Gulf countries, benefits would be tilted towards India; as it would fortify energy relations. Persian Gulf countries except Iran are not going to look for an alternative to their security provider, the United States. They are rather happy under US security umbrella. Nevertheless, strategic co-operations at the military level, especially training, intelligence sharing to curb terrorism, drug trafficking and crime have a great value to both India and the region.

New Delhi based Foundation for National Security Study has done a survey on India's strategic relationship with other countries (Subramanium 2012) Nirupama Subramanium referred that the study's findings in respect to a number of countries; this nomenclature 'strategic partnership' appears less serious. Moreover, she commented that India should not bestow the "respectable nomenclature" to one and all, rather introspect and take it seriously. Three basic elements of the strategic relationship have been elaborated, i.e. political-diplomatic, defence and economic. India

has political, diplomatic and economic relations with the Persian Gulf countries, but defence ties are rare. Moreover, possibility to materialize it in future is also not bright. Security scenario in these countries is different, most of the cases defence related pacts are not feasible; as other parties won't be interested.

Relationship with the Persian Gulf might not pass the strategic test. Nevertheless, if it means to express the willingness to go another level and beginning a new era in the relationship, then it is a different story. If India is readily agreeing to put the relationship at the high pedestal, it must be said that India is doing it intelligently. To ensure its energy security, India must translate its vulnerabilities into assets or advantages. For energy producing countries, security of demand is ensured by any means or by any number of countries. Thus, India should take any step cautiously to understand the whole gamut of relations. If India takes it seriously, India should take measures to create the environment so that strategic relations can evolve. Moreover, energy producing countries' perception and assessment about India is also important. India requires to think in a concrete term to project its importance to the world. It is not necessary only to maintain a tight rope balance in case of Iran and US relations; but a rhythmic nature of relations are necessary in respect to Persian Gulf energy producing countries. To elaborate, GCC states and US are not in opposite direction in international relations unlike Iran. So, to fulfil its ambition, if India goes for more co-operation with the United States, this posture cannot create any problem with GCC. But at the same time, India should acquire some unique position, where India's relations would get the first priority. India needs to calculate and cement energy relations along with non-energy relations. To put it simply, India can have an edge with other trade items and products, which are necessary for the region. Actually, non-energy factors can only strengthen energy relations. As commonness and the contrast are visible in the relationship; India should tread the path carefully in case of sensitive issues as well.

6.12.1 Strategic Uncertainty as the Policy Level

While identifying India's energy challenges as the most difficult, analysts pointed out the "strategic uncertainty in the Indian policy community" (Luft and Korin 2009). Govt. of India's energy related documents are scattered without policy direction. There is no well researched study to reflect the real picture and policy options. In 2000 Govt. of India put forward its long term plan for the oil and gas industry in Hydro-carbon Vision 2025. Short and long term measures are discussed in this document. There are many unachievable goals in the policy documents. India's Hydro-carbon Vision 2025 talked about self sufficiency by means of increasing the indigenous production. This goal is not achievable as it is not in the hands of any country to increase the production. Moreover, not only at the present scenario, but in future also, it is not possible to achieve self sufficiency in oil. As in all reference scenarios, it has been said that India's import dependency will be more and India will be importing more and more energy in future. It took time to realize that only

technological advancement does not mean increase in the indigenous production and moreover in India's case gap between production and consumption is always wide. (Luft and Korin 2009). Analysts explained the genesis of the concept of India's 'self sufficiency' was from its colonial experience. The concept of energy independence is also a well thought out concept. United States talked about energy independence as a policy issue. That makes policy change and policy reversal at the governmental level. In India's case this goal is not only far reaching, but not possible to achieve, if any geological revolution does not happen.

While published in December 2013, Kelkar committee report on "Roadmap for Reduction in Import Dependency in Hydro-carbon sector by 2030" (Ministry of Petroleum and Natural Gas, Govt. of India, Part-1 2013). is ambiguous in its recommendations and basically focussing on the private sectors and how to cater their needs. In that way, Auto Fuel Vision and Policy 2025 (Ministry of Petroleum and Natural Gas, Govt of India 2014). is a welcome move. Nothing could be appropriate at a time, when Indian cities are competing with world cities as the polluted cities of the world. Before 2003, there was no comprehensive auto fuel policy, it came into the picture after R. A. Mashelkar put forward his vision in this regard. New Auto Fuel Vision and Policy 2025 report has been submitted in May 2014. This policy is a step forward to provide Indian citizens clear air. Among other documents, Integrated Energy Policy 2006 has dealt with the energy question at length with the range of energy problems India has been grappling with. India needs a comprehensive energy policy. In this way, Integrated Energy Policy is a forward looking document. Its recommendations should be implemented to streamline the function of different energy departments. Emphasis on holistic approach is absolutely necessary and should be accepted at the policy level. A long term vision is needed to encounter the problems of unforeseen energy requirements, volatility in usages and prices along with energy crisis. Last but not the least, most importantly unless the question of energy is made a part of national security and the process to link both traditional and non-traditional security in a synchronized manner has not been initiated; the goal to achieve energy security would remain unfulfilled in India.

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Chapter 7
Geopolitics of Energy Security in Central Asia: Implications for India

Nalin Kumar Mohapatra

Five major developments altered the geostrategic map of Central Asia[1] since 1991, impacting upon the geopolitical discourses, better summed up as the 'New Great Game'. These developments are: the construction of the Baku-Tiblisi-Ceyhan (BTC) pipeline routes, pumping oil from Azerbaijan and having connectivity with the Tengiz oil field of Kazakhstan, (delivering oil to Europe through Turkey) bypassing Russia. This route is being promoted by Western energy industries with the active support of America. The second is the Caspian Pipeline Consortium pipeline (CPC) connecting Kazakhstan and Russia and being promoted by the 'traditional hegemon' Russia. The third pipeline which is assuming significance and being operationalised by connecting the rich gas fields of Turkmenistan with China and passing through Uzbekistan, Tajikistan, Kyrgyzstan and Kazakhstan. This gives the 'peripherial hegemon', i.e., China, an upper hand in the Central Asian energy diplomacy. Fourthly, the proposed Trans Caspian Pipeline (TCP) connecting Azerbaijan, Turkmenistan gas fields to Europe through Turkey. This route will give much needed boost to European gas security thus reducing their dependence on Russia at the same time giving European Union an upper hand in the Central Asian geo-

[1] In this article the present author is including Azerbaijan as a Central Asian state, though, it is located in the South Caucasus. This is mainly due to their historical linkages as well as complex energy game which is currently going on this region mainly due to pipeline diplomacy. The same is adapted from Barry Buzan and Ole Waever's theoretical construct of 'Regional Security Complex' (Buzan and Waever 2003, pp. 4–49. See also for a similar view Kubicek 2013; Alstadt 1992, pp. 6–20).

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politics. Finally, the much hyped Turkmenistan-Afghanistan-Pakistan-India (TAPI) pipeline route connecting Turkmenistan gas field with India. If operationalised, this route will give a new vista to the South and Central Asian regional energy cooperation (Bahgat 2002; Cornel et al. 2005; Blank 2012; Eder 2014; Weitz 2011; Kubicek 2013; Shaffer 2010; Tengri News 2014; Stulberg 2005; Rasizade 2003; Menon 2003; Hopkirk 2002; Kaushik 2005). These developments are not only shaping the energy relations of Central Asia but also providing an opportunity to them for pursuing an effective 'multi-vectoral' foreign policy. Because of these geopolitical developments, external actors, are getting a 'leverage' to manoeuvre in the emerging Eurasian geopolitics. These multiple pipelines are not merely serving the purpose of carrying energy from this region to different parts of the world but also entail ending the organic sway of Russia in this space. More importantly with multiple stakeholders (in the form of external state and non state actors) in this region, the pulse of the geopolitical game have also changed to a significant extent (Shaffer 2010, pp. 7209–7210; Star 1996; Kubicek 2013; Blank 2012).

The present paper is an attempt to look at some of these nuances in shaping the energy geopolitics of this part of the world and its ramifications for India. The geopolitical trends of Central Asia demonstrate the fact that the traditional 'game theory' model of International Relations has not lost its significance on the other hand the liberal approach of 'cooperative hegemonic theory' is also gaining preponderance (Pedersen 2002, pp. 677–678; Cutler 1996). It also tries to highlight, that, controlling the energy resource is not the sole motive of external powers, the present work argues that apart from energy the classical geopolitical doctrine 'heartland' is still significant and the outside state actors particularly the West is trying to ensure a tacit control over this part of the world which will give them an additional geopolitical space to manuver. This aspect is assuming significance in the background of growing military build-up in and around this region. Finally, it looks at the India—Central Asia energy cooperation through the prism of 'geo-historical' linkages (Stulberg 2005; Brzezinski 1997; Kaushik 2010).

7.1 The Legacy of 'Energy Game' in Central Asia

Historically speaking, the geopolitics of Central Asia is closely intertwined with energy diplomacy. The first oil boom took place in Baku much before in the USA. Realising its significance both the Tsarist administration as well external energy conglomerates like Noble, Shell, etc played an important role in its exploration. However, the lack of infrastructure to explore the resources restricted it to be carried to the international market (Yergin 1991, pp. 57–58; Akiner 2004, pp. 5–6). The First World War however entirely changed the geopolitical configuration of this part of the world. In the 1920s Baku used to produce roughly around 15 % of global oil. To control the oil reserves of Baku both Germany and England competed with each other. As observed by Lord Curzon, in the context of First World War, both these powers: 'floated to victory on a wave of oil' (O'Hara 2007, pp. 141–143). The First World War also propelled Mackinder to restrategise the British approach

in this part of the world. He extended the concept of 'pivot area' to 'heartland' by giving a new eulogy to the geopolitics i.e.,: 'Who rules Eastern Europe commands the Heartland. Who rules the Heartland commands the World-Island. Who rules the World-Island commands the world' (Weigert 1945–1946, pp. 46–47; Mackinder 1904, 1919, p. 186).

The onset of Second World War put the Central Asian region again into the vortex of the War. This in turn stymied the economic development of this region. To meet the energy need Nazi Germany focused its attention towards the Baku oil field, a reminiscent, of the First World War. The German efforts to control this field got a setback when it lost the Stalingrad war (Gel'man and Marganiya 2010, pp. 26–28). In the post-Second World War phase efforts were also made to develop new oil and gas infrastructures in Central Asia. One may add here the fact that in the post-Second World War phase three republics of Soviet Union, Kazakhstan, Uzbekistan and Azerbaijan used to produce around 3–4 % of total oil production of the country. On the other hand major chuck of Soviet energy produced from its Ural parts. However to tide over the fluctuation of energy production in the aftermath of the 1970s the Soviet planners developed new regions of Turkmenistan, Uzbekistan as well as Tajikistan (Liebowitz 1992, pp. 101–102; Raballand and Gente 2008, pp. 10–11). Because of the diversification of energy resource from Uralsk to the Central Asian region, production increased substantially in this part of the Soviet Union. In 1974 the report published in the *Narodnoye khozyaystvo* states that the contribution of: 'Central Asian oil to the Soviet oil production was 8 % and natural gas was 31.7 %' (Newton 1976, pp. 101–102).

Thus a closer look at some of the historical incidents demonstrates that this region played a catalytic role in shaping the geopolitics of the Soviet space. The significance of this region has not diminished in the post-1990s rather this space is providing the necessary leitmotif to the accentuation of geopolitical rivalry both from a realist and in the neo- realist perspectives as well as liberal institutionalist perspectives (Rasizade 2003, p. 53–56).

7.1.1 Strategic Hegemony' and Energy Geopolitics, the Incipient Phase: 'Conundrum of Realism[2]

The implosion of the Soviet empire in 1991 marked a new phase of geopolitical uncertainty. With the crumbling of the centralized system a chaotic situation emerged in this part of the world. As a result of which external players tried to have their

[2] Understanding the significance of energy in shaping the dynamics of international politics, theoretical approaches are being increasingly employed to study the same. The realist school of thought as eulogized by Hans J Morgenthau argues that international politics is 'nothing but struggle for power' (Dannreuther 2010; Morgenthau 2007 p. 13). His argument is basically premised upon the ideas developed by contractualists like Hobbes who stated that: 'state of nature is nothing but a state of war'. In this regard Morgenthau emphasizes on the fact that energy provided both U.S.A and the then USSR the necessary leverage to increase their preponderance vis-à-vis their adversary during the Cold War period (Morgenthau 2007, pp. 83–84; Yurdusev 2006; Hobbes 1997, pp. 147–156; Cherp and Jewell 2011).

stake in this part of the world in the realist paradigm of 'maximization of national interest'. However, the landlocked geography, inherited Soviet economic structure and resource integration (particularly energy) compelled these states to maintain the old economic system in a de facto form (Soligo and Jaffe 2002, pp. 109–110; Olcott 1992, p. 109; Morgenthau 2007, pp. 14–24). It is in this context analysts are arguing that the Central Asian energy provided the necessary: 'glue that held the republics of the Soviet Union together' (Sim 1999 p. 31).

The post-1991 era marked a new phase in the Central Asian energy dynamism. Though the post-Soviet states attained de-jure independence but could not able to consolidate it. The fall in the energy prices in the international market as well as the isolationist character of this landmass resulted in the slowdown in the interest of external players in this part of the world. However the first strategic move to acquire energy stake in this region was made by the American energy giant Chevron. In 1993 it signed an agreement with Kazakhstan to develop the Tengiz oil field. It was followed by signing of a deal by a group of energy conglomerates which include BP, Chevron, Exxon Mobil with Azerbaijan in 1994. This was called the 'deals of the Century' to develop the Azeri-Chirag-Guneshli oil field (ACG). It aimed at exploring the estimated 6.5 billion barrels of oil (Klare 2008, p. 116, 120–121; West 1994).

The structure of energy geopolitics of Central Asia underwent a massive change in the aftermath of 1995. America which slowly made an entry, tried to assert itself both strategically and politically in this part of the World. This altered the geopolitical framework to a 'confrontist one'. The best exposition to the aggressive postures on the part of America was reflected in the writings of American geostrategist, Zbigniew Brzezinski who's idea got a strong support at the policy level from the then Deputy Secretary of State of America Strobe Talbott. Talbott in his address to the Central Asia and Caucasus Institute argued for a 'pro-active role' for America as this region possesses rich hydrocarbon (Talbott 1997; Baker 1997; Brzezinski 1997, p. 29).

The aggressive policy posture adopted by America was matched with equal measure by the 'traditional hegemon' of this part of the world i.e., Russia. After consolidating itself economically as well as politically Moscow tried to restrategise its relations with its so-called 'strategic backyard'. Having a stake in its southern periphery's energy resource provided much needed leverage to the Russian foreign policy as this region became the 'swig producer' (Nanay 2009, p. 109; McFaul 1997–1998). As observed by the then Russian Deputy Prime Minister Alexei Bolshakov: 'The USA and its allies are achieving more and more new positions in CIS countries, which often harms Russian interests' (Drezner 1999, p. 139). Moscow took seriously to the aggressive policy in its 'soft underbelly' by pursuing retaliatory measures against Central Asian energy producing states like Kazakhstan and Turkmenistan (Nanay 2009, p. 166, 171–172; Drezner 1999, p. 121).

As both Russia and the United States entered into the realist rule of 'maximization' of respective 'national interests', the Central Asian states including Azerbaijan, slowly started diversifying their energy resource to the multiple external powers. These kinds of strategic divergences between producing states as well as

the receiving states shaped the geopolitical complexity of energy in this part of the world largely based on the premise of 'realism'. The first move in this regard was made by the US and other Western oil conglomerates who constructed a pipeline starting from Baku and connecting it to the Turkish port of Ceyhan. Thus for the first time the Baku oil supplied to the European countries bypassing Russia through Georgia, which is a nemesis of Russia in the post-Soviet space (Nanay and Stegen 2012, p. 347; Cornel et al. 2005; Socor 2006; Morgenthau 2007, pp. 4–12). Russian anxiety over this pipeline was evident at the sideline of the UN conference in 2002, in which the then foreign minister of Russia Igor Ivanov answering to the queries of journalists stated that the objective of BTC pipeline is to: 'oust Russia from regions which are historically the regions of lawful interest of Russia' (Nanay and Stegen 2012, p. 347).

The growing geopolitical weight that the West got, following the initiation of the BTC pipeline, resulted in the emergence of new geopolitical condominium in this part of the world. However unlike the nineteenth century, in this 'New Great Game' the Central Asian states became the actors in defining the contours of this game and not simply acted as a client (Matthew 2003; Hopkirk 2002). To counter the BTC pipeline Russia beefed up its presence in the latter part of the 1990s by reinvigorating the 1600 km pipeline connecting Kazakhstan with the Russian port of Novorossiisk in which Russian owned a stake of 24% followed by Kazakhstan having 19%. The opening of multiple pipelines also gave the host Central Asian states a strategic leverage in the global energy market (Ahrend and Thomson 2007, pp. 172–173; Gachechiladze 2002, p. 126; Ziegler 2005, pp. 202–205).

Thus the first decade of the 90s resulted in the major geopolitical configuration and reconfiguration in which each of these major external actors tried to occupy maximum space for themselves as has been discussed by the Classical geopolitician above. This phase also can be termed as 'incipient geopolitical phase' as these actors are also tried to initiate moves aimed at strengthening theirs sphere of influence in this landmass. These states also having consolidated their state building processes tried to use energy as a 'bargaining chip' with the external powers thus increasing their sway in the global geopolitics (Rasizade 2000, pp. 139–141; Blank 2005).

7.1.2 The 'Consolidate Geostrategic Game' and 'Neo-Realist'[3] Framework of Security

The Central Asian energy geopolitics in the post -2001 is an apt reflection of neo-realist framework of security analysis as envisaged by Waltz (Waltz 1979, pp. 87–88). External powers who took interest in the 1990s tried to consolidate their hold

[3] As has been observed by Kenneth Waltz in his book *Theory of International Politics,* the 'structure' generates 'insecurity' and 'fear' which propels the 'state to behave' accordingly. He further argues that the 'asymmetric distribution of 'capability' creates 'hierarchy' in the international system and states' try to 'coordinate with each other to balance each others'. (Waltz 1979, pp. 87–88); See also for a similar analysis (Eder 2014, pp. 69–84; Gilpin 2001).

on the geopolitics of this region. Four major factors contributed to this phase of geo-strategic game plan. These are restructuring of Russian foreign policy under the leadership of Putin; secondly, the 9/11 incident after which America made a strategic inroad into Central Asia in the name of 'War on Terror'. Thirdly, the operationalisation of some of the projects for diversifying energy supply to different external powers. Finally, the 'multiple pipeline' routes provided these nascent states an option to pursue the so-called 'multi-vectoral foreign policy without any external constrains. These above-mentioned external structural factors also gave volatility to the Central Asian energy security in the line of 'neo-realist' perception (Khidirbekughli 2003, pp. 161–164; Spechler 2010; Blank 2005).

Looking at the Central Asian geopolitics from the 'cooperative hegemonic stability theory'[4] what one can infer is that the two major external powers, Russia and USA along with China agreed on common issues like regional stability and fight against terrorist, etc. in the post 9/11 incident. These actors agreed on to maintain a minimal regional peace despite feeble geopolitical situation largely due to energy bargaining for achieving long-term goal of equitable distribution of energy (Lifan and Shiwu 2004, pp. 142–145; Menon 2003; Ziegler and Menon 2014; Cutler 1996). Incidentally just a year before the 9/11 incident Russia in its foreign policy concept paper 2000 under a new dispensation outlined the 'Cooperative Security approach' with a 'assertive doze' in the so-called Southern periphery. As the Concept paper stated:

> 'Viewing ….the Caucasus, and the Caspian Sea basin, Russia intends to steer a purposeful course toward for turning it into a zone of peace, stability and good neigh-borliness, something that will help advance Russian economic interests, including in the matter of the choice of routes for important energy flows.'[5]

Similarly the American policy in the post 2001 era aimed at maintaining what an American journalist Charles William Maynes argued for a 'quasi- permanent U.S interest' in this part of the world. In this regard he stressed on increasing American engagement in the 'oil-rich Kazakhstan and gas rich Turkmenistan' (Maynes 2003, p 121, 124–125). One may add here the fact that despite agreement on common issues still both these external actors tried to promote respective countries' national interests in terms of 'resource securitization'. Under the stewardship of Putin Moscow pursued a pro-active energy policy in its so-called 'soft-underbelly' aimed at acquiring stakes in both the pipeline routes as well energy resource (Monaghan 2011, pp. 281–282). To appease these states Russia provided number of incentives to them like giving concessions if they agree to opt for Russian oil and gas pipelines as well as resolving the intra- state disputes through bilateral means. In addition to some of these above mentioned 'conciliatory measures', Moscow followed to-

[4] The basic proposition of this theory is that all the external actors are interested in 'distribution of material resource equitably' which in turn contributes to stability of the regional system in the longer-run.To achieve that 'hegemonisation' is needed at a shorter-run. Emergence of European Union is a good instance in this regard as highlighted by Kindelberger (Pedersen 2002, pp. 681–682; Cutler and Robson 2000, pp. 38–39; Cutler 1996; Khindelberger 1981; Gilpin 2001).

[5] (The Foreign Policy Concept of the Russian Federation 2000).

wards former Soviet allies; it also pursued 'coercive measures' against them aimed at bringing these countries to mend their fences with the former's whims (Stulberg 2005, pp. 6–7; Olcott 2007, p. 334; Boucek 2009, p. 160). It can be evident from series of measures Russia initiated towards them to appease. For instance Moscow's oil giant Lukoil as a strategic move against the BTC pipeline project withdrew itself from the AGG oil project in 2002. Incidentally the ACG project as originally envisaged would have provided large chunk of oil to the BTC project. It also adopted a hard stand on the legal regime of the Caspian Sea and went back to the original treaty of 1921 and 1940 as the guiding principle for resolving legal tangles involving the status of the Caspian Sea (Blum 2003; Olcott 2007, p. 334; Chow and Hendrix 2010, p. 35; Lillis).

Taking advantage of Moscow and Washington's 'zero-sum' nature of strategic realignment, Beijing became the net gainer of the Central Asian energy. The issue of energy gained importance for China as the White Paper on Chinese Energy published in 2007 explicitly mentioned that it: 'is the second largest consumer of Chinese energy' (Huasheng 2006, pp. 109–111; China's energy 2011; Weir 2007). The growing energy deficit in term of consumption forced China to pursue a belligerent foreign policy in its so-called 'extended periphery' using geo-economics as a tool to shape its strategic objectives. As the Chinese experts perceive since history this landmass formed the: 'thickest piece of cake given to the modern Chinese by the heaven' (Wong 2011). The 'thickest piece of cake' as noted above is 'energy' what China interested most in recent years. Having made some inroad into the hydrocarbon sectors China tried to consolidate its energy harvest in this strategic landmass. Apart from the Atashu–Alashankau pipeline (932 km) the Petro-China Company also constructed another pipeline within less than 2 years to connect the 1200 km pipeline (Petrochina 2006; Calder 2012, pp. 164–165; Wong 2011). Besides connecting with Kazakhstan, China showed much interest in the energy sectors of Kazakhstan. It acquired major stakes in two oil fields in MangistaumunaiGaz and KaznunaiGaz 50 and 11% respectively in 2009 (Buxton 2009). Encouraged by growing energy exploration in Kazakhstan, Astana also pursued a 'complementary multi-vectoral' foreign policy in which is Beijing placed at a highest pedestal (Walsh 1993). It is in this background both the countries interested in pursuing their energy game in a 'win-win situation' (Sulemei 2014a, b; Kazenergy 2008; Xiaojie 2008).

The biggest energy gain for China however has been in Turkmenistan. After remaining under the shadow of Gazprom, the latter finally broke the shackle of the Russian energy firm in the post 2005 phase. This happened when China constructed a new gas pipeline of around 1800 km connecting Turkmenistan with China through Uzbekistan, Tajikistan, Kyrgyzstan and Kazakhstan. Built by the CNPC it was operationalised in December 2009 and expected to transport around 40 billion cubic meter of gas to China after fully operational (BBC 2009). It is argued that after the BTC deal this gas pipeline route broke off some of the Russian monopoly in the Central Asian energy market. Because of the new energy deal with China, Turkmenistan demanded right prices for its gas. This contributed to the souring of relationship between two countries and finally took an ugly turn when Ashgabat blamed Moscow for carrying out blast in the gas pipeline in 2009 (UPI 2009; Cutler

2010). The geopolitical significance of this project was aptly summarized by the Turkmen President: 'This project has not only commercial or economic value, it is also political' (Gorst and Dye 2009). By promising hefty sum of gases to China, Turkmenistan is quite successful in manoeuvring the geopolitics of this region thus giving a new dimension to the second phase of Central Asian energy diplomacy (Gorst and Dye 2009).

7.1.3 Assertive Energy Geopolitics, 'Strategic Chaos' and Neo-Liberal Institutionalism[6]

The third phase of Central Asian geopolitics started from 2010 when external actors after their minimal consolidation began asserting their influence. This can be seen by the fact that China emerged as one of the largest consumer of the Central Asian energy. Russia, too despite being one of the largest producer of oil and gas, had shown interest in the hydrocarbon resource of Central Asia to restricts the gains of Beijing and Washington. Though there has been convergence between Beijing and Moscow at political level but a lots of misgiving still persist between these two over sharing of hydrocarbon resource particularly in Central Asia (Weitz 2011; Peterson and Baysch 2011, pp. 21–45).

The Western partners in the post -2010 received a strategic setback when their pet project Nabucco (aimed at diversifying the Central Asian and Azeri gases to Europe bypassing the traditional partner Russia like the BTC pipeline route) went into rough weather. This 3900 km pipeline meet Europe's energy need without depending on Russia (Champion and Parkinson 2011). Azerbaijan considered to be the main supplier of gas to Nabucco questioned the viability of such a long pipeline gas project. Similarly, both EU and US have different opinion on the participation of Iran in this project. While the former favoured participation of Teheran latter one rejected it. Finally, Russia entered into a lucrative deal with Azerbaijan for exploring the Shah Deniz II gas project from where it is originally planned to feed into the Nabucco project. This gave a serious jolt to the western energy diplomacy in this region (Engdahl 2004; Weiss 2013). However a number of proposals for pipelines like Trans Anatolian Pipeline (TANAP), the Trans-Adriatic Pipeline, Trans Caspian Gas Pipeline from the Russian 'soft underbelly' to Europe resulted in growing anxiety on part of Russia. To counter such move and to frighten Turkmenistan, Russia,

[6] Contrast to realist and neo-realist, the liberals on the other hand argues for creating an institutional mechanism which can regulate the pattern of behavior of nation states. Heavily drawing from the idealistic school of thought propounded by Kant, Wilson, etc. this school posits that 'creating an institutional structure' which can able to 'evolve a regime' to resolve persistent conflict mostly economic in nature. This resulted in the growing importance of this approach in the domain of international political economy. The nexus between domestic as well as international political economy so also rapid 'integration' and 'interdependent' character of international economy propelled the growth of this approach (Katzenstein et al. 1998, pp. 647–648; Waltz 1993, pp. 66–67; Dannreuther 2010; Keohane 1984; Keohane and Lisa 1995).

Kazakhstan and Iran conducted joint military exercises. Russian Foreign Minister Russian Foreign Minister, Sergei Lavrov in an speech in October 2013 stated that: 'Our European partners are imposing the Trans-Caspian gas pipeline on Azerbaijan and Turkmenistan, disregarding the fact that such issues should be resolved between the coastal nations rather than in Brussels' (naturalgaseurope 2014; trend.az 2013; Fitzpatrick 2013; Tengri News 2014; news.az 2013; Krashakov 2014). It has been observed that to counter the joint moves by the Caspian allies like Russia, Turkmen President even hinted of enlisting support from international bodies like U.N and OSCE (Fitzpatrick 2013; Kucera 2012).

Though external powers are trying to circumvent Russia, while carrying out energy from this landmass, it is not sitting idle. Using its traditional clout in this region President Putin undertook series of measures aimed at regaining Russia's traditional space in this part of the world. This can be inferred from 'shuttle diplomacy' President Putin undertook in this region with a spirited zeal. During his visit to Baku in August 2013 both the sides agreed to develop joint hydrocarbon sectors and pipeline projects. In this regard Russian energy giant like Rosneft showed keen interest in developing cooperation with Azeri giant SOCCAR. LukOil has also demonstrated its keenness to participate in the Shah Deniz gas field. Despite its stand-off with Baku, Moscow got around 1.55 bcm of gas. This deal can be understood in the background of Moscow-Baku trade-off as a result of which the latter cancelled an 16 years joint agreement on energy (Pravda.ru 2013; Ria Novosti 2013; Reuters 2013). Even if Russia's position in the Central Asian energy sector is somewhat dwindling still it has some leverage in the Uzbek energy sector. On the contrary these two share hot and cold relations over the years. Russian energy giant like Gazprom and Lukoil are investing heavily just to balance their overall presence in Central Asia. By 2010 Moscow invested around $ 1.25 billion in the energy sector of Uzbekistan. This is happening despite the fact that in 2008 Uzbekistan demanded higher prices from Gazprom. Moscow's overture can be understood in the context of growing Beijing's interest in the Uzbek energy sector (Monaghan 2011, p. 129; Paramonov et al. 2010).

Proactive efforts of energy engagement by China are illustrated by its endeavour to expand pipeline projects. After successful completion of a gas pipeline from Turkmenistan, China, turned its attention towards Kazakhstan. Beijing started constructing the Beyneu to Shymkent gas pipeline thus augmenting its presence in this part of the world. The pipeline is reported to be carrying 10 bcm gas and will cover a distance of 1475 km (China Daily 2010). Besides constructing pipeline, in September 2013 Chinese energy giant CNPC acquired 8.3 % of stake at the Kashagan, the second largest oil field in the world through a negotiation of $ 5 billion. Thus China gave a serious blow to the rivals in the energy game. In 2013 around 11 billion barrels of oil was transported to China, meeting the latter's oil need to a significant extent. Besides acquiring energy stakes, constructing pipelines, Beijing has also provided soft loan to Kazakhstan to upgrade its energy infrastructure. Way back in 2012 it provided $ 1.13 billion to upgrade the Atayru (Reuters 2012; Beshimov and Ryskeldi 2014). Kazakhstan is also emerging as an important energy hub for the transit of Russian oil. An agreement to this effect was reached in December 2013

when two countries agreed to the proposition of Russia pumping 7 million metric tons of oil to China through Kazakhstan. This would help Astana to regain its importance in this region (Ria-Novosti 2013).

With Turkmenistan Chinese energy engagement is growing particularly in the field of gas. The energy relations between these two states reached to a higher level when Turkmenistan's President visited China and signed strategic partnership agreement in the field of energy security. By the end of May 2011 Ashgabat provided around 10 billion cubic meter of gas to Beijing which constituted around half of the Chinese gas consumption (China Daily 2011). Chinese influence in the Turkmen gas sector got further consolidated when Chinese President Xi visited Ashgabat on his whirlwind tour to Central Asia. During his visit to Turkmenistan both the sides decided to intensify the energy cooperation further and agreed to develop the Galkynysh (Renaissance) gas field considered to be one of the largest gas field containing (as per estimate of British energy group Gaffeny Associate) contains 26 trillion cubic meter of gas. As per the estimate by 2016 Ashgabat will provide 40 billion cubic meter of gas and by 2021 the same will reach to 65 billion cubic meter of gas (Turkmenistan.ru 2014; Rejepova 2013; ogj 2014). In addition, China has started constructing line D in addition to the line AB and C. Under the plan China's Trans Asia Gas Pipeline a subsidiary of CNPC has aligned with Tajik Gas agency Tojiktransgaz to construct the pipeline. Kyrgyzstan is also another state through which this pipeline project will pass thus bringing all the five states under the Chinese influence. Incidentally the line C of the same pipeline was to operationalised in May 2014. By 2015 it has been estimated that this route will provide 25 bcm to China. Similarly giving a big jolt to Russian energy monopoly in Uzbekistan last year (2013) CNPC signed with Uzbek counterpart to Surkhan, Qarasul and Baisun blocs for the development of oil and gas industry (Ergasheva 2014; Xinhua 2013).

The energy diplomacy in this region witnessed a new twist when Russia and China along with Central Asian countries visualised a 'regime of cooperation' (under the framework of neoliberal instiutionalist perspectives) for exploration and transportation of energy. Shanghai Cooperation Organisation (SCO) is one such organisation which provided a platform for promoting the energy interest of member states which include two major Central Asian states Kazakhstan as well as Uzbekistan apart from Russia and China. Besides this, the Chinese initiated gas pipeline project, also gave SCO member states like Tajikistan and Kyrgyzstan an opportunity to get some monetary benefits as these two states are acting as transit states. The SCO's interest in the energy issues gained prominence when the member states in its meeting held at Shanghai in 2006, emphasized on deeper cooperation in the field of energy. At the initial phase the member states agreed to form an 'Energy Cartel' which can meet the needs and aspirations of the member states (Kolchin 2006; SCO 2006; Kooalee and Tisheyar 2013, pp. 1–29). At a meeting in December 2013 the member states discussed the issue at length and gave a call for formation of 'SCO Energy Club'. In the meeting it was agreed to evolve a common approach to discuss issues relating to energy security. Incidentally this issue has been discussed at length since 2006 at various SCO summit to chart out a common responses.

Statistical data from various sources estimated that the regional bloc contains 20% of oil (if one take Iran into account) and 50% of global gas reserves (news.tj 2013; Kolchin 2006; Kooalee and Tisheyar 2013, pp. 1–29)

Eurasian Economic Union which will be operational in January 2015 is another such institutional arrangement aimed at forging cooperation among the three member states, Kazakhstan, Belarus and Russia. Incidentally, except Belarus, these two are energy producing states and Belarus act as a transit corridor for Russian energy (Vatanka 2014; Itar-tass 2014; Akimbekov 2014). One may add here the fact that Russia is using the Eurasian Integration Project to win back CIS states who have fallen with the former. Under the integration scheme Moscow is providing large-scale financial as well as technical assistance to develop hydropower projects in Kyrgyzstan and Tajikistan. This paves the way for better positioning of Russia through collective mechanism. Under the integration scheme the member states of this organization agreed to create 'common norms' with regards to energy security and to give each other a preferential treatment. International financial agency like Moody has also forecasted a favourable market conditions for this group in terms of trade flow in near future (Itar-tass 2014; Akimbekov 2014; Katzenstein et al. 1998, pp. 647–648). Buoyed by the success in the energy game in the Eurasia region the Kazakh President in recent years also even envisaged the 'Asian Energy Strategy' in which Kazakhstan could play a key role (kazenergy 2008).

One may highlight here the fact that despite positive measures by post-Soviet Central Asian states along with China and Russia to ensure 'cooperative energy security' in this region there are irritants among the major actors impeding fruitful cooperation.

7.2 Impediment to Energy Cooperation in Central Asia

Over the years strategic experts (especially the Chinese) are of the opinion that the nature of interaction between Russia and China in Central Asia especially in the field of energy is quite frail in nature. This is happening despite their common approach in SCO to form an 'Energy Club'. There are number of undercurrents which are going to shape their interaction in the Central Asian energy sector. These undercurrents are generating growing disdain in the Eurasian space. Russia is also increasingly worry over Chinese presence in Central Asia particularly in the energy sector as the latter destroyed its monopolistic hold. The diversification of Turkmen gas as well Trans Asian pipeline connecting Turkmenistan and China is a major source of anxiety for Russia (Cutler 2013; Eder 2014, pp. 101–102). Russia in recent years is also forced to cut back its price from $ 400 per thousand cubic meter of gas to $ 300 on the other hand Chinese are paying merely $ 200–210 for the same amount of gas from Central Asia. This could dent Russian financial exchequer by making Russian gas less attractive for China (Stratfor 2013b). Similarly from 2005 to 2010 the Russian gas production fell quite drastically as a result of which it met its export commitment by using Central Asian gas. In nutshell one may say that the

nature of strategic bargaining between Russia, Central Asia and China carries with it the possibility of a 'zero-Sum perspective'. This is happening notwithstanding the fact that Russia and China made a headway in signing the 400 billion deal for supplying gas to China recently (Cooley 2012, pp. 64–65; Martin 2014).

Apart from Russian-Chinese competition in Central Asia, native states of this region are also voicing concern over growing dominance of Chinese in the energy sector of respective states. There is a consensus among the Kazakh analysts that the Chinese and Kazakh energy relations are asymmetric in nature as the former pay less price to Kazakh energy in comparison to the Europeans. This may hinder their bilateral energy relations in future (Urazova 2014; Vatanka 2014). In addition to hovering around the Central Asian space over the years, Beijing is also showing expansionist design in Central Asia. It can be inferred from the way China is penetrating in Central Asia by building new infrastructures what many call as 'new border' of China. The Chinese move is also generating apprehension in the mind of political elite regarding its intention (Stratfor 2013). The accentuated energy game which is currently going on in Central Asia is having a deeper repercussion on India located at the vicinity of Central Asia (Kaushik 1997).

7.3 India and Central Asian 'Energy Calculus'

Over the years India is emerging as a major player in global politics on the strength of its growth story. However the growth is vulnerable to 'unremitting supply of external energy'. Thus supply of energy is one major challenge for India's energy security (MEA 2009). The country has yet to reach energy sufficiency in terms of domestic production both in terms of domestic hydrocarbon resource as well as renewal energy. The external energy supply is subjected to large-scale volatility ranging from pricing issues to geopolitical compulsions as well as accentuation of conflict in the hydrocarbon supply country. It has been historically observed that whenever there is an acceleration of conflict in the West Asian region India faced worst form of energy crisis (Pant 2007; MEA 2009).

It is in this context one has to look at India's approach to secure hydrocarbon resources externally. Right now New Delhi is depending heavily on the West Asian region for meeting energy needs. It needs to diversify its sources of supply. When Central Asian states attained independence India did not see much promise because it used to maintain relations with these states through Russia. However slowly and steadily this region got the attention from Indian policy makers as the future source for India in terms of securing energy. However India faced the constraints of accessibility and penetration of large number of external players in this part of the world Further. Till the mid-90s India's economic situation was in a shamble. It did not have enough economic capabilities to pursue aggressive energy diplomacy which could match the investment of external players (Kaushik 1997; Bhadrakumar 2009, 2013).

India's energy policy towards Central Asia can be looked at from these two external structural factors which impeded its active engagement in this region. A

sea-change in India's approach towards this region came when India unveiled its 'Extended Neighborhood Policy' largely aimed at promoting its 'enlightened national interests' in this part of the world. Under the rubric of 'Extended Neighbourhood Policy' New Delhi factored stake in the energy sectors. Though it faced some serious competition from established players in this region like China, Russia and Western powers led by America (Aneja 2003; Sinha 2003). The assertive foreign policy posture on part of Indian diplomacy towards this region can be evident from the fact that Indian energy conglomerates tried to buy assets in the region One may add here that the visit of Vajpayee to Kazakhstan in June 2002 provided a springboard for India to pursue assertive energy diplomacy in this region. In his interaction with press, Vajpayee outlined the 'New Silk Road Initiative'. He also emphasized on the 'Energy Trade' for mutual benefits of both the countries (PIB 2002).

India's energy engagement with the region has been of mixed success. In Kazakhstan OVL got 25% stake in Satpaev bloc after a protracted negotiation with KazMunaiGaz. Similarly in Turkmenistan OVL in cooperation with Mittal group acquired 30% stake in Turkmenistan's offshore gas project. In Uzbekistan the Indian company GAIL has been planning to establish LNG bottling plants. This is in addition to India's pro-active negotiation with Azerbaijan for entering into negotiation for establishing a joint group on hydrocarbon cooperation. Baku is also showing keen interest in New Delhi's participation in the ACG field as well as participation in BTC project. This could be termed as a major victory for India Energy diplomacy (ONGC VIDESH 2007; PIB 2014; Commerce.NIC 2007; The Hindu Business Line 2014).

Notwithstanding the positive gains India has also suffered heavily in its energy engagement with Central Asia. The more recent one took place in Kazakhstan when India lost to China in acquiring stake in the Kashagan energy field. This happened despite receiving positive assurances from Astana. The CNPC got the stake from ConocoPhillips (the initial stakeholder) at a $ 5 billion deal (at a lesser price of $ 0.5 billion) which the OVL originally agreed to pay (The Times of India 2013; cerebralbusiness 2013). Though India lost the bidding to assuage New Delhi's feeling, Astana has offered around 25% of stake in the Abai Bloc. This bloc as has been reported holds around 2.8 billion barrels of oil. It may be underlined here that by offering this bloc Astana at least officially demonstrated that it is not tilting towards any country and consistent to the 'multi-vector foreign policy' (Times of India 2013; cerebralbusiness 2013)

One major factor which is hindering India's extensive energy diplomacy is the fact that it does not have a direct access to this part of the world. This is one area where Chinese have an advantage over India as they are sharing border with three Central Asian states. This is more so in the case of Kazakhstan with whom the Dragon has an extensive linkages. Over the years numbers of routes are being mooted to 'connect' Central Asia. TAPI route is one such proposal originally mooted by the American energy giant UNOCAL to link Daulatabad gas field with Pakistan, later India became a partner in this project. However the feasibility of this pipeline route is being questioned. This is basically due to two reasons. First one is that this route will criss-cross Afghanistan (passing through the regions) under the de facto

control of Taliban. Further the security of the country remains uncertain once the ISAF forces withdrawn from Afghanistan by the end of 2014. In addition to this the political situation of Pakistan is also quite fragile and this route has to pass through the trouble torn North West part of Pakistan (Telegraph India 2014; Bhutta 2012; Flood 2011; Starr 2013). This is in addition to lack of warmth relationship between these two countries. As Pakistan is trying to vitiate the security environment of this region. Apart from security aspect the feasibility of this route in terms of getting gas from Daulatabad is also being questioned. After the opertionalisation of Turkmenistan-China pipeline route and the proposed European routes in addition to the existing Russian route scholars are questioning whether 'enough gas is left for TAPI'. Though the member countries have signed both the 'inter-governmental agreement' and 'gas pipeline framework agreement' no concrete measures have been initiated to make this project a success (Telegraph India 2014; Bhutta 2012; Flood 2011; Starr 2013). In March 2013 the Kazakh Foreign Minister during his visit to India unveiled a new pipeline route connecting India with Kazakhstan through Uzbekistan, Afghanistan and Pakistan. The visiting foreign minister told that the starting point of this route will be Shymkent and it will extend later to Russia (Dixit 2013a).

The third pipeline route through which India can get an access to Central Asia is through the North South Transport Corridor Project. The opening of Astra port which is located in the Caspian part of Iran (Press TV 2013). The INSTC meeting held in May 2013 gave a call to resolve all the outstanding issues among the 16 member countries which might hinders the future prospects of this route. It has also been agreed to the fact that Iran is emerging as a major transit country for accessing energy of Central Asia (Dixit 2013b). The INSTC route from an Indian perspective got a further kick start when Indian External Affairs Minister during his visit to Iran in May 2013 agreed to the Iranian proposal that the Chahbar Port which is the lynchpin for India's strategic calculation in terms of providing road route to Afghanistan is going to be modernize with the Indian assistance (Farsnews 2013). The recently conducted test runs in March 2014 though this route will provide accessibility to India in the energy resources of Central Asia (PIB 2014).

In addition to the above-mentioned proposed routes the Chen-Chenmo route may emerge as a potential route for India to get connectivity. The Chen-Chenmo route got prominence during the nineteenth century. Through this route Kazakhstan can be connected with the energy grid of Xinjiang. From there already a operationalised railway route is there connecting Urumchi with Lhasa. An energy pipeline can be constructed besides the existing railway route. On the way this route will be connected with India by constructing a pipeline in Leh and Ladakh through Himachal Pradesh and finally it will reach Punjab (Kaushik 2010, p. 330). The present NDA government of India is taking a keen interest in developing relationship with China. It is in this background one should look at the viability of this pipeline route. If Indian authority can negotiate with Chinese for building up the infrastructure project than it will certainly contributes to the bonhomie in the bilateral ties between these two Asian giants (Telegraph India 2014).

In evaluating, India's energy diplomacy in Central Asia, it must be acknowledged that though Chinese are gaining an upper hand in the energy sector vis-à-

vis India, however, the latter enjoys more acceptability at the local level. In this regard the traditional bonhomie can be nurtured further to make the relationship more substantiate which will be beneficial to both the sides (Hasimova 2013; Ratna 2013). There is a strong view emanating from various quarters that following the 'theoretical framework' of 'Cooperative Hegemonic Stability Theory', India, China and Russia should cooperate each other in Central Asia especially in the energy field. This will ensure peace and stability in the region rather than make this region a playground for 'Zero-Sum' game among various external actors. India is a major player in the Eurasian energy geopolitics which both the Chinese and Russian cannot ignore (Pedersen 2002; Laruelle 2010; Khindelberger 1981).

7.4 Summing Up

A comprehensive survey of 'geopolitics of energy security' in the context of Central Asia demonstrates the fact that 'land and its location' remain the primary incubator for governing the pattern of energy security. By applying the logic given by the Classical Realist it can be assumed that both external powers and internal energy producing states of Central Asia are trying to manoeuvre each other following the logic of 'perpetuating and maximizing national interest' and capturing the hydrocarbon resources in the line of Morgenthau. The energy race that is currently going on this historic landmass is nothing but extension of global energy geopolitics. Tacit cooperation, growing rivalry is what one can describe the nature of Central Asian energy diplomacy. This provides (of course in recent years) the necessary opportunity to the native Central Asian hydrocarbon actors to manoeuvre the Central Asian geopolitics which suits their interest best. Another interesting aspect that needs to worth mention is that though the role of Russia is weakening in this space over the years especially after the entry of China and USA, still it enjoys much strategic clout in this part of the world. This can be inferred from the fact that another external power, China is increasingly engaging in Central Asia on its own but often appeasing Russia realizing the fact that external powers like America and EU might swamp it. Thus it need tacit support from Russia. This is what the neo-realist calls as 'fear' in the 'structure' of international politics (Waltz 1979, pp. 1–24).

Opinions are emanating from various quarters that with the growing extraction of shell gas particularly in America the significance of Central Asia in global geopolitics will decline. This observation by scholars can be considered as paradoxical in nature. It is true that shale gas will galvanize the global energy market, but effectiveness of this form of gas in the energy market is yet to be measured (Stevens 2010, pp. 19–25; Verrastro and Branch 2010; Fensom 2013). It is in this context one can argue that Central Asian energy is going to shape the dynamics of global energy security.

Coming to context of securing energy for India though the lack of geographical connectivity is impeding India's grand entry into this region still New Delhi is trying to emerge as a major power in this region. The opening of North-South Transport

Corridor Project and peace in Afghanistan will certainly provide the momentum in this direction. The native Central Asian energy players also realized the fact that India can be a better partner for energy security. The same can be inferred from the fact that Kazakhstan's offering of energy bloc to develop joint-venture and expression by other Central Asian states on various occasions in this regard. Cooperation with China can be possible in Central Asia if one embark on constructing pipeline through China and bypassing Afghanistan. This will ensure mutual benefits to both India and China (Kaushik 2010; Times of India 2013). Finally, one can argue that the classical geopolitics is still a useful framework to study the energy security of Central Asia. This is due to the fact that 'land' and 'strategic location' and 'natural resources' three important components of Classical Geopolitics are interacting with each other over a period of time in Central Asia (Hagan 1942). In future studies can be done on applying critical geopolitics to energy security in Central Asia. This will helps in understanding the internal 'societal conflict' as well as 'environmental conflict' which this region is confronting partly due to its emergence as 'energy hub'.

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Chapter 8
India's Energy Security Imperatives in Africa

Bhupendra Kumar Singh

India is diverse in its energy endowments and requirements. As its development process increases, its need for a clean and sfi supply of energy at sustainable prices will rise accordingly. Declining oil reserves, uncertainties in future oil supply, fluctuations in oil prices in the global market and growing concern for climate change, however, complicate its prospects for development. Therefore, India's Energy Security emanates from the growing imbalance between the demand for energy and its supply from indigenous sources resulting in increased import dependence.

8.1 India's Energy Scenario

India has only 0.7% of the world's total oil reserves with an R/P (Reserve/Production) ratio of 30 years. While it produces 40.4 million t (Mt) (Table 8.1), it consumes 162.2 Mt (Fig. 8.1) or 3.9% of the total global consumption, making India the world's fourth largest oil consumer. Currently the country is importing 75% of its total oil consumption, which is further expected to increase to 90% by 2025.

Gas reserves stand at 1.5 trillion m^3 (0.8% of the world's proven reserves) with an R/P ratio of 28.5 years. While India's production of gas is 41.5 Mt (Table 8.2) its consumption is 55.8 MT (Fig. 8.2). India's gas demand is set to touch 280 Million Metric Standard Cubic Metres per day (MMSCMD) by 2011–2012. At consumption levels of 280 MMSCMD, gas would account for 14% of India's energy mix by the end of year 2012 from the current level of 11% .

Liquefied natural gas imports at 39.32 MMSCMD constituted 25.5% of the total consumption of the fuel in the country in 2011–2012. This share, according to Petroleum Ministry's latest estimates, will rise to 41% in the current fiscal and to

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Table 8.1 Increasing growth of India's oil consumption. (Source: BP Statistical Review of World Energy 2012)

Crude oil	Years				
	2007	2008	2009	2010	2011
Production(million tonnes)	36.1	36.1	35.4	38.9	40.4
Consumption(million tonnes)	132.9	143.6	148.5	155.5	162.2
World's consumption(million tonnes)	3969.5	3959.9	3882.1	4028.1	4059.1
India's share of the world consumption (%)	3.34	3.62	3.82	3.9	4.0

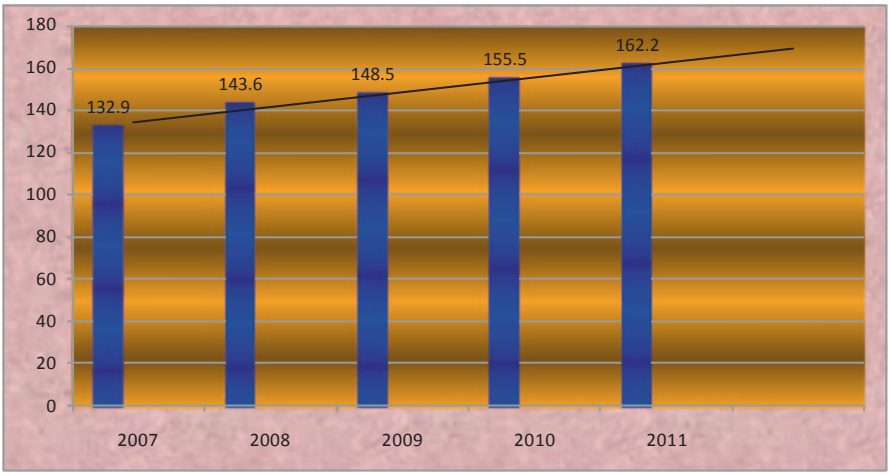

Fig. 8.1 Increasing growth of India's oil consumption

Table 8.2 Increasing growth of India's gas consumption. (Source: BP Statistical Review of World Energy 2012)

Natural gas	Years				
	2007	2008	2009	2010	2011
Production (million tonnes of oil equivalent	27.1	27.5	35.3	45.8	41.5
Consumption (million tonnes of oil equivalent	36.1	37.2	45.9	55.7	55.8
World's consumption (million tonnes of oil equivalent	2645.8	2712	2643.7	2843.1	2905.6
India's share of the world consumption (%)	1.36	1.37	1.73	1.95	1.92

50% in the next. In 2012–2013, domestic natural gas production is estimated to be around 104 MMSCMD, down from 114.90 MMSCMD in the previous fiscal. In the current year, LNG imports will jump to 73 MMSCMD and are projected to further rise to 105 MMSCMD in 2013–2014, equaling the domestic gas production of that year. In 2014–2015, imports at 115 MMSCMD will surpass domestic production of 113 MMSCMD.

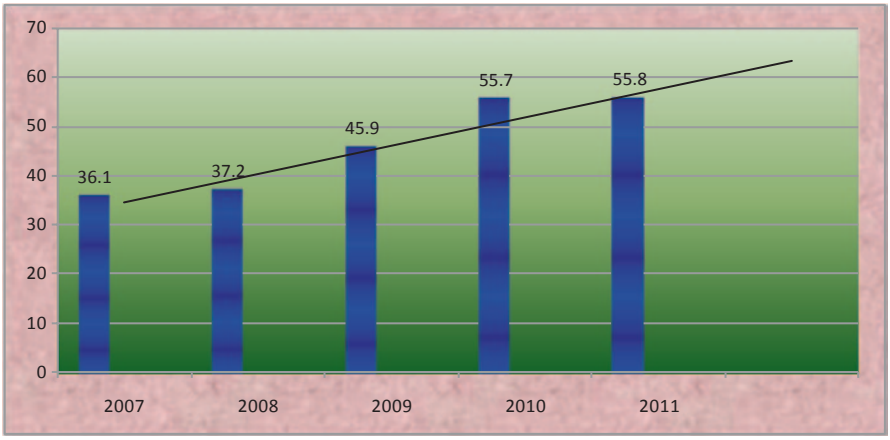

Fig. 8.2 Increasing growth of India's gas consumption

India's total coal reserves are around 60,600 Mt In 2011, total coal production was 222.4 Million tonnes of oil equivalent (Mtoe) (Table 8.3) or 5.8% of the world's total, while consumption was 295.6 Mote (Fig. 8.3) or 7.9% of the world's total. Thus India is the world's third largest coal consumer.

As far as the Power sector is concerned, India's total installed power generation capacity is around 207 GW. Coal dominates the energy mix with 56.92% of the capacity added so far, followed by hydro with 18.98% and renewable energy sources with 12.07%.

It is estimated that almost 40% of the total population in the country does not have access to electricity. India's power supply demand has grown at the average rate of 8–10% over the last 10 years and currently the country is facing a very significant peak hour power deficit as high as 10–12 GW, or 10%.

Thermal power plants (Coal and Gas) alone accounts for 66.63% of the existing installed capacity and it has contributed to about two-thirds of the incremental capacity addition during 2006-2011. In the 11th plan, bulk of the new capacity has come from coal fired power plants and this trend is likely to continue in the 12th plan for which 50 GW of capacity addition is projected to be coal based. The Centre

Table 8.3 Increasing growth of India's coal consumption. (Source: BP Statistical Review of World Energy 2012)

Coal	Years				
	2007	2008	2009	2010	2011
Production (million tonnes of oil equivalent)	181	195.6	211.5	216.1	222.4
Consumption (million tonnes of oil equivalent)	210.3	230.9	245.8	277.6	295.6
World's consumption (million tonnes of oil equivalent)	3184.1	3286.4	3278.3	3555.8	3724.3
India's share of the world consumption (%)	6.60	7.02	7.4	7.8	7.9

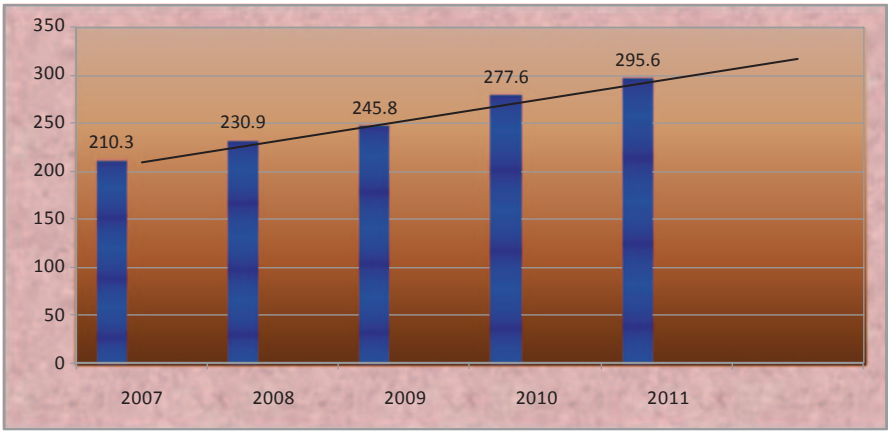

Fig. 8.3 Increasing growth of India's coal consumption

has targeted capacity addition of 100,000 MW each in the 12th Plan (2012–2017) and 13th Plan (2017–2022). However, the acute coal shortage being faced in the country has cast a shadow on these plans.

India's Energy Opportunities in Africa Due to stagnating domestic crude production, India imports approximately 75% of its oil and its dependence is growing rapidly. Majority of these supplies emanate from the Persian Gulf. Wary of its reliance on Persian Gulf, India is following twin strategy of diversifying its sources of supply of crude oil and acquiring overseas energy assets. In this context, Africa's vast hydrocarbon reserves have proved to be very attractive for India. Africa also provides ample business opportunities in power and renewable sector to Indian Companies.

Africa Hydrocarbon Scenario Africa accounts for 8% of the world's proven oil reserves, 7.8% of the world's total natural gas and about 6% of the world's proven coal reserves. In 2011, Africa produced around 417.4 Mt (Table 8.4) of oil and consumed 158.3 Mt.

In the same year it produced about 182.4 Mtoe of natural gas and consumed 98.8 Mtoe. Africa's major gs reserves and its production have been shown in Table 8.5.

Similarly it produced about 146.6 Mtoe of coal and consumed 99.8 Mtoe in 2011.

India's Energy Engagement in Africa India is a hydrocarbon deficit country. By all accounts it will be depending heavily in external supplies. While maintaining the traditional supply from Gulf, India is in a vigorous search for other options overseas. One of the important sources of India's diversification of energy supply is Africa.

Oil and Gas Africa is emerging as dynamic source of energy supplies. While the countries of North Africa, such as Algeria and Libya, and Nigeria in West Africa,

Table 8.4 Africa's oil reserves and its production. (Source: BP Statistical Review of World Energy 2012)

Countries	Proved reserves (1000 million barrels)	Share of the world (%)	Production (million tonnes)
Algeria	12.2	0.7	74.3
Angola	13.5	0.8	85.2
Chad	1.5	0.1	6.0
Republic of Congo (Brazzaville)	1.9	0.1	15.2
Egypt	4.3	0.3	35.2
Equatorial Guinea	1.7	0.1	12.5
Gabon	3.7	0.2	2.2
Libya	47.1	2.9	22.4
Nigeria	37.2	2.3	117.4
Sudan & South Sudan	6.7	0.4	22.3
Tunisia	0.4	>0.05	3.7
Other Africa	2.2	0.1	10.9

were already principal oil-producing countries through much of the twentieth century, it is only in the last few years that the African continent as a whole has come to be seen as a global oil and gas producer.

Over the last 10 years, Saharan Africa and sub Saharan Africa have recorded significant increases in gas production, of 70 and 89 % respectively. North African gas discoveries in recent years have significantly transformed the region's hydrocarbon scenario. North Africa is estimated to have gas reserves of about 8tcm, with the principal sources being Algeria (57 %), Egypt (21 %) and Libya (16 %).

Africa is also developing its LNG facilities. Today it has around 60 Mt per annum of LNG capacity, accounting for 30 % of the global capacity. Algeria was the world's first LNG exporter and in the mid 1990s, it became the world's largest LNG producer. Intensive oil and gas exploration over the last 10 years has increased Africa's oil reserves by 25 %. According to the US geological survey, West Africa's undiscovered oil reserves could be as much as 72 billion barrels. In oil-equivalent terms, Sub-Saharan total reserves could be about 121 billion barrels—more than those of North America, Europe, the Asia-Pacific region and South Asia.

Significant reserves are available even in areas that have been producing for some time- Nigeria, Angola, Gabon and Congo Brazzaville, particularly in deep

Table 8.5 Africa's major gas reserves and its production. (Source: BP Statistical Review of World Energy 2012)

Countries	Proved reserves (trillion cubic metres)	Share of the world (%)	Production (million tonnes of oil equivalent)
Algeria	4.5	2.2	70.2
Egypt	2.2	1.1	55.1
Libya	1.5	0.7	3.7
Nigeria	5.1	2.5	35.9
Other Africa	1.2	0.6	17.5

off-shore waters. Recent exploration activity has identified considerable potential in new areas such as Ethiopia and Niger, and in East and Southern Africa. Africa's strategic significance is growing with the oil supplies coming from Angola, Sudan, Equatorial Guinea and Chad. The offshore potential is rated fairly high around the cost of Tanzania, Mozambique, Mauritania, Morocco and Namibia.

Africa's hydrocarbon potential is attested to by new acreages being regularly offered by different countries, significant new discoveries and active production activity supported by infrastructure development.

Africa's rich hydrocarbon potential adds an entirely new and potentially very significant dimension to India's ties with this continent. India's growing energy needs have pushed it towards energy cooperation with the African countries.

India is keener for energy assets acquisition in Africa due to the following factors:

1. *Good Quality Oil*: Africa's oil is generally viscous and its low sulphur content makes it easier and cheaper to refine than the Middle Eastern crude oil that lacks lower hydrocarbons, therefore, making it very sticky.
2. *Continent's Geographic Location*: The continent's geographic location makes it strategic and accessible. Given that it is almost entirely surrounded by water bodies, this cuts down transport-related costs and risk incurred. The existing sea lanes offers quick and cheap delivery and so building expensive pipelines through unpredictable countries is not necessary.
3. *Africa's Favorable Contractual Environment*: African Sub- Saharan countries operate on a production-sharing agreements basis. The arrangement allows a foreign oil company to be given license to look for petroleum on the condition that it assumes the up-front costs of exploration and production. The oil company shares revenues with the host government if oil is discovered in that block.
4. *Offshore Discoveries*: Major discoveries in recent years in Africa have been off-shore, in deepwater reserves hence the oil companies can continue pumping out oil without sabotage or nationalist fervor getting in the way. This will also cut down the losses incurred as a result of fights, organized crimes or communities' protests.
5. *Speed of Growth*: the speed of growth for the untapped and underexplored African continent makes it strategic as a new oil hub. Africa's oil producing countries have also increased in number, with the latest discoveries being in Equatorial Guinea. The ferocious pace and scale of Africa's oil boom has placed the continent at the core of oil scramble, with one-third of the world's new oil discoveries since the year 2000 taking place in Africa.

Currently around 20% of India's crude oil imports are sourced from Africa. Major oil exporting countries of Africa with the quantity exported to India have been shown in Table 8.6.

Indian oil companies have invested in equity assets in Sudan, Ivory Coast, Libya, Nigeria, Nigeria Sao tome Principe Joint Development Area, Gabon, Tunisia and Kenya (Table 8.7).

Table 8.6 India's import of crude oil from Africa in 2012–2013. (Source: Data provided by Ministry of Petroleum and Natural Gas, Government of India)

SN	Countries	Quantity in (MMT)
1	Algeria	2.1
2	Angola	9.0
3	Cameroon	0.5
4	Congo	0.5
5	Egypt	2.8
6	Equatorial Guinea	0.9
7	Gabon	0.1
8	Ivory Coast	0.2
9	Libya	0.2
10	Nigeria	14.1
11	Sudan	0.7

Coal Africa hosts about 6% of the world's total coal reserves. It provides ample business opportunities for Indian companies in coal mining.

South Africa's coal reserves are estimated at 53 billion t. South Africa produces an average of 224 Mt of marketable coal annually, making it the fifth largest coal producing country in the world. 25% of our production is exported internationally, making South Africa the third largest coal exporting country.

In Mozambique coal mines are distributed all over the country. The major coal mines are Moatize, Mucanha and Vuzi coal basins in the Tete province. This basin is said to contain as much as 4000 Mtcoal reserve. The Mozambican government has signed deals with various coal mining companies under which these companies will undertake exploration and mining and explore the possibilities of coal mines in various parts of the country. The authority has also undertaken various industrial, developmental and infrastructure projects for various coal mining projects in the Tete province of Mozambique. An estimated amount of 2.4 billion t of coal reserves in Tete Province of Mozambique makes it a region with world's largest untapped coal reserves.

Botswana has large coal deposits predicted at 212 billion t of which 3.3 billion t are measured reserves. At least 17 billion t of coal is estimated to be suitable for power plant use.

Many Indian companies are actively coal mining in Africa including Jindal Steel and Power limited and Tata Power Limited. Jindal Power Limited is also going to acquire coal mines in South Africa, Mozambique besides Botswana.

Opportunities in Renewable Sector in Africa India has offered to expand and strengthen its cooperation with the African countries in the field of Renewable Energy. India is already assisting African countries for electrification of villages through solar energy and aims to set up 40 solar charging stations and 40 biomass gasifiers. India has established many institutes which have tailor-made training programmes in various areas of renewable Energy and the country is ready to share its experience, knowledge and technology in the field of renewable energy with the African countries. India had offered US $ 5 billion for the next 3 years under lines

Table 8.7 India's major successful energy projects in Africa. (Source: Data provided by Ministry Of Petroleum and Natural Gas, Government of India)

Country	Blocks	Participating interest and partners
Libya	Block 86	OIL (50% operator) and IOCL (50%)
	102/4	OIL (50% operator) and IOCL (50%)
	Area 95/96	OIL (25%), IOCL (25%) and SIPEX (50%)
	Contract area—43	OVL (100%)
Sudan	GNOP block 1, 2 & 4	OVL (25%), CNPC (40%), Petronas (30%), Sudapet (5%) joint—operatorship
	Block 5A	OVL (24.125%), Petronas (67.875%), Sudapet (8%), Petronas and Sudapet are joint operators
	Pipeline project	OVL (90%), OIL (10%)
Nigeria	OPL—279 and OPL—285	OVL holds PI through its JV ONGC Mittal Energy Limited (OMEL), which is the operator of these two offshore blocks. Other partners are Total and EMO OPL-279: OMEL (45.5%), EMO (40%), Total (14.5%) OPL-285: OMEL (64.33%),EMO (10%),total- (25.67%)
	OPL—205 (Onshore)	25% equity of Suntera Nigeria 205 Limited, which is a Nigerian company having 70% interest in Exploration Block OPL 205
	OPL-226	Essar Energy (100%)
Egypt	Block 3 and 4, offshore	Block 3 (South Quseir) is located in Red Sea area and Block 4 (South Sinai) at the junction of Gulf of Suez and Red Sea. GSPC led consortium was awarded these two blocks in GANOPE International Bid Round 2008. GSPC (50% Operator), OIL (25%), HPCL (25%)- PSA not signed
Gabon	Shakthi	OIL (45% Operator), IOC (45%) Marvis Pte Ltd (10%)
Mozambique	Offshore area 1	Anadarko (36.5% Operator), Mitsui E&P Mozambique Area 1 (20%), BPRL Ventures Mozambique BV (10%), Videocon Mozambique Rovuma 1 (10%) and Cove Energy Mozambique Rovuma Offshore (8.5 %), Empresa Nacional de Hidrocarbonetos, E.P. (15%)
Madagascar	2 onshore blocks in the Morondava basin	Essar Energy (100%)

of credit and US $ 700 million as assistance to help Africa achieve its development goals.

The drive to increase energy access in Africa has helped accelerate the deployment of renewable energy sources. However, the need to import much of the renewable power generation equipment is required. This will provide good business opportunities for Indian wind companies.

Challenges The challenge before Indiais to comprehend the African needs listen to African Voice and position its policy accordingly. Other challenges are as following:

High Risk Business Environment Africa is in the process of transition. It is no more stagnant, the economies growing and expanding unleashing opportunities but with a degree of risk. Africa thus is market with risk and high return. Africa is no more a continent of ignorance. It is emerging with thriving civil society and a higher degree of alertness and awareness. Engagement with Africa thus needs be crafted taking cognizance of emerging sensitivities and vulnerabilities.

Scramble for Energy Syndrome The scramble for energy syndrome cannot be a sustainable paradigm. A new comprehensive approach which takes into its ambit the interest of all stake holders could be the only way to have enduring relationship ensuring energy supplies. Concern is also expressed that the gains and distribution of oil wealth be shared with some element of rationality of equity. The communities surrounding the extractive industries need to be adequately compensated.

Socialization of Energy Projects Coherence, coordination and craft are the three mantras to make optimum from the African energy sector. India has yet to display them in ample measure. This cannot be explained in terms of political institutions and culture but sheer lack of farsightedness of the decision makers. Anticipation and preemption is the ingredient of innovative approach. India has to be innovative to meet its energy needs by contributing towards socialization of energy project so that it does not turn out be resource curse for African people.

Resource Nationalism Resource nationalism is a growing concern in coal rich countries. It manifests in domestic supply obligations. While nationalization is often equated with ownership of resources, there are many variations of this phenomenon. One means by which the state can exert control over resources in its territory is through taxation. Africa has lost significant revenue over the years through its failure to adequately capture proceeds from resource extraction on the continent.

In the few cases where countries had the administrative ability to collect tax revenue, the money was not always invested into visible and viable long term national development projects aimed at building Africa's human capital. The costs of this lapse, coupled with the plight of many of the continent's citizens who continue to slip into destitution, are driving African countries to seek greater control over their natural resource endowments.

A distinct pattern in resource nationalism seems to be emerging in Africa. Where the state is strong and unionism is weak, as in Tanzania and Ghana, resource nationalism is driven from the top, often with radical policy shifts that cause ruptures in production and markets. In countries with strong unions where the state's influence is mediated by other actors, combined with high levels of urbanisation and strong civil society organisations such as South Africa, the process is driven by demands for transformation from below. Both scenarios create a very uncertain operating environment for investors.

Lack of Infrastructure Many countries have good energy reserves but they lack adequate infrastructure like transportation and ports due to which coal acquisition by foreign countries are problematic. For example, South Africa is a good destination for coal acquisition. Here the coal quality and quantity are good but the problem is that there are transportation constraints both in terms of rail and ports. Mozambique has also got large coal reserves but unfortunately, it lacks adequate infrastructure to facilitate smooth coal acquisition.

Geopolitical Consideration Geopolitical location of energy assets is a major determinant of overseas energy assets acquisition. If the energy resource is very far from India then the transportation cost will be high. This is one of the main reasons which makes India's coal acquisition in Botswana an uphill task. The freight cost of coal transportation from Botswana to India is a costly affair. Botswana is a landlocked country which necessitates transportation crossing many adjoining countries. However in Africa the relationship between the neighboring countries is a flip flop. Today it may be good and tomorrow it may not be. Mongolia is again landlocked. From Russia the ocean freight is going to be high.

Stumbling Blocks to Augment Economic Growth The African countries are at the threshold of real challenges and stumbling blocks to augment their economic growth rate. The oil and gas sector, is not a position to derive leverage from the global regime due to lack of foresight of the policy makers in devising domestic as well as external policies.

Failure to Tap the flow of FDI and the Restrictions on Foreign Investments Foreign direct investment in the African countries is relatively low because of a host of negative factors, notably the lack of investment opportunities and the availability of liquidity locally. There are also other problems such as obstacles to foreign investment in trading services and the acquisition of real estate and inequality in tax treatment and the provision of services and subsidies. Moreover, fluctuations in economic activity act as a deterrent to foreign capital because government expenditure is a function of oil revenue. This has attributed failure of African countries to attract foreign investment in the present global regime of liberalization and globalization.

China Factor Both China and India are keen to assume great power roles which they believe to be their historical and civilizational rights. Having already attained regional power status, both remain suspicious of each other's intention and see themselves as the rising great Asian powers whose time has finally came. This means that a resurgent India would face a rising China, which might lead to a conflict of interests between the two giants unless their power competition is managed carefully.

Since both India and China are pursuing a strategy to diversify the sources of petroleum supply, Africa has become their competitive battle ground. China is keen to explore better strategies to obtain more oil from the African Countries. This makes it imperative for India to seriously consider the prospect of future energy competition with China in the African Countries.

Table 8.8 India's major loss to China for energy assets acquisition in Africa. (Source: Data provided by OVL, India)

Assets	India's bidding companies	China's bidding company	Winner	Year
Sonagol(Angola)	ONGC	Sinopec	China	2004
South Atlantic Petroleum (Nigeria)	OVL(Bid withdrawn)	CNOOC	China	2006
Heritage oil 50% stake in lake Albert Basin (Uganda)	OVL, OIL and Indian Oil	CNOOC	China	2009
Berine Basin(Algeria)	ONGC led consortium	CNOOC Consortium	China	2010

Chinese state owned companies have a great deal of autonomy which helps in timely decision and disposal of the projects.

In comparison to the Chinese state owned companies, Indian PSUs have limited autonomy in decisions related to overseas investments. Due to this India had been out bided at many occasions by China (Table 8.8).

Required Strategies for India's Foreign Policy Towards Africa The Government of India should adopt following value added strategies to develop core competency to make Indian companies more competitive in energy deal in Africa.

Financing Infrastructure Financing of infrastructure in the African countries is important for a successful energy trade. What is important is that infrastructure development has other development spin-off effect. As per the World Bank Study, "FDI in the natural resources sector is some times packaged with official finance for infrastructure needed to facilitate development and export. This may include power for processing and rail and port facilities for outward transportation".

Many countries in Africa like South Africa, Mozambique and Botswana are poor in terms of port and rail capacities which make the transportation of energy commodity a costly affair.

Economic Diplomacy Economic diplomacy includes the promotion of trade and investments, management of aid and other financial flows abroad. The Government of India should encourage and support Indian eneterprises' investment and business in Africa. It should provide preferential loans and buyers credits to this end. To further develop India- Africa cooperation in the area of finance, the Government of India should support the effort of Indian financial institutions to increase exchanges and cooperation with their counterparts in African countries as well as regional financial institutions in Africa. This will help Indian companies to acquire energy assets in Africa.

Public Diplomacy Public diplomacy makes overseas energy deal easier. Lobbying for Indian companies is always advisable to ensure overseas energy acquisition. Granting loans and other economic aids create favourable environment for the concerned country.

Facilitating Line of Credit Energy surplus countries are increasingly beginning to leverage their resources for promoting infrastructure development in their countries and it would be important for India to not only pay attention to developing more intensive political contacts with those countries through high level exchanges but also to encourage Indian companies to secure greater involvement in capacity-building and infrastructure development in those countries. To facilitate this task, India should be prepared to leverage more effectively the instrumentalities available to it, namely, concessional lines of credit and technical assistance.

Better Availability of Data on Resource Potentials Better publically—available data on resource potential is required for a successful energy acquisition in Africa. While the potentials are in many cases understood, verifiable data is often not available, and better resource measurement are needed to support bankable project proposals. Therefore, an important requirement is that resource potential data is developed on a sufficiently detailed level to remove this barrier.

Creation of an Enriched Energy Fund An enriched sovereign energy fund should be created to provide financial backing for Indian companies looking to acquire oil and gas assets abroad. Besides easy financing, it would also provide much-needed confidence to compete in the global oil and gas asset market. This will help energy companies to enable them to match foreign bidders for overseas energy assets.

Single Window Clearance/Approval System The bureaucratic nature of the government calls for various time consuming approvals and clearances to be obtained. This can be a significant disadvantage, as evidences by the blocks which OVL lost to CNPC in both Sudan and Angola due partly to delays in obtaining approvals. Therefore, a single window clearance/approval system may be put in place for government approvals for acquisition of overseas energy assets.

Promotion of Public–Private Partnership Public–private partnership should be permitted to enter into joint ventures to create the financial leverages required to successfully bid for overseas investments.

Leveraging the Strengths of the Private Sector to Enhance Energy Acquisition in Africa India is at an advantage that it has several large private sector oil companies which are active in acquiring energy assets abroad and indeed some such as Reliance, Jindal Steel & Power, Tata Power, GMR, Essar, Videocon, etc. have significant assets overseas and over the years have developed capability in this process and have built up relations with international oil companies and governments. Leveraging the strengths of the private sector is crucial in increasing our competitiveness in overseas energy acquisitions vis a vis foreign companies and Government support in these efforts particularly by local diplomatic missions and the MEA would be of great help.

Two Imports and One Export Strategy Pursuing a strategy called "two imports and one exports" to strengthen its energy ties with energy producing country is an important tool to acquire major energy deals. The "two imports" refer to oil imports and capital to invest in the development of India's oil industry. The "one export"

refers to India's investment in oil exploration and development projects in energy producing country. Utilizing this strategy Indian oil companies may sign long-term supply contracts with the African countries and may obtain exploration rights.

Joint Venture with International Majors Many producing nations prefer to draw on the expertise of the western majors. Indian oil companies should try to develop linkages with International oil companies and the national oil companies of the African countries.

Cognizance of Emerging Local Sensitivities Africa is in the process of transition. It is no more stagnant, the economies are growing and expanding unleashing opportunities but with a degree of risk. Africa thus is a market wit risk and huge return. Africa is no more a continent of ignorance; it is emerging with thriving civil society and a higher degree of alert and awareness. Engagement with Africa thus needs to be crafted taking cognizance of emerging local sensitivities.

Well Crafted CSR Policy The areas where India has to plug in include an action plan to engage civil society. This in operational terms means to promote proactive track-two diplomacy by promoting interaction with opinion makers, the business community, academia and NGOs. In the context of Africa, social consequences of energy deals are very vital. Indian companies both public and private need to have a well-crafted CSR policy. Responsible investment is the key factor in negotiating with the backlash of external players' presence in extractive sector including energy.

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Chapter 9
Sourcing Energy from Latin America: Indian Quest for Energy Security

Abdul Nafey

Energy, more so if it is oil and gas, is a measure of national power it capability. The weight and strength of a state in international affairs depend upon the skills and resources it deploys to manage energy policy; more so, if it happens to be an oil-rich state. States formulate their policies and scholars thus analyse them accordingly in (geo-) political and strategic terms. Key questions in the context of Latin America and the Caribbean (LAC) have their own particular character, challenges and circumstances.

The issues raised and the dynamics analysed in the present article pertain largely to regional energy matrix and the mix; regional energy security; impact of the unconventional oil and gas; state regulations and 'resource nationalism'; the evolving political economy of Latin America-Asia energy ties; and, finally, Latin America-India energy relations.

Before delving into these issues, two prefatory notes are in order: (i) Various scenarios, all looking up to 2030s, predict massive growth in the demand of energy, particularly oil and gas, led by the dynamic economies of Asia. International Energy Agency (IEA) forecasts a rise of 50 % in energy consumption by 2030; with nearly 86 % of the increase accounted for, mainly, by oil and gas. As urban middle class expands, particularly in emerging economies, transportation will consume most of the oil and gas. IEA calculates around 1.7 billion vehicles on global roads by 2035, pushing the demand for oil to nearly 100 million barrels a day.[1] (Deloitte 2013). (ii) Of late, there is a discernible shift in favour of gas (both conventional and unconventional), renewables, and biofuels in US and European Union and, also away

[1] Preference for fossil fuels, in particular oil, in global energy mix is also explained, among others, by the comparably higher subsidy that oil enjoys. World-wide subsidy for oil amounted to US$523 billion in 2011—higher by almost 30% over the 2010 figures; and significantly, six times more than the subsidies for renewable. (Deloitte, 2013)

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from nuclear energy, in Japan. Again, the degree and depth of the shift will be felt not before 2030. Liquefaction and pipeline networks are enhancing the physical liquidity of natural gas; it might facilitate regionalisation of gas markets in the near future. Switching over to 'smart' energy and 'neo-industrial' is however neither cost effective nor technologically affordable and realisable at least until the 1930s.[2] (Bitar 2013). The bottom line is that the world would continue to use hydrocarbons, as against all other types of energy; and the nexus between oil consumption, climate change and access to technology would become only more tense implicating trade and investment, and health and environmental issues in the years to come, with no international agreement likely to be arrived at any time soon.

9.1 Rich in Resources…

Regional energy mix reveals dependence on conventional oil in terms of production, export and consumption; growing importance of liquefied natural gas (LNG) in regional consumption; potential and reliance on hydropower for generation of electricity; rise of biofuels to the level of being an strategic asset; and future in conventional and unconventional oil and gas from deep-waters and shale formations.

Oil and Gas At 17%, LAC region holds the second largest reserves of oil in the world; natural gas and coal are placed at a modest 4 and 2% respectively. The region presently accounts for 13% of the production and 9% of global oil consumption. Nearly half of the oil produced is exported; notwithstanding the current average annual rise of 3% in the regional energy consumption. Regional energy mix reveals 'oil addiction'—second highest after the Middle East. Oil is consumed mainly by the transportation sector, with some 65 million automobiles on the regional roads, mainly in Brazil and Mexico, and growing. Fossil fuel consumption has remained same at 74% over the last 40 years: oil holding at 40% and natural gas and coal at 30 and 4% respectively of current regional energy consumption.

A notable feature of LAC energy map is heavy concentration of oil and gas in few countries; 90% of all oil reserves are concentrated in Venezuela, Brazil and Mexico: (i) Placed among the top ten producers in the world, Venezuela is a petro-economy and –state. Oil accounts for more than three-fourth of its export earnings; one-third of its GDP; 50% of total government revenues; and the state-owned *Petroleos de Venezuela, Sociedad Anonima* (PdVSA) is the largest employer in the

[2] 'smart' grids; energy efficiency, renewable energy, rise of gas, and new principles of organization of energy systems. Battery operated vehicles, hybrid cars, methanol and mixing of biofuels are some of the expressions of 'neo-industrial'. 'Smart' technology is basically a disruptive technology whose spread should bring about substantial changes in the production, employment, well-being, governability and human relationships. And a 'smart' energy includes several aspects such as the intelligent networks that improve efficiency and security by receiving and distributing energy, such as electricity, based on users' behaviour. Synthetic-biological redesign of organisms that generate biofuels almost identical to gasoline, are also in this category along with nanotechnology that advances solar cells.

country. Venezuela alone holds 84.2% of all regional oil and 72.8% of its natural gas reserves. Estimates vary, at times greatly, but proven reserves of Venezuela are approximately 85 billion barrels of oil and 185 trillion cubic feet (tcf) of gas. It also has huge estimated reserves of around 298.3 billion barrels of mostly 'extra-heavy' crude in Orinoco Basin. No gainsaying, all this has some far-reaching geo-political and –economic implications for the regional and global energy demand and supply. (ii) In 2007, Brazil made one of the world's largest offshore discoveries of oil and gas in the pre-salt layers in Santos Basins. Estimates are difficult to make but conservative assessments still put reserves at 65 billion barrels of oil.[3] Once developed, pre-salt layers would make Brazil the fourth largest producer; and combined with the proven oil reserves of 15 billion barrels, a significant oil exporter. The emerging economy is already the ninth largest consumer of energy and seventh largest consumer of oil in the world; pre-salt layers bid well for Brazil's rise as a major power.

Mexico has huge offshore and onshore hydrocarbon proven reserves; however production-reserves ratio is deteriorating for several years. Peak oil production at 3.5 million barrels a day was attained in 2004; it fell to a low of 2.5 mbd in 2013–2014. Oil accounts for nearly 40% of export earnings in Colombia; the country is otherwise known as the fourth largest exporter of coal in the world. Ecuador, an OPEC member, is the fourth largest producer and exporter of oil in the region. Like Mexico, proven oil reserves are small but its Amazonian resources are estimated to be significant. Oil contributes to about 20% of Ecuadorean GDP. Peru again has sizeable underdeveloped oil reserves; it was also the first regional exporter of LNG in the 1970s. Bolivia has the second largest natural gas reserves in South America; discovery of natural gas in Argentina and its other neighbours might not be good news for the landlocked state. Another energy powerhouse is Argentina, with reserves of oil and gas both onshore and offshore estimated to be very high besides its potential in, significantly, nuclear energy.

Biomass contributes 34% to the Central American energy matrix. The 23 states comprising Central America and the Caribbean are energy deficit; Guatemala meets one-third and Cuba one-half of its needs from domestically-produced oil. Only Trinidad depends largely on export of LNG.

Hydropower Hydropower potential is concentrated mainly in Brazil, Colombia, Ecuador and Peru and Venezuela, besides in some inaccessible parts of the Amazon. Hydropower accounts for 8% of total regional energy consumption. It provides for around 65% of all electricity generated in the region and goes up as high as 70% in the case of Venezuela and Colombia; the world average is only 16%. Brazil is different and being the South American growth engine should be taken a separate note of:47% of its energy mix comprises renewables (compared to the global average of 3%); and roughly 85% of its electricity is generated from renewables—mainly hydropower and ethanol.

[3] Exploiting pre-salt layers poses both financial and technological challenges. Returns are lower; interpreting seismic data and predicting reserve volumes with some accuracy is difficult.

The sheer vastness of hydro resources raises prospects of environmentally-sustainable regional energy security. It already is a strong regional argument in climate mitigation negotiations. Nearly all countries produce more hydropower than their peak demands. It is also a big plus for creating regional/sub-regional integration of both hydropower and gas infrastructure. Relatively cheaper hydropower also contributes to raising economic productivity, export competitiveness and living standards. Mega power projects and displacement of local communities of course raise serious environmental and social concerns.[4] (Viscidi 2014b).

Biofuels Ethanol from sugarcane accounts for 7% of regional energy consumption; if one includes biodiesel and others, the percentage goes few notches up. South America accounts for 31% of global ethanol production; with Brazil alone contributing 96% of regional ethanol production. Ethanol production is forecast to rise to 640,000 barrels a day, or 34% of the global production, and biodiesel to 117,000 bd, roughly a quarter of global production by 2016. South America has large exportable potential in ethanol and biodiesel; besides, biofuels are reducing regional dependence on imported diesel and petroleum products.

As for Brazil, its potential and technical know-how in the field of ethanol are already counted among its emerging power attributes. (Latin American Business Chronicle 2007) The land-surplus Brazil uses only 6% of its arable land for sugarcane production. Only 72% of its arable farmland is under cultivation; and this does not include Amazon and other ecologically vulnerable areas. *Cerrados* (savannas) are used for cultivation of soy to produce biodiesel. Argentina and Colombia are also expanding cultivation of soy and African palm respectively to produce significant quantities of biodiesel. Deforestation and displacement of food crops are the two main arguments used against biofuels industry; neither holds much ground in the context of South America.[5] (Tissot 2012). Several countries have mandated 20–25% fuel blending in automobiles; 80% of cars in Brazil run on blended fuels, and ethanol substitutes for up to 20% of oil imports. Notwithstanding current enthusiasm with shale revolution, Brazil remains the 'Saudi Arabia of biofuels' for its export potential.

Other Energy Resources Nuclear power represent only 1% of regional energy mix, compared to 6% globally. Small nuclear power reactors in Brazil, Mexico and Argentina produce 3, 5, and 10% of these countries' energy respectively. (Iglesia 2011, pp. 16–18) Argentina and Brazil, both being members of Nuclear Suppliers Group, also hold the prospect for further expansion and trading in nuclear materials

[4] The Belo Monte Dam in Brazil, with enough capacity to provide electricity to 60 million people, has serious impact on environment and the indigenous communities. Likewise, the HydroAysen project in Chile envisages building five dams over two least developed rivers in Patagonia which would produce 2.75 GW of electricity. (Viscidi Lisa, Latin American Business Chronicle, 2014)

[5] Deforestation in Brazilian Amazon is caused essentially by cattle-ranching, logging and hydroelectricity projects. Anyway, land in Amazon is not suitable for sugarcane cultivation. Soy is grown in savannas to produce biodiesel, which definitely is ecologically damaging. Savannas might get damaged further if soy is replaced by sugarcane cultivation and factories. (Tissot 2012, p. 8)

and technology. Latin America has the lowest consumption of coal, accounting for only 4% of regional energy mix, compared to the global average of 28%. However its use is growing fast in Colombia and Brazil, which hold 49.2 and 33.2% of regional coal reserves respectively.

Latin America has some of the world's largest potential for geothermal energy—estimated at 35,500 MW. The Andean region and the oil-scarce Central America account for a significant portion of this potential As for wind energy, Latin America, spearheaded by Brazil and Mexico, is projected to install more than 20,000 wind turbines between 2013 and 2022, with a combined generating capacity of approximately of 33.5 GW. Latin America could also be reaping the 'second generation' biofuels, produced from traditional biomass—the animal waste and wood which currently meet the fuel needs of 100 million in the region. The ultimate in clean, environmental-friendly energy for transportation is the battery-powered vehicles. More than 70% of the world's salt lake lithium deposits are in South America. Chile is the current major producer; but deposits of lithium are found in the entire Andes region. It is Bolivia which holds almost half of the world's lithium deposits. Currently, lithium-ion batteries are used in computers and smart-phones; and China, being a major producer of batteries, has invested heavily in lithium extraction in the region.

9.2 …Advent of Shale Revolutionaries

The outbreak of shale revolution in North America around 2007 has changed the global and Western Hemispheric energy scenario in some meaningful ways. For one, it is beginning to rebalance the global political order in favour of the United States. Shale resources and technology give US an incomparable advantage over all others; other countries may have shale resource but none can replicate the success of US. (Blackwill and O'Sulivan 2014).

Foremost impact of the shale revolution is being felt within North America. Put together the oil production of US, Canada and Mexico; and the North American region is being described as 'Saudi America'. (Kraus 2014a). US accounted for 10% of world's oil production in 2013–2014 with production reaching 8.5 mbd in 2014, which surpassed Saudi Arabia's oil production. (Kraus 2014a). In 2013, Texas singly produced more crude than either Venezuela or Kuwait. Delivering his sixth State of the Union Address, President Barrack Obama declared that US has 'grown more self-reliant on its own energy reserves'. Imported crude met 60% of US needs in the previous decade; it accounts for only about 30% now. By the end of the present decade, the IEA expects North America to be producing 20% of the world's oil supply, and to have become a 'titan of unprecedented proportions' in the oil products market.

As gas been stated by American scholar Robert Kaplan "The Age of Gas could make the United States the world's leading geopolitical power into the new century." (Kaplan 2014). Shale gas is predicted to make US a net LNG exporter by

2016, with shipments reaching 3.4 billion cubic feet per day by 2025. Shale gas already accounts for 44% of total US natural gas production. The single gas play of Marcellus, with production at 12 bcf per day, is greater than the export capacity of the two largest LNG exporters, namely Qatar and Australia. US gas is priced at one third of European and one-fifth of the Asian price; it gives US gas exports a competitive edge. Besides, cheap gas has triggered a 'manufacturing renaissance' in US economy.

What does North American shale revolution mean for the LAC region? For one, it could mark the start of a new ball-game in inter-American relations. (Mares 2014; Morse 2014, pp. 1–32). In the altered circumstances of shale revolution, the 'new energy axis runs from Alberta, Canada, down through North Dakota and South Texas, past a major new discovery off the coast of French Guyana to huge offshore oil deposits found near Brazil' (Yergin 2011, 2014). The Western Hemisphere accounts for:

i. 33% of the world's proven oil reserves (Venezuela—297, Canada—173, US—25, Brazil—13, Mexico—13 mmbd);
ii. 37% of world's undiscovered oil reserves (Brazil—83, Mexico—19, and Guyana-Suriname—12 mmbd);
iii. 42% of world's shale oil reserves (US—58, Argentina—27, Venezuela—13, and Mexico—13 mmbd);
iv. 10% of world's proven natural gas reserves (US—372, Venezuela—196, Canada—66, and Mexico—17 tcf (trillion cubic feet);
v. 8% of world's undiscovered gas reserves; and
vi. 43% of world's shale natural gas reserves.

Besides, the region holds several 100 billion barrels of undiscovered conventional oil resources.

Several Latin American countries themselves are in the premier league of shale revolutionaries. In terms of technicallestimates that Latin America needs to investchnology regardless of production cost, the data from the US Information Energy Administration for 2013 indicates that total technically recoverable shale oil worldwide is estimated at 345 billion barrels. Among the top 10 countries with technically recoverable shale oil resources, Argentina occupies fourth position with 27 billion barrels of shale oil; and Venezuela and Mexico with 13 billion barrels are tied at seventh and eighth position respectively.[6] Likewise, among the top 10 countries with technically recoverable shale gas resources, Argentina with its 802 trillion cubic feet (tcf) occupies the second position; Mexico with its 545 tcf is at sixth and Brazil with 245 tcf stands at tenth position. It is estimated that Latin America holds roughly a total of 30% of world's recoverable shale gas.

BP has made the prediction that shale revolution, along with other fuels, will make the Western Hemisphere virtually self-sufficient in energy by 2030. If that

[6] World-wide technically recoverable shale oil resources are estimated at 345 billion barrels with Russia assessed to be the largest holder of resources estimated at 75 bb; US 58 bb and China 32 billion barrels.

happens, it would effect a permanent rebalancing of oil in the region and will create a new geo-politics of energy resources and routes. More oil will become available to rest of the world; and a regional market in gas, characterized by low price, may emerge in Latin America.

There is a discernible geographic shift in the sources of energy supplies to US: 45% of American oil imports are from the three main Hemispheric producers—25% from Canada, 11% from Mexico and 9% from Venezuela. Add to it the oil from Brazil, Colombia and Ecuador, the percentage reaches over half of total US oil imports. To the discomfiture of both Mexico and Venezuela, their 'extra-heavy' crude export to US is facing competition from the Canadian crude. (Yergin 2011a, 2014). It is a shift with geo-political implications: US would always use Canadian crude as a political tool; and in future, though crude import from Latin America would go up in absolute terms, it would fall in relative terms. Comparing the date for 2008 and 2013, US import of crude oil and petroleum products from every country/region except Canada has declined. For Latin America and Canada, the corresponding figures for 2008 and 2013 are from 3.4–2.6 mbd and from 2.5–3.1 mbd respectively.[7]

US oil refineries are working at full capacity refining crude, manufacturing diesel and producing other refined products—thus making oil price low in US and ready to export low-priced petroleum products to Latin America, Africa and Asia. International Security Advisory Board of the Department of State estimates US to become a net exporter of oil products soon, though not of oil any time soon in the future. The US total export of petroleum products in 2008 was at 1.8 mbd which increased to 3.5 mbd in 2013; to Latin America, the corresponding figures for the 2 years were at 0.8 and 1.7 mbd.

The impact is being felt more in the political area. American shale revolution is making every major hydrocarbon producers in Latin America adjust to new situations and challenges. Those who lack a diversified economic base, such as Venezuela and Ecuador, are losing out more in terms of production, price, income, and some prestige too including their ability to use oil as a political tool. Low price of hydrocarbons is stressing all: Venezuela, Ecuador and Bolivia all are experiencing fall in their regional influence and disarticulation of the 'twenty-first century socialist' model of development. Mexico is importing LNG and natural gas, ironically through the same pipelines which were laid to export gas to US; and Cuba is mending fences with US in anticipation of cutting off cheap oil supply from Venezuela. LNG exporters like Trinidad & Tobago might not be able to handle the adverse impact of US LNG exports. Impact would be even more far-reaching, once the American crude oil and gas pipeline capacity expands into the US Gulf coast. The building of the controversial Keystone XL, which shall bring Canadian oil to the Gulf coast, could be real game changer in the Western Hemisphere.

[7] US import of crude oil and petroleum products fell from 12.9 mbd in 2008 to 9.8 mbd in 2013.

9.3 …High on ‘Resource Nationalism’?

Almost every single analysis cautions investors against ‘resource nationalism’; on their part, Latin American governments blame international oil companies of exploitative practices and their parent countries of harbouring interventionist designs. How high is ‘resource nationalism’ and pernicious the effects of oil companies?

‘Resource nationalism’ is lapped up mostly by Realist writings. Largely using the ‘*dependencia*’ analytical framework of economic underdevelopment in resource export dependent economies, analyses, premised on Realism, squarely blame the central role of state in the ownership and management of resources for all the ills that afflict the energy sector. Dependency analyses have entailed that resource export-dependent economies inevitably experience ‘resource curse’. More likely being ‘mono-cultural’, as most Latin American economies have been, the ‘curse’ is particularly severe for those who are endowed with as strategically important a product as oil. A ‘rentier’ state, an authoritarian polity; a profit-seeking, self-perpetuating elite, a national population marked by low productivity and high consumption, and a demented economic productive structure that only reinforces economic inequality and social marginality are the enduring structural features of such societies. Taking the cue, Realist school argues that it is then that countries enter into a cycle of mutual reinforcement and repetition of the correlation between the internal effects of ‘resource curse’ and ‘resource nationalism’.[8] (Milina 2013, pp. 75–97). Realists also highlight the illiberal and contra-development aspects of oil. Thomas Friedman finds an inverse relationship between oil and freedom. “The price of oil and the pace of freedom always move in opposite directions in oil-rich petrolist states.” (Friedman 2006). He calls it the ‘First Law of Petropolitics’. Oil-rich states invariably have some of the poorest people, who are also more likely to be sucked into savage internal ‘resource wars’. Paul Collier calls it ‘resource predation’. (Collier 2010, pp. 1105–1132).

The question of ‘resource nationalism’ in Latin America is however more complex. Historically, land and all sub-soil resources belong to the state; and being national patrimony, oil is subject to expropriation if granted as concessions. Secondly, Latin American leaders and masses alike expect oil wealth to lead their countries out of the conditions of development. Since the times of the adoption of the import substitution industrialisation under (ISI) model of development in the 1940s, oil remains a matter of national identity and oil nationalisation a sacred event in the history of Latin America. State has been tasked with the responsibility of development; it does not matter whether a government professes to be ‘twenty-first century socialist’ or a free-trade champion.

[8] Typically, high profits from resource exports endow local elites more autonomy who in turn promote more of the ‘resource curse’. Politically rewarding but stultifying for rest of the economy, ‘resource curse’ intensifies dependence, say, on oil. High degree of dependency increases the benefits of ‘resource nationalism’ for the elites; and high profits, as a result of policies of ‘resource nationalism’ further promote ‘resource curse’. (Milina 2013)

Be that as it may, the relationship between oil and politics is fairly complex everywhere. More than 80% of global oil and gas resources are state-owned; and governments would continue to restrict foreign participation everywhere. International oil companies prospect, produce and profit but sovereign states know when and how to make political gains and bargains out of oil. Every country, be it a producer or a consumer, has a plethora of ministries and departments entrusted with the task of ensuring energy security. Political stability in producing and consistency of demand in consuming countries are matters of international energy strategic importance. Ironically, neither can be ensured; and the world energy market, hence, remains in search of the ill-defined and ever-elusive 'fair price' of fossil fuels. The elusive 'fair price' was perceived and eventually obtained in 2005 when oil price reached US$ 100 per barrel. It immediately reignited the developmental debate, as 'consolidating' democracies took the 'Left-turn', promising high social spending in hydrocarbon-rich countries of Venezuela, Ecuador, Bolivia and also Brazil. The question of 'resource nationalism' therefore needs to be taken in perspective; and, as has been further analysed in the subsequent pages, it opened the energy sector for the entry of oil firms from India and China.

9.4 Or, Low on Management…!

As the commodity export boom since around 2002 has produced higher growth rates and improved living standards, thanks to huge export earnings, it has also brought in sharper relief certain long-standing problems that bedevil the regional energy sector:

i. Regional oil production had peaked in 2005 as oil prices shot up to $ 100 a barrel. Since around 2009, production is stagnating, even declining, in the absence of requisite investments in new exploration and production. In Venezuela, production is declining at a rate of about 20% per annum; it fell to an abysmally low of 2.4 million bpd in 2013–2014—the lowest in the past 14 years. Oil production is stagnating for the past 4 years; the year 2013 was particularly disappointing for Brazil when production fell below 2 mbd. Mexico had attained the peak oil production of 3.5 mbd in 2004; since then it is declining and touched a low of 2.5 mbd in 2013–2014. In Colombia, which is said to follow more market-oriented norms, production remains flat for the past 3 years. In a pattern, oil continues to be extracted from the ageing fields using existing technology, with no new investments forthcoming in prospecting and developing new oil wells.
ii. Production-reserve ratio has deteriorated rapidly. Mexico, Ecuador, Argentina and Colombia might all have to import oil soon. Mexico might have to import oil as early as 2018. Existing reserves in Colombia might run out around 2020. (environmental and social concerns.). On the whole, regional exportable surplus of oil has declined by 30% since the late 1990s. IEA estimates that Latin America needs to invest about $ 3.5 trillion in energy sector by 2035 and roughly

$ 1.9 trillion in oil sector alone. ‘Resource nationalist’ governments don’t have that kind of money; and won’t allow private equity without state control and participation.

iii. Rising import of refined petroleum products, diesel and gasoline etc. is making all major oil producer go in for expansion and refurbishment of the refining capacity so as to handle the ‘heavy’ and ‘extra-heavy’ crude. OPEC estimates that refining sector in the region needs more than $ 100 billion in investments over the next 25 years; besides there are technological challenges in refining the ‘extra-heavy’ crude.

Historically, economies in Latin America have remained heavily determined by the political context. They also remain less amenable to regulatory changes than economies in rest of the world. (Mares 2008). Governments often respond to the crisis in energy sector in a political manner which generally leads to greater regulatory controls over private oil firms, even nationalization measures; and greater state controls over state-owned oil enterprises. Almost everywhere, state-owned oil monopolies are shielded from competition; they are expected to contribute to annual tax earnings; subsidize domestic energy consumption and finance social spending. There is equally a long and sordid history of foreign companies taking entire nations for a ride and their parent countries of interventionist machinations. A 2013 study on natural resources policies in South America, carried out by UN Economic Commission for Latin America and the Caribbean (ECLAC) at the request of Union of South American Nations (UNASUR), has found that the present tax system does not generate adequate revenues for the state, especially during periods of export surge. Disputes with foreign firms are mostly related to royalties, ‘windfall’ taxes, and delayed projects which often lead to partial nationalization of oil assets. Oil firms regularly resort to dodgy practices e.g., not declaring windfall profits, selling off participating interests without even informing the host governments, etc. (CEPAL-UNASUR 2013; Bitar 2013). In consequence, reforms which are meant to incentivize investment often parallel higher state controls and direct participation in energy sector. This precisely has happened to the series of reform, that were introduced in 2013.

For instance, government is mandated to hold 61% of the shares in the state-owned Petrobras; state controls and direct participation are very high over the pre-salt layers. Government of President Dilma Rousseff simply needs more oil revenues for social spending in the face of endemic protests that have literally ravaged governance in Brazil since 2012. At the same time, government does not have the ability to mobilise the requisite investments in the off-shore sector.

Petrobras itself is an over-stretched firm, dominating the entire petroleum value chain. It controls over 90% of the Brazilian crude oil and natural gas production. In 2013, it embarked on one of the globally most ambitious upstream investment programme. It targeted production at 3.9 MMboe/d by 2018; and an upstream spending in the range of $ 147.5 to $ 153.9 billion during 2014–2018, with over half of it allocated to developing the pre-salt layers. (Viscidi 2014b). In the midstream segment, Transpetro, a subsidiary of Petrobras, exclusively operates Brazil’s 46,600 miles crude oil transport network. Three LNG regasfication terminals with a combined

capacity of 41 MMcm/d are also owned by Petrobras. In the downstream, Petrobras controls 2.13 MMbbl/d refining capacity spread across 17 refineries. It wants to become self sufficient in refining by 2017, when it is expected to also become a net exporter of petroleum products and might not import diesel anymore. (Malhotra 2012). Petrobras also holds a dominant share in the multi-billion dollar retail products market. Its vast supply chain accounts for almost 6% of national GDP. As a result, Petrobras is always looking for new investments and expanded capacity without the required capacity and capability. The company had an outstanding debt of US$ 114 billion at the end of 2013.

PdVSA is in a more precarious situation and faces some unique challenges. Crude export to US is declining; it is a long-term trend, and Venezuela is looking for new buyers, such as India and China. More crude exports to Asia means higher transport cost; some oil sales linked to Chinese loans are discounted to make up for higher freight rates. The late President Hugo Chavez (1999–2013) had his own political priorities like selling oil on non-market terms. Some 30% of production, and a growing share of export earnings, is exported under prepaid and government supply agreements. Critically needed cash flows are rapidly falling so are exports, which were at a 10-year low, at 875,000 bd, in 2013.

Domestic oil consumption per capita is the highest in the world thanks to extremely cheap retail prices. At home, PdVSA is said to have spent $ 123 billion on social programmes since 2001. Venezuela had presidential elections in 2012, won by Hugo Chavez. It is estimated that PdVSA spent $ 30 billion (24%) of its oil revenues on social programmes in 2011 alone. Popular expectations are very high in every energy-rich country of Latin America; President Nicolas Maduro is diverting resources from PdVSA to back his government spending, which increased by 88% in 2013. PdVSA is procuring loans to finance JVs; while the government itself owes to PdVSA's joint venture partners around $ 6.7 billion.

It is same story everywhere. It is said that *Petroleos Mexicanos* (Pemex), Petrobras and PdVSA, all need greater operational and budgetary autonomy from state. But the heads of these behemoths are commonly called 'Czars' and often rival elected presidents in their audacity and authority. One simply needs to analyse the depth of corruption, as currently being witnessed in the case of Petrobras, to know why governments want to keep control over state oil enterprises.

9.5 India in the 'el Dorado'…

Robert Kaplan talks of new developments and directions in geopolitics of energy involving resources and routes. He approvingly quotes Mohan Malik to argue that a new world map of energy is emerging with the rise of the Indo-Pacific as the 'ground zero' of growth in so far as energy consumption is concerned. Kaplan argues that in the next 20 years, 85% of growth in energy consumption will come from Indo-Pacific. (Kaplan 2014). China will account for 40% of the growing consumption until 2025, after which India will emerge as the "biggest single source of

increasing demand". This will have larger consequences. The International Security Advisory Board of the US Department of State reports that rise in energy demand in Asia "significantly alters fuel mixes and trade flows. It also challenges energy security frameworks and climate change mitigations efforts heretofore structured mainly around the industrialised West." (US Department of State 2014).

As demand rises, so would supply. As Latin America comes to increasingly supply itself and the whole of Western Hemisphere becomes oil and gas surplus, energy from Latin America would also flow towards India and the whole of Indo-Pacific region. The study by ECLAC for UNASUR points out to the rising flow of Latin American energy towards Asia.

Where does Latin America figure in India's energy security? India's overall externally-oriented energy security and its myriad dilemmas demand appropriate policy responses and prescriptions. India's oil import dependency is likely to reach 90% of its oil demand by 2040. Besides, reliance on sea-borne energy trade and spread of its energy assets over vast swathes of oceans demand calibration of defence capabilities with energy security needs. No less, as a result, the country seeks cooperative security in the larger Indian Ocean world. Energy security and diplomacy are also more closely entwined than ever before. It won't be an overstatement to say that the externally-oriented energy security today is an extension of India's national security.

Taking the above perspective, India's relations with Latin America have shown a meaningful dynamism over the past roughly 15 years. Not just the actual, promise and potential of the bilateral relationship are huge, spanning energy, trade and investment, political cooperation and significant exchanges in the areas of science and technology and defence production, etc. There is no concerted strategy, but there is an evolving road-map of India's relations with Latin America and the Caribbean; and energy is a major component for the long term in the two-way exchanges.

Following aspects of the burgeoning relationship are noteworthy: there is a fair amount of the projection of India's 'soft power' through the presence Indian firms in energy, information technology and pharmaceutical sectors. Besides, there is a marked preference to engage LAC countries through fora such as the IBSA Dialogue Forum and CELAC (Community of Latin American and Caribbean States), etc which encourage participation of governments in a democratic and consensual manner—mechanisms which also involve participation of civil society groups. A generalized view in the LAC region is that engagement with India has helped LAC economies become 'knowledge –based'; and further, that Indian firms impart skills and transfer know-how to Latin America. The thrust of India's political and economic engagements also suggests that India wants to be recognized as contributing to the national development strategies while remaining distanced from domestic and regional contentious issues. ECLAC has repeatedly noted the beneficial effects of engaging with India; and has urged Latin America to build synergies of relationship with India.

It is in this larger and broader context of the evolving synergy that the energy relations between the two subcontinents need to be examined. Two aspects bear utmost significance: Indian oil majors had started making their presence felt only

around 2005 that is around the time when Latin American oil production and price had peaked. Secondly, Indian oil firms could make an entry only at the height of 'resource nationalism' especially in Venezuela, Ecuador and Brazil. In other words, a receptive political atmosphere in the host countries enabled the Indian oil majors to break the stranglehold of the Western oil companies.

It won't be an exaggeration to say that India-Latin America relations remain essentially energy driven. Nearly half of the two-way annual trade of around US$ 45 billion is accounted for mainly by import of crude and export of diesel and petroleum products. As many as eight major Indian firms are part of the 12 joint ventures in all the leading oil and gas producing countries. Indian oil firms have their presence all through the petroleum value chain, demonstrating India's technological prowess and transferring know-how gained through working in JVs. Indian oil firms look particularly for know-how transferable to India for the development of India's offshore energy resources. David Mares writes that by participating in exploration and production, the four state-owned Indian oil companies want to demonstrate to the region their global competitiveness and technological competence. In sum, Indian oil firms' presence in Latin America is part of the projection of India's 'soft power'.

Other aspects are also equally significant: volume of import is substantial, given the diverse sources of oil imports; and private Indian oil companies are also of late actively coming to the region to pick up businesses. For instance, Reliance's import of an average 300,000 barrels a day of crude oil from Latin America was about a quarter of its total crude imports during 2012–2013, exceeding the crude it imported from Saudi Arabia. Essar, another major private oil player, reportedly aims to buy 35–40% of its crude oil needs from Latin America; same as it does from Middle East.

Important to note here is that, as different from China, nature and scale of India's energy ties remain politically unencumbered and without entanglement into complex issues like 'loan-for-oil' etc. It is also to be noted that a substantial portion of the estimated Indian investment of $ 12 billion also remains in Latin America's energy sector. Furthermore, India wants to develop a domestic ethanol industry by learning and collaborating with Brazil; and this has been one of the key thrust areas of its engagement under the banner of IBSA Forum. Surely, for Indian oil firms the baseline remains commercial viability and business interest of energy projects in the LAC region. Nevertheless, there have also been instances of energy businesses backed by diplomatic and political efforts.[9]

Brazil is a significant exporter of crude to India since 2008. In 2013, it exported around 45 million bpd of crude, mainly to India, China and Singapore. Likewise, Venezuela's crude export to India and China is rising—estimated at 400,000 and 200,000 barrels a day respectively in 2014. Venezuela is the fourth largest source of crude import for India, accounting for about 12% of total crude import in 2013–2014. The three main producers namely, Venezuela, Brazil and Mexico account for

[9] Reliance's decision to import crude from Venezuela was reportedly at the instance of the government during the visit of President Hugo Chavez to India in 2005.

import of most of India's crude from Latin America; and if one includes Ecuador and Colombia, the five together accounted for roughly 34 million tons of crude import, i.e. 15% of all crude imported by India in 2013–2014. Rising import of crude also explains persistent trade deficit with the region.[10] For instance, as per the 2012 trade figures, of the total two-way trade of $ 26 billion, the three countries had accounted for $ 20.32 billion trade; and for the total Indian imports at $ 14.2 billion from the region, crude oil import alone had accounted for $ 8 billion—again from these three countries only. In 2012, imports at $ 3.98 billion from Venezuela and at $ 2.83 from Mexico had consisted almost exclusively of crude. In particular, Venezuela has become a very major source of crude import since the visit of the late President Hugo Chavez to India in 2005. It accounts for roughly 60% of all Indian crude imports from Latin America.

Yet another notable aspect is the rising presence of the private sector Reliance which is increasingly shaping India's energy ties with the region. It is Reliance which is importing most of the crude from Venezuela and Brazil. Reliance's import of an average 3 lakh barrels a day of crude from Latin America was about a quarter of its total crude imports in 2012. Brazil is India's largest trading partner in Latin America now for several years; nearly half of India-Brazil trade is accounted for by Reliance's import of crude and export of diesel and petroleum products to Brazil. In 2012, of the two-way trade of $ 10.62 billion, import of crude and export of diesel by Reliance accounted for $ 5.5 billion. Also to be noted is that the import of 'heavy' and 'extra-heavy' crude is on the rise for processing in Reliance's refining facilities in India. In a change of strategy from buying oil from productive wells, Reliance has also begun to go for E&P agreements. With domestic production falling and Latin American governments set to invite for E&P and also expand their refining capacity, the footprints of Indian oil companies are set to expand all through the petroleum value chain.

A broad survey of the strategies deployed by the four major oil PSUs in Latin America reveal that all four are hunting mainly for equity oil.

- ONGC Videsh Ltd (OVL) is present in the region since 2006 and has partnered state-owned enterprises, Indian oil PSUs and foreign oil companies in varieties of E&P projects in Colombia, Brazil, Venezuela and Cuba. It has a marked presence in the pre-salt layers of Campos and Santos Basins in Brazil since 2007, working on several blocks on its own and in partnership with Petrobras and others including through JVs. It has brought to Brazil's deep waters its rich knowledge and experience in offshore E&P, which it has gained by working for decades in Mumbai High. OVL has put in several billion dollars in acquiring assets in the Orinoco Basin of Venezuela, creating a consortium of companies for the production of 'heavy' and 'extra-heavy' crude in the Carabobo and San Cristobal oil blocks. OVL's presence in Brazil includes a floating production,

[10] Crude oil, edible oil and copper, together account for over 3/4 of Indian imports from LAC region. Seven LAC countries where over 90% of two-way trade is concentrated are: Brazil, Mexico, Venezuela, Chile, Argentina, Colombia and Peru.

storage and offloading (FPSO) vessel and sub-sea systems—experiences which could be transferable to its Indian E&P projects.

- OVL is present in Cuba, again for the deep water exploration, for the last 10 years with a participating interest of 30% in Blocks N-25 to N-29 and N-36, which are located in Cuba's Exclusive Economic Zone. These blocks hold potentially 4–20 billion barrels of hydrocarbons. (Rainsford 2012).
- A joint venture of ONGC and Sinopec, called the Mansarovar Energy Colombia, with 50–50 shareholding is engaged in exploring, developing and transporting 'heavy' crude utilizing cyclic steam stimulation (CSS) of the Velasquez fields, the Nar Association and the Teca fields. ONGC has interest in several offshore blocks, which plays to the company's strength since half of its production in India is from the Mumbai High offshore platform.
- Oil India Ltd had contracted its first Latin American assets in 2010, a 3.5% interest in Carabobo—1 oilfield. Bharat PetroResources Ltd (BPRL), a subsidiary of Bharat Petroleum, has partnered with Videocon to purchase 10 deepwater exploration blocks in Brazil from the Encana Corporation of Canada.
- Reliance is currently involved in two deepwater exploration blocks in Colombia in conjunction with the state-owned Ecopetrol. In Peru also, Reliance has hydrocarbon concessions in a JV with an Argentine and an Australian company. The private oil major has shown interest in other countries too including in Venezuela, and in upstream ventures in Mexico and Central America.
- Other Indian companies have also ventured into varieties of oil related activities. Jindal have hydrocarbon blocks in Peru. Assam company has a farm-out agreement with Sismopetrol and R3 in Colombia for exploration and production of an oil block, known as ANH EL Triunfo, located in Casanare in Colombia. The block size is 10,200 hectares and Assam company has 70% participating interest in it. Gammon India Ltd has established a subsidiary Campo Puma Oriente SA, based in Panama which operates the Puma oilfields in Ecuador which consists of 11 wells with proven reserves of 8 million barrels. The contract was signed in 2008 for a 20 year lease.

9.6 …and the political economy of Latin America-Asia ties

Not geopolitics, rather it is the political economy which explains Latin America's fast expanding relationship with Asian economies, importantly with China and India. Scholars opine that change is structural in nature; and therefore probably irreversible. Importantly, the relationship is being shaped by export of resources, mainly energy, to China and to India. (Lederman 2009). The shift in the status and role of Latin America in the international political economy, which had begun to come into view as resource exports boomed around 2002, has accelerated since the global financial crisis of 2008. Significantly, the process is now marked by, among others, Latin America's gradual insertion into the Asian supply and value chains.

Several studies by ECLAC point out that the new political economy of Asia-Latin America integration is being catalysed mainly by China. China's appetite for resources, mainly energy resources, and its huge investible capital has brought Latin America into Asian supply and value chain. For instance, Chinese oil companies predate Indian companies by a decade or more in terms of their presence in Latin America. A more resolute approach however came in view with the global financial crisis of 2008, which convinced China to have a long-range view of Latin American resources for its energy security. Since 2008, state-owned oil companies of China have formed dozens of joint ventures for E&P. More noteworthy, China's state-owned banks are now directly involved in offering loans and credits to cash-strapped governments. Chinese banks have loaned around $ 98 billion, mostly under 'loan-for-oil' arrangement between 2005 and 2013, mostly to Venezuela and Ecuador and increasingly to Brazil and Argentina.[11] (Krauss and Keith Bradsher 2014). Thus, unlike India, China backs its energy policy with offers of credit and investment and strong political-diplomatic follow-ups in these countries.

There is an overarching pattern of energy-related investments, loans and development of infrastructure. The cash-rich China Development Bank (CDB) and Export-Import Bank of China provide cheap credit to various Chinese oil enterprises for their global ventures. Flushed with cash, China's state-owned oil companies are seen to bid for energy resources without bothering about aspects of profitability or politics. This is where Indian oil majors generally find themselves hamstrung and outsmarted.

One also notes that the two main state-enterprises viz. the China National Petroleum Corporation (CNPC) and the China Petroleum & Chemical Corporation (Sinopec) work in a vertically integrated manner. While CNPC is engaged essentially in upstream, Sinopec prefers downstream operations. The Chinese National Offshore Oil Company (CNOOC), tasked principally with the development of China's offshore energy resources, works out joint ventures and acquisitions and mergers. This is how CNOOC has enabled PdVSA and Petrobras to have a toe-hold in China including in the refining sector. (Mares 2011, pp. 1–58).

To secure energy and mineral assets, Chinese banks are also extending infrastructural loans and even arms transfers.[12] Then there are other aspects, for instance

[11] Figures are impressive, especially when compared to the combined lending of US$163 billion by the World Bank and the IADB during the same period. Deutsche Bank Group, China—he New Financial Player in Latin America, 29 July 2014. Clifford Krauss and Keith Bradsher, "China's Global Search for Energy", New York Times, 21 May 2014. Under the arrangement, Latin American state-owned oil monopolies are obliged to sale to the Chinese oil companies millions of barrels of oil daily at the market price for the duration of the loan. Chinese oil companies make the payment for every purchase in the account of the Latin American oil company at the Chinese bank. Chinese oil companies routinely sale the oil consignment at a profit in the open market. In order to repay itself, the Chinese bank deducts the loan money from the account of the Latin American oil company.

[12] In September 2008, it was agreed to barter Chinese military equipment for Venezuelan oil. In 2010, under an oil-credit swap arrangement, China Development Bank provided $20 billion to Venezuela for energy, agriculture, railroad and housing projects. The credit, reportedly half in US dollars and half in Chinese Yuan, would be repaid with oil supplies on daily basis over the years.

trade and investment which are facilitating acquisition of energy assets. China's trade with Latin America has grown faster than its trade with any other region since 2002. China is the number one trading partner for Brazil, Chile and Peru and number two for Argentina and several others. Annual two-way trade is about $ 250 billion, and China proposes to double it by 2025. Investments are more modest at $ 9.2 billion for 2012; almost 90% of Chinese investment is in resource extraction, mostly oil and gas.

China and India have similar energy goals and methods except that the scale of China's engagement with Latin America is much larger and secondly, it is backed by a comprehensive economic and political strategy. Scholars do talk, sometimes alarmingly, of China's rise in Latin America. However, the discerning view is that "…there is as yet little, if any, evidence to suggest an attempt to pursue a purposeful ideological, political, geopolitical or military strategy in Latin America". ECLAC reports also point out that Latin America's insertion into Asian supply and value chain is bringing in 'reindustrialisation' to the region. (UN-ECLAC 2011, pp. 1–32, 1–76).

The commodity export boom followed by rising investments offers an historic opportunity to the region to integrate itself with the Asian supply and value chain. Latin America has dealt with the global financial crisis and its aftermaths with lots of "resilience" and the region must now seek a "strategic alliance" with the dynamic economies of Asia built on synergies, economies of scale and, no less significant, the political will. Riding the Chinese crest, Latin America might already be leaving underdevelopment behind. Alicia Bercena, the Executive Secretary of ECLAC recommends Latin America to become the "export platform for China". (Barcena). A qualitative shift has taken place in the bilateral ties with energy, infrastructure and innovation becoming focal areas of joint ventures and collaborations. ECLAC concludes that this new phase of globalization and economic development, catalyzed by energy, could be transformative for the whole of South America in particular.

India is part of the same political economy forces and processes which are catalyzing Latin American integration with Asian economic dynamism. Latin America and the Caribbean is the proverbial *el Dorado* of promise and potential in the field of energy and beyond. It is time for India to have a concerted strategy so as to access energy resources and much more in the Latin American-Caribbean region.

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Chapter 10
Energy Transition and the Global Energy Regime: Strategising India's Energy Relations

Girijesh Pant

The world energy order is reaching to the point of inflexion. Its dynamics no more reflects the binary pulls and pressure from/by consumers and producers. It no more remains the preserve of the state or market exclusively. It cannot even be defined in terms of national security alone. It has become transnational and part of Global Common. Thus it has acquired a distinct composite character with strategic connotation to environment, energy poverty national and international security. Consequently the discourse on energy has moved on from securitisation to sustainability. The UN declaration to dedicate the present decade i.e. 2014–2024 to 'Sustainable Energy for All' locates the energy on the intersection of above mentioned diverse concerns. It calls for an inclusive global energy regime to alleviate the global energy poverty while preserving the ecology. Clearly such a regime cannot be premised on conflict-competition matrix, it has to be imagined as common global construct. In other words the trade-off is not to be seen between those who have consumed and those are potential consumers of energy or between and among different components of energy mix. It is the question of framing a holistic regime that looks at the energy security in wider terms at global scale as complex interdependent project. In this chapter attempt has been made to reflect upon the positioning of India in the larger global energy frame. It analyses the dynamics of energy transition and the role that the Indian energy regime could play in its accomplishing. It also attempts to look at the strategy that India as leading energy consumer needs to conceive by defining matrix of its energy relations in making of an energy regime which facilitates energy transition to address the issue of energy poverty at global level.

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10.1 The Changing Context

"Energy is the golden thread that connects economic growth, increased social equity and a healthy environment. Sustainable development is not possible without sustainable energy," (United Nations 2012) said UN Secretary-General Ban Ki-moon. "That is why I have launched the Sustainable Energy for All Initiative in 2011. Now, the Decade and Forum will help us stay on track to meet the objectives we have set" (United Nations 2012). The statement while recognises the centrality of sustainability in energy –development nexus and underlines that the present hydrocarbon dominated energy regime:

> Inadequate to meet the needs of the world's poor and jeopardizing the achievement of the Millennium Development Goals (MDGs). For instance, in the absence of reliable energy services, neither health clinics nor schools can function properly. Access to clean water and sanitation is constrained without effective pumping capacity. Food security is adversely affected, often with devastating impact on vulnerable populations. (Energy for a Sustainable Future 2010, p. 7)

The challenge thus is to construct an energy regime with energy mix which could addresses the needs of diverse stake holders. This implies recognising the diverse needs of stakeholders in terms of affordability, accessibility and delivery logistics in a dynamic setting. Thus unfolding of next energy transition can not be confined to mere progression towards superior energy but needs to be geared towards constant improvement of existing energy mix and delivery mechanism. The necessity of harmonising the competing demand across the countries and within the nation and integration of national market to global make the issue of energy governance as part of transition process.

Historically energy transition has been defined in terms of shift in energy mix. It has been very complex and lengthy process. It is observed that "It took 100 years for coal to go from supplying 10–60 % of the world commercial energy. Thereafter it was 60 years after the introduction of oil as fuel source before it supplied 50 % of the world's energy."(Green Power) The genealogy of energy transition shows that it is the technological innovations and the state policies that defined path of transition from bio mass to coal and oil. It can well be argued that in the coming times too this combine will be the key driver. Further as Yergin puts the two key determinants in the next transition are going to be the limitation of present energy mix to meet the demand and the environmental consequences of consuming the present energy mix (Yergin 2013). While technological breakthrough will expand the resource base, the pace of energy transition is going to determined by the enabling conditions. In other words the transition trajectory is no more confined to change in energy mix but refers to larger issues of combining security, equity and environmental sustainability defined as energy trilemma by World Energy Council (Wymank 2013).

10.2 Energy Transition Pathways: Synergising the Diversity

It is rightly observed that transition is "not an abrupt change from one 'reality' to another but rather a shift that unfolds generationally over considerable time, and one that may lead to greater diversity in the energy marketplace" (Yergin 2013). The transition path in a given context is influenced by a large set of pressures of convergence and divergence. The energy mix is not a normative concern alone to be determined by concerns of carbon emission or affordable price. It is equally matter of the inter fuel cost and market sentiments. It is not one size fits to all. It is observed that,: "Policies and politics too often favor the status quo in government and industry, locking in institutional frameworks and protecting existing arrangements even where better alternatives exist" (Moon Ban Ki 2011, p. 7). Given the diversity of locale, it has been argued that:

> There could be multiple path of transition because any energy transition will combine investment in supply-side solutions (renewable energy systems, system efficiencies), demand-side interventions (behaviour change, incentives and punishments for energy subjects), and various -technical possibilities in between.—- Moreover, any energy transition will be shaped by political choices about what to prioritise in terms of investment and regulation. (While, p. 1)

The political choice however is influenced by the diverse pressures. These pressures could come from multiple considerations and sources. It can be argued while at one level of analysis these pressures could be seen located at global, national/regional and local context at another level it could be from the state, market and the community yet another level it could be seen in terms of pressure emanating from the need of efficiency, equity and access. This makes a case of prioritising energy transition path ways to converge the diverse concerns than visualising them in competing frame. This means that one set of priorities need to create enabling context for the next.

In the age of globalisation with local production becoming part of global supply chain, the energy consumption is not determined by local community needs. It carries with it the globalised local consumption emanating from energy intensive production of the global production network. On the other hand being part of global supply chain, the low end economies do move to energy efficiency process. The point made is that transition path in the global age is also going to be influenced by the global production network which locates and relocates the energy intensive production at cheap labour economies. The same pattern could be seen at regional level with emerging regional production network.

In contrast to earlier transition where market played the key role and state was more a facilitator, the next energy transition will be needing a more proactive state to steer it. In the hydrocarbon sector, the state run companies from emerging economies have created a niche for themselves. The regulatory mechanisms have been used to provide them space to acquire strategic leverage to compete in the market

with private players. However in the case of renewable, the private players both in OECD countries and emerging economies have not been finding the leveled playing field. The bias against renewable and obstruction coming from prevailing institutional structure put them on disadvantageous position. They need state support to take off. The need is felt more acutely in developing countries where there is high incidence of energy poverty and the economics of centralised energy regime restricts its access. Subsidies thus have become the necessity. A subsidised energy regime promoting hydrocarbon consumption has obvious environmental consequences. Thus the role of state becomes vital in promoting inter fuel substitution thereby in defining and engineering the transition path ways. This has made energy governance critical in embedding transition pathways to the local needs. This has brought the role of communities in energy governance. The successful case of energy transition in the Nordic countries illustrates that innovative democratic engagement promoting synergy between the state, the private sector and community could contribute in promoting sustainable energy pathway by dovetailing centralising grids and decentralising energy generation process thereby contesting the assumption that energy has to be centralising and demonstrating feasibility of its decentralising texture (Hvelplund 2013, pp. 5–8).

The success of Nordic experience in energy lies on its integrated and inclusive democratic approach in policy making. The literature shows that the strategy of energy transition emphasises the need for a broad consensus about the strategies. Sharp disagreements can slow down or hinder development and investments. Convergence of energy policy, industry interests and civil society is argued to be a precondition for the success of renewable energy transition. In Nordic countries energy policy pathways were facilitated by strategic processes including engagement with political parties, industry, R&D organisations and non-governmental organisations. Energy strategies are discussed in parliaments and political agreements are achieved across political parties ensuring a long-term commitment towards the chosen goals of development (Gregersen and Johnson 2009).

10.3 The Emerging Geo-economics of Energy

The spatial organisation of production processes is creating new economic geography reflecting in global flows including energy. Unlike past, today the forces of globalization are contributing to the composition of global energy by making it possible to “to trade any fuel across almost any border, greatly enhancing the prospect that fuels are allocated to their most efficient application. Globalization allows the diffusion of technology across borders to proceed at unprecedented speed, helping to ensure that fuels compete on true cost. Globalization also brings standardization, ensuring efficiency gains and unprecedented flexibility in energy production and consumption” (Rühl 2013, p. 23).

The globalising production network and services is dispersing the economic activities across the globe in the format of clusters. Theses clusters are interlinked to

each other on transnational frame. Consequently the demand for energy is getting linked to the growth propensity of theses clusters. The suppliers of energy thus are not pegging their exports to a national market, a political construct but to economic clusters thereby changing logistic of energy market context from primacy of politics to economics.

The Asian shift of energy trade illustrates that moving of economic gravity to East has redirected the energy trade to Asia. IEA estimates suggest that between 2012–2018 oil exports from Middle East to Asia will increase by 1.2 million barrels per day in contrast to exports to the US and OECD Europe will shrink by 1 and 0.3 mbpd respectively. Thus the projected Asian crude import by the end of the decade would be 22.1 mbpd or 65% of international crude trade and 27% of total crude production. What is equally significant that by 2019 North America will become net exporter of oil (IEA 2014). From the perspective geo-economics of oil, a more relevant development is the drop in global oil trade despite rise in oil consumption due to growing domestic consumption in oil exporting countries and their increased refining capacities. This resulted in as the IEA report highlights:

> The net result is that crude markets contract in both volume and geographic reach: less crude is traded internationally, while the main trade routes increasingly converge on Asia from producers in the Middle East, Africa and the former Soviet Union (FSU). By the end of the decade, though, westbound trans-Pacific trade also rises, as Asian refiners import growing volumes of feedstock from South America and, at the margin, North America. (IEA 2014)

Globalisation of refining industry according to IEA has further contributed in geo-economic restructuring of oil trade. Its massive expansion has changed its coordinates. IEA report observes that like the crude trade flows the map of global refining is going to change radically because the new capacities are created outside the OECD, with nearly half of the increment in non-OECD Asia (IEA 2014). The structural changes outlined above bound to have its geopolitical ramifications.

The emerging geography of energy and the shift of production site in Asia has unfolded a new dynamics of emerging geo-economics having implications for the transition path underlining complex diversity of pressure emanating from interdependence of global political economy. Clearly being the leading consumer heavily dependent on imports, non OECD countries would be more vulnerable to the geopolitics of energy. They would face greater degree of susceptibility to energy supply security and its price volatility. It is in their security interest that energy transition unfolds by changing the energy mix, thereby enhance the diversity of supplies. However since the production of non fossil fuel is going to be with OECD countries on the strength of their technology, the benefit of shift in energy mix is not likely to be evenly shared. History underlines the fact that energy mix becomes more diversified as an economy moves to higher stage of development. The BP report also reinforces that along with the technology the price have historically played vital role in energy transition.[1] Interestingly the BP report makes political

[1] "Early industrialization was based almost entirely on coal. Cheap oil and the internal combustion engine helped oil to replace coal as the dominant fuel. Gradually, the energy mix diversified further

economy point of energy transition by observing that, "Competition and innovation, guiding the global improvement in energy intensity, are not directing changes in the energy mix toward faster improvements of carbon intensity. The market does not do for carbon intensity what it does for energy intensity because energy is costly, and carbon is not." (BP Energy Outlook 2035 2014) This brings into the debate the role of the politics in fashioning the energy market in energy transition. A study of transition in Denmark (Hvelplund 2013) brings out that it was the political decision that created market conditions in favour of renewable but as:

> The competition between FFU and REC technologies is becoming more tough in the second phase than it was in the first phase, there is an increased need for a strong innovative democracy process in order to avoid REC technologies being pushed back by strong FFU organizations now fighting for market survival. (Hvelplund 2013, p. 5)

It was the bold decision backed by politically unanimously support that the Germany could adopt legislation in 2010 setting target for carbon reduction, renewable energy and energy efficiency. In the words of their minister of environment, for the Merkel Administration, "this is unprecedented and brings to an end decades of public debate in Germany." (Americanpowerplan) It is well documented that the success of Germany and Denmark in moving to renewal energy lies critically with the political support and policy support for innovation.

10.4 Geopolitics of Next Energy Transition

The on going transition processes when measured in terms of mainstreaming the renewable into global energy mix indicates that its geopolitics is going to be defined by the countries having invested on technology and have control on it. Unlike conventional energy, the resource endowment of renewable are widely dispersed and so is the market. Some of the leading trends during last decade identified by the Global Status Report 2014 indicate that the transition dynamics is changing its geopolitics. The expansion of renewable could be seen by the fact that the targets fixed for 2020 were already achieved by 2010. The Countries like Germany and Denmark Spain.USA played critical role in this expansion. According to the report during 2004–2014, one major shift has been about the mind set and popular perception:

> When people widely acknowledged the potential of renewable energy, but large-scale deployment still had to be demonstrated. Over the last 10 years, continuing technology advances and rapid deployment of many renewable energy technologies, particularly in the electricity sector, have demonstrated that their potential can be achieved. Today, renewable energy technologies are not only viewed as tools for improving energy security and mitigat-

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with fuels specializing in various applications (oil in transport, coal in power).Overall, the fuel mix remains determined by availability and the local cost of fuels. Countries with lower energy intensity tend to have more scope to afford cleaner and more convenient fuels. The historical pattern of fuel diversification has tended to reduce carbon intensity, but until recently, this trend was largely the accidental outcome of changes in the availability and relative cost of various fuels" ('Midterm oil Market Report, IEA 2014').

> ing and adapting to climate change, but are also increasingly being recognised as investments that can provide direct and indirect economic advantages by reducing dependence on imported fuels, improving local air quality and safety, advancing energy access and security, propelling economic development, and creating jobs. (Renewables 2014, p. 102)

The economics of renewable changed due to cost factor making it competitive with conventional energy, thus it is found that companies are switching over.[2] According to the above mentioned report during 2004–2013, global investment has increased by five times in renewable power capacity and fuels. Further net addition in electricity generation capacity exceeded the conventional power since 2009. This can be appreciated by the fact that R&D in this area got doubled during the same period. With the expansion of market the industry developed in different countries on the strength of their comparative advantages. During last decade as the report observes the number of countries engaged in manufacturing of renewable also got increased. It is no more remained confined to Europe, USA and Japan. Among the new player China is in lead along with other Asian and West Asian countries. What is significant from the perspective of energy sustainability that the spread has lead to growing use in rural areas. As has been highlighted in the report:

> Renewable electricity in rural areas has continued to become more affordable and diversified in both application and size as technology has advanced, prices have decreased, knowledge of local renewable resources has improved, and new business and financing models have emerged. (Renewable 2014, p. 102)

Apparently with the arrival of renewable the geopolitical landscape of energy is likely to be impacted by many new players joining the energy game. While the number of countries promoting renewable has tripled from 45 to 137 since 2004, the control over market is dominated by those who control technology. The available estimates indicate that America and Europe have the advantage. The only Asian country catching up is China. The reports are that Green Tech Race has already begun an China is seen as threat. Thomas Friedman has reportedly: "warn that the United States is engaged in a global green-tech competition with China, whose potential dominance represents a 'new Sputnik' (Friedman 2009)."

Given the multiple contending and complimentary factors impinging upon the global energy space, transition towards the sustainable energy for all has to be engineered in a framework that reinforces the sequential processes based on prioritising of objectives. This in turn could be possible only if enabling conditions are created. It is correctly argued that it was the convergence of economic, technological, and social enablers that facilitated: "energy transitions—a pre-condition for the Industrial Revolution that began in the UK in the eighteenth century, or the nineteenth century transition from whale oil to petroleum" (Kapsarc 2013, p. 5).

[2] As a result, companies have begun to realise that making the switch to renewable energy in conjunction with energy efficiency measures can reduce their energy costs while helping them to tackle sustainability concerns. An increasing number of companies, large and small, are either purchasing renewable electricity from utilities and other providers, or installing and operating renewable energy capacity at their own facilities. (Renewables 2013, p. 102).

It may also be noted that in the past change in energy mix was induced by the fact that the new source was superior in some attributes if not all and cheaper too, so could easily be substituted. In present transition it is the environmental concern that is triggering the change in mix and cost still remains a concern. Thus the enablers have to create condition to day to facilitate it possibly in a time frame ie 2030. (Kapsarc 2013, p. 5) In the context of energy poverty renewable are playing significant role by growing usage in rural areas with people of low income groups. Moreover it has reportedly strengthened the local knowledge system as well. Further cost cut is attribute to advances in ICT sector. The Renewal 2014 Report stresses upon the fact that: "Over the past decade, the share of people who lack access to modern energy services has fallen by nearly 10 percentage points (down from almost 25 %), even as the global population has expanded significantly. Renewables have also played a role in this advancement" (Renewables 2014, p. 102).

Energy transition means realignment of power dynamics within the energy mix. Despite the progress made by the renewable, the power dynamics of energy mix continues to be dominated by hydrocarbons. The arrival of renewable is perceived as erosion of market power thus the efforts are made to restrict and delay the transition. This is best illustrated by the recent discovery of non conventional gas. IEA has warned that tripling of unconventional gas output by 2035 will dampened the pace of transition. As the IEA in its study 2012 outlined:

> Gas is now relatively abundant in some regions, thanks to the massive expansion of hydraulic fracturing for shale gas, and in some areas the price of the fuel has fallen. The result is a threat to renewable energy, which is by comparison more expensive. (Guardian 2012).

Consequently the geopolitics of hydrocarbon energy regime is likely to impact upon the pace of energy transition adversely. The projection of Shale gas as geopolitical gains for USA in the context of its posturing towards energy independence underlines that the leverage is likely to be factored in its foreign policy. "The American discourse on the subject does reflect it," The upshot of the U.S. shale-oil boom might be to reverse the course of history and roll back the clock to pre-1973 when the U.S. oil surplus (via the Texas Railroad Commission), put Washington, not Riyadh, as the world's swing producer. "The chances that an 'oil weapon' could be used again to pressure Washington to adjust its foreign policy are fading with time" (Jaffe 2013). IEA estimates that the shale oil and gas could make USA to surpass Saudi Arabia as oil exporter by 2017 and Russia as natural gas producer by 2015[3] (Taylor 2013). Though opinion are divided about the estimates and more so about

[3] The EIA estimates that U.S. crude-oil production (plus lease condensate) will increase from 5.74 million barrels per day (mb/d) in 2012 to 7.47 mb/d in 2020. This 1.73 mb/d increase in U.S. production, however, is in the context of an 88.8 mb/d world crude-oil market at present. If everything else remained the same and the market responded to new supply as it has in the past, this new U.S. production would reduce world crude-oil prices by all of about 2 % (for the economically minded, I'm using [Taylor] long run demand and supply elasticises of -.48 and.36, respectively) (Taylor 2013).

the claim of its being cleaner energy but the fact remains that in global energy market it will have its impact on the power equation.

It is argued that discovery of shale gas in diverse sites may change the energy geography. While being cheaper it can affect the market of coal and traditional gas it may also slow down the growth of renewable by diverting capital flows. As a recent report from KPMG on shale gas states:

> Shale gas production could turn countries that traditionally import natural gas into producers, making them self sufficient with domestic supplies. And shale gas deposits are found in both the mature and underdeveloped energy markets. (KPMG Report 2011, p. 2)

Significantly though the America enjoys the technological lead in making unconventional gas as part of energy mix, the potential of this gas is estimated to be highest in China. Recognising the strategic advantage of the unconventional gas China has drawn a 5 year strategic plan allocating huge resources for research and development besides pursuing a proactive policy of collaborations with foreign companies to acquire technology thereby to be important player in this field too. Royal Dutch Shell is reportedly planning to spend $ 1 billion a year in China to develop the unconventional gas (Bloomberg 2013). Apparently old energy players are making inroad to the new energy domain as well, Thus it can be argued that the hydrocarbon corporate might face heat of coming up of clean energy but would like to be present there to have influence on the pace of transition and possibly its terms and reference thereby in making of energy regime.

It will be relevant here to mention that the pace of transition is being impacted by the hydrocarbon lobbies. According to a study by Energy and Policy Institute:

> Fossil fuel and utility interests, concerned about the rise of cheap clean energy, are financing attacks on pro-clean energy policies, in an effort to delay the growth of market competitor. The price of a solar panel has dropped more than 60% since early 2011, and the price of wind power is down by more than 50% in the past 4 years. Approximately 29% of the power added in 2013 in the United States was solar energy. But, special interests tied to the fossil fuel and utility industries are spreading disinformation about the cost of clean energy.— Furthermore, these attacks on pro-clean energy policies are not about "creating free markets" as opponents of clean energy policies, like the State Policy Network (SPN) and the American Legislative Exchange Council (ALEC), claim. It's about manipulating markets to benefit their allies (and financiers) in the fossil fuel business. (Energy and policy Institute 2014)

The discovery of Shale has lead to further intensification of activities by the hydrocarbon lobbies. This is best illustrated in Europe where the lobby has been successful in tweeting the energy regime by intervening on the issue of regulation. The Commission was of the view that the shale gas operation be subjected to the EIA mandatory frame work. According to "European Parliament resolution of 21 November 2012 on the environmental impacts of shale gas and shale oil extraction activities, it would be appropriate to include non-conventional hydrocarbons (shale gas and oil, 'tight gas, 'coal bed methane'), defined according to their geological characteristics, regardless of the amount extracted, so that projects concerning such hydrocarbons are systematically made subject to environmental impact assessment" (WWF 2013).

Reportedly under the pressure, the EU parliament did not put forward the legislation, it only issued a kind of advisories[4] (EUOBSERVER 2014). The influence of hydrocarbon industry on energy transition could also be seen by the fact that these corporate are heavily investing in clean energy and its technology which by virtue of determining the cost could impact on transition pace. In America one fifth of investment on renewable has come from companies who have spent nearly $ 9 billion during 2000–2010 (Switzer 2014). However since hydrocarbon will continue to be part of new energy mix the oil companies face difficult choice to balance their investment portfolio. This is experienced by some big player like Cheveron. The company having made significant investment and getting good return decided to withdraw and pool resources to strengthen its hydrocarbon domain (Elgin 2014). Clearly the transition is shaped by the diverse pulls and pressures of multiple stake holders. These pressures are working at local regional and global level sometimes transgressing the boundaries. It is precisely the mutual sensitivities at these levels that rationale is emerging to look at the regime complex recognising their inclusion and autonomy.

10.5 Dynamics of Global Energy Regime: Sustainable of Energy for All

An energy regime to meet the objectives of sustainable energy for all carries with it a mandate to promote energy mix in favour of renewable, enhance the efficiency factor of present energy mix and facilitate its access at affordable price. The complex mandate elevates the status of interaction among the institutions geared to protect their respective energy interest. The UN sponsorship certainly provides a space and legitimacy but action would require a transition path that ensures compensations and incentive for cooperation when interest are competing and colliding. In the past, cooperation among oil producers (OPEC) did provide them market leverage. Subsequently, the leading consumers of the time aggregated and defended their interest by establishing IEA. At later stage when the pressure of volatile market made both consumers and producers vulnerable to their energy moves, a process of dialogue began which lead to the formation of International Energy Forum (IEF) in 2003 with its head quarter at Riyadh. Examining the significance of International Energy Forum (IEF) Lesage, Westphal and de Gaff observed “The IEF is one of the most inclusive global energy forums. At present more than 80 countries participate including IEA and OPEC, such as Russia, Brazil and Mexico as well as key importing countries outside the IEA such as India, China and South Africa and many other countries from the developing world” (Lesage et al. 2010, p. 6). It may be noted

[4] The list of recommendations, which are not legally binding, marks the completion of a u-turn by the EU executive, which had promised to legislate on shale gas exploration just a few months ago, only to backtrack in the face of concerted government lobbying. EU ditches plan to regulate on shale gas. (EUOBSERVER 2014).

that these coalitions were formed primarily to defend their interest in world energy (hydrocarbon) market. It was the recognition of mutuality of interest that has lead to OPEC-IEA dialogues or formation of IEF. As is clear from the above analysis, today the incentive for cooperation is sought to change energy mix which could be perceived as detrimental to the interest of hydrocarbon stake holders. The new energy regime has new energy mix which along with hydrocarbon includes renewable.

The imperatives of promoting sustainable energy lead to creation of Renewable Energy Policy Network for the twenty-first century as follow up from Bonn conference of 2004. REN 21 as it is called is said to be "the coalition of the willing" Subsequently it lead to the establishment of the International Renewable Energy Agency (IRENA) in 2009. Significantly, Germany, Spain and Denmark intiated it. To day its membership includes 130 countries. It is a collective platform to help in promoting energy transition across the globe. Its report titled Remap 2030 observes that global share of renewable exceed 30% by 2030 on the strength of existing technologies with no extra cost. It could further be enhanced to 36% by efficiency (IRENA 2014). Unlike the hydrocarbon domain where resource endowment is highly skewed, renewable are available across the countries. Countries have been harnessing it in their respective ways despite it being on the margin. The need for aggregating these dispersed and diverse initiatives described as 'Renewable Energy Policy Jungle'. (Suding and Lempp 2014, p. 4) is felt to change the energy mix to save the environmental ramification. Therefore despite the apprehension of duplication a case got made for institutional initiative with global mandate. International Renewable Energy Policy (IRENA) aims to overhaul the existing policies on renewal energy by focusing more on:

> IRENA can be seen as indicative of a broader systemic change taking place in global energy governance as a result of the pressing problems currently facing humanity. Energy governance has in many ways remained stuck in the twentieth-century, relying on traditional institutions like the IEA, whereas our current circumstances necessitate a new framework for the twenty-first century. IRENA is therefore potentially a key piece of a reformed global energy governance framework which is better positioned to promote cleaner sources of energy. (Wright 2013)

In other words the charter of IRENA is distinct with much wider mandate than the energy institutions created so far[5] (Wright 2013). It may be relevant here to draw attention to the fact that while these institutions as collective entity do have huge potential to cooperate towards making of new global energy regime but the possibilities are not ruled out when they contest and even inflict injury on each other. IEA has been pursuing the case of energy transition by bringing out a strong case for renewable yet there has been strong apprehension that being the promoter and protector

[5] In this sense the establishment of IRENA can be seen as indicative of a broader systemic change taking place in global energy governance as a result of the pressing problems currently facing humanity. Energy governance has in many ways remained stuck in the twentieth-century, relying on traditional institutions like the IEA, whereas our current circumstances necessitate a new framework for the twenty-first century. IRENA is therefore potentially a key piece of a reformed global energy governance framework which is better positioned to promote cleaner sources of energy (Wright 2013).

of hydrocarbon IEA would not be able to factor regime transition effectively. It is even argued that IEA was perceived: "as a fossil fuels and nuclear lobby that underestimates the potential of renewable sources of energy. In early 2009, the Energy Watch Group, an international coalition of politicians and scientists headquartered in Germany, accused the IEA of blocking a global switch to renewable" (de Graaf 2013, p. 19). However the signing of the partnership agreement between the two in January 2012 seemingly is going to synergise their respective interest in collective and cooperative mode. In the words of IRENA's Director-General, Adnan Z. Amin:

> IRENA and the IEA are natural partners in the global quest to increase the deployment of renewable energy. This agreement will allow us to maximise output by drawing on each others' respective strengths and complementary areas, while avoiding duplication of efforts. (IEA 2012)

It is clear from the above analysis that both renewal energy and clean energy technologies operate in complimentary to each other. In this regard the observation by IEA above is quite significant:

> As clean energy technologies develop and trade in renewable energies expands, the energy regime will increasingly come across tensions between fossil fuels ad cleaner energy sources with regard to rules and disciplines that should apply. With climate change and energy security concerns gaining political momentum, their influence on the trade system is likely to increase and would require a realignment of the energy regime in ways that would more adequately consider the interconnections of these various agendas. Formalising such a process would allow the creation of a more transparent and predictable framework, which would benefit energy exporters and importers.[6]

Further the thrust on sustainability and accessibility makes the normative imperative of regime. The UN perspective articulates them in terms of investment for collective future. Universal energy access, increasing the use of renewable energy, improved energy efficiency are the defined target of the decade for sustainable energy. The collective is however fragmented by competing, contesting interest though it does represent community of stakes as well. The regime complex has to be envisaged as an mechanism incentivising harmonisation of the competing and contesting interests and consolidation of the collectivity. This could be possible if the sustainability rationale is not defined in binary frame. The global energy poverty when perceived as potential global energy market of diverse mix, dovetailing into common supply systems across the globe, could be a business for all. The rationale for complex regime thus arises from the compulsions of harmonising the diverse interest.

Complex energy regime for sustainable energy by its very scope and scale ie qualitative and quantitative traits cannot be envisaged a mono construct. It has to be

[6] (ICT Denmark and Germany are perceived as role models in transforming the energy sector. The price per kilowatt-hour for electricity from community-owned wind parks is not only competitive with conventional power production, but is actually half the price of electricity from off-shore wind parks. Germany increased its total electricity share from 3% to more than 20% within the last decade. The vast majority of the investments were made by co-operatives and small- and medium-sized companies. The renewable energy sector employs 370,000 people in Germany. Power to the people: Community-based energy transition surest and most effective strategy for the European energy sector. ICTSD 2007) (WorldfutureCouncil 2012).

visualised as multiplex interlinked by complex interconnect at local, regional and global space both as producer and consumer of energy in its all possible mix along with delivery systems. Apparently it assumes complex centralised yet decentralised federal governance system. In this context it will be relevant to refer to the success stories from Germany and Denmark where community is playing critical role in energy transition towards renewal energy systems. It is observed that: "High citizen participation and regional value creation from decentralised renewable energy production are the success factors of the German and Danish move towards achieving 100% renewable energy"[7] (WorldfutureCouncil 2012). In addition to the broad public support for clean energy, German energy policy is explicitly encouraging citizen investment in renewable. Over half of renewable energy projects are owned by individuals and farmers amounting to over $ 100 billion of investment. A report on "Community Energy Strategy" by the UK government makes two critical comments among others as follows:

> Community-led action can produce energy, reduce energy use, manage energy demand and purchase energy. It can often tackle challenges more effectively than government alone, developing solutions to meet local needs, and involving local people. Putting communities in control of the energy they use can have wider benefits such as building stronger communities, creating local jobs, improving health and supporting local economic growth;Community energy can unlock opportunities for lower energy bills and carbon emissions saving that would otherwise be missed. A community role in electricity generation, whether in shared or full ownership or as part of a community benefits package, can help encourage investment. Various heat generation technologies are dependent on community level action. (Community Energy Strategy 2014, p. 7)

The point made here is that with the expansion of energy market to the margin of the society new organising principles have to be developed. From local governance to global delivery systems a new phase is emerging where market and society has to be mutually embedded and governance has to be correspondingly devised. Apparently these are going to be the attributes of global- local energy regime.

10.6 Towards Sustainable Energy Regime: Strategising India's Emerging Energy Relations

Indian is rated as third largest economy in the world. and fourth largest consumer of energy. It imports more than 70% of its oil demand which is estimated to go up to 90%. What enhances the vulnerability of the country is its energy poverty which is

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linked to income level of the people. The implication is that it is not mere availability that defines India's energy security concerns, equally significant is the question of accessibility. Thus UN declaration of sustainable energy for all, is very relevant and timely initiative. The global move to reconfigurate the energy regime by accelerating the pace of transition certainly provides India a better ambiance to re-craft its energy regime. This means Indian energy regime has to be re defined factoring efficiency, accessibility and renewable energy as leading parameters. Clearly India has high stakes in accelerating the pace of energy transition and formation of global energy regime which allow it a space to meet its energy needs.

Indian energy regime is fragmented. It is predominantly dominated by its concerned for energy security defined in terms of hydrocarbon supply. Though Indian Planning Commission in its Integrated Energy Policy document did define energy security in wider sense yet the thrust of its energy regime has been around the hydrocarbons and its supplies. The Ministry of Petroleum in its strategic Plan 2011–2017 has clearly spelt out that "the prime objective of the Ministry of Petroleum and Natural Gas strategy plan is to achieve its 'vision of addressing India's energy security needs in the hydrocarbons sector and to ensure availability of petroleum products at reasonable prices'" (Strategic Plan 2011–2017, p. 1). Surely the growing need of fuelling growth rate made India to place high premium on availability of volume in its energy relations. Hence the thrust of India energy relations have been to expand and consolidate relations with hydrocarbon rich countries. Since the Gulf countries, Iran and Iraq have been its principal supplier of oil and gas, India's energy relations have been imagined and constructed around these countries. The estimates are that the GCC countries provide 60% of India's oil imports. The high dependence of India on the Gulf region while provides rationale to promote their relations to new heights of partnership but at the same time contributes to its vulnerability due to huge dependence on the region. The region has been passing through a phase of uncertainty specially after the Arab uprising since 2011.

Given the fact that 44% of India's house hold still not connected to grid power and the present energy mix cannot meet its requirement except by enhancing import dependence, it becomes obvious to move to renewable which could ensure not only decline on import dependence but access to all. Estimates suggest that on existing identified sources India's potential for renewable energy is 3000 GW though so far only about 30 GW has been harnessed which is only 1% of the potential. Recognising the potential, the Indian government has launched proactive policy which has yielded good results. "These include mechanisms such as 'feed-in-tariffs (FiTs), capital subsidies, and tax benefits. These mechanisms have been successful in attracting significant investments and adding RE capacity. New policy instruments such as Generation-Based Incentives (GBIs), Renewable Purchase Obligations (RPOs), RE certificates (RECs) and open access (wheeling and banking) have provided further stimulus to the sector in the last few years. This has led to an annual growth rate of over 19% in RE capacity over the last 5 years (2007–2012)" (PACE-D 2013, p. 1). The target set by the Indian government is to have 15% of power generation from renewable by 2022. This can be achieved only if the investment are made and technology cuts down the cost to make it competitive. The 12th

5 Year Plan target of achieving 30 GW of RE in monetised term means investment of $ 39 billion, According to United Nations' Sustainable Energy for All Initiative India needed an investment of $ 5–7 billion annually till 2030 (PACE-D 2013, p. 1). Significantly, the cost of electricity generation from coal based plant is going up, it is declining in case of solar and wind energy. In case of former it came down from ₹ 18/kWh in 2010–2011 to ₹ 9 in 2012–2013 may go down to ₹ 6–8/kWh (Krishnaswamy 2013).

Indian move towards sustainable energy future inevitably makes it to refashion its energy regime. By establishing National Solar Mission it has clearly defined its mission "to establish India as a global leader in solar energy, by creating the policy conditions for its diffusion across the country as quickly as possible." (MNRE) This demands not only initiatives at domestic level but equally engagement with external players. With the inclusion of renewable in India's energy security agenda, its energy relations are expanding and getting diversified. Clearly India's energy relations have to be expanded to accelerate the pace of transition. In other words renewable energy has to be mainstreamed by external support. According to the Ministry of New and Renewable Energy India has signed about 30 agreements of co-operations with different countries.

While India's foreign energy policy continues to reflect the primacy of energy partnership around hydrocarbon, however of late renewable is gaining ground in expanding its profile. Though India has yet to be player in global renewable energy race it has all potential to be in race in big way. In fact as leading energy consumer it has to be in the arena of global renewable energy race to be counted as emerging global power[8] (Global and Mail 2011; White House 2011). Though the assessment vary on the nature and scale of renewable energy race, it is clear that the country having control over technology and manufacturing capacity will have the strategic advantage. Clearly India needs to develop R&D infrastructure and manufacturing hub which in turn means investment. In contrast to hydrocarbon, renewable is not trade in energy but in capacity building.

India is actively engaged with countries to augment investment and capacity building. Among the significant energy partners in renewable are USA, Israel, Germany and Nordics countries. India and the US have been engaged in energy dialogue since 2005, the last of it was held in March 2014. To focus the energy relations on renewable the two countries signed a MOU 2009. This was further expanded in 2013–2014 when, 'Promoting Energy Access through Clean Energy (PEACE) was made focus of this expanded relationship. PEACE reflects the spirit of the UN Sustainable Energy for All. The two countries have also been organising Energy Partnership Summit since 2009[9] (US and India Energy Partnership Summit 2009).

[8] As President Obama has said, "the countries that lead the clean energy economy will be the countries that lead the twenty-first century global economy" (Globe and Mail 2011).

[9] The first US–India Energy Partnership Summit held in 2009 laid the foundation for a dialogue between the two countries on matters of collaborations between private organizations, research institutions, and government for clean energy and R&D of related technologies. In 2010, the second US–India Energy Partnership Summit discussed technologies and partnerships for energy security. The third edition of the Summit themed 'Fostering Innovations for a Sustainable Future', held in

"In the same year the two governments decided to launch, Partnership to Advance Clean Energy (PACE). It has mobilized nearly $ 2 billion in capital for clean energy projects in India, including the finance of 20% of Phase I projects of India's Jawaharlal Nehru National Solar Mission."Under PACE-D, USAID announced that it is developing an ambitious new multi-year, multi-million dollar initiative to address the systemic costs of integrating renewable energy into the Indian power grid at a scale—a major hurdle facing utilities and project developers across India. "USAID is currently examining opportunities to engage with Indian institutions—both government and private sector—to support the scale up of renewable energy which can make electricity more reliable and support economic growth" (Energy.Gov 2014). Under the cooperative initiatives a, Joint Clean Energy Research and Development Center has been established with solar energy, second generation biofuel and energy efficiency of building as its priority areas of research.

Renewable Energy is one of the redefining features of India's emerging relation with EU. It started in November 2004 when the two recognised the need for continuing energy dialogue for cooperation in the field of clean coal technology energy efficiency and promoting environmental friendly energies. EU- India Energy Panel was created as institutional frame. Europe being committed to reduce carbon emission and moving towards sustainable energy regime is keen to share and promote its own experiences both in terms of knowledge, technology and finance. It is observed that: "The EU—India energy partnership has now reached a mature level. Shared objectives include enhancing energy security and safety, promoting energy efficiency, and pursuing sustainable development through, among other things, the development of clean and renewable energy sources" (EBTC 2010, p. 11). The European Investment Bank is reported to have invested Euro 80 million to promote renewable energy in private sector (Pv-Magazine 2013). The growing thrust on clean energy in relations with the Europe is quite visible in Energy Partnership with Germany and the Nordic countries. Green Energy Corridor is the main gateway of Germany's contribution to strengthened energy delivery systems efficiently. The Corridors is Indian plan to syncronise power produced from renewable into conventional power grid system. Estimated to be ₹ 43,000 crore project, it is expected to be implemented with the German support of 1 billion € including technical assistance. Germany has expertise of making small grids to be integrated with national grid. Nordic countries place high priority to renewable energy in their global partnership. With India too theses countries are engaged in promoting sustainable energy regime for instance the Research Council of Norway is supporting research on topics ranging from geothermal energy and CO2 storage to wave energy converters (Olsen and Lie 2012). Finland and Denmark are other two countries where global concerns are

2012 discussed innovations in the arena of clean energy for a secure future. It served as a vital platform for the two nations to discuss and debate strategies in the realm of energy efficiency and exploring avenues for synergy. The fourth edition of the Summit, themed 'Stimulating Technology, Trade, and Development', held in the US capital on May 13 and 14, earlier this year. The near future between the two countries in the field of technology and trade (US and India Energy Partnership Summit 2009).

reflecting in their energy regime hence are promoting them in their energy partnership. India has signed MOUs with them to work towards the systems and regime.

Significantly with hydrocarbon partners too India is engaging on renewable energy. Hydrocarbon rich Gulf countries have recognised the need to diversify their energy portfolio by harnessing renewable specially the solar energy for sustainable development. The growing domestic consumption of oil and gas is going to impact upon adversely on the exporting capacity of hydrocarbon these countries. Besides being hyper consumer of hydrocarbon, the region has been on scanner for its ecological consequences Thus individually and collectively, the Gulf countries are moving to promote renewable in their energy consumption. Since India too is moving to a new energy mix by enhancing the share of renewable, new complementarities have emerged in energy relations with the Gulf countries.

Of late a number of initiatives have been taken to forge solar energy partnership between the two to improve technology, finance, training in both the regions, by promoting joint ventures, benefitting both India and GCC countries. It is reported that to support solar industry in terms of resources and experience, the Saudi Arabia Solar Industry Association (SASIA), the Solar Gulf Cooperation Council Alliance (SGCC) and the National Solar Energy Federation India (NSEFI) have agreed to collaborate on range of solar energy initiatives including the PV industry. "SGCC and SASIA are seeking engineering, procurement and construction (EPC) assistance from India, to build solar projects in Saudi Arabia and its neighbouring Gulf Cooperation Council (GCC) countries—Jordan, Qatar, Kuwait, UAE, Oman and Bahrain" (SASIA; Balan 2014). At bilateral level a number of agreements are signed to explore all the emerging dimension of new energy partnership. India and the UAE signed an agreement to develop cooperation in solar and wind energy by forming a working group to promote research, training, sharing information and experiences (Times of India 19 January 2014).

Demand side management has also become a vital component of energy security. Energy efficiency has played critical role in rationalising energy consumption thereby reducing the security risk, it is called fifth fuel after, coal, petroleum nuclear and renewable. Energy efficiency and conservation thus are critical component of sustainable energy for all initiative. Recognising the contribution of it energy security India has established National Mission for Enhance Energy Efficiency. Its target has been to save about 23 million t of oil equivalent (MTOE), capacity addition of over 19,000 MW avoided, and emissions of carbon dioxide reduced by 98.55 million t annually by the end of 5 year. (NMEEE) This is in correspondence with the global target of doubling the rate of improvement in energy efficiency. Clearly energy efficiency is recognised as critical component of India's energy security. It does reflect in India's emerging energy relations as well. It has been the principal text of India Japan Energy Dialogue. This was further reflected during the visit of Prime Minster of Japan in January 2014 while discussing agenda on sustainable energy between the two countries, energy efficiency and conservation as given prime importance. The two countries signed agreements on comprehensive energy efficiency and conservation. This included agreement signed by India, Petroleum Conservation Research Association and Japan's Energy Conservation Centre to promote energy

efficiency, reduction of greenhouse gas emissions using clean technologies, an MoU between Japan's New Energy and Industrial Technology Development Organisation (NEDO) and India's Department of Economic Affairs, Ministry of Communication & Information Technology, Ministry of New and Renewable Energy, Government of India on a Model Project for Energy Management Systems. (METI 2013) Energy efficiency has been component of energy relations with Germany, Israel also.

As outlined above such initiatives are being attempted by seeking cooperation and collaboration at bilateral level in emerging energy relation of the country. However equally important is to engage with global initiatives to push transformation of global energy regime. In the present age of globalisation when production and consumption processes are integral part of global production and supply chain, the energy regime too has to be conceived in multilayers formation but with the clear goal of sustainable energy future. This inevitably involves a transition but not in competitive –conflict mode. It is ironic that renewable energy discourse is framed in terms of 'winning the race'. The debate, it is said is not about the beginning of the race but of who is going to be the winner. In an interesting study the question posed was, 'What does it mean to win clean energy race?' (Greentechmedia 2014) According to Pew study, though the investment on renewable has increased the gap between developed and developing countries have not narrowed down. It is significant while investment flows between nort-north $ 31 billion in 2011, it was $ 1.3 billion between North and South and $ 7 billion between South and South. However important fact is that investment shift has reached 25 % but it was the consequence of intra South investment (Bloomberg Energy Finance 2012).

The power dynamics of renewable so defined could jeopardize the objectives of energy for all. Countries like India has to be proactively contest such formulations by empowering collective action in promoting energy transition. Since the global energy mix will continue to have hydrocarbon as one of its component, the task of converging the renewable and non renewable energy path becomes the need of the first order. Such synergy cannot be left to the market or intergovernmental mechanism. A case of promoting its institutionalisation has the potential of becoming victim of bureaucratisation. Moreover, at this stage the transition is faced with conflict of interest which may reduce the processes into non starter. It is argued that at this stage where consensus has to be pushed more by soft power, it would be more desirable to have club approach (Graaf and Westphal 2011). Asian countries have high stake in energy transition and in the making of a global energy regime because they are the major consumer and producer.[10] To steer the energy transition at regional level Asian energy dialogue on the dynamics of transition could contribute in creating trust and coalition of willing. Regional energy net working across the borders by transmission or pipelines could facilitate in regional regime formation.

At global level India as fourth largest energy consumer with high incidence of energy poverty need to proactively engaged in expanding the boundaries of UN initiative Sustainable Energy for all. India is the largest democracy, it can extend the processes of democratisation of energy regime by promoting decentralising energy

[10] The Gulf countries are part of West Asian geography.

regime. In contrast to hydrocarbon lead energy regime, it is the renewable lead regime that could facilitate in making India global power because as observed by Jeremy Rifkin, an American Economist, "India is the Saudi Arabia of renewable energy sources and, if properly utilized, India can realize its place in the world as a great power," Similar sentiments were also expressed by IRENA chief Helene Pelosse when she compared the potential with emerging hub of electronics in Asia and the Indian positioning as leader (Hindustan Times 2009).

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Chapter 11
Optimising Gains from Emerging Energy Engagements

Girijesh Pant

The growing profile of India's energy relations, outlined and analysed in the preceding chapters, reflects the energy security anxiety of the Indian state and its efforts to forge energy ties with leading energy players. However a closer scrutiny will reveal that most of these energy engagements have been defined in terms of secured supply that too of hydrocarbons, though chapters on India—US and Europe do spell out the growing nature of energy relations beyond oil and gas. Further most of these initiatives do not adequately reflect medium to long term concerns like diversifying energy mix, energy poverty, environmental consequences and research and development investment on energy technology. Certainly the issues do get reference in on going energy dialogues but not as part of a meta policy frame. In other words these relations are pegged to a fractured than integrated understanding of energy security captured in bilateral frame. It needs to be underlined here that unlike the seventies when energy security was bilateral project defined in terms of hydrocarbon particularly oil, to day, it is global project with multidisciplinary concerns like availability, affordability and environment. Indian energy security policy thus has to factor and synergise all the three dimensions in the context of domestic drive to alleviate energy poverty and global commitment to restrict carbon emission. Its global energy engagement and relations with countries need to reflect these objectives in a defined framework. This obviously assumes conceptualisation of integrated energy security policy and its operationlisations in promoting energy relations with different countries to maximise the gains both in short and long term. This would demand framing of holistic domestic energy regime dovetailing with emerging global energy regime but safeguarding its freedom of action ie autonomy. In other words, India needs to conceive its global energy strategy as part of globalising interdependent energy transactions, as partner not mere consumer. Apparently the question could be raised as to how a energy deficit country could graduate? The answer is

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affirmative because global energy endowment and energy mix are increasingly being rediscovered by the innovation and energy technology revolution. India needs to peg for the partnership in the domain of energy technology revolution.

The transformation of the Energy market in the global age is going to be triggered by technological revolution. The commercial discovery of shale is one such illustration. Shale is not a new product but it could come to the market to change the energy equation because of technology. Its success has rejuvenated the prospects of research and development industry in the sector. Further, the pressure for transformation triggered by energy poverty and environmental impact of present energy mix is defining the market dynamics in terms of innovation and technology diffusion. Energy industry no more revolves around the hydrocarbons despite its continuance predominance in the global energy mix. The compelling need to diversify the energy mix and efficiency has put innovation and research in technology central in the energy security discourse. It is argued that the emerging global energy market will be dominated by those who control the technology. Evidently USA could turn the table on the strength of fracking technology. The increasing visibility of solar on energy spectrum also underscore the driving power of innovation. The race for energy innovation is already begun. The countries are strategising their positioning in the future energy innovation regime by investing in the sector (Atkinson et al. 2009; The Pew Charitable Trust 2011). In other words countries are leveraging energy security by acquiring a place in the domain of energy technology. The primacy of technology in the expanding and transforming the global energy market is emphasised by IEA in Energy Technology Perspective 2012 stating that the "present pace of energy innovation is simply not enough to meet this century's energy challenges.—A dramatic improvement in the pace of energy technology innovation and diffusion is essential. Inventing new energy technologies is not enough—these technologies must be widely deployed if they are to make a difference in meeting security, economic and environmental energy challenges" (Diaz et al. 2014, p. 9; IEA Energy Security Perspective 2012a). For a country like India it is necessary to join the global drive for energy innovation as an active player in the emerging global energy innovation net- work which is moving towards greater degree of diversity both in terms of energy mix and in geographical reach.

Maximisation of gains from energy relations thus needs to be seen not merely in terms of supply securities but in terms of creating capacities to be part of global energy technological innovation system. With innovation processes getting globalised, "ideas resources, and manufacturing coming from different countries throughout the value chain" (Diaz et al. 2014, p. 169) it has become imperative that energy transition is conceived in a framework of cooperation and collaboration among the different players. The extended profile of energy security makes it very clear that the gambit of issues involved cannot be addressed by a country individually or unilaterally. In fact "Countries and firms that attempt to go it alone in developing new energy technologies and bringing them to market are likely to be left behind by those who are sharing in the global flows of ideas and resources" (Diaz et al. 2014, p. 169). Clearly, Energy Independence is losing relevance with energy-environment interface pushing the concerns of energy security from national to global domain. It needs cooperation and collaboration among the countries at various level. The

prominent players like USA and Europe have taken lead by forming EU- US Energy Council with the objective, "to bring together all key actors working on energy issues on both sides of the Atlantic, in three areas for which corresponding working groups were established: Energy security, Energy technologies research and Energy policy" (Europe- US Energy). The Council in its meeting held in December 2014, appreciated EU initiative to form Energy Union, "aiming at affordable, secure and sustainable energy, and supports the work underway to achieve a fully functioning and interconnected internal EU energy market, as laid out in the conclusions of the European Council of 23 October. Reinforcing energy infrastructure, accelerating priority projects including electricity and gas interconnections, moderating energy demand through the more efficient use of energy, and tapping into indigenous resources, including renewable energy, will bring the benefit of greater energy security and more competitive energy prices to all Member States and neighbouring states in the Energy Community" (Joint Statement EU-US Energy Council).

With a view to accelerate the pace of energy innovation, the policy makers in USA have been talking about energy innovation clusters. It is based on cooperative and collaborative engagement of the state and market from incubation of ideas to its commercialisation. It envisaged a defined public policy regime not only nursing and empowering but handholding at critical stages called "Technological Valley of Death" and "Commercialization Valley of Death" (Jenkins and Mansur 2010). The underlining assumption is that given the nature of industry the market barriers have to be mitigated by the public policy to bring the desired level playing field. It is also envisaged that given the required spurt, the new technology could open huge opportunity in terms of employment besides the carbon capturing. The energy innovation is described as an ecosystem. "The ecosystem will be productive only it has enough nutrients (funds, ideas, and appropriately trained and motivated people), and if all the various elements of the ecosystem namely the actors, institutions and the linkages between them are in balance" (Diaz et al. 2014, p. 169). Clearly the countries visualising energy engagement at the level of innovation breakthrough have to have a comprehensive multidimensional linkages as imperatives of the ecosystem. It may be mentioned that the imperatives of meeting the challenges of carbon emission compelling countries to have a more free and open regime for innovation and diffusion of technology. It is argued that countries like America could take lead in the process by concentrating on three areas, ideas, investment, and trade, "It each category, it should reinforce its efforts by ensuring that its own market and innovation system remain open too" (Diaz et al. 2014, p. 43). The need to move away from protectionist practices to promote the pace of energy innovation have been argued because "Technology advances most rapidly when researchers, firms and governments build on one another's success." (Levi et al. 2010) when perceived in terms of 'winning the race' it slows down the very processes of innovation thereby affecting the transition adversely" (Levi et al. 2010). The emerging dynamics of global energy market makes it imperative for India to recognise the centrality of energy innovation in defining its integrated energy security policy. India needs to recognise that growing competition for energy in all forms and the pressure for energy transition will impede its progress if it does not design an energy architecture and visualise its strategic positioning to define its global energy engagement accordingly. It needs to

migrate from reactive mode to a pro active engagement. India is a huge market for energy product and energy services. India is also globalising it. Thus its energy innovation regime has to have synergy to promote technologies, sensitive to local and the globalising concerns. It is a complex task but required to unleash the innovative potential of the country. This could be possible by creating dynamic energy innovation regime in terms of policy and institution which triggers the formation of core and critical capacities to be augmented by global engagement. This is essential to participate as a player with competitive strength than to be a subordinate in the global innovation hierarchy. It is positioning in global hierarchy that will determine its negotiating power in evolving rules of the game in the globalising energy domain. In other words to promote core- critical strength, India needs to augment its capacity by global energy engagement at different levels of energy innovation cycle, all converging to the former. In the global energy innovation value chain, India needs to position itself and strategise the gains.

At the high end of global innovation spectrum, America and Europe being the leader, become the obvious choice for Indian energy engagement. While the US has been the lead innovator of energy technology, Europe has dramatically cut down its energy consumption on the strength of technology with greater community participation. Both are actively engaged in energy transition by promoting their energy engagement with emerging economies. President Obama has been very categorical about the leading role for US in accelerating the pace of energy transition towards American Clean Revolution.[1] Europe has successfully cut down its energy consumption and moving towards new energy regime with least dependence on hydrocarbon. Significantly both the countries recognise the need to expand their global energy engagement towards making of sustainable energy systems. Energy technology engagement thus has become important factor in their foreign policy. India's energy relations with the US and Europe are graduating to this new mode. Energy technology is reportedly high on their bilateral relations (Asian Age 2015). The joint declaration issued following the visit of the American President Obama in January 2015, has placed special emphasis on clean energy cooperation. With a view to facilitate research in the field, it was resolved that "The United States will host the Clean Energy Finance Forum and government-to-government Clean Energy Finance Task Force to help overcome strategic barriers to accelerating institutional and private financing. The Department of Commerce will launch a trade mission on clean energy. The Export-Import Bank is exploring potential projects for its MOU with the Indian Renewable Energy Development Agency for up to $ 1 billion in clean energy financing. OPIC plans to build on its existing portfolio of $ 227 million in renewable energy and continue to identify potential projects to support utility-scale growth and off-grid energy access" (White House 2015). With EU too India is moving towards technology collaboration. As a part of promoting innovation, "The European Patent Office has concluded a cooperation agreement with EUROCHAMBRES to promote the European patent system in India

[1] "The rapidly expanding global clean tech market could be worth $ 2 trillion by the end of the decade, so it is critical that the US seizes the opportunity to create these new jobs and industries" (Clean Revolution 2013).

and support technology transfer between Europe and India" (Clean Technologies Year Book 2014. However sharing new technology has been perceived by countries as part of their strategic engagement. Put differently, countries scale technological cooperation based on their strategic preferences. Green technology too is trades or shared on the premise of strategic preferences though the pressure of environment degradation forcing the countries to take a more liberal view. Yet it cannot be denied that there is a significant element of control and competition in the emerging energy innovation space having bearing on global power structure.

For an emerging power like India to transform its potential in the changing dynamics of global energy value chain, it is imperative that it leverages its bilateral energy innovation engagements to calibrate the global energy innovation processes constantly to mitigate its hegemonic import. This means that it dovetails its bilateral energy innovation platform to its multilateral energy engagement. This could be done by promoting technology diffusion with countries engaged in diversifying their energy portfolio. Countries on the east and west of India besides in the continent need the technology to accelerate their energy transition. India could play vital role as co-creator of regional energy innovation hubs with these countries. India has the advantage of its location and of the large market for low carbon energy products and services. It has R&D infrastructure with a pool of scientific manpower. It is rated as six most innovative country.[2] On the western frontiers of India, the extended neighbourhood-Gulf countries are proactively investing to harness their clean energy endowment despite huge reservoir of hydrocarbons. The Gulf countries have recognised that high energy consumption has made their future vulnerable hence are looking for substituting their domestic hydrocarbon consumption by changing energy mix in favour of renewable particularly the solar. However the cost parity has been impeding its progress because oil costing in the region is very cheap. Thus they need a price parity which could be possible only with new technology. In other words constant innovation of technology is their necessity. It may be pointed out that the hydrocarbon industry too is actively engaged in innovation specially in view of falling oil prices. The challenge of constant engagement with innovation is the necessity of global energy transition. India too has to be in the race. It is precisely to augment the pace of innovation that India and the Gulf countries could factor regional energy innovation as part of their energy relation. The R&D base in the Gulf countries is inadequate despite finances. The higher education in the field of science and technology has yet to match the global standard (Hajjar et al. 2014, pp. 45–57)s. The rationale for India-Gulf Energy Innovation cluster needs to be seen in the context of restructuring of global innovation sites. It is argued that geographical proximity, shared values and face to face interaction at regional level play crucial role in promoting local scientific and innovative temper which may not be so high in case of transfer of technology. In other words a regional setting has its

[2] Brilliant scientists, devoted entrepreneurs and high-caliber research and academic institutions are some of the key characteristics of India's R&D contributing to its excellence despite the infrastructural, bureaucratic and mindset challenges. India offers three significant advantages to international players interested in R&D—a burgeoning market for virtually all products and services, a large pool of scientists and engineers, and R&D at low cost"see Science and Technology Research Players in India (ebtc.eu).

own innovative drive with much wider impact on the R & D ambiance of the country (Plachero 2012). This will also have enabling impact in making the technology market more competitive besides the advantage of scale.

On the eastern flank of India are the energy deficit countries like China, Korea. Japan, Indonesia. These are also high energy consumers. Moreover it is this part of Asia where the global growth is moving hence energy consumption is rising. Except Japan having energy innovative economy reflecting in its efficiency quotient, other Asians are struggling to contain their carbon emission in midst of energy poverty. Energy transition for them is a challenge. Asia is said to be the tipping point of energy transition (Rostand 2011). China the highest energy consuming country, has been able to accelerate its transition on the strength of its technology manufacturing capacity. It is reported to be having edge over other players in renewable energy market. (Lozanova 2014) "China is dominating the solar manufacturing sector. The country installed more solar PV last year than the U.S. has ever installed. And it is the world's leading market for wind and solar hot water. The country is a strong force in clean energy deployment due to its top-down approach and long-term planning" (Greentechmedia 2014). The Chinese model despite its advantage is of limited application because of its nondemocratic nature. The Eastern Asia leans more towards bottom up than the top down approach not as much for its democratic temper as energy poverty. Networking of energy innovation at the grass root level could help in creating regional energy innovation supply chain. It will also promote people's/ community participation thereby the roots of democratisation. India has advantage to co-create energy innovation clusters in this part of the Asia. Unlike the Gulf, the region is rich with scientific manpower and S&T infrastructure. The Look East Policy of India could factor the engagement with the region on energy innovation platform.

Besides the geographical areas and technological space, India needs to craft its policy in the context of growing role of multilateral agencies shaping the energy discourse and governance at global level. It has to relocate its energy policy on the interface of global and local trajectory. A more aggressive engagement globally would mean migrating from the mind set suspicious of external presence. The experience of a protectionist approach has encouraged rentier temperament restricting the energy profile of the country. It is rightly observed that "India should amend its policies of looking primarily inward for energy solutions to its energy availability problems. Certainly domestic development of availability is important. However energy independence in the sense of relying solely on domestic resources is a slogan at odd with reality" (Vickery 2015). While shedding away its inhibition from global engagement, India has to peg its energy diplomacy to strengthened the multilateral institutions by proactive role in contributing their transformation. It could explored the possibility of joining IEA along with Russia and China to remould its western character without its mediating role (blogactiv 2008).

Indian energy engagement with larger number of energy players and the multilateral institutions could maximise gains if it is embedded in a coherent regime. This brings the issue of both the policy and its governance besides institutional restructuring. One leading restrictive factor impacting coherence has been the policy inconsistency conflicting among the different ministries engaged in the energy sector (IEA 2012b, p. 91).

> The JNNSM is one example; while aiming to increase India's installed solar capacity substantially, JNNSM also aims to establish India as a global solar manufacturing hub. To do so, it stipulated a mandatory domestic content for solar PV and thermal project, reflecting India's earlier industrial policy of import substitution. Nurturing a domestic solar industry is a legitimate goal for the Indian government; however, how this is currently pursued could potentially hamper the building of India's solar capacity. Providing sufficient assistance to domestic manufacturers through separate industry and education policy could have been considered. Thus, domestic and imported equipment manufactures could compete with one another on an equal basis and solar capacity growth would not be restrained by a domestic manufacturing bottleneck and higher domestic equipment prices. For a relatively new industry like renewables, and particularly in consideration of the fluid global market conditions and high risks, expertise and know-how of established manufacturers should be valued (IEA 2012b, p. 91).

The presentations in the volume while provide details of emerging contours of India's energy relations, they also plead for the need for a strategic vision for energy policy which transcends transactional nature of engagement. While the state remains the prime player in its visualisation, it alone cannot be its executor. In the context of globalising energy regime where private players are the drivers, mainstreaming of them domestically, at institutional level involving both in the decision making and value creation has become imperative of the time. A public- private and community partnership has to be its hallmark. The state infrastructure (laboratories and scientific manpower), the company investments,[3] the community engagement could be the co-ordinates of strategic approach towards energy transition.

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