

Energy Security in India: Future and Prospects

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Abstract: *Global dependence on sources of energy derived from the environment, and their uneven distribution across the globe, have consistently dominated political, strategic and diplomatic philosophies of nations. History is replete with examples of sources of energy having played a major role in a bewildering variety of bilateral and multilateral interaction between countries – both coalitions and confrontations. Prior to the Second World War, the Germans had carried out a detailed analysis of the energy situation and it is a well-known fact that the German offensive on both Romania and Russia were mainly to secure the oil reserves, in order to keep their war machinery underway. Similarly, the Chaco war of 1932-35 in which Paraguay annexed a region of Bolivia assuming presence of oil resources, reluctance of France to grant independence to Algeria during their war of independence of 1954-62, Nigeria's war against the liberation of Biafra in 1967-70, China's war against Vietnam in 1974 over the Paracel Islands in the South China Sea, Iraq's Occupation of Kuwait and the subsequent Gulf War of 1991 are all classic examples of sources of energy having driven nation states to wage war. The import requirements of oil for our country, that was 30% a decade ago stands at 70% presently and is expected to gallop to 90% within a couple of decades. Similarly, 70% of the requirement of Natural Gas will also need to be imported [1]. It hence needs no reemphasis that any supply disruptions, or even cost fluctuations, on account of any of the reasons brought out above, will have a devastating effect not only on our economy, but also on the day-to-day life as the modern society is heavily dependent on energy. Under such circumstances it is imperative that our country charts out a clear future strategy and implement time-bound measures to ensure 'energy security'*

Keywords: Global, Energy, Security, Dominated, Natural Gas, Occupation

1. Introduction

Global dependence on sources of energy derived from the environment, and their uneven distribution across the globe, have consistently dominated political, strategic and diplomatic philosophies of nations. History is replete with examples of sources of energy having played a major role in a bewildering variety of bilateral and multilateral interaction between countries – both coalitions and confrontations. Prior to the Second World War, the Germans had carried out a detailed analysis of the energy situation and it is a well-known fact that the German offensive on both Romania and Russia were mainly to secure the oil reserves, in order to keep their war machinery underway. Similarly, the Chaco war of 1932-35 in which Paraguay annexed a region of Bolivia assuming presence of oil resources, reluctance of France to grant independence to Algeria during their war of independence of 1954-62, Nigeria's war against the liberation of Biafra in 1967-70, China's war against Vietnam in 1974 over the Paracel Islands in the South China Sea, Iraq's Occupation of Kuwait and the subsequent Gulf War of 1991 are all classic examples of sources of energy having driven nation states to wage war.

As the present-day global realities alter the concept of national security, one of its ingredients that have continued to grow in importance is 'energy security'. The concern of the most powerful nation in the world, both militarily and economically, to the possible threats emanating to its energy security is discernable in the US proclamation that "an attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America and such an assault will be repelled by any means necessary, including military force". [2]

Today we live in an era of economic interdependence. Nothing exemplifies this as much as the interdependence of nation states upon sources of energy. As the economies of the developing countries continues to grow, so will the requirement of energy to sustain their growth.

Enhanced energy consumption is not only a pre-requisite for economic growth, but is also a consequence of it. India is emerging on the world scene as a major energy consumer as, ever since the Indian economy opened up, the growth in GDP has resulted in a related increase in energy consumption. The potential for further increase in the consumption of energy in our country is borne by the fact that presently the per capita energy consumption stands at 300 kg oil equivalent (kgoe) as against the world average of around 1500 kgoe. While the country continues to rely on a vast variety of sources of energy, oil and coal dominate the Indian energy map with majority of our energy needs being met through them. During the first two decades of the twenty-first century the rate of growth of consumption of Natural Gas is expected to be the fastest and that of coal, the slowest. India however possesses only about 0.5 and 0.4 percent respectively of the world's proven reserves of oil and gas. Hence, in order to bridge the gap between the availability and the requirement of oil, India imports about 70 percent of her total requirement. The situation is bound to get compounded in the years to come as the percentage dependency on external imports is calculated to increase to about 90 percent by 2025 [3]. This growing import of oil, gas and coal continues to re-define the conditions that guarantee India's energy security.

There are a number of factors that have the potential to pose a threat to the energy security of our country. The foremost concern is the unequal distribution of sources of energy across the globe and the strategic and geopolitical dynamics

obtaining in those regions from where imports are fait-accomplish. The Middle East region that is home to a vast majority of oil reserves is ever in a state of apparent instability that is reportedly abetted by the west. Further, despite the initial hype regarding oil and gas reserves in the Central Asian Republics (CARs) being sobered down considerably in line with reality, the problems of transportation of these resources from these land-locked areas could pose a major diplomatic, and at times military, complication. That these regions are susceptible to Islamic fundamentalism further aggravates the situation and enhances the possibility of supply disruptions. Secondly, energy consumption levels are expected to record an unparalleled growth in the coming years. As per the International Energy Outlook published by the Energy Information Administration (EIA), the energy demand in respect the two major sources of oil, that stood at 157.7 British Thermal Units (BTU), and Natural Gas, that stood at 90.1 BTUs, in 2000, is expected to soar to 224.6 BTUs and 177.5 BTUs respectively by 2020, marking an increase of about 63% [4]. This by itself is bound to stretch the existing resources resulting in possible diplomatic and political manipulations and tensions. In addition, with terrorism expected to further spread its tentacles, the threat of disruption of energy resources through piracy at sea or by terrorist strike on land would remain predominant.

The import requirements of oil for our country, that was 30% a decade ago stands at 70% presently and is expected to gallop to 90% within a couple of decades. Similarly, 70% of the requirement of Natural Gas will also need to be imported [5]. It hence needs no reemphasis that any supply disruptions, or even cost fluctuations, on account of any of the reasons brought out above, will have a devastating effect not only on our economy, but also on the day-to-day life as the modern society is heavily dependent on energy. Under such circumstances it is imperative that our country charts out a clear future strategy and implement time-bound measures to ensure 'energy security'.

Sources of Energy – A Global Perspective

Dependence of mankind on various sources of energy dates back to the dawn of civilization itself. With the discovery of fire, man's quest for energy too started. From wood, that was first used in earlier days, to the present day nuclear energy, the evolution in energy exploitation continues to this very day. The dominant source of energy of any particular era not only determined the life style of the particular time period, but also dictated the power politics between various geographical entities depending upon their distribution. Periodic adoption by humankind of any new and more modern source of energy was also responsible for rise and fall of importance of various power blocks across the globe. What makes the energy equation further complicated is the fact that, while new resources continued to be discovered, none of them substituted the earlier resources completely. As a result, there exists a wide variety of sources of energy that the world is presently dependent upon.

Sources of Energy and International Politics

The Middle East Politics: The 1967 oil embargo by the Arab oil-producing countries and the 'first oil shock' of 1973 clearly demonstrated to the world, the potential of oil

as an instrument for political and diplomatic blackmail. Further, historically, the entire region has remained in a state of political and religious turmoil with problems between Iran and Iraq, Israel and Palestine, Egypt and Libya, Saudi Arabia and Yemen etc. This eternal conflict in the world's largest oil producing region is viewed with favour by the rest, as this is thought to maintain the entire region in a state of "dynamic balance". Infact, a study of recent history would reveal that the west, headed by USA, have indeed taken efforts to keep a number of these conflicts alive. During the cold-war era, they also resorted to huge military assistances to various Middle East countries under the garb of prevention against the Soviet takeover of the region. The collapse of the Soviet Union was followed by the Gulf War 1, and the near simultaneity of these two events makes one ponder whether the whole drama of Iraqi occupation of Kuwait was stage-managed to permanently open the Middle East door for the west to march in. Towards the end of the twentieth century, however, voices of dissent within Saudi Arabia, demanding that the US forces leave their country, became increasingly louder. That USA launched a war and effected regime change against Saddam Hussein, despite the lack of international consensus, has clearly highlighted the desperation of the American policy makers to remain in and control the Middle East.

CAR Centric Dynamics: The Central Asian Republics becoming a focus of world attention in the recent years has mainly been on account of the oil and natural gas reserves that these countries are estimated to possess. According to testimony before the US House of Representatives in March 1999 by the conservative think tank Heritage Foundation, Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan together have 15 billion barrels of proven oil reserves. The same countries also have proven gas deposits totaling not less than nine trillion cubic meters. Another study by the Institute for Afghan Studies placed the total worth of oil and gas reserves in the Central Asian republics at around US\$3 trillion. The outsourcing of this oil, however, has triggered off unprecedented politics by itself, due to the complications imposed by geography and international relationships. While a pipeline through Iran would be the most economically sensible option, the lack of trust between Iran and USA has prevented such a plan from fructifying. The other option of laying the pipeline through Afghanistan and Pakistan has the Taliban and the Al-Qaida factor attached to it.

Russia-Belarus – Oil as a Tool for Blackmail: Belarus has been one of the former Soviet countries that has remained close to Russia following the break up. In Apr 2001, in a meeting between the two presidents, the Russian President Mr. Vladimir Putin announced that Russia would sell gas to Belarus at the same rate at which it was available to the people of Russia. The implication of such a measure was that the subsidies that were available to the local populace in Russia were now being extended to Belarus as well, resulting in loss of profits for Gazprom, the state owned gas company. However, in Sep 2003, the Russian government announced that the subsidies were planned to be withdrawn from 2004 by which the price of Russian oil for Belarus would then be three times the present cost. This is bound to result in severe economic hardship for Belarus, as the oil bill alone would go up by nearly \$700 million. Although

economic calculations are claimed to be behind this act by the Russians, to an analyst it is clearly apparent that the vacillation on the part of Belarus president in adopting Ruble as the common currency, as had been earlier decided by both the countries, was the major reason. With the demand-supply gap of sources of energy continuously widening, these resources have a great potential to be used for such political blackmail.

The Chinese Angle: China today remains the cynosure of all eyes with a rapidly growing economy that has resulted in trebling of its GDP in less than two decades. The unprecedented economic progress has had its obvious repercussions on its energy consumption levels as well. As per the United States Energy Information Administration (EIA) estimates, China is expected to become the second largest energy consumer in the world by end 2003, behind USA. A study of the energy sector of China reveals that she became self-sufficient in petroleum products as early as 1963, and by 1973 she was an exporter. However, the galloping internal energy demands, on account of her phenomenal economic growth, made her a net importer in 1993. Conservative estimates predict that by 2010, China will import close to 40% of her requirements which corresponds to six million barrels a day. To understand the correct perspective, it is interesting to note that currently the largest producer of oil, Saudi Arabia, is capable of producing only about eight million barrels a day. Such an impending situation has forced China to initiate a wide variety of steps to ensure her own energy security. Some of these measures include restructuring of China's petroleum industry in order to create region-oriented operations by merging all her state owned oil and gas assets, the China National Petroleum Corporation (CNPC) in the north and west and the China Petrochemical Corporation (Sinopec) in the south, entrusting all the off-shore exploration to the China National Offshore Oil Corporation (CNOOC) and creation of State Energy Administration (SEA) in 2003 as a regulatory authority. In addition, she has also embarked on about 30 joint ventures with foreign collaboration. However, despite all these efforts, China will continue to be dependent upon the Middle East oil in the long run. This has inevitable geo-strategic implications for us as the Indian Ocean region will continue to be a major factor in all her security considerations. Building of the Irrawaddy Corridor from their mainland to Akyab in Myanmar, assisting Pakistan to build a modern port and connected infrastructure at Gwadar, her military collusion with Iran, are all measures that China is already involved in, to get a foothold in this region. The fact that economic factors do not permit the CAR oil to flow through pipelines straight to China has only exacerbated matters.

Dangerous Liaisons: As the demand-supply gap for sources of energy continues to widen across the world, certain dangerous and unhealthy liaisons are likely to emerge. The recent reports indicating collusion between Saudi Arabia and Pakistan wherein a secret deal has reportedly been concluded between both these countries to barter the Pakistani nuclear know-how for cheaper Saudi Arabian oil is a case in point. The possibility of more such dangerous liaisons, with adverse global implications, could be a matter of time as majority of the oil and gas deposits that the world

is currently dependent upon are located in regions fraught with Islamic fundamentalism.

Energy Security: A Threat Analysis and Its Implications

As the dependence on imported sources of energy continue to increase, it is imperative to identify various threats to the nation's energy security as well as their implications to the nation prior to charting a road map. Threats to our energy security could present themselves in numerous forms – be it supply disruptions, price fluctuations or sabotage - and each of these are analyzed in the succeeding paragraphs.

Supply Disruptions in Peace Time: The biggest threat that the world faces today, and will continue to face in the foreseeable future, is in the form of Islamic fundamentalism. The facts that majority of world's oil reserves are situated in Islamic countries and that Islamic fundamentalism is directed mainly against the west, Israel and India, make the possibility of supply disruptions a reality to be reckoned with.

Sabotage: In the present day and age, the Clausewitzian philosophy of "long periods of peace punctuated by war" looks threatened to be substituted by "long periods of terrorism rarely punctuated by conventional war". International pressures against conventional wars, strategic deterrence through nuclearisation, the concept of global village, the consequent economic interdependence and the heavy financial cost of waging a war have although reduced the chances of conventional war, these very factors have succeeded in spawning terrorism. Hitherto fore, with terrorist activities being aimed at creating a fear psychosis amongst the local populace, terrorism has by and large spared economic targets. While the Geneva Convention and the Hague Protocol prohibit targeting of oil wells, terrorism has consistently displayed a total disregard for any of the laws of armed conflict. With terrorism being rampant in our country, be it in the J&K, the Northeast or the Naxal threat in Heartland India, spectre of sabotage targeting energy lifelines of the country will remain a major concern.

Inadequacy Driven Conflicts: As energy demands continue to rise faster than the ability of the supplies to match up, conflicts between states, on account of inadequacy of available resources, seem destined in times to come. One can now only imagine as to what a militarily and economically strong China of the future could resort to, in the interest of her internal security, if the large amount of oil and gas requirements of hers, from the Middle East, is unable to be met due to competition from other energy consumers such as India.

OPEC and the Potential for Disaster: The Organization of Petroleum Exporting Countries (OPEC) has thus far proved to be an extremely effective organization capable of ruling the international oil markets, fine tuning the price-production relationship, and putting pressure on new international players. As on date the non-OPEC countries account for about 35 to 40% of existing oil and gas reserves. This however is expected to be a temporary phenomenon as the reserves in the non-OPEC regions are estimated to deplete faster than those of the OPEC members. For

instance, the oil production in the North Sea, Gulf of Mexico and in USA would have peaked by 2010 or earlier [6]. Hence, the influence of OPEC would, in the long run, remain unchallenged.

2. Implications of a Threat to Energy Security

Economic Fallout: While suffering direct damage to the infrastructure due to any of the wide variety of reasons does result in loss of valuable property and stock, the potential economic effects of a price fluctuation are invariably more severe. With our growing external dependence for oil and natural gas, the economic fallout of price fluctuation in the international market is bound to be grave. With over 60% of our oil requirements being met from external sources, the country's annual crude oil import bill stands at Rs 65000 Crores [7]. As we currently import about 1.2 million bbl/day, simple mathematics reveals that an increase by one dollar per barrel of crude results in the national oil bill going up by about \$450 million. Hence, any fluctuation in the international oil price directly affects the economy of the country. For example, the 1991 Gulf War cost the exchequer a whopping Rs 4000 crores that was equivalent to 26% of that years defence budget. [8]

Socio-Political Effects: To understand the adverse socio-political implications of energy disruptions as well as price fluctuations, it is necessary to examine the sectoral distribution of utilisation of various resources, which is tabulated below [9]:-

Sector	Coal	Natural gas	Petroleum products	Power	Total
Agriculture	0	1.3	9.5	89.2	100
Industry	73.1	2.4	13.6	10.9	100
Transport	0	0	98.5	1.5	100
Residential	0	1.1	71.3	27.6	100
Others	0	33.9	60.9	5.2	100

From the table it is clearly evident that petroleum products are essentially required to sustain both the transport and the residential sectors that are the back bone of socio-political stability. Any fluctuation in prices therefore has the potential to unleash social chaos and political disasters.

Way Ahead: With Energy Security assuming increasing importance in the present day concept, the country can ill afford to neglect this vital aspect in its strategic planning. Having analysed the adverse consequences of lack of a comprehensive energy security plan, it becomes imperative to chart a way ahead for the country. The various issues highlighted in the succeeding paragraphs need to be implemented in a time-bound manner, in order for the country not only to progress in her path of economic revival, but also to ensure a minimum standard of living for the people of the country.

Accelerate Exploration: There is a need to accelerate our exploration efforts so that the complete potential of our sedimentary basin is fully exploited. The Hydrocarbon Vision 2025 aims to complete the survey of our entire basin by 2025, and towards this a number of positive measures have already been implemented. We should further open up

this sector to attract foreign investment that will bring in not only the funds but also the technology.

Increase External Sources: A country like India, with an ever-increasing dependence on imports for oil and gas that stands at over 60% now and is expected to gallop to 85% by 2010 and 92% by 2020 [10], can ill afford to rely on limited number of external sources. Over-dependence on Gulf oil alone would be akin to putting all the eggs in one basket, with a potential for internal disaster if for some reason the supplies are disrupted. The proactive measures that are being initiated by the ONGC Videsh Ltd (OVL), of acquiring stakes in a variety of exploration fields abroad, is a small step in the right direction.

Diversify the Energy Basket: It is obvious that with sources of energy playing a pivotal role in not only economic progress of the country, but also the standard of day-to-day life of every common man, the country can ill-afford to let a single-source of energy dominate the entire sector. It is therefore inescapable that the energy basket of our country be suitably diversified. While the working out of a recommended energy mix does not form a part of this study, the country needs to analyse this issue threadbare, arrive at the ideal diversification and implement a suitable action-plan.

Implement a National Oil and Gas Pipeline Grid: As against an international average of 60%, transportation of petroleum products through pipelines in India is only about 32%. The Product Pipeline Policy implemented by the government is expected to raise this percentage to about 45% in the next couple of years [11]. Transportation of products through pipelines is not only about 40% cheaper than any other method, but is also safe, prevents adulteration and reduces pollution. Of matching importance is also the creation of pipelines for both crude and natural gas. In order to ensure that incapacitation of a particular refinery, port facility, storage or any other related infrastructure, due to any of the reasons such as terrorist strike, enemy strike during war, machinery failures or labour union strikes, does not disrupt flow of petro products to the affected sector of the country, it is imperative that the nation is covered by a national pipeline grid.

Go Nuclear: The Japanese experience post-the first oil shock of the 70s has a lesson in it for us to learn from. They planned and reduced the oil component of their energy basket from about 80% in the seventies to about 55% in the 90s by investing heavily in nuclear energy. Our deposits of Uranium and Thorium are sufficient to cater for all our energy needs and yet common problems associated with nuclear energy has prevented us from exploiting it fully. It is time that we invested in technology for safer nuclear power plants, opened them up for routine inspections by concerned international agencies and increased the nuclear power component in our own energy basket, in order to reduce external dependence.

Build Strategic Reserves: For a nation like India, whose import dependence for oil continues to grow with time, building up strategic reserves is unavoidable. Availability of strategic reserves of oil help us tide over both supply

disruptions as well as price fluctuations. With the prevalent geo-political situation that our country is faced with, disruptions in oil supply from the gulf cannot completely be ruled out in case of a war with our western neighbor. In such a scenario, availability of a cushion in the form of strategic reserves would permit us not only to keep the war machinery underway, but also help prevent social problems that may arise if regular petroleum and gas supplies are interrupted. Strategic oil reserves would also permit the country to absorb/ moderate any substantial fluctuation in prices of international oil. For instance, the strike and consequent oil disruption in Venezuela, from whom USA imports majority of her oil, could be comfortably handled by USA as the country maintains a six-month strategic reserve. Currently, India reportedly has a 15-19 day crude reserve and a 45-day stock of petroleum products with oil companies. However, since these are mainly to cater for the requirement of the companies in case of a supply disruption, it is a misnomer to call them strategic reserves.

Enhance Shipping and Port Infrastructure: As compared to the import requirements, currently, the merchant shipping and port infrastructure in our country is grossly inadequate. Presently, only 30% of our trade is carried on Indian ships as the country possess only 554 merchant ships accounting for a mere 1.5% of total world tonnage. Although open-market competition among trade shipping could result in Indian trade being carried on foreign shipping, strategic importance of oil and natural gas dictates enhancement of our domestic shipping to meet our requirements. In addition to shipping, another area that requires deliberate attention is our ports. Our 11 major and 181 minor ports (of which only 140 are operable) are desperately in need of modernization to keep pace with the growing imports in the energy sector.

Invest in Research and Technology: One of the areas that needs dedicated attention is in the field of research and technology. There exists a lot of scope for not only improving the recovery rates of our oil and gas wells, but also in finding solutions to our energy security issues by resorting to non-conventional sources of energy like coal bed methane and gas below gas hydrates.

Enhance Use of Renewable Energy: The potential for exploitation of renewable energy in a tropical country such as ours is phenomenal. Solar energy, wind and hydro power are abundantly available but have not been fully tapped in our country. This, in addition to plugging the gap between demand and availability of conventional energy sources, will also help the environment by reducing emission of greenhouse gases.

3. Administrative Improvements

Create Umbrella Ministry: Presently, there are a wide variety of ministries in both the central as well as state governments that deal with various aspects of energy. This has often resulted in a disjointed approach to this vital subject. Not only are the authorities looking after different types of sources of energy, such as coal, oil and natural gas, and nuclear energy diverse, but the fact that certain policy decisions concerning these ministries actually originate from certain other ministries makes the matter worse. The existing

arrangement is hence considered irrational and there is an urgent need to form an umbrella ministry catering for all aspects of energy.

Cut Down Red Tape: One of the major hindrances for foreign investment flow into our country has been the existence of archaic rules and regulations that deter prospective investors. Foreign collaboration in the energy sector has the inherent advantage of better technology coming into the country both for exploration and production. We will then not only be able to use the latest technology that is available to map our entire sedimentary basins but also increase the drilling recovery rates from our existing fields from the current low level of 28% to a more acceptable level of about 40%. Although steps to cut down our bureaucratic procedures have been initiated, more practical, investor-friendly policies need to be adopted in keeping with the present-day norms.

Find Diplomatic Solutions to Economic Issues: Many economically preferable options in the field energy are currently mired in diplomatic complications. The trans-Afghan pipeline from CAR to India through Pakistan and the Bangladeshi natural gas are a few examples. It is therefore essential that the country launches diplomatic initiatives to find solutions to various existing problems for the mutual benefit of all affected nations.

Develop an Asian Energy Forum: Energy security being as much a collective concept as military security is, our country could take the lead in bringing leading Asian energy consumers under a single forum so that cooperation and information exchange reduces cost of research and facilitates a joint energy security strategy. The success of such a forum would depend on the leading energy consumers of Asia such as China and Japan being a party to it.

4. Summary

It is an acknowledged fact that India is a country that is on course to becoming an economic giant. As the country's economic progress is inextricably intertwined to energy security, this aspect needs dedicated attention in order to ensure that the planned economic progress is not impeded. Although potential threats and their ramifications are far too many, 'energy security' in its simplest form means 'uninterrupted availability of energy at acceptable costs'. Working out a strategy to ensure energy security is complicated by the fact that each source of energy poses a different set of geographic, economic as well as political problems. The non-renewable sources of energy, comprising coal, oil, gas and uranium, although continue to dominate the energy sector, impose the greatest strain on any planner due to their international volatility. Yet, the galloping demand has opened out so much from the domestic production capability, that the potential for disaster is easily identifiable. As brought out in the paper, our external dependence for various non-renewable source of energy, that too from regions that are in eternal political and religious turmoil, is bound to make us extremely vulnerable, unless measures to counter these are catered for.

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