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India's Energy Security Challenges

Talmiz Ahmad*

In 2012, India emerged as the world's third largest energy consumer, after China and the USA. Its energy consumption then was 788 million tonnes oil equivalent (mtoe)[1] – 1.7 times that of Japan, and equal to the combined consumption of the United Kingdom, France and Germany.[2] In 2013, India was the sixth largest consumer of oil globally and the ninth largest oil importer.[3] These figures reflect India's remarkable growth, increasing urbanisation and industrialisation, and higher incomes generated over the previous decade. Between 2000 and 2010, India achieved its highest growth since Independence – at over 8 per cent per year. However, there was a dip to around 4.5 per cent during 2012 and 2013 – in line with the global economic turndown in these years.

There had been a steady increase in India's energy consumption since 1990, when it was a mere 319 mtoe.[4] Though the future global economic scenario is fraught with considerable uncertainty, most observers believe that India's long term growth until 2040 will be well over 6 per cent annually, when India's economy will be 7 per cent of the global economy. This will have significant implications for the country's energy consumption and its energy mix. According to the Institute of Energy Economics Japan (IEEJ), India's energy consumption in 2040 will rise to 1814 mtoe, with its share in global energy consumption being between 6–9 per cent.[5] The energy mix envisaged in the Reference Scenario is set out in Table 1.

Table 1: India's present and long term energy mix

Energy source	2012 mtoe (%)	2040 mtoe (%)
Coal	354 (45%)	776 (43%)
Oil	177 (22.5%)	445 (24.5%)
Gas	49 (6%)	220 (12%)
Nuclear	9 (1%)	79 (4.5%)

*__The Author__ is a former Ambassador to Saudi Arabia, to Oman, and to the U.A.E. He served in the Ministry of Petroleum and Natural Gas as Additional Secretary for International Cooperation. He was also the Director General of the Indian Council of World Affairs, New Delhi.

Hydro	11 (1.5%)	22 (1.2%)
Renewables, Inclomass	188 (24%)	272 (15%)
Total Energy Demand	788 mtoe	1814 mtoe

Source: Asia/World Energy Outlook 2014, IEEJ, October 2014, p.75–76

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Though India's energy consumption is so substantial in absolute terms, the country's per capita consumption is among the lowest in the world: it is 0.58 mtoe, as against the world average of 1.8; USA of 7; OECD of 4.28; China of 1.7; Brazil 1.2; and Africa of 0.67.[6] Similarly, in 2009, the average Indian consumed just 571 KWH of electricity, as against 2631 KWH consumed by the average Chinese and 12,914 KWH by the average American.[7] It is important to note that biomass, mainly consisting of firewood and manure – that is, a non-commercial energy source – constitutes the bulk of 'Renewables' in Table I. With increasing urbanisation and improvements in living standards, the share of biomass has come down in the national energy mix – from 33 per cent in 2000 to 24 per cent in 2012. Even then, however, firewood was still the primary cooking fuel for 62.5 per cent of rural households, while over 12 per cent used crop residue, while 11 per cent used cow dung.[8]

A quarter of the Indian population – that is, over 300 million people – does not have access to electric power. However, the overall power situation for the rest of the country is also quite parlous as is affirmed by the crash of the grid across north India in July 2012 that left over 600 million people without power. Of the country's total installed power capacity of over 250,000 MW, over 70 per cent is thermal generated: 59 per cent of the plants are coal-based, while others are hydro-based (17 per cent), gas-fired (9 percent), nuclear (over 2 per cent) and based on renewables (over 12 percent). However, actual generation is just 110,000 MW due to low plant load factor, with a further loss of 25 per cent in transmission and distribution.[9] The power problem is compounded by the poor state of the infrastructure, and widespread non-payment of electricity charges. Hence, inspite of significant increases in its installed capacity every year (a 65 per cent increase between 2003 and 2011), India remains power deficient to the extent of 8–10 per cent through the year. This situation is expected to continue in the coming years: in 2011–20, generation capacity is expected to grow by 70 per cent, but electricity demand will grow by 90 per cent.[10]

The situation relating to other energy sources is also unsatisfactory. Coal dominates the country's energy mix as also the electricity generation sector,

while the steel and cement industries are also heavily coal-dependent. India has the world's fourth largest coal reserves (286 billion tonnes of proven global reserves of 850 billion tonnes), and is the world's third largest producer – its output doubled from 2000 to 2012 to 650 million tonnes.[11] However, domestic production remains significantly short of demand, leading to frequent electricity outages and industrial shutdown. Hence, the country has had to increasingly resort to imports, which now meet over 20 per cent of domestic requirements, making India the world's third largest importer of coal (in November 2014, the Indian Minister of Energy announced that India would do away with coal imports in 2 – 3 years by boosting domestic production.)[12]

Similarly, due to near-stagnant domestic oil production (expected to go from 865,000 barrels/day in 2011 to 975,000 b/d in 2020), India's dependence on oil imports has been increasing every year: the country's imports went from 61 per cent of demand (21 mtoe) in 1990 to 81 per cent of demand (162 mtoe) in 2009.[13] India's import dependency will continue to increase, and is expected to reach about 90 per cent in 2040.[14] Over 50 per cent of India's oil imports come from the countries of the Gulf Cooperation Council (GCC). If imports from Iran and Iraq are taken into account, India's import dependency on the Gulf would be over 70 per cent. In 2012–13, India imported 120 million tonnes of oil from the Gulf countries (including 82 million tonnes from the GCC), valued at over US$ 90 billion (US$ 63 billion from the GCC).[15] India's consumption of natural gas has increased at 8 per cent per year between 2000 and 2012: in 2012, India consumed 2.1 trillion cubic feet (TCF) of gas, of which about 30 per cent was imported, mainly from Qatar.[16]

It is forecast by EIA that, by 2020, India will domestically produce only one-half of its fossil fuel requirements as against 60 per cent in 2012, thus raising serious concerns relating to its energy security.[17] McKinsey have projected India's energy scenario over a longer period – upto 2030 – but have come to same conclusion: that is, India will be import-dependent for its total energy needs to the extent of 51 per cent.[18] These projections assume an annual increase of 5 per cent in power demand (generated to the extent of 60 per cent by coal), and improved energy efficiency of 1 per cent per annum. The report concludes that, in 2030, in spite of major increases in domestic production, India will see significant increases in imports of coal, oil and gas, so that India's import dependence will be the third highest in the world, after Germany (60 per cent) and Japan (80 per cent), and well above China (20 per cent) and the USA (1 per cent).[19] It is interesting to note that, from about 2020, India's energy demand will exceed that of China, so that, in the words of the chief economist of the International Energy Agency (IEA), Fatih Birol,

'India will be the new China in terms of global [energy] demand growth.'[20]

Taking into account these serious energy challenges, in the last few years the Indian government has commissioned two reports to study the country's energy situation and also suggest remedial initiatives.

The Hydrocarbon Vision 2025,[21] published by the Government of India in February 2000, set out in stark terms India's energy security predicament: its self-sufficiency in crude oil declined from 63 per cent in 1989–90 to 30 per cent in 2000–01; in 2024–25, its crude oil self-sufficiency was expected to be a mere 15 per cent. The situation relating to gas was equally grim: from 49 BCM (billion cubic metres) in 2006–07, India's demand for gas was expected to rise to 125 BCM in 2024–25. As against this, production from existing fields and discoveries was 52 BCM, leaving a gap of 75 BCM to be filled through new domestic discoveries, and from imports. The electric power sector was projected to account for 71 per cent of the total incremental growth in India's natural gas demand from 2000 to 2025, as against the existing mix in the power sector of: coal: 59 per cent; hydro: 26 per cent; gas: 10 per cent; and nuclear: 2 per cent. With this, the share of gas in the national mix would go to 20 per cent. The report envisioned that India would achieve energy security 'by achieving self-reliance through increased indigenous production and investment in equity oil abroad.' It called for a national hydrocarbon industry that was globally competitive, and provided for 'a cleaner and greener India.' This pioneering study placed energy security at the top of the national agenda.

However, since the 'Vision' report confined itself to the hydrocarbon sector, it was followed by the 'Integrated Energy Policy' report,[22] published by the Planning Commission in August 2006 under the Chairmanship of Mr. Kirit Parikh. This report took a holistic view of India's energy requirements up to 2031–32. The report postulated that, in order to reach growth rates of 8 per cent per annum up to 2031–32, the country needed:

- to increase primary energy supply three to four times, and,
- to increase electricity generation capacity five to six times from the 2003–04 levels – that is, power generation capacity should increase from the current 160,000 MW (megawatt) to nearly 800,000 MW by 2031–32.[23]

The report projected several energy mix scenarios based on the country's success in promoting the best use of one or more items in the national energy mix such as: maximum coal-based development; maximum civilian nuclear energy; maximum hydropower; utilising gas to provide 16 per cent of electricity generated; obtaining higher efficiencies in coal-based power plants,

and obtaining 50 per cent improvement in fuel efficiency.

Four out of the eleven scenarios set out in this report are in Table 2 below.

Table 2: India's Energy Mix

India's Energy different energy-use scenarios in 2032 (%)*

S. No.	Energy Source	Energy Mix in 2006	Coal dominant	Full use of Hydro, Nuclear & Gas	Plus enhanced fuel efficiency	Plus maximum use of renewables
1	**Coal**	51	54	45.5	42	41
2	**Crude Oil**	36	26	26	29	23
3	**Gas**	9	5.5	10.7	10.2	9.8
4	**Hydro**	2.1	0.7	2	2.1	2.2
5	**Nuclear**	1.5	4.0	5.3	6	6.4
6	**Renewables**	0.7	0.1	0.1	0.1	5.6

Source: Integrated Energy Policy, Planning Commission, New Delhi, Sep. 2006, pg. 44 *
Note: In the above figures, non-commercial energy is between 10–12%

In order to achieve the energy requirement targets, the report emphasised the importance of the following initiatives to augment domestic resources:

(i) to maximise the use of the national hydro power potential;

(ii) to obtain the materials and technology to pursue civilian nuclear power projects;

(iii) to pursue energy efficiency and demand side management policies; and

(iv) to diversify energy sources through increased use of renewables.

However, in spite of these efforts, the report noted that the following facts would characterise the Indian energy scene:

(i) even if India succeeded in exploiting its full hydropower potential of 150,000 MW, the contribution of hydro energy to the energy mix would only be around 1.9–2.2 per cent;

(ii) even if a 20-fold increase took place in India's nuclear power capacity by 2031–32, the contribution of nuclear energy to India's energy mix was, at best, expected to be 4–6.4 per cent;

(iii) even with a 40-fold increase in their contribution to primary energy, renewables would account for only 5 to 6 per cent of India's energy mix by 2031–32; and,

(iv) in all scenarios, fossil fuels would be between 74 per cent and 85 per

cent of the energy mix, as against 96 per cent at present (2006).

Thus, the report made it clear that domestic resources alone, regardless of the effort expended, would not be sufficient to meet India's energy requirements. Still, over the last two decades, the country has mounted a major effort to increase domestic resources and diversify the energy mix; but the results have had a limited impact and India's import-dependence has, in fact, increased every year. Thus, in order to boost domestic oil production, the New Exploration and Licensing Policy (NELP) was introduced in 1997 to attract the private sector and foreign companies in the exploration and development of the national potential. In nine rounds of NELP, 257 blocks were auctioned; there were discoveries in 107 of them; but only 31 were declared commercially viable and only one is a producing asset.[24]

In 2010, India's premier energy think-tank, TERI, prepared a detailed report on reducing India's energy imports and consumption by pursuing sustainability and 'climate restrained' energy options.[25] The report had noted that in India's Business As Usual (BAU) scenario, energy demand in 2031–32 would be 2151 mtoe, of which energy imports would be 1599 mtoe (that is, 75 per cent). The report projected that, in its sustainability scenario, energy demand would be a mere 1388 mtoe (with imports at 52 per cent) as a result of greater efficiency and the increased use of renewables and nuclear power.[26] The report also looked at two other scenarios: Higher Import Independence [HII] and Climate Restrained, in which energy demand would be 1163 mtoe (imports 2 per cent) and 1107 mtoe (imports 29 per cent) respectively. However, the report did point out that the upfront costs in the HII scenario would be 41 per cent higher than the BAU scenario, while the upfront costs in the other two scenarios would be 61 per cent higher.[27]

Similarly, the pursuit of nuclear power in the country is also not market-driven; as energy expert Lygia Noronha has pointed out, 'it really is politics not economics that drives nuclear power as an energy choice'.[28] It is primarily the desire for self-sufficiency in energy, coupled with the sense of national achievement as an indigenously developed programme at the cutting edge of global technology that is behind it. The widespread availability of thorium resources domestically has given a fillip to the thorium-based three-stage nuclear power programme, which has been further boosted by the Indo-US nuclear cooperation agreement of 2005, and subsequent agreements with the International Atomic Energy Agency (IAEA) and the Nuclear Suppliers' Group (NSG), followed by contracts for uranium supply with a number of producing countries.[29] However, as the TERI report of 2010 noted, a nuclear power plant costs Rs. 60,000 million (US$ 1.2 billion) to produce one GW of power.

As against this, a coal-fired plant using different technologies would cost in the range of Rs. 40–51,000 million (US$ 800 million"1 billion) to produce one GW of power – though, of course, the nuclear plant would have very low annual operational costs and negligible carbon dioxide emissions.[30]

Besides the cost factor, questions have also been raised about the safety of the three-stage cycle: nuclear scientists S. Raju and M.V. Ramanna wrote in 2011 thus: 'plutonium-fuelled fast breeder reactors … when compared to heavy water reactors, carry a significantly greater risk of catastrophic accidents and produce much more expensive electricity.'[31] Ligia Noronha has pointed out that, with increasing public consciousness relating to safety issues and the cost *versus* benefit of specific energy-related projects for local communities, policy-makers would need to obtain a 'social license to operate' before projects can be undertaken.[32] The widespread public opposition to the location and expansion of nuclear power plants in different parts of the country do raise doubts about the implementation of the ambitious nuclear projects envisaged by the government at present.

Given the centrality of energy security in India's long term economic and political interests, it would be useful, at this point, to examine the concept of energy security and its associated idea, energy independence.

Energy Security and Energy Independence

Though 'energy security' is one of the most frequently used terms in energy literature, there is no consensus about its meaning and implications. Most energy analysts have defined it in terms of supply and price (that is, affordability) and the physical safety of energy facilities; at some point it has even been imparted a military value in terms of suggestions to use armed force to secure supply and transport corridors, protect pipelines, and confront terrorists who threaten the free movement of resources. The distinguished authority on energy issues, Benjamin Sovacool has noted that he has seen forty-five different definitions of energy security in various writings:[33] one speaks of the 'five Ss': supply, sufficiency, surety, survivability and sustainability, while the IEA mentions the 'three As': adequate, affordable, and (reliable) access, along with decreasing imports and decreasing adverse impact on the environment.

The reason for these different definitions is that energy embraces at least five different disciplines of academic interest: (i) science, including physics, chemistry, geology, and various areas of engineering and technology; (ii)

economics; (iii) ecology; (iv) social welfare; and (v) politics and security studies. These different areas of energy studies have encouraged experts to focus on their own area of specialisation while defining energy security. Similarly, special interest advocates and lobbyists also promote one aspect of energy security over the other: thus, there are entrepreneurs who promote the increasing use of new technologies, who have to contend with those who uphold the primary importance of environment-related interests. Again, we have diehard advocates of 'energy independence', that is, promoters of national self-sufficiency whatever the cost, who have to compete with economists and energy corporations who focus on the bottom line and seek energy from the cheapest sources, wherever they might be. We also have activists who condemn Big Oil and its close association with government – a liaison that, in their view, often sacrifices the interests of common people in favour of the corporate sector. Finally, there are the militarists who see energy as having an enduring strategic and geopolitical significance for the national interest, and hence see the expanding consumption and access to resources of rival countries in competitive, zero-sum terms; this view is opposed by those who see energy security in cooperative, win-win terms.

After an extensive review of different views, Sovacool has set out four aspects of energy security: availability, affordability, efficiency and stewardship. Each of these aspects has a number of attributes. *Availability* means sufficient and uninterrupted supply, minimal imports, diversified sources and their physical security. *Affordability* refers to stable prices and confidence relating to their future outlook, and equitable access to energy resources (mainly electricity and fuel for heating and cooking) for the populace in general. *Efficiency* means the most efficient use of energy resources, while *stewardship* refers to policy makers giving priority to social and environmental concerns.

The energy security of a nation can be frequently jeopardised: it can be threatened by war or other types of civil conflict in supplier countries which can destroy or obstruct production and transport facilities. There are other less obvious threats, such as trade and investment barriers placed by the UN or other national regulatory regimes; political constraints on trans-border connections; restrictions on the free movement of technology, investments and human resources; and technology-based threats such as power outages due to fuel shortages, subversion, natural disasters or cyber attacks.

However, separate from threats that emanate from external sources is the issue of energy poverty which means the denial of affordable access to energy resources to large sections of a national population. It has both global and national ramifications. Thus, globally, 2.4 billion people use biomass fuels, while

1.6 billion do not have access to electricity. Even by 2030, 1.4 billion people will not have access to modern energy.[34] Issues of energy poverty have implications for gender equity, social justice and environmental degradation.[35]

One aspect of energy security that comes up quite frequently, usually from political leaders, is that of 'energy independence'. In November 1973, in response to the Arab oil embargo when oil prices had begun to quadruple, President Nixon announced 'Project Independence', in terms of which the USA would 'meet [its] own energy needs without depending on any foreign energy source', within seven years.[36] In India too, energy independence has been an important aspiration in the country's energy policy: as noted above, self-sufficiency was an important aspect of India's hydrocarbon 'vision' in 2000. Later, the former president A.P.J. Abdul Kalam, in his Independence Day address to the nation in August 2005, highlighted energy independence by 2030 as the country's 'first and highest priority', to be achieved through technological innovations, conservation and efficiency.[37] In 2013, former petroleum minister, Veerappa Moily, announced his Ministry's action plan to make India energy independent by 2030 through the following: increased domestic fossil fuel production; increased acquisition of equity assets abroad;[38] development of coal bed methane (CBM) and shale gas;[39] and pricing and subsidy reforms. His successor reiterated the same vision, focusing this time on the increased use of renewables.[40]

The McKinsey report on India's energy independence, referred to above, essentially builds on the ideas set out by President Abdul Kalam and the 'Integrated Energy Policy' document of 2006. Rejecting the Business As Usual (BAU) model – which would make India import-dependent to the extent of 51 per cent for its total energy needs – the report proposes a comprehensive alternative scenario which would see significant changes in crucial areas of the country's energy sector. These would include a comprehensive development of domestic resources and the establishment of an energy corridor with West Asia. The report asserts that, with this blueprint, India's 'energy independence' scenario would reduce energy demand in 2030 from 1508 mtoe projected in the BAU model to 1387 mtoe, yielding an import-dependency of just about 15–20 per cent. In this scenario, while there would be decreases in the share of coal, oil and biomass, there would be increases in the share of gas and renewables as compared to the BAU forecast.[41]

The McKinsey report is in a long line of similar studies in India and other parts of the world – it highlights concerns relating to import-dependence and the profligate use of energy resources, and advocates alternative policies, embracing the development of domestic resources; conservation; efficiency;

clean energy; and, where possible, the diversification of supply sources. However, most energy independence studies are aspirational; very rarely are they able to actually achieve real change in a nation's energy policies. This is because they often fail to note that all energy-related policies are driven by economic considerations that operate within a specific timeframe. Hence, as Leonardo Maugeri reminds us, the replacement of a particular resource in a country's energy mix will be determined not by politics but by economics,[42] regardless of the wishes of energy advocates or policy makers.

It is also important to note that notions of 'energy security', while frequently touted by political leaders (and lobbyists favouring a particular energy policy), are a 'confusing myth' since oil and other energy sources, like most other goods that are internationally traded, will always be subject to supply, demand, and price volatility, with disruptions, shortages and occasional over-supply being unavoidable aspects of the global energy scenario.[43] Global energy authority, Daniel Yergin, also points out that the interdependence of energy has been a fact of international life for centuries;[44] and so have been the hazards of energy supply: Hurricanes Katrina and Rita, in 2005, delivered an 'integrated energy shock' when they destroyed production facilities, pipelines, onshore terminals and pipelines, refineries, and power plants and transmission lines.[45] The earthquake and tsunami at Fukushima in Japan, in 2011, not only destroyed the country's nuclear power plants, but also compelled Japan to seek gas from international markets for its power plants. Yergin's conclusion says it all.

> Overall, the reality of integration needs to be recognized. Only one oil market exists. The market is a complex, worldwide system that moves and consumes nearly 90 million barrels of oil every day. Let there be a disruption in one part of the world, and the effects will reverberate throughout the market. Security resides in the stability of this market. Secession from the global market is not an option, except at very great cost.[46]

Given that the global energy market is interdependent, and global developments will impact on India's energy security challenges, the prospects for the global energy scenarios in the next two decades need to be reviewed.

The Global Energy Scenario

Overall, the global energy picture is one of considerable dynamism – and even turbulence – with regard to both demand and supply. Oil production is experiencing important changes in terms of the geographical location of new

finds; this is also true geologically, chemically and economically. Conventional oil production, while still a major part of the global energy mix, will increasingly yield space to unconventional oil from a variety of sources, such as: shale oil, oil sands, new heavy oil, deep water oil and production from the Arctic region.[47] However, inspite of major increases in supply, energy demand from 2010 to 2035 does not show any significant changes in regard to the global energy mix, as is brought out in Table 3 below.[48]

Table 3: World Energy Outlook

Energy Demand by Fuel, 2010 & 2035

	2010 (%)	**2035 (%)**
Coal	27	24
Oil	32	27
Gas	22	24
Nuclear	6	7
Renewables	13	18
Total Energy Demand	**12 730 Mtoe**	**17 200 Mtoe**

The long term global energy scenario is expected to be characterised by the following:[49]

(i) global energy demand will increase by 33–52 per cent from 2011 to 2035;

(ii) fossil fuels, which accounted for 82 percent of the energy mix in 2010, and will constitute 80 percent of the global mix in 2035; each of the three fuel types (coal, oil and gas) will have similar shares of about 26–27 per cent; and,

(iii) long term oil demand will increase by 20 million barrels per day (mbd) over 2012–2035, reaching 108.5 mbd in 2035; developing Asia will account for 88 per cent of this increase.

The increase in Asian energy demand has been a constant feature over the last few decades. Between 1970–94, Asian energy demand increased by 400 per cent, with Asia's demand for oil increasing by 265 per cent, while world demand growth during this period was only 63 per cent. The long term (2035) Asian energy scenario is likely to have the following features:[50]

(i) Asian primary energy demand will go from 4.2 billion tonnes oil equivalent (btoe) in 2010 to 7.7 btoe in 2035;

(ii) In 2035, Asia will account for 40 per cent of global oil demand, going up from 31 per cent in 2010; Asia will also account for 60 per cent of global oil demand growth;

(iii) China and India will represent nearly 70 per cent of Asian energy demand in 2035, with China accounting for 52 per cent and India 18 per cent~ Japan's share will decline from 12 per cent in 2010 to 6 percent in 2035;

(iv) While rising, non-OPEC oil output from North America and Brazil will reduce demand from OPEC suppliers over the next decade; OPEC will regain its role as the key source of oil supply growth from the mid-2020s.

(v) Saudi Arabia will remain a central player in OPEC and global energy scenarios: it plans to maintain its production capacity at 12.5 mbd, but will develop new fields and extend the life of old fields by lowering their production.

Asia already absorbs about 75 per cent of GCC energy exports, the extent of dependence being: Japan: 70 per cent; Korea: 60 per cent; India: 50 per cent, and China: 30 per cent. Over the next 10–15 years, nearly 90 per cent of Gulf production will shift to Asia, while the dependence of Asian countries on Gulf imports will vary between 60–90 percent;[51] the scenario relating to oil imports from the Gulf in 2035 is expected to be as follows:[52]

• China	:	6-8 mbd
• India	:	5.0 mbd
• Japan and ROK	:	4.5 mbd
• Europe	:	2.2 mbd
• US	:	0.2 mbd

India's Energy Diplomacy

Having looked at the long term global energy prospects as well as the suggestions from various sources to address India's energy concerns, it is clear that India's long term energy scenario will be characterised by significant import-dependence and, further, that its energy security interests will be determined by the following immutable facts:

(i) fossil fuels will dominate the global (and Indian) energy mix up to 2040;

(ii) world energy markets will be dominated by conventional fuels;

(iii) the global energy trade will shift eastwards from the Atlantic to the Asia-Pacific, with Asia as the principal energy consumer; and,

(iv) the Gulf, with nearly two-thirds of global reserves, will be the fundamental pivot of world energy markets.

Given India's import-dependence and the fact that the country's interests would require extensive regional and international engagement, India has crafted a robust energy diplomacy founded on cooperation rather than competition; it is one that is multi-facetted, having bilateral, regional and global dimensions. This diplomatic effort has the following aims:

(i) to set up arrangements and partnerships that would enhance domestic resources and capabilities across the energy value chain;

(ii) to acquire energy assets abroad through:

  a) equity participation in producing fields; and

  b) exploration and production (E & P) contracts in different parts of the world, both on-shore and offshore;

(iii) to expand the participation of Indian enterprises in downstream projects (refineries and petro-chemicals) and the investments of energy producers in Indian projects;

(iv) to pursue long term LNG contracts;

(v) to pursue the setting up of trans-national gas pipelines wherever feasible; and

(vi) to promote and participate in regional and global producer – consumer dialogue for energy security.

In pursuit of its energy interests, India has built up a series of bilateral strategic energy partnerships in order to enhance its domestic capabilities in different areas, and obtain access to global resources and technologies to meet its domestic demand.[53] Besides building solid relationships with the principal supplier countries of the Gulf, India has turned to China to cooperate in developing clean coal technologies; to Japan and South Korea to enhance its conservation and efficiency capabilities; to Turkey to learn about transnational pipelines; and to Norway to benefit from deep sea exploration technologies and its achievements in the areas of health, safety and environment.

India also set up platforms for Asian producer–consumer dialogue, commencing with two Round Tables in 2005, which laid the foundation for a cooperative approach to Asian energy interests. The first two rounds led to consensual agreements on the reform of the Asian oil market, and the setting up of an Asian Gas Grid which would link the producers of Central and West Asia with consumers in South and Northeast Asia. Again, in a pioneering initiative, India commenced dialogue with its neighbours on transnational gas pipelines. Though these early negotiations did not

result in actual projects due to political constraints, India was able to acquire considerable in house knowledge of this new sector, and will be in a position to revive these interactions when the political situation is more propitious.[54] India is also an active participant in the deliberations of the multilateral energy body, the International Energy Forum (IEF), based in Riyadh.

The global shift in the energy pivot towards Asia, and the long term dependence of Asian countries for supplies from West Asia for their energy security have thrown up new opportunities for Asian countries to define a role for themselves in promoting security and stability in West Asia. This is the subject of the following section of this essay.

Gulf-Asia Ties: New Opportunities

Asian countries are experiencing a significant change in their status and role in the global economy. Asian economies have continued to show fairly substantial growth in output even after the global financial crisis of 2008–10, with China and India attaining 9.5 per cent and 7.8 per cent growth respectively, while South East Asia obtained 5.3 per cent. Though growth rates in Asia have fallen over the last few years, even as growth in the West has remained sluggish, they are still well above rates in developed countries, with signs of recovery in several Asian countries already apparent.

These trends in favour of Asian economic achievement are expected to continue through the 21st century. By 2025, the Chinese economy will be of the same size as the US economy, with India being the fourth largest after Japan; in 2050, the largest economy in the world will be China, which will be twice the size of the US economy, with the Indian economy following a close third – and almost on par with that of the USA. The combined India-China GDP will exceed that of the G-7 OECD economies by 2025; in 2060, it will be more than one and a half times larger. In 2010, India and China accounted for less than half of G-7 GDP; in 2060, the combined GDP of the two will exceed that of the existing OECD area.[55] All these prospects can be realised only if the Asian countries are assured of energy security.

In this context, while the security and stability of the Gulf are of crucial importance to the energy consuming Asian countries, the regional scenario is in fact marked by competition and conflict, particularly after the Arab Spring four years ago, which has sharpened the divide between the principal Gulf

powers, Saudi Arabia and Iran. This has led to a bloody civil conflict in Syria, set up a face-off between them across West Asia, and has facilitated the rise of a new jihadi outfit, the Islamic State, which is attracting militants in the hundreds, and is competing with Al Qaeda for ideological influence and geographical space.

Amidst these contentions, the USA has signalled a sea-change in its firmly held positions by engaging with Iran on the nuclear question and indicating a shift in strategic priorities from West Asia to Northeast Asia. Though it is unlikely that the USA will significantly dilute its presence in West Asia due to its abiding interest in the security of its partners in the region, there is little doubt that it is now averse to large scale military interventions, with the President focusing on his domestic agenda. The changing geopolitics of energy in favour of Asian countries, the crucial dependence of the latter on West Asia for their energy security, and the interest of the USA in sharing the responsibility for regional security, these developments have thrown up new opportunities for Asian countries to pursue shared interests that would bring the USA, other Western powers, and the principal Asian powers – China, Japan, Korea and India – in a new cooperative paradigm structured around the GCC countries, Iran and Iraq.

The challenges in realising this strategic paradigm would require the principal regional players to give up their present postures of confrontation and hostility, and engage with erstwhile rivals on the same platform for dialogue, the establishment of confidence building measures, and the addressing of issues that divide them in a free and frank environment.

Before this happens, the four principal Asian countries would themselves have to develop the habit of dialogue as well as the development of consensus amongst themselves – a daunting task in itself since Asian countries have little experience of strategic dialogue with each other on Asian issues.[56]

Besides promoting Gulf security, the Asian role as a catalyst in shaping the new security architecture will have the concurrent advantage of promoting broader and deeper connectivities among the Asian producers and consumers that are not possible in a divisive political environment. These possibilities had been envisaged by then Indian petroleum minister, Mani Shankar Aiyar, in his remarks in Beijing in January 2006, when he had set out a clear vision for Asian resurgence founded on shared energy security interests.

> The Asian quest for Energy Security could lead to Asia regaining its traditional place – a place it has held for thousands of years of recorded

history and lost only in the last two hundred years or so – in the vanguard of the advancement of human civilisation. The Asian Renaissance brought us all to independence and liberation. Now, the Asian resurgence depends on energy cooperation in Asia. The 21st century will indeed be the Asian century only if Asian countries – buyers and sellers – join hands together in a continent-wide bid at bringing Asia together. I am confident that we will.[57]

Notes

[1] Unit representing energy generated by burning one tonne of crude oil which is approximately 42 gigajoules, or 39.6 million BTU, or 7.4 barrels of oil equivalent (boe).

[2] Asia/World Energy Outlook 2014, Institute of Energy Economics Japan (IEEJ), October 2014, p.75, at: www.eneken.ieej.or.jp/5875pdf (19 January 2015).

[3] Meena Singh Roy, 'India-West Asia Energy Dynamics: Managing Challenges and Exploring New Opportunities', in Rumel Dahiya (ed.), *Developments in the Gulf Region: Prospects and Challenges for India in the Next Two Decades*, New Delhi: Pentagon Press, p.66.

[4] 'Understanding Energy Challenges in India', International Energy Agency (IEA), Paris, 2012, p.24.

[5] IEEJ, p.76; the IEA estimates India's share in global energy consumption will be 8.6 percent in 2035. Again, different analysts give different figures for India's long term energy scenario due to different growth rates assumed and energy policy options adopted: the IEA projects total energy demand of 1464 mtoe in 2035 under the New Policies Scenario, while McKinsey forecasts energy demand of 1508 mtoe in 2030 under the 'Business As Usual' model. Please see, 'India: Towards Energy Independence 2030', McKinsey & Co, January 2014. However, while they may disagree in detail, all forecasts agree that India's energy demand will increase very significantly in the coming years in tandem with its growth trajectory.

[6] IEA, p.24.

[7] 'Empowering Growth: Perspectives on India's Energy Future', The Economist Intelligence Unit (EIU), 2012, p.26.

[8] IEEJ, p.75; 'India Analysis', US Energy Information Administration [EIA], updated 26 June 2014, p.19, at: www.eia.gov/countries/cab.cfm?fips=india (January 19, 2015).

[9] Shebonti Ray Dadwal, 'The Geopolitics of America's Energy Independence: Implications for China, India and the Global Energy Market', IDSA Monograph Series, No 30, December 2013, p.59–60.

[10] 'Empowering growth: Perspectives on India's Energy Future', Economist intelligence Unit [EIU], p. 4–6

[11] Energy Information Administration [EIA], *India Analysis*, June 26, 2014, p.15.

[12] Clean Technica, 14 November 2014, at: www.cleantechnica.com/2014/11/14.

[13] IEA, p.27; IEEJ estimates India's oil import dependence at 76 per cent in 2012 [IEEJ, p.75].

[14] IEEJ, p.76; the EIA estimates that India's oil demand in 2040 will double to 8.2 million barrels a day, of which 87 per cent will be imported [www.eia.gov/countries/cab.cfm?fips=IN].

[15] Meena Singh Roy, p.72–73.

[16] EIA, p.9.

[17] Ibid.

[18] McKinsey, p.8

[19] Ibid., p. 8–9.

[20] James Crabtree, 'The Threat of Energy Dependency in India', ABO – About Oil and Energy, 26 August 2014, at: www.abo.net/oilportal/topic/view.do?contentId=2291217.

[21] Jasjit Singh (ed.), *Oil and Gas in India's Security*, Knowledge World/IDSA, New Delhi, 2001, p.131–230.

[22] 'Integrated Energy Policy: Report of the Expert Committee' [IEP], Planning Commission, New Delhi, August 2006.

[23] IEP, p.13.

[24] Fereidun Fesharaki and Praveen Kumar, 'India's Energy Sector: Pride and Prejudice', in Najeeb Jung (ed.), *The Political Economy of Energy and Growth*, New Delhi: Oxford University Press, 2014, p.227–28.

[25] 'Building an energy secure future for India: in consultation with stakeholders', Project Report No. 2006RS22, TERI, New Delhi, 2010.

[26] TERI, p.6.

[27] Ibid., p.7.

[28] Ligia Noronha, 'Challenges to India's Energy Security', in Najeeb Jung, op. cit., p. 214.

[29] For details, see: *Energy Security Handbook*, Energy Security Division, Ministry of External Affairs, New Delhi, March 2013, p.224–29; TERI, p.17-18.

[30] TERI, p. 14–15; the exchange rate used is $1=Rs 50.

[31] Quoted in Noronha (2014), p. 215.

[32] Ligia Noronha, 'Social License', Sharing Value, and Resource Security: The Undervalued Linkages', in *Resource Security: The Governance Dimension*, KAS Publication Series, NO 27, New Delhi: 2009, p. 59.

[33] Benjamin Sovacool (ed.), *The Routledge Handbook of Energy Security*, Routledge, p.3.

[34] Sovacool, p.18–19.

[35] Ibid., p.19.

[36] Daniel Yergin, *The Quest: Energy, Security, and the Remaking of the Modern World*, London: Allen Lane, 2011, p.267.

[37] 'President of India calls for Energy Independence', August 14, 2005, at: www.greencongress.com/2005/08.

[38] India's flagship foreign exploration company OVL has set a production target of 20 million tonnes of oil from overseas assets by 2018, and 60 million tonnes by 2030 [Dadwal, p.62].

[39] Till end December 2013, 8.9 trillion cubic feet of CBM had been established in 33 blocks, while the first steps were taken to develop India's shale gas potential. See Dadwal, p.7–71.

[40] EIA, p.1.

[41] McKinsey, p.11–13.

[42] Leonardo Maugeri, *The Age of Oil: The Mythology, History, and Future of the World's Most Controversial Resource*, New Delhi: Pentagon Press, 2008, p.268.

[43] Maugeri, p.268–69.

[44] Yergin, p.264.

[45] Ibid., p.266.

[46] Ibid., p.276.

[47] For details, see: Deborah Gordon, 'Understanding Unconventional Oil', Carnegie Endowment for International Peace, May 2012; J. David Hughes, *Drill, Baby Drill*, Post Carbon Institute, Santa Rosa, CA, June 2012.

[48] Maria van der Hoeven, World Energy Outlook, IEA, Paris, April 4, 2013.

[49] OPEC forecasts in *Middle East Economic Survey*, 15 November 2013, p.16.

[50] Yuhji Matsuo, 'Asia/World Energy Outlook 2012', IEEJ, January 2013, at: www,eneken.ieej.or.jp/data/4684.pdf.

[51] 'Shifting energy markets spur Gulf tilt towards Asia', Oxford Analytica, 27 August 2013, at: www.oxan.com/analysis/dailybrief/samples/GulfEnergyTilt.aspx.

[52] Mahmoud Vaezi, 'Changing Asia: Toward Cooperation and a Common Identity', Centre for Strategic Research, Tehran, September 2007.

[53] For details, see Ahmad (2009), p.70–73; Energy Security Handbook, p. 302–11.

[54] Ahmad (2009), p.74.

[55] 'Economic outlook, analysis and forecasts: Looking to 2060 – Long term growth prospects for the world', OECD, at: www.oecd.org/eco/outlook/lookingto2060.htm.

[56] For details relating to an Asian role in defining, promoting and realising a new security paradigm in the Gulf, see: Talmiz Ahmad, 'The Gulf Security Imbroglio: Shaping an

Asian Initiative for a New Regional Security Architecture', in Tim Niblock and Yang Guang (eds.), *Security Dynamics of East Asia in the Gulf Region*, Gerlach Press, Berlin, 2014, p.31–68.

[57] Quoted in Talmiz Ahmad (2009), p.83.

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