

Energy and Security in a Changing World

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Abstract

The centre of gravity of global economic growth is rapidly shifting to the Asian continent. The transition is led by China and India which have propelled themselves onto a robust growth trajectory to be fuelled by affordable energy supplies. These developments have been accompanied by a fortuitous but significant growth in the sources of global energy supply, thanks to the re-emergence of Russia as the new petrostate and the discovery of substantial energy deposits in the Caspian and Central Asian Republics. This, coupled with the resolve of the United States to move away from excessive reliance on Middle East oil and the increasing importance of gas as the preferred fuel in a post-Kyoto world, foretell significant realignments in global energy relationships. Regional energy alliances are set to acquire a salience hitherto unknown.

This paper discusses the possible energy relationships that might emerge in the Asian region with particular reference to China and India. Part I introduces the context. Part II briefly outlines the magnitude of energy import dependence of the two Asian giants. Part III discusses the possible supply sources for the Asian region and potential energy alignments that might make this a reality. Part IV is a brief summary of the conclusions.

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I

Introduction

Global energy equations have been undergoing significant realignments. First, the two Asian giants — China and India — have propelled themselves on to a growth trajectory fuelled by an enormous demand for energy that cannot be met by their domestic reserves alone. While China is expected to clock annual GDP growth rates of 8 per cent during this decade, India might lag slightly behind. Consequently, the centre of gravity of the global energy markets is shifting rapidly

and resolutely to the Asian continent. Asia, led by China and India but including Japan, South Korea and Taiwan constitutes the predominant market for energy. Second, this shift is happening *pari passu* with certain fortuitous developments on the supply side as well. In a happy coincidence, Russia is rapidly re-emerging as a formidable petrostate spurred by huge and growing stakes in oil revenues. Third, the Caspian — including the countries on its eastern flank — energy reserves are now a force to reckon with. Estimates of energy reserves in the Caspian might vary wildly, but investments flowing into the region indicate the presence of reserves large enough to warrant a serious interest on the part of investors as well as energy-insecure neighbours. A fourth dimension is the predominance of gas in the Russian and Caspian energy deposits — one that assumes enormous significance in the context of clean energy in a post-Kyoto world.

These developments are happening at a moment in history when the US, the largest energy consumer and importer in the world, is trying to move away — albeit not so successfully — from its dependence on Middle Eastern energy supplies. The US imports half of its hydrocarbon requirements from foreign sources, but only 30 per cent of its oil imports come from the Gulf region, the rest being supplied mostly by Mexico, Venezuela, Colombia and others. While the decision to move away from the Middle East and Gulf oil was reinforced by the unfortunate incidents of 9/11, the US resolve to minimise its dependence from this region predates September 2001. Long before Iraq entered the US radar screen as a possible target of attack, the US had been fine-tuning its energy policy in an attempt to access new sources of oil and gas. President George W. Bush's controversial new energy policy of 2001 focused on how to minimise American dependence on Gulf oil, even if it meant dumping the Kyoto Protocol and drilling in the pristine snows of Alaska. The voluminous Energy Bill, currently doing the rounds of the Congress, voices similar concerns and intentions.

All these have far-reaching implications for the major energy-importing countries of Asia. Japan could be the biggest beneficiary of Russian oil and gas supplies while Central Asia, and to a lesser extent, the Russian Far East could provide a modicum of supply diversification for China. Nevertheless, China's enormous and growing demand for energy will ensure that it continues to source increasing quantities of its energy from West Asia and the Persian Gulf. Finally, India, geographically distant from both Russia and the Caspian, will continue to import its physical oil supplies from West Asia and the Persian Gulf region. To the extent Caspian and Russian energy go to satisfy European and even north American demand, they could release Middle East and Gulf supplies for the two Asian

importers dependent on the region. While all this might reinforce a certain degree of mutual interdependence between the GCC on the one hand and India and China on the other, how it will impact relations between India and China in the coming years remains to be seen.

II

Asia's Energy Security Conundrum¹

India

India, with its billion plus population is poised for enormous energy consumption in the coming decades. It is currently the sixth largest energy consumer in the world. For over a decade now, India's energy consumption has grown faster than its economy and this trend is likely to continue.² A recent study indicates that India's energy consumption will increase at the rate of 5 per cent every year up to 2010-11 in a business-as-usual scenario.³ This is a rather conservative estimate and actual consumption is likely to grow at an accelerated pace. The country's energy-intensive growth makes access to abundant, clean and affordable energy sources imperative.

At present, coal accounts for a predominant share in India's energy basket. But, being a signatory to the Kyoto Protocol, India's burgeoning energy needs of urbanisation, modernisation and rapid growth in motorised transportation will have to be catered for with cleaner fuels. In recent times, the share of oil and gas is increasing, owing to two developments: the explosive growth in transportation sector and the use of Combined Cycle Gas Turbine (CCGT) technology in new power generation.⁴ Of the ten million and more vehicles on Indian roads, all but a few thousand public transport vehicles in the national capital run on liquid fuels. Capacity addition in the power sector tends to favour CCGT technology using liquid fuels or gas. The Energy Information Administration (EIA) of the United States government estimates that by 2010, India's oil consumption will be twice the current levels.

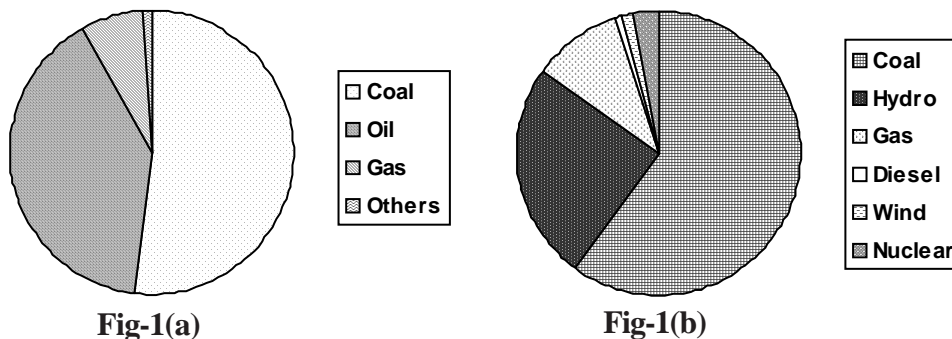


Fig-1(a) : Share of Fuels in Commercial Energy 2000

Fig-1(b): Share of Fuels in Electricity Generation in 2001

India's domestic hydrocarbon reserves are slender. Domestic production has been stagnating around 32 million tonnes a year (6,42,000 barrels a day). Bombay High, the largest oilfield is past its prime and its production is declining, but it has not been replaced by any major new finds. Oil recovery from existing wells is just 28 per cent. Geologists are of the view that the vein carrying liquid gold tantalizingly bypasses India while there might be significant offshore gas.⁵ Currently, India's domestic crude consumption is around 113 million tonnes (2.2 mbd) of which 1.5 mbd is imported. Domestic gas at around 29 billion cubic metres accounts for 8 per cent of total commercial energy consumption, but LNG imports have begun early this year. Dahej, the first LNG terminal to be built in the country has an initial capacity of 5 million tonnes per year and another LNG terminal coming up at Hazira for a similar capacity is expected to push up the share of gas in the total energy basket. However, India's pipeline infrastructure is inadequate and needs substantial upgradation. Besides, the volume of LNG that will eventually be imported will depend upon the price at which it is likely to be available since both power and fertiliser, the downstream industries using LNG are currently unviable at the price at which regassified LNG is available to them. New gas finds off the south-eastern coastline, are deep sea deposits entailing considerable expenses in extraction, limiting near-term prospects for substantial increases in domestic gas production.

As is evident from the charts given above, renewables play a marginal role in India's energy supply. The rather ambitious target of 12 per cent from renewables by 2012 is unlikely to be reached, considering their relatively high costs and the subsidies required to make them viable. The Clean Development Mechanism

(CDM), intended to provide funds for transfer of clean fuel technologies to developing countries is unlikely to make a dent on the renewable energy scene in India. So far, only six renewable energy projects with a total capacity of 75 MW have been signed under CDM.

In the circumstances, it is inevitable that India should have chosen to aggressively pursue all available energy options such as: improving recovery rates from existing wells; acquisition of overseas oil acreages by its national oil companies; enticing international investors in exploration and production by offering appropriate incentives; acquiring clean coal technologies in order to be able to exploit its abundant coal reserves; exploring possibilities of accessing the abundant gas reserves in the neighbourhood; exploiting new fuels like gas hydrates and coal-bed methane; expanding wind energy farms where feasible; and increasing the share of clean, affordable and sustainable nuclear power in the country's energy basket.

At current consumption levels, India imports over 73 per cent of its hydrocarbon requirements. More than 60 per cent of it comes from the West Asian region with the rest supplied by Nigeria, Libya, Sudan and a few others. India's import-intensity is much more acute than that of the US which imports only half of the 20 million barrels it consumes every day. Even China imports only a third of its oil consumption. Such heavy import dependence adversely impacts India's trade balance. In FY 2002, India imported crude and Petrol, Oil & Lubricants (POL) to the tune of US \$ 17.5 billion (Rs 840 billion), accounting for more than a third of the country's total import bill. POL imports pre-empt 40 per cent of export earnings. India's import bill for FY 2003 is expected to touch a staggering US \$ 20 billion and with crude prices reigning consistently above the \$ 35 mark over the last several weeks, the oil import bill for 2004 will be nothing short of an oil shock. India's per capita energy consumption is just about 3 per cent of the OECD average.⁶ Such a low energy consumption base portends quantitative leaps, especially in the transportation sector. The Indian government data forecast that in the next 25 years, oil consumption would triple to more than 7 million barrels a day implying near-total dependence on imports to fuel the economy.

China

Unlike India, China does not have an energy-intensive growth. Yet, in view of the rapid growth rates forecast, the country's energy consumption will rise rapidly in the current decade. Currently, China's energy mix constitutes 62 per cent coal, 28 per cent oil, 3 per cent natural gas and 2.5 per cent hydropower.⁷ However,

increasing environmental pressures compelling a move away from polluting fuels,⁸ rapid industrialisation, urbanisation and growth in motorised transportation⁹, and finally, the manifest reluctance of the Chinese government to embark upon a costly railroad expansion to carry coal from the north and the west to the major consuming centres in the coastal areas of the south and east¹⁰ foretell a significant change in the energy mix during the course of this decade. Natural gas in the energy basket is miniscule — less than 3 per cent of the total — even when compared to the Asian average of around 10 per cent, but China has targeted doubling the share for gas in the next 10 years. Nonetheless, oil will account for a larger and increasing share in China's energy mix in the next twenty years.

China's oil production was 165 million tonnes in 2001 (3.3 mbd), while imports at 65 million tonnes (1.5 mbd) accounted for 31.25 per cent of total consumption.¹¹ In 2002, China imported 1.39 mbd.¹² The year 1993 marked a watershed in China's energy frontier when, after three decades of self-sufficiency and several years of oil exports, it became a net oil importer. Domestic oil production, especially from the mature on-shore fields that supply 70 per cent of indigenous supply, has been stagnating and hopes of major new finds seem dim at least for the moment. Daqing oil fields discovered in the 1960s remains China's major find so far. In the event, oil from overseas acreages and imports will have to satisfy China's ever-growing demand for oil. The IEA estimates that by 2010, imports will rise to 4 million barrels a day.¹³ By 2020, China is projected to become the second largest consumer of oil in the world, next only to the US, and imports are estimated to double to 8 mbd.

In recent times, the share of oil imports into China from the Asia-Pacific has been steadily declining. From 59 per cent in 1992, it came down to just 19 per cent in 1999.¹⁴ In 2001, West Asia — notably, Oman, Yemen, Iran and Saudi Arabia supplied 56.2 per cent of China's oil imports.¹⁵ The Straits of Malacca and the South China Sea account for virtually all the tanker traffic to China. Therefore, potential supply disruptions caused by instability in the Gulf region, price volatility,¹⁶ price spikes caused by any disturbance including war and the physical security of sea lines of communication constitute the security conundrum for China.

Thus, the coming decades will witness the emergence of the two energy-guzzling Asian economies competing with Japan, South Korea and Taiwan for the available sources of supply. Even Indonesia, which is now a net exporter, will join the ranks of the major importers once its reserves deplete by the end of the decade. However, China is geographically more advantageously placed than India in as

much as it can turn to its neighbourhood for diversification of supplies, having settled its border problems with all its neighbours except India.

III

Regional Energy Developments

a) Re-emergence of Russia as the New Petrostate

The global energy firmament has witnessed the rise of new players in the last decade. Russia is fast emerging as a formidable petrostate that could challenge the pre-eminence of the Gulf. As part of the Soviet Union, Russia used to produce 12.5 mbd. After the collapse of the Soviet Union, the output declined drastically, but in the last three years, it has picked up once again, to reach 7.7 mbd in 2002. Exports crossed the 6 mbd mark last year. Oil production in Russia is growing by 11 per cent and is estimated to have reached 8.4 mbd in 2003. By 2010, it is expected to grow between 9-9.8 mbd.¹⁷ Western estimates of Russia's oil reserves are said to be conservative and it is believed that the country has substantially higher reserves waiting to be discovered.¹⁸ EIA estimates that Russia has proven recoverable oil reserves of 58.8 billion barrels.

While OPEC would like to see a disciplined Russia helping it fine-tune output to maintain prices, Russian firms have repeatedly exhibited a tendency to flout their commitments and Vladimir Putin's government is powerless to enforce them because, having successfully privatised most of Russia's oil companies, he has little say in their commercial decisions.¹⁹ Domestic petroleum prices in Russia are lower than the world market prices and this puts a pressure on Russian oil producers to try and sell as much as they can in the international markets that would fetch them not only higher prices, but in dollars. There are varying estimates about the share of oil revenues in Russia's export income — from 25 per cent to 40 per cent depending upon the source. The oil sector provides 25 per cent of the country's tax base.²⁰ Yet, unlike Saudi Arabia and the other OPEC members, who depend solely on oil sales, the Russian economy is more diversified and hence can withstand a price war with the former.²¹ Therefore, Russia is in a position where it can afford not to play ball with OPEC and still get away with it.

There have been conflicting views on whether Russia can displace Saudi Arabia — whose trump card is its acclaimed spare capacity — as the global energy price setter. For instance, Robert Mabro argues that unlike Saudi Arabia, Russia does

not have enough spare capacity to influence oil prices.²² However, there are others who question Saudi Arabia's ability to fine-tune supplies in response to demand.²³ Salameh argues that investments in Saudi Arabia have been stagnating and hence OPEC's spare capacity is a meagre 1.5 mbd, down from 5 mbd in 1990, whereas world oil demand is growing at the rate of 2.2 per cent.²⁴ Salameh further points out that global oil production, currently at 99 per cent of capacity, will soon use up all spare capacity even as demand puts pressure on supplies. Whatever its impact on oil prices, Russian oil supplies spell a global realignment of energy equations. Russia is eminently poised to become a major supplier of oil, gas and even petroproducts to Europe, the US, China, Japan and South Korea.

Substantial infrastructure is already in place and moves are afoot to augment it. Currently, Russia supplies a fifth of Europe's oil needs and a third of its gas. The Russian-EU Energy Charter of October 2000 and EU's Green Paper on the Security of Energy Supply (2001) provide substantial opportunities for increased Russian energy sales to the region. EU imports 16 per cent of its oil and 41 per cent of its natural gas from Russia. In the recent past, Russia has been retreating from the CIS markets to turn towards more lucrative and creditworthy European buyers. The Baltic Pipeline System — commissioned in December 1991 — and the Caspian Pipeline Consortium can together send out 400,000 barrels a day. The Baltic and Black Sea terminals are operating at full capacity and the Russian government is underwriting a new port at Primorsk with a capacity to handle 6 million tonnes to bypass Latvia and Estonia in its outward-bound tanker traffic. Currently, Estonia, Feodosia and Novorossisk handle a sizeable chunk of Russian oil bound for Europe. Russia is targeting a European oil market of 5 mbd.

In its quest for supply diversification, the US views Russia as a key energy ally. The Bush-Putin summit in May 2001 produced a joint declaration on strategic relations of which energy cooperation formed an integral part. The US is extending substantial assistance to Russia to develop/modernise the Russian oil sector in East Siberia and the Far East, as well as in upgrading ports, pipelines, supertanker fleets, etc.²⁵ Currently, the US buys 160,000 barrels a day of Russian oil — constituting just about 1 per cent of its annual consumption, but Russia is targeting 5 per cent share of the US market.²⁶ With the integration of the Druzhba and Adria pipelines and the establishment of an oil outlet at Omishalj in Croatia (being financed by the Croatian government at a cost of \$ 40 billion) Russia will be able to export upto 300,000 barrels a day to the US by 2010. By 2003, the first phase of the integration will enable transportation of 100,000 barrels a day. LUKoil, the Russian oil major, is planning to build an ice-breaker port at Murmansk to ferry

Russian oil in tankers through the Barents Sea to the North American Pacific coast. The Sakhalin-II — Pacific coast route spanning 7,000 kilometres is also considered a potentially viable route for US-bound tanker traffic.

Russia is also the repository of the world's largest gas reserves. State-owned Gazprom controls most of the 48 Tcm of gas that Russia is estimated to possess. In fact, new gas finds are said to be keeping pace with production, and many of them are located in the Irkutsk region of eastern Siberia.²⁷ In 2002, Russia exported 198 Bcm of gas, the rest being used by the domestic market. According to reports, Gazprom plans to produce 530 Bcm of gas a year and most of it is likely to be exported even as Central Asian gas supplies domestic markets in Russia. Currently, state-owned Gazprom is a monopoly supplier and it has been appointed to coordinate all gas exports from eastern Siberia. As production volumes increase, Gazprom might have to look for new markets for the incremental gas. At present, most of Russian gas headed for Europe transits through Ukraine where Russia faces the vexing problem of Ukrainians helping themselves lavishly to the gas without paying for it. Therefore, it might make immense sense for Russia to ship it in other directions as well.

Where will incremental Russian oil and gas be headed? While the substantial chunk of Russian oil is Westward bound, in recent times, Russia has begun to explore markets on its eastern and southern flanks as well. The logical choice would appear to be Japan — for oil as well as gas. A major part of Japan's refining capacity is located on its west coast and can easily be supplied by Russia. The prospect of avoiding congestion in Malacca Straits is a big plus point in Russia's favour. At present, Japan sources more than three quarters of its crude supplies from West Asia and Persian Gulf all of which will have to pass through Malacca. The distance is so huge that it takes nearly two months for a Very Large Crude Carrier (VLCC) to do this trip. As against this, ships from Sakhalin to Japan's northern shores located just 47 km away take only 15 days, making Sakhalin oil a very attractive option for Japan.²⁸ But then, Sakhalin freezes over in winter and has no ports for loading VLCCs as yet. Also, Japan is probably somewhat hesitant to tie its supplies to a regime which does not permit globally accepted production-sharing agreements.

Nevertheless, Russia's recent decision to build a pipeline from Angarsk to Nakhodka gives a big boost to Russo-Japanese energy cooperation. That this 4,000 km pipeline was favoured over a shorter one to Daqing in China has come as a surprise to the latter which had been hoping to access Siberian oil to fuel its economy's growing thirst for energy. The Nakhodka project, although considerably

costlier, would encourage the development of Eastern Siberia and the Far East, which is on top of the list of Putin's priorities. It is also expected to attract substantial Japanese investments in the region and generally help Russian-Japanese relations. The proponents of the Nakhodka route also point out that a coastal location will allow Russia to sell oil to anybody in the region including China, Taiwan and the US. It is possible that the decision to build the pipeline which will carry 50 million tonnes of Siberian oil to Japan and not to China may have less to do with the destination *per se* than with Putin's resolve to reclaim control over energy pipelines which he feared he had lost to Yukos under Khodorkovsky. While there is still a plan to extend a spur to Daqing, it is doubtful whether the existing volumes available in Siberia warrant investments in the spur.²⁹

While Asian markets' access to Siberian crude may be somewhat limited, gas is another story. Asia appears to be the natural market for Russian gas. Especially for Japan, which is committed to Kyoto targets, access to abundant gas is imperative. Already, the share of gas has increased steeply in recent years to 16 per cent of the total commercial energy, thanks to large-scale LNG imports. Japan's deregulated electricity markets also make gas the preferred fuel for new generation. Sakhalin is only 1,000 kilometres from Hokkaido and thus even pipeline exports appear to be a feasible option. While Japan is currently importing its LNG requirements mostly from the GCC and from Indonesia, in the not to distant future, Siberian, Sakhalin and Far Eastern sources might supplement and to some extent, even supplant GCC supplies. However, there are two factors that would impede Japan's exploitation of near-source gas through pipelines — the absence of a domestic trunk-line network that would allow the gas to be piped to the locations where it would be required, and the seismic zones through which gas pipelines may have to pass before they reach consumption centres.

However, export of Siberian and Sakhalin gas in LNG form is an eminently feasible option. China, like India, has already begun to view LNG imports as a potential option to diversify supply sources as well as ensure a clean and sustainable growth paradigm. The first LNG terminal at Guangdong province will be importing 3.3 million tonnes a year Australian gas from 2006. Two more LNG terminals are being built — one at Fujian and a third in Zhejiang province with a total capacity of 5.6 million tonnes a year. In fact, by 2010, China National Overseas Oil Company's (CNOOC's) total gas capacity is expected to reach 30 billion cubic metres a year.

The Nakhodka deal may have put paid to China's efforts to access regional crude supplies, but there are enough gas fields whose production could reach

China in the form of LNG. Russia has to find markets for Kovykta in eastern Siberia, estimated to contain 6.6 Tcm of gas and another 1.24 Tcm at Chayandinskoye, 0.7 Tcm at Yurbchono-Tokhoms koye, 170 Bcm at Sobinsko-Paiginskoye and 50 Bcm at Talakan.³⁰ China and South Korea will be the likely customers for this gas which is expected to be piped in about four years' time. A feasibility study conducted by Rusiya, a technical consultancy firm with China's National Petroleum Corporation (NPC) and South Korea's Kogas found the project commercially viable and gas exports of 34 Bcm/year are expected to begin in 2008.³¹ There are also estimates which show that Talakan and Verkhne-Chonsk might produce enough oil to justify a spur to Daqing from the Nakhodka pipeline.

Table-1 gives the LNG potential in the Asian region and it is expected that most of the supplies will reach Asian destinations.

Table-1: LNG Capacities in the Asia-Pacific Region

Country	Existing Capacity Million Tonnes (MT)	Proposed Additions (MT)	Possible Total Capacity (MT)	Operational From
Australia	7.5	25.5	33	2004-2008
Brunei	6.7	4	10.7	2008
Malaysia	16.7	6.8	23.5	2005
Indonesia	30.8	13	43.8	2007-2009
Russia		36.6	36.6	2007-2010 & After
China (West-East Line)		8.8	8.8	2005

Source: Petroleum Economist. May 2003, p12

LNG imports from Sakhalin will go into China's polluted Northeast. The massive 4,000 km West-East pipeline does not reach these provinces. Sakhalin-II, operated by a consortium led by Royal Dutch-Shell hopes to ramp up capacity to 9.6 million tonnes a year of LNG, but has committed buyers only for two-thirds that quantity. It is now looking to China as a possible customer for Sakhalin LNG. As for Sakhalin-I which is estimated to contain 2.3 billion barrels of oil and 485 Bcm of gas, the most likely customer is China.

Unlike China, India's gas imports are unlikely to come from the Siberian region even in LNG form. India's geographical proximity to the gas-rich Persian Gulf will

enable it to import LNG from Qatar, Iran and even Saudi Arabia while piped gas from Iran is being seriously investigated for commercial feasibility.

b) Central Asian Energy Potential and Possible Markets³²

Central Asia, landlocked and hidden behind the iron curtain of the Soviet Union, has emerged in the last decade as a potentially energy rich region. While estimates of the region's reserves vary widely, there is consensus that the region could play a vital role in affording a modicum of supply diversity options for countries of the region. Table-2 gives a sketch of the proven and potential oil reserves in Central Asia, while Table-3 lists the proven gas reserves in the Caspian region.

Table-2: Proven and Potential Oil Reserves in Central Asia

Country	Proven Oil		Potential Reserves	Total	
	Low	High		Low	High
Kazakhstan	9 bbl	17.6 bbl	92 bbl	101 bbl	109.6 bbl
Turkmenistan	0.5 bbl	1.7 bbl	38 bbl	38.5 bbl	39.7 bbl
Uzbekistan	0.3 bbl	0.6 bbl	2 bbl	2.3 bbl	2.6 bbl

Source: EIA, August 2003 (bbl = billion barrels)

Kazakhstan which might be a possible supplier to Asia has about 9 to 17.6 billion barrels of oil while the combined gas potential of the three Central Asian Republics on the eastern flank of the Caspian is estimated to have up to 22 trillion cubic meters of gas.

Tengiz, Karachaganak and Kashagan are the three major oil fields in Kazakhstan. The last two also have quantities of gas. While a substantial portion of Kazakh oil is headed west to European markets and some to northern Iran through swap deals, as of now only a small quantity is shipped from the eastern Caspian shores of Kazakhstan by rail.

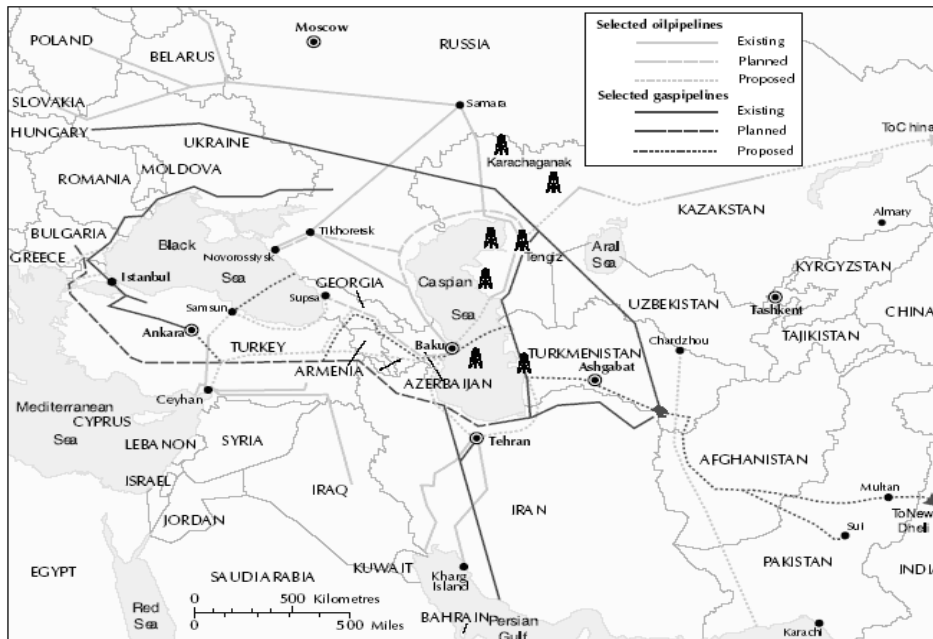
Table-3: Proven Gas Reserves of Central Asia

Kazakhstan	1.84 Trillion cubic metres
Uzbekistan	1.87 Trillion cubic metres
Turkmenistan	2.86 Trillion cubic metres

Source: British Petroleum

Turkmenistan's proven and probable reserves are estimated to be in the region of 22 Tcm. The entire Central Asian region, especially the Caspian Sea is believed

to possess huge quantities of offshore oil and gas deposits; but it is also a chasm that separates Central Asia from potential Western markets. Forbidding mountain ranges block access to the south. The north and east are the only routes through which Central Asian energy can be accessed, but here again, the eastern markets are too far away. The conspiracy of geography has been reinforced by accident of history to ensure that the region's energy flows to markets solely through Russian outlets in the north (See Map). Before the Caspian Pipeline Consortium (CPC) was built by multinational oil companies, Transneft, the Russian state-owned pipeline company provided the sole pipeline transit routes for Kazakh oil. Even today, Russia's Gazprom provides the sole gas outlets from the region. The CPC pipeline system as well as the Baku-Tbilisi-Ceyhan (BTC) backed by the US government and the World Bank provide diversification of oil transit routes. There has been talk of an undersea Caspian pipeline to Baku in Azerbaijan whence they would be linked to another Azerbaijan International Operating Company (AIOC) pipeline supplying to Western markets, but technical and environmental considerations have stalled the move, at least for the moment. If and when this comes about, it might provide a supplementary route bypassing Russia.



Selected Central Asian and Transcaucasian Oil and Gas Pipelines

Source: IEA Caspian Oil & Gas, 1998, <http://www.iea.org>

Most of Caspian energy is found in the seabed and until the legal status of the Caspian is determined, division of the spoils will remain a contentious issue. Nevertheless, Russia has put forth the notion of a 'modified median line' that will help it carve up the seabed to its advantage and is supported in this endeavour by Azerbaijan and Kazakhstan although Iran is vehemently opposed to the proposal. Owing to its political influence and geographical dominance, Russia is uniquely poised to control energy transit routes radiating from the Caspian region. The CPC links Kazakhstan's oilfields to the Russian ports on the Black Sea and will transport Kazakh oil through Russia to the Western markets. But then, evacuation of Kazakh oil through pipelines to Black Sea ports have an inherent limitation because the Bosphorous Straits through which they must pass subsequently to reach the Mediterranean for further transportation to consuming centres are a veritable choke point already replete with tanker traffic. Russian oil headed for Western markets also passes through Bosphorous. Turkey has expressed concerns about the possible environmental impact of increased tanker traffic through this region.

Currently, Kazakh gas has only one market, namely Russia. Nearly 6.93 Bcm of gas from Karachaganak is being exported to Russia. Further increases in gas production from Karachaganak will have to wait until viable buyers are found outside of Russia because the price that Kazakhstan commands from Russia is currently too low. While some oil from Kashagan can be transported through CPC, another dedicated route will have to be established before production from this field can reach peak levels. At present, there are no outlets for Kashagan gas reserves, which are considerable.

China's national oil company has acquired equity stakes in Uzen oilfield in eastern Kazakhstan from where China proposes to build a 1,000 km pipeline to ferry the oil to its refineries and consumption centres. Incidentally, this pipeline could help Kazakhstan reach oil from the Caspian shores to its own markets in the west and the south. Besides, if the pipeline is routed through Xinjiang's Tarim Basin which also has discovered deposits, it could add to the economies of scale of the operation. China and Kazakhstan are jointly building a new pipeline transporting crude from Aktyubinsk west of Atyrau to the gas hub in Atyrau. A Chinese national oil company has a controlling stake in an oilfield in the region and the pipeline will help evacuate oil from this field to the markets. But the pipeline is expected to have spare capacity, which other producers in the region will also use. Earlier this year, Chinese oil companies unsuccessfully tried to acquire BG's stake in Kashagan. Chinese officials are on record saying Kazakhstan is an important

target for diversification of the country's supply sources.³³

Turkmenistan is the gas giant in Central Asia. The country has the world's 11th largest gas reserves. BP Statistical Review puts recoverable oil reserves at 0.5 billion barrels. The government's figure for combined oil and gas reserves is 45.44 billion tonnes of oil equivalent (mostly gas). It estimates total proved, probable and possible reserves at 12 billion tonnes for oil and 22.64 Tcm for gas.³⁴

That would make Turkmenistan the world's fourth largest potential gas producer. Gas production in 2002 was around 0.05 Tcm. It is expected to go up as the country's biggest field, Dauletabad, reaches peak production, the Chartak, Gazyldepe and Balguyy fields are brought on stream and output optimised at a handful of other fields.

Marketing the gas remains a problem because of the shortage of export pipelines, the remoteness of viable markets and limited internal demand. The only two gas export lines are through Russia to Europe (with a capacity of up to 59 to 69 Bcm per year) and to Iran (up to 339 Bcm a year). Gas exports in 2001 were 36 Bcm, of total output of 50 Bcm.³⁵ Gas output projections depend entirely on assumptions regarding export opportunities. As long as major new export pipelines are not in place, Turkmenistan's gas production and exports will continue to grow only sporadically, mirroring the payment abilities of its neighbours and its transit relationship with Russia.

The proposal for building a pipeline to transport Turkmen gas to South Asian markets through Afghanistan and Pakistan remains a non-starter for various reasons. Any transit route for Turkmen gas through Iran is likely to be opposed by the latter, which has huge gas reserves of its own. In fact, Iran has the second largest gas reserves in the world after Russia and it makes little sense to provide transit for other countries' gas supplies.

Thus, Turkmen gas will probably go to supply Russian needs to free up Russian gas for sale to Asian and European markets. Unocal (US) and Delta Oil Company (Saudi Arabia) propose to build a crude oil export pipeline from Chardzhou, Turkmenistan, via Afghanistan to a terminal on the Pakistani Arabian Sea coast. The so-called Central Asia Oil Pipeline (CAOP), with an envisaged capacity of 50 Mt/year (1 Mb/d), would have to transit some 700 km of politically unstable Afghan territory. Fields in both the Turkmen and Uzbek portions of the Amu Darya basin, as well as the Kumkol field in central Kazakstan, could be connected to the CAOP. The CAOP project is linked to a similar pipeline for gas, which is expected to precede it.

For Central Asian gas, at the moment, the Russian route appears to be the most feasible. In 2003, President Saparmurat Niyazov of Turkmenistan and the CEO of Russia's Gazprom signed an historic gas sales and purchase contract which will allow Russia to import 1.68 Tcm of Turkmen gas between 2004-2029. In fact, President Vladimir Putin is said to be pioneering the idea of a gas-OPEC between Russia and the three CARs — Kazakhstan, Uzbekistan and Turkmenistan. For Russia, it makes eminent sense to buy CAR gas so that it can free up its own Sakhalin and Siberian Far East reserves for supply to Japan and South Korea. In the process, Russia can delay development of more expensive fields such as the onshore and offshore fields of the Yamal peninsula. Therefore, Russia is keen to regain its sphere of influence in the region and act as the energy leader for the region.

In Central Asia, China has substantial interests. Militant Islamic groups and ethnic populations (Uyghurs) that straddle China's north-western borders are worrisome concerns for China because Xinjiang — with its concentration of Uyghurs — is the emerging energy heartland of China. Therefore, China's political and energy interests overlap in this region. Trade and investments have been used as essential tools in building relationships with Central Asian states. China is also a member of the Shanghai Cooperation Organisation (SCO) along with Russia, Kyrgyzstan, Tajikistan, Kazakhstan and Uzbekistan. Though it targets cooperation against terrorism in the region, SCO gives China a foothold into the Central Asian region rich in oil and gas reserves. Newly independent of Russian rule, the Central Asian states have not been averse to increasing Chinese influence in the region if only to keep Russia at bay. In this scenario, it is inevitable that China and CARs would forge mutually beneficial energy relationships.

c) Asian Energy Potential & India's Energy Security

While Russian and Caspian energy sources will go a long way to meet the energy demands of the Asia-Pacific region, India, the isolated Asian country heavily dependent on imported energy sources will continue to rely on supplies from the Gulf region supplemented by regional gas and hydroelectric resources. In this context, the emergence of the Russian petrostate and the addition of Caspian oil to global production are likely to impact India's energy security.

First and foremost, regardless of its origin or location, addition of oil and gas to global energy supply serves to enhance overall energy security by reducing shortages in the face of growing demand. In a world set to graduate from the current 77 mbd consumption to 120 mbd in the next eight years, (a substantial

chunk of it needed by China and India) increased flow of Russian and Caspian oil is undoubtedly a welcome development. It will tend to keep prices stable.

Unlike the US and Europe, India will continue to rely on oil from the Gulf region to satisfy its burgeoning needs. Considering the excessive reliance of the Gulf oil producers on oil revenues, it is unlikely that they would be able to withstand sustained production cuts to the extent of North American and European withdrawal from their supplies. Therefore, the OPEC, especially its Gulf members, would be looking at other large, growing and stable markets like India and China. Geographical proximity will also ensure that Gulf oil is the most viable source of supply to India. To the extent the global energy realignments will wean states away from West Asia and Persian Gulf, leaving them – with near-total dependence on oil revenues – to sell to those who cannot access alternative sources of supply to any significant extent, there will develop a modicum of mutual interdependence between the suppliers and the consumers.

Table-4: Proven Oil and Gas Reserves in West Asia

Country	Oil (Billion Barrels)	Gas (Trillion Cubic Metres)
S. Arabia	261.6	6.62
Iraq	115	N.A.
Iran	100.1	25.85
Kuwait	98.9	N.A.
UAE	63	5.78
Qatar	N.A.	25.92

Source: World Oil. August 2003, 224 (8) US Energy Information Administration

What can India do in order to enhance its energy security is to acquire oil acreages in Russia and Central Asia? For some years now, India's premier exploration and production company ONGC has been making forays into overseas oil acreages in the form of Production Sharing Contracts (PSC) through its subsidiary ONGC Videsh Limited (OVL). It has also been acquiring exploration rights in various parts of the world. Oil India Limited (OIL), the other public sector upstream company, and Reliance Industries Limited, the private sector oil major have also made forays into overseas exploration acreages. OVL has obtained a 20 per cent stake in Sakhalin-1 in Russia at a cost of US \$1.7 billion and the field is expected to commence production in 2005. In Iraq, OVL is eyeing a stake in the giant Tuba oilfield in the south of the country. It hopes to develop this field with Reliance, once sanctions are lifted. In Vietnam, OVL has 45 per cent stake in

Nam Con San gas basin which is being developed by a consortium of BP, Petrovietnam and OVL. The venture, which has just commenced production, will produce 3 billion cubic metres a year for 20 years. In Kazakhstan, OVL has submitted a bid for minority stake in Kurmangazy oil field which is being shared equally by Russia and Kazakhstan. If successful, this venture will give India a toehold in Central Asia. It is one of the largest offshore fields in the region and has 820 million tonnes of recoverable reserves. OVL is also considering acquiring a 15 per cent stake in Alibekmola, a discovered field, currently controlled by Canadian firm Nelson Resources. OVL's acquired 25 per cent stake in the Greater Nile Petroleum Operating Company in Sudan controlled Canadian firm Talisman Energy Inc. at a cost of US \$750 million. In Libya, OVL has signed an agreement with the Turkish Petroleum Overseas Company to acquire 49 per cent stake in two on-land oil and gas blocks. In Myanmar it has acquired a 20 per cent stake in offshore gas exploration block. OIL has 10 per cent prospecting share in North Hell Hole Bayou fields in the US and a 20 per cent share in Iran's Farsi along with ONGC and OIL each of which hold 40 per cent of the equity. ONGC and Reliance have equity stakes in Yemeni oil fields as well. The exact quantum of funds committed for these ventures is not available.

India has already received two consignment of equity oil from its investment in the Greater Nile project in Sudan at a fixed price far below the prevailing market price for similar grade of crude. Similarly, the investment in Vietnam has already started yielding dividends — in the form of payments in lieu of gas. India has already received US \$6 million in revenues from its investment in Vietnam. OVL has targeted a supply of 400,000 barrels of oil in 20 years and eventually hopes to source 15 per cent of India's oil consumption from its overseas acreages. That, however, would depend upon a number of factors, including ONGC's ability to raise the finances to fund the development. Besides, there are inherent limitations in the acreage route, especially if the acreages are too far away to physically transport the oil or if they are located in unstable regions.

Like China, India has ratified the Kyoto Protocol and is committed to ensuring a clean growth paradigm. The share of gas in India's energy basket may have to be increased steeply to fulfil this objective. Piped gas supplies from Iran, Turkmenistan, Bangladesh and Myanmar and LNG from the Gulf region would feature prominently among India's options in the future. Iran is sitting on the second largest gas reserves in the world — next only to Russia — and its monetisation would be critical to Iran's future growth and prosperity. While Iranian gas could be either piped to India through undersea pipelines or overland route through

Afghanistan and Pakistan, another option is to liquefy it and supply LNG in tankers. But the US sanctions against that country preclude major investments by global oil majors. Nevertheless, India with its acute energy vulnerability is keen to access Iranian gas. India's pipeline company, GAIL and National Iranian Oil Company have together commissioned a feasibility study to evaluate the viability of a deep-sea pipeline from Iran to India's west coast to ferry Iranian gas. The feasibility report will decide whether Iranian piped gas is a viable option for India. If not, pipelines may have to await return of peaceful political relations between India and Pakistan. Meanwhile, negotiations are on to bring Iranian gas to India in LNG form.

Bangladesh, India's eastern neighbour has been blessed with substantial quantities of natural gas. There are wide variations in the estimates of gas reserves in Bangladesh, but a Petrobangla — United States Geological Survey estimate of 0.9 Tcm is considered reasonably accurate. Unocal has found a huge deposit in Bibiyana and it is possible that this well, when producing, can supply up to 14.15 Mcm a day (500 mmcf/d) to India. However, owing to the immense domestic resistance in that country to any proposal for gas exports to India, it is doubtful that Bangladesh gas will feature in India's supply calculus.

Myanmar where India's OVL has two fields, is a potential source of supply for India. ONGC Videsh Ltd, India's flagship overseas investment company, has discovered a world-class gigantic gas field in an offshore block in Myanmar. The discovery in offshore Myanmar, is estimated to hold 113 to 169 Bcm of gas, equivalent to India's 40 per cent gas production. The block, where OVL has 20 per cent stake, is estimated to hold in-place gas reserves of 396 to 592 Bcm and can supply 15 Bcm of gas a day. However, being offshore, it can be accessed only after laying a pipeline undersea or overland through Bangladesh. Whether Bangladesh would be willing to allow the pipeline to be routed through its territory and the security of such a pipeline would be paramount concerns which would decide the pace of monetisation of this gas find.

A key variable determining the share of gas in India's energy basket would be the price of gas. At the moment, domestic gas pricing follows a complex formula wherein, the consumer price of gas is fixed (at a discount to global prices), but there is a dual producer pricing formula. While international oil companies producing gas in India are paid a price that is linked to an index of fuel oils, the domestic gas producer ONGC is paid a cost-plus price. Besides, ONGC absorbs the difference between the price paid to IOCs and the price charged to domestic consumers. However, as the share of IOC gas in the total domestic gas production goes up,

and as LNG imports materialise, it would be difficult to maintain dual gas pricing. Considering that fuel price is critical to the price of electricity produced by gas turbines, it is unrealistic to expect steeply priced gas to have a market in India. Therefore, be it LNG or piped gas, the cost of the associated infrastructure (LNG regassification facilities or pipelines) will be critical in determining the affordability of gas to Indian consumers.

There is also a possibility of a regional electricity grid being developed in the South Asian region. If it materialises, India would be the biggest buyer, while most other countries of the region would be suppliers to the grid.

IV

Conclusions

- The rapid growth trajectory of the two Asian economies will shift the centre of gravity of energy markets to Asia by the end of this decade. China and India, together with Japan, South Korea and Taiwan will account for 85 per cent of Asia's energy demand and energy security will become their paramount concern.
- This emerging demand centre is ringed by supply sources comprising predominantly Russian Far East, Siberia, Caspian Central Asia, Bangladesh, Myanmar and the Gulf states of Oman, Qatar and Iran.
- Diversification of supply sources is an acknowledged imperative for heavily import-dependent nations.
- Diversification of markets is a desirable objective for energy suppliers, especially when their economies are fuelled by energy export revenues.
- There are significant and compelling reasons for turning to 'near-source' incremental supplies especially for the Asia-Pacific region whose supplies have to transit the congested Malacca Straits. Japan to a large extent and the rest of Asia-Pacific to a lesser extent, would be the chief beneficiaries of incremental energy from Russian Far East, Siberia and Sakhalin. New discoveries, on-going and planned investments point to new regional energy alliances. But Middle East and Persian Gulf will retain their primacy as the pre-dominant energy suppliers to Asia-Pacific.
- Gas will feature prominently in Asia's incremental energy demand. Increasing share of gas in the Asia-Pacific will be sourced from within the region where possible, through pipelines, but also as LNG. For India, the price of

gas will critically determine its share in the country's energy basket.

- To the extent Central Asian gas supplies meet Russia's domestic demand, they will free up Russian gas supplies for the Asia-Pacific markets.
- India will continue to source its oil from GCC. India's quest for gas supplies will lead it back to the Gulf – Iran, Oman and Qatar – to be supplemented by Myanmar and possibly Bangladesh gas.
- With the United States and Europe reducing their dependence on Middle Eastern Oil supplies, the slack would be taken up by the growing demand in China and India.

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Legend: Tcm = Trillion Cubic Meters
Bcm = Billion Cubic Meters
Bbl = Billion Barrels
Mbl = Million Barrels
MT = Metric Tonne

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