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Co-operative Strategies For Energy Security

Sudha Mahalingam

The twenty-first century is witnessing certain key developments on the energy scene. Even as the centre of gravity of global energy markets is shifting rapidly and resolutely to the Asian continent, Russia is emerging as a formidable petro-state. There is a natural synergy between resource-rich Russia and the energy-thirsty economies of China and India. Geographically, the three together constitute a massive and contiguous land mass, home to a third of the global population and rich in natural as well as human resources. This fortuitous configuration opens up possibilities for forging a new regional identity, based on shared interests and mutually beneficial cooperation. Energy cooperation leads the list of such possibilities. This paper identifies potential areas of energy cooperation among the three countries of the region, namely, Russia, China and India, and in doing so, adopts an approach that goes beyond the conventional, to examine prospects that are at once specific, immediate and feasible.

The challenge is huge. For China and India to reach just one-quarter of the level of US oil consumption, world output would have to rise by 44 per cent. To get to half the US level, world production would need to nearly double. That's impossible. The world's oil reserves are finite. And the view is spreading that global oil output will soon peak.

The Christian Science Monitor, 20 January 2005

PART I INTRODUCTION

For some years now, global energy equations have been undergoing significant realignments. First, the two giants of Asia—China and India—are asleep no more and have propelled themselves onto a growth trajectory fuelled by an enormous and growing thirst for energy—thirst that cannot be quenched by their domestic reserves alone. China is expected to clock annual GDP growth rates of at least 8 per cent during the remaining years of this decade. Having managed to move away from an energy-intensive growth paradigm, China's energy consumption is expected to lag marginally

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behind its economic growth, although for some reason, its oil consumption has been growing far more rapidly during the last two years—at 11.3 per cent in 2003 and 16 per cent in 2004. The Indian economy, on the other hand, is rather energy-intensive and the expected 7 to 8 per cent growth during this decade is likely to require around 8 to 9 per cent growth in energy consumption. Thus, energy demand from both the Asian countries is slated to grow at around 8 to 9 per cent in the remaining years of the decade.

Most of Asia's energy demand growth will be led by hydrocarbons. Oil leads energy demand, accounting for 40 per cent of commercial energy consumption, while gas, currently at 10 per cent, is expected to go up to 15 per cent by 2020. More than a third of incremental energy demand comes from oil while gas accounts for 12 per cent (*Petroleum Economist* 2004). Domestic oil production is tapering off in both China and India and production is lagging behind burgeoning demand, with imports bridging the widening gap between demand and supply. 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 is rapidly developing into what one may call the new energy demand heartland.

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 petro-state that could challenge the pre-eminence of the Persian Gulf as the sole piper calling the energy tunes. The Russian economy has key stakes in its energy industry that contributes as much as a quarter of the country's GDP and a third of its tax revenues. A second fortuitous development is the emergence of the Caspian and Central Asian countries as the new energy frontier. Despite the scaling down of their originally estimated reserves from 233 to just 33 billion barrels, the region is attractive enough as a source of supply diversification for China and India, both being currently dependent on oil from the Persian Gulf region. For Russia, Central Asia and the Caspian, Asia represents a promising source of market diversification.

Thus, there is a natural synergy between resource-rich Russia and the energy-thirsty economies of China and India. Geographically, the three together constitute a massive and contiguous land mass, home to a third of the global population and rich in natural as well as human resources. This fortuitous configuration opens up possibilities for forging a new regional identity, based on shared interests and mutually beneficial cooperation. Energy cooperation leads the list of such possibilities.

PART II

OVERVIEW OF ENERGY SCENARIOS IN CHINA, INDIA AND RUSSIA

CHINA

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 (Guo 2002 [IEA puts the share of oil in 1996 at 20 per cent, slated to go up to 26 per cent by 2020]). However, increasing

environmental pressures compelling a move away from polluting fuels,¹ rapid industrialisation, urbanisation and growth in motorised transportation,² and finally, the manifest reluctance of the Chinese government to embark upon a costly railroad expansion to carry coal from the north and west to the major consuming centres in the coastal areas of the south and east (Harrison 2002: 271) foretell a significant change in the energy mix during the course of this decade.³ Natural gas in the energy basket is miniscule—just 3 per cent of the total—even when compared to Asian average of around 10 per cent, but China has targeted doubling the share for gas in the next seven years. Even so, oil will account for a larger and increasing share in China's energy mix in the next twenty years.

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. In 2004, China's oil production was 175 million tonnes satisfying just about 60 per cent of domestic demand, with the rest being supplied by imports. Domestic oil production, especially from mature on-shore fields has been stagnating and China is now hoping to ramp up production in its western oilfields in Xinjiang (*Sinocast*, 2005). Even so, oil from overseas acreages and imports will have to quench China's ever-growing thirst for oil. International Energy Agency (IEA) estimates that by 2010, imports will rise to 4 million barrels a day. There have been claims that China has already outpaced Japan to become the second largest energy consumer in the world. In 2001, China had 15 million cars, buses and trucks, but automobile manufacture is proceeding at a frenetic pace with 2 million vehicles being added every year. It would therefore be plausible to estimate that by 2020, oil imports will reach 8 million barrels a day (mbd),⁴ necessitating half of domestic consumption to be met by imports (*Xinhua*, 2005).

It hardly needs emphasizing that such import dependence exposes China to global oil price volatility and spikes, especially because (like India) China sources a substantial chunk (58 per cent) of its consumption from the Middle East—notably, Oman, Yemen, Iran and Saudi Arabia. Apart from the vulnerability caused by excessive dependence on a single region—one that is perceived to be unstable—for energy supplies, virtually all the tanker traffic bound for China passes through the Straits of Hormuz, Straits of Malacca and the South China Sea—all considered choke points. Therefore, security of sea-lanes of communication is a concern for China, which perhaps explains its 'String of Pearls' strategy (Rajamohan 2005).

China appears to be generously endowed with gas reserves—Sichuan, Daqing, Changqing, Liahoe, Tuha, and the Tarim basin in Xinjiang, which is estimated to

¹ China currently accounts for 14 per cent of global carbon emissions and by 2020 will become the highest emitter of green house gases (GHG). China has ratified the Kyoto Protocol and has displayed keenness to reduce pollution levels.

² In the current year, transportation sector is set to overtake industry in the consumption of oil.

³ The liberalisation of the Chinese economy in the late 1970s began in coastal areas where import was an easier option.

⁴ IEA estimates are higher than those of others. Baker Institute: 3 mbd, APERC: 2.9, while Chinese estimates are much lower. PRC State Council: 1.7.

contain 48 trillion cubic feet (tcf) of gas reserves. The most promising basins are situated in western and north-central China, necessitating substantial investments in pipelines. Petrochina, an NOC (National Oil Company), is building a 1400 km gas pipeline project linking the Shan-Gan-Ning gas basin to Shandong province in eastern China via Beijing. The other pipeline projects are SeNingLan from Sebei in Qinghai to Lanzhou in Gansu (already operational), and Zhong Wu pipeline from Zhongjian in Sichuan province and Wuhu in Hubei province, which is under construction. China is also pursuing a 'Develop the West' policy to bring the energy-rich but development-poor regions on par with the metropolitan centres in the east and south. An international consortium of Royal Dutch/Shell, Gazprom, China Light & Power, etc. is building the pipeline from Xinjiang to Shanghai, covering a distance of 4,200 kilometres—the second largest infrastructure project in China after the Three Gorges Dam—at an estimated cost of US \$18 billion (*Petroleum Economist*, 2002: 38). Although the cost of carrying gas over such long distances would be high enough to make imported LNG (Liquefied Natural Gas) a more economical option, China's determination to go ahead with the project indicates that when it comes to energy security, the country prefers high-cost self-reliance to the markets.

The Chinese leadership appears to be acutely conscious of the country's energy vulnerability. In the last two decades, energy security concerns have informed and dominated China's diplomatic, strategic, commercial and scientific initiatives. China has been quick to grasp the opportunities provided by the opening up of upstream activities to foreign investments in energy-rich countries around the world. It has effectively used diplomacy as a tool in this pursuit. Just three years after it became a net oil importer, China National Petroleum Corporation (CNPC) launched an aggressive foray into overseas oil acreages as well as share-oil ventures. It now has investments in Argentina, Bangladesh, Canada, Colombia, Ecuador, Indonesia, Iran, Kazakhstan, Malaysia, Mexico, Mongolia, Nigeria, Pakistan, Papua New Guinea, Peru, Russia, Sudan, Thailand, Turkmenistan, United States and Venezuela. China's 15 billion US \$ investment in Sudan has been fruitful with the latter supplying 7 per cent of China's oil imports. China has also moved to secure a hold on Canada's vast oilsands' resources. Enbridge Inc, a Canadian company and PetroChina announced a preliminary deal to invest a new US \$2.5 billion oil pipeline on Canada's West Coast. The deal envisages a pipeline that would move liquefied bitumen across the Rockies to Prince Rupert, a port on British Columbia's Pacific Coast (*Energy Bulletin*, 2004).

Sinopec has committed to develop oil and natural gas fields in Tunisia and the Arabian Sea through purchase of equity in Sinochem, another SOE (State-owned enterprise), which has acquired these oilfields (*China Economic News*, 2002). Recently, in a bold move, China made an outright offer to buy America's Unocal for \$13 billion in cash. Unocal holds large leases in the waters off Southeast Asia. However, US interests moved to keep China out of the deal which eventually went to an American multinational. In December 2004, China signed a deal with Venezuela and neighbouring Colombia to construct a pipeline linking Venezuelan oil fields to ports along Colombia's Pacific coast. This will allow China to bypass the US-dominated Panama Canal.

China National Overseas Oil Corporation (CNOOC) invested US \$85 million to acquire five major oilfields in Indonesia to access 40 million barrels of shared oil. The concession was obtained at a very attractive price when oil prices were ruling low (*Ibid.*). It was followed by a gas agreement with Australia. Last year, Sinopec signed 21 overseas oil and gas projects with Iran, Brazil, Saudi Arabia, Angola and Nigeria. So far, China has invested US \$7 billion in about 30 countries all over the world and 65 energy cooperation projects. China is also building a pipeline from Uzen field in eastern Kazakhstan where it has acquired equity stake, to take the oil to its western refineries and consumption centres. It is also building a pipeline jointly with Kazakhstan to transport crude from Aktyubinsk to the gas hub in Atrayu. China's attempts to acquire a stake in Kazakhstan's elephant oil field Kashagan have not been successful.

While China sources small quantities of oil from Russia through railway wagons, it has been lobbying for a pipeline from Angarsk to Daqing. With the Yukos controversy, China's hopes of securing this project had faded. Russia had originally announced that it would build the oil pipeline to Nakhodka with Japanese financial support. Recent reports, however, suggest that the pipeline will be built to the Pacific Coast, closer to China than to Japan. China might after all, be a beneficiary of this oil pipeline. In an attempt to co-ordinate its measures addressing energy security, China is planning to set up a special task force. The new leading group will be based on an existing energy bureau at the National Development and Reform Commission and will be headed by Ma Kai, the minister in charge of the commission (*Energy Bulletin* 2005).

China's efforts to ensure its energy security have been multi-pronged:

1. Liberalisation of investments in exploration and production to increase domestic availability.
2. Enhancement of domestic supplies through overseas oil acreages.
3. Rationalisation of consumption through price signals, by integrating domestic prices to global markets.
4. Diversification of supply sources through strategic, diplomatic and commercial alliances.
5. Establishment of pipeline infrastructure to access domestic and neighbourhood resources.
6. Conservation and demand-side management measures (Mahalingam 2004).

INDIA

India is the sixth largest energy consumer in the world, with coal accounting for 51 per cent, oil 40 per cent and gas 8 per cent of the energy basket. Despite the predominance of coal in the energy basket in both the countries, India derives a much larger share of its energy from hydrocarbons than China. India, like China, has ratified the Kyoto Protocol and is committed to reducing polluting fuels, even as it caters to the burgeoning energy needs of urbanisation, modernisation and rapid growth in

motorised transportation. This points to a greater role for hydrocarbons in India's growth effort. IEA estimates that by 2010, India will be importing 3.4 mbd of crude, up from the current 1.7 mbd, assuming an oil demand growth of 10 per cent a year and an energy demand growth of 4.6 per cent.

Domestic production has been stagnating around 32 million tonnes a year (642,000 barrels a day). State-owned Oil & Natural Gas Commission (ONGC) supplies 80 per cent of domestic oil and gas with Oil India Limited (OIL), also a NOC, supplying the rest. Oil recovery factor from existing wells is just 28 per cent. Geologists are of the view that the vein carrying liquid gold bypasses India. Off-shore finds of gas and oil hold out some hope.⁵ On the natural gas front, India is doing better than China, with gas already accounting for 8 per cent of total consumption. However, unless the necessary pipeline infrastructure is in place to supply new domestic finds to southern cities, gas is unlikely to displace oil except as a feedstock for fertiliser and power generation. In any case, as in China, transportation sector leads oil consumption.⁶

Being a non-signatory to the Non-Proliferation Treaty (NPT), India's hopes for substantially augmenting electricity generation capacity with nuclear power plants are not very bright.⁷ Currently, India suffers from peak shortages of around 20 per cent while baseload shortage is also considerable at 12 per cent. New generation plants tend to favour gas as fuel.

Crude imports account for 72 per cent of domestic consumption, compared to just 40 per cent for China. Supply disruptions therefore, have much more serious implications for India than they do for China. In 2004, India's petroleum import bill shot past US \$25 billion, a staggering financial burden adding to the physical dependence on imported supplies. Oil price spikes, and the attendant affordability issues therefore, are much more of a concern for India than they might be for China.

Again, like China, the bulk of India's oil imports comes from the Gulf region and has to pass through the choke point of Straits of Hormuz. In recent times, Nigeria has emerged as the leading oil supplier to India, but the Gulf Co-operation Council (GCC) still accounts for more than half of India's oil imports. Pipeline project proposals for transporting energy to India from overseas sources, often ridiculed as pipedreams, are presently confined to gas. The proposal to build a pipeline from Iran to India via Pakistan, another to bring Turkmenistan's gas via Afghanistan and Pakistan to India, and a third from Bibiyana gas fields in Bangladesh to eastern India are still at very tentative stages due to political differences. The recent Reliance gas find has put an additional question mark over the economics of bringing piped gas from deep offshore

⁵ Recent gas finds by Reliance, estimated at 7 billion cubic feet (bcf), though impressive, carry several uncertainties. Being deep sea finds, production cost is expected to be steep, and delivered price of gas high enough to take its sheen off as competitor for oil.

⁶ Public transport in the national capital has recently been converted to CNG, but infrastructure is not yet in place to replace liquid motor fuels on a large scale.

⁷ Currently India generates 75 per cent of electricity from coal, 20 per cent hydel, and negligible shares for nuclear power.

wells over long distances. Until thorny relations with Pakistan and Bangladesh are sorted out, shipping will remain India's main energy lifeline for oil as well as gas in the form of LNG.*

India's gas reserves estimated to be upwards of 8 tcf now, are much smaller than the 48.3 tcf that China is estimated to contain. Currently, there are two LNG terminals—in Dahej and Hazira—with a combined capacity of 7.5 million tonnes per annum. Qatar is the supplier for one and the other procures its supply from spot purchases. The linkage to crude price is a cause for concern, since that pushes up the cost of landed LNG. Even if the price is right, domestic pipeline infrastructure is confined to northern India. Unless a southern gas grid is built, gas will remain a feed-stock for fertiliser and power industry. A consortium of public sector oil companies and financial institutions has come together (Petronet India) with the express purpose of strengthening the gas pipeline network within the country. Reliance Industries is planning an east to west pipeline on the lines of Gas Authority of India's Hazira–Bijaipur–Jagdishpur (HBJ) pipeline which forms the artery as of now. There is a proposal to make pipelines common carriers so that the network can be utilised more efficiently.

For some years now, India's premier exploration and production company ONGC has been making forays into overseas oil acreages through its subsidiary ONGC Videsh Limited (OVL). The company now claims presence in 12 countries. It has obtained a 20 per cent stake in Sakhalin-1 in Russia at a cost of US \$1.77 billion and the field is expected to commence production anytime now. 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 British Petroleum, Petrovietnam and OVL. The venture, which has just commenced production, will produce 3 billion cubic metres a year for twenty 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 acquired a 25 per cent stake in the Greater Nile Petroleum Operating Company in Sudan, controlled by Canadian firm Talisman Energy Inc at a cost of \$ 750 million. In Libya, OVL has signed an agreement with the Turkish Petroleum Overseas Company to acquire 49 per cent stake in two onland oil and gas blocks. In Myanmar, it has acquired a 20 per cent stake in offshore gas exploration block where gas has been struck recently. India is in talks with the Myanmar and Bangladesh leadership to bring this gas through pipelines to eastern India.

* Recently, Bangladesh was reported to have cleared the proposal to build a pipeline from Myanmar to India through its territory, but a formal agreement is yet to be signed.

In recent years, India's energetic Petroleum Minister Mani Shankar Aiyar has been on a diplomatic spree, sewing up LNG deals, pipeline projects and even overseas oil acreages in many parts of the world. India recently signed a deal with Iran to import LNG over the next twenty-five years. In return, Iran has offered India stakes in two of its oil fields. India is also in talks with Iran and Pakistan to build a pipeline from South Pars through Afghanistan and Pakistan. A joint working group on energy co-operation between India and Pakistan has been set up. A third project that hopes to extend another pipeline—this one from Turkmenistan—is also on the anvil. India's OVL is also interested in applying for a stake in Russia's state-owned oil company Rosneft for a license to develop Sakhalin-3 project, estimated to have reserves of over 600 mm tons of hydrocarbons. The pace of activity on the pipeline and LNG deals indicates the urgency with which India has begun to treat its energy vulnerability.

RUSSIA

While Russia's oil reserves were estimated to be only around 5 per cent of global reserves, new studies conducted by international energy consultants De Goyler & MacNaughton have recently doubled recoverable oil estimates of Russia to 150–200 billion barrels, most of it being located in Siberia. However, Russia's energy superpower status derives from its huge gas deposits—Russia has the largest gas deposits in the world—which at 32 per cent share of global discovered gas reserves, is far ahead of Iran, the second largest gas power in the world.

In 2004, Russia produced 8.5 mbd of oil accounting for 11.4 per cent of global production. Of this, over 7 mbd was exported. In the same year, Russia also produced 500 billion cubic meters (bcm) of gas and exported a third of it. Energy exports are critical to the Russian economy with energy contributing to half of the country's export revenues. Domestic prices of oil and gas in Russia are far lower than international prices, thus incentivising exports.

At present, the availability of infrastructure determines the destination of Russian energy exports. Currently, Europe is the biggest beneficiary, receiving a fifth of its oil imports and a third of its gas imports from Russia. Europe is served by the Black Sea and Baltic terminals as well as the Caspian Pipeline Consortium, the Baltic Pipeline System and the newly-constructed Bluestream pipeline that ferries Russian gas under the Black Sea to Turkey. However, all these outlets are operating at full capacity and Russia is planning to build new ports at Murmansk and elsewhere to increase its export capacity to western markets.

Yet, the south and the east are logical markets for Russian and Central Asian energy, especially because most of the new discoveries are located in Siberia and the Russian far east. But when the Sakhalin fields go on stream, Russia will be compelled to turn to eastern markets oil as well as liquefied natural gas.

PART III CO-OPERATIVE STRATEGIES FOR ENERGY SECURITY

Cooperation in the energy sector has thus far been bilateral, rather than multilateral. However, as the European Union has demonstrated (despite the recent French demurrer), multilateral and regional cooperation promises benefits of a much larger magnitude. In fact, history seems to have taken a turn in favour of integration based on shared interests and concerns. The biggest common challenges the two Asian neighbours share are in securing adequate energy, safeguarding transportation, diversifying import sources, and fending off price fluctuations. Russia, for its part, can help China and India reduce their vulnerability, in return for benefits such as long-term stability and market diversification.

This paper does not address the possible oil and gas pipeline routes from Russia to China and India, but looks at other practical areas of cooperation. The following are the specific areas in which Russia, China and India can cooperate to mutual advantage.

1. Ever since the 1973 oil crisis, importing nations around the world have scrambled to build an emergency stockpile of crude and petroleum products—an inventory that could be used during periods of physical supply disruption. The US has a Strategic Petroleum Reserve (SPR) of 300 million barrels—the largest in the world—which at the moment, has been filled to the brim for the first time since its inception. The EU also has a common stockpile under the auspices of the IEA of which Japan and South Korea are also members. The ASEAN countries have been discussing the possibility of setting up a common stockpile for the region.

Both China and India have decided to set up their respective stockpiles—of 45 days in the case of China and 15 days for India. The two Asian neighbours can cooperate in the establishment and operation of a joint stockpile of crude—to be maintained in identified locations in both the countries. Joint bidding for construction of oil tanking facilities, and more crucially, joint oil purchases for filling up the SPR could bring down costs substantially. The oil can be sourced from Russia—for the moment through railway wagons into China and through swap arrangements with Iran into India. It is extremely crucial at the moment not to disturb the already heated oil market by placing additional demand to fill up the SPRs of the two Asian giants. At the same time, any delays in setting up the SPR might be ill-advised in a situation of volatile oil markets where terror premium accounts for over US \$10 in the price of each barrel of crude.

China and India could persuade Russia to supply incremental production at negotiated prices rather than at market-determined rates. Such an arrangement is not unusual. Russia has traditionally been supplying oil to Moldova and Georgia at prices that are below global market rates. Recently, in a very significant statement, Vyacheslav I. Trubnikov, Ambassador Extraordinary and Plenipotentiary of the Russian Federation

remarked that Russia would be willing to negotiate; 'The oil and gas pricing mechanism is—apart from pure market considerations that certainly play a serious role in its formation—a kind of political instrument' (*Times Internet Limited*).⁹ For Russia, China and India would present a ready market for its incremental production. After all, the infrastructure ferrying Russian oil to western markets is already strained and export of incremental production may have to wait until new pipelines/ports are constructed, whereas China and Russia now offer a ready and instant market. Besides, Russia is also nearing its peak production capacity, and building of new infrastructure may not be warranted since current production rates cannot be sustained for too long. Filling up SPR is a one-time purchase, maybe spread over one or two years and is an ideal fit for using up Russia's incremental production in the next one or two years. The feasibility of this proposal needs to be examined in the light of capacities available at Neka terminal in Iran for such swap arrangements, and railway wagons for shipment to China.

2. Russia's offer of stable long-term contracts at below global market prices can also be extended to new LNG projects that are being planned at Sakhalin and Kovykta. Globally, LNG price is linked to crude price—an individual marker or a basket of crudes. In the current scenario of spiralling crude prices, such linkage may render LNG beyond the purchasing capacity of India and China. Since the most logical markets for gas from Sakhalin, Siberia and the Russian far east are to the east, particularly China, it would be in Russia's (and the operating companies') interest to agree to a pricing structure that is not linked to crude, but is based on the net-back concept. Such a gesture would be beneficial to both Russia and China—securing stable and long-term buyers for the former and conversely, affordable and stable supplies for the latter. The west-east pipeline is unlikely to cater to China's polluted northeast and hence, Sakhalin fields are the most eminent option. Royal Dutch Shell which hopes to produce 9.6 million tonnes of LNG from Sakhalin-2 needs markets. For Sakhalin-1, in which India is also a stakeholder, and Sakhalin-3 in which India hopes to acquire stakes, China will be a key customer. India, for its part, can persuade Russia and the other partners in Sakhalin projects to agree to a LNG pricing structure that is not linked to crude. If accepted, it could set the benchmark for LNG supplies from the Persian Gulf region as well, of which India will be a major beneficiary. In fact, for natural gas to claim its rightful place as the fuel of this century, it is essential to delink LNG from crude pricing and make it affordable to the developing world. Russia, India and China can play a key role in making this a reality. The political externalities of such an agreement will be a bonus.

3. While all Asian countries pay a premium of US \$1 to 50 for each barrel of oil imported from the Persian Gulf, Russia sells its Ural marker crude at a discount to WTI and Brent in the western markets. Thus, both Russia as a seller and China and

⁹ 'Russia offers oil at below market prices to India'.

India as buyers are losers in the bargain. In fact, Asian importers lose as much as US \$10 billion annually on account of this premium, which they consider totally unwarranted and unjustified. While there has been some discussion among Asian buyers of the need to collectively bargain for elimination of the 'Asian premium', no concrete measures have emerged so far. Proposals for an Asian marker crude—to reflect the heavier crudes consumed by Asia—have not taken off. Russia, China and India could push for an overhaul of the international oil pricing mechanism to a less discriminatory and more equitable one. Mutual support for each other's position—a higher price for Russian crude in the western markets—there could be no better timing, with the west eager to diversify its source of imports in the post 9/11 world—and the discontinuance of the Asian premium—could perhaps be more effective in achieving the desired results.

4. With President Vladimir Putin and the Russian Duma (the lower house of Parliament) ratifying the Kyoto Protocol late last year, the treaty has come into force from January this year. Developed countries that have been subject to emission reduction targets have been reconsidering the nuclear power option to cut down on their GHG emissions. Even the US—a non-signatory to Kyoto—that has not built a single atomic power reactor in the last quarter of a century, is gearing up to kickstart its nuclear power programme. In the second Kyoto commitment phase, which will begin in 2012, it is very likely that China, India and Brazil will also be required to agree to emission reduction targets, preventing the former two from generously dipping into their substantial coal reserves. In that scenario, it is perhaps inevitable that both these countries will turn to nuclear power to meet their growing electricity demand. Even without Kyoto targets, China and India cannot ignore the nuclear power option, if they are serious about providing affordable electricity to their people. Russia, on the other hand, has impressive capabilities in nuclear technology, making possible a synergetic cooperation.

India has had a long and chequered history in its development of nuclear power. Currently, the country has a capacity of around 2,700 megawatts, mostly pressurised heavy water reactors. A 500 megawatts (mw) prototype fast breeder reactor is also under construction. Russia is setting up two 1,000 mw VVER reactors in Koodankulam in south India. The first unit will be reaching criticality in 2007. Under the agreement, Russia will supply the reactors' designs, drawings, huge components, equipment and systems and Nuclear Power Corporation of India Limited will build the reactors. Russia will supply enriched fuel for the entire life of the reactors. Light water will be both moderator and coolant. The plant comes under plant-specific safeguards. By 2030, India plans to increase nuclear capacity to 20,000 megawatts, although demand growth would require additions of much larger capacity.

China currently has nine operating reactors, including French, Canadian, Russian and Japanese designs as well as its own model, producing 6,450 megawatts of power, or about 1.4 per cent total capacity. Chinese officials have estimated that by 2020 the country will need an additional 32,000 mw from its nuclear industry, or about

32 additional reactors. In fact, US Vice-President Dick Cheney made a pitch for sale of Westinghouse nuclear reactors to China during his visit to Beijing last year.

With nuclear back on the international agenda of an increasingly environment-conscious world, there is tremendous scope for China, India and Russia to collaborate. Demand from China and India for new power stations would generate scale economies which Russia can exploit to standardise design and manufacture reactors, equipment and components. India may have to be flexible enough to admit full-scope safeguards for future reactors supplied by Russia.

5. Electricity trade is another area of potential trilateral cooperation. Tajikistan and Kyrgyzstan, the two Central Asian Republics have substantial hydel potential. Tajikistan has a potential of 263.5 billion kilowatt hours—of which only 6 per cent has been exploited. Kyrgyzstan has 163 billion kilowatt hours of potential of which only 10 per cent has been exploited. The potential in these two countries remains unexploited for want of capital as well as markets.

Perhaps, one can explore the possibility of setting up hydel projects in these two countries and transporting power to India and even to China if it is near the demand-centres of the latter. High-voltage direct current (HVDC) lines can transport electricity from Tajikistan via Xinjiang to Ladakh in India. No doubt, the lines will have to traverse difficult mountain terrain, but Powergrid Corporation of India—the country's state-owned transmission company—has demonstrated expertise in building high voltage transmission networks in difficult terrains.

During the Soviet era, all the Central Asian Republics were interconnected through a high voltage grid and there was power flow between Russia and the Republics. In recent times, the grid has been disconnected and is in disuse, although both Kyrgyzstan and Tajikistan supply some electricity to Uzbekistan through cross-border connectivity. It might be worthwhile to explore whether the Soviet period grid connectivity can be restored at minimal cost. Surplus electricity, over and above local consumption, can then be transported south to India through HVDC lines. In fact, in the future, it is also possible to extend the connectivity to Uzbekistan where electricity generated by gas turbines can also be fed into the same grid to be transported southwards to India.

Russia, China and India can collaborate in the construction of hydel projects as well as in the transmission networks, pooling of capital as well as technology. For India, the project will have the added advantage of bypassing the troubled Afghan and Pakistani territories. China can earn transit revenues while Russia will benefit from the returns on its investments, and India will stand to benefit immensely from such power projects since they could relieve the country's chronic power supply shortages. India's new electricity law allows open access of its transmission and distribution networks so much so, bulk consumers can directly buy power from producers. Hydel power has marginal operating costs and does not contribute to global warming. Tajikistan and Kyrgyzstan will stand to benefit from the economic activity generated by the investments. The example of Chukha project in Bhutan, built with Indian capital and technology and supplying power to India, has virtually transformed the economy of Bhutan and has proved to be mutually beneficial. Large-scale cross-border

power trading is not a novel concept. In fact, it has been successfully practised in many parts of the world, such as between Canada–US, US–Mexico, Scandinavia–Germany, France–UK, etc. Islanding technologies now make it possible to isolate problem stretches of the grid.

While the relative economics of a gas pipeline vis-à-vis the HVDC cable needs to be determined, industry experts are of the view that the latter may be cheaper than the former. If that is the case, then it might even be possible to eventually transmit electricity all the way from Russia—fired by its abundant gas reserves—to India, tapping along the way China's gas deposits in the Xinjiang region. Swapping oil has been standard industry practice for many years now and perhaps the time has come to experiment with a trans-Asian electricity grid.

6. Russia has offered to collaborate with India in the Turkmenistan–Afghanistan–Pakistan–India pipeline. If and when the pipeline materialises, it will require huge capital investments as well as technology and expertise in construction. China which has recently completed one phase of its west–east pipeline all the way from Xinjiang to Shanghai, and Russia with its experience in the construction of several pipeline networks will be a valuable ally in helping India realise its dream of accessing gas from Central Asia.

7. The three countries can also collaborate in joint investments in exploration and production acreages in Central Asia. China and India have been competing with each other to acquire oil and gas acreages in many parts of the world. Such competition often serves to push up the prices whereas collaborative bidding might have the opposite effect. Collaboration between Russia, China and India for long-term oil and gas supplies is bound to send strong signals to OPEC to not indulge in whimsical production cuts to raise prices. The three countries can also collaborate to set up refining capacity in the region.

8. All three countries have huge coal deposits, but due to a variety of reasons, have been moving away from coal in favour of increasing shares for hydrocarbons in their fuel baskets. However, as fuel imports burgeon and import bills balloon, not to mention the vulnerability caused by excessive reliance on a single region for the bulk of imports, China and India are bound to find return to coal a rather attractive proposition. At the same time, it is difficult for them to ignore global warming, and hence they will have to look for cleaner use of their abundant coal deposits. Despite Kyoto measures like Clean Development Mechanism (CDM) and Flexible Mechanism, developed countries seem rather reluctant to share clean coal technologies with the developing world. Perhaps the three countries can launch collaborative research and development on clean coal technologies, coal bed methane and coal gasification—all of which will greatly reduce their dependence on imported fuels. Russia, with its cutting edge R&D in several fields, can perhaps lead the way. Carbon trading could generate handsome surpluses for Russia, Kyoto's newest member, while China and India can halt the upward spiral in their fuel bills by turning to domestic resources.

CONCLUSIONS

For purposive and fruitful energy cooperation, it is essential to have an institutional framework that can identify the synergies and harmonise the energy policies of the three countries. Since energy is a strategic commodity with political, economic and security dimensions, a task force comprising members from all the three countries could be set up to identify areas of collaboration, draw up specific plans and schemes, flesh out the details and modalities and thrash out the differences. The task force should ideally comprise policymakers, experts as well as industry representatives. Political will to move ahead will determine the success of cooperation.

Most ambitious projects begin with the germ of an idea. A regional cooperative framework between the three key Asian countries could well transform the global energy landscape and pave the way for greater stability and friendship through the creation of stakes for all the players involved. The ensuing political gains would be immense indeed.

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