

Energy Policies for Natural Gas in China & India: A case of Cooperation or Competition

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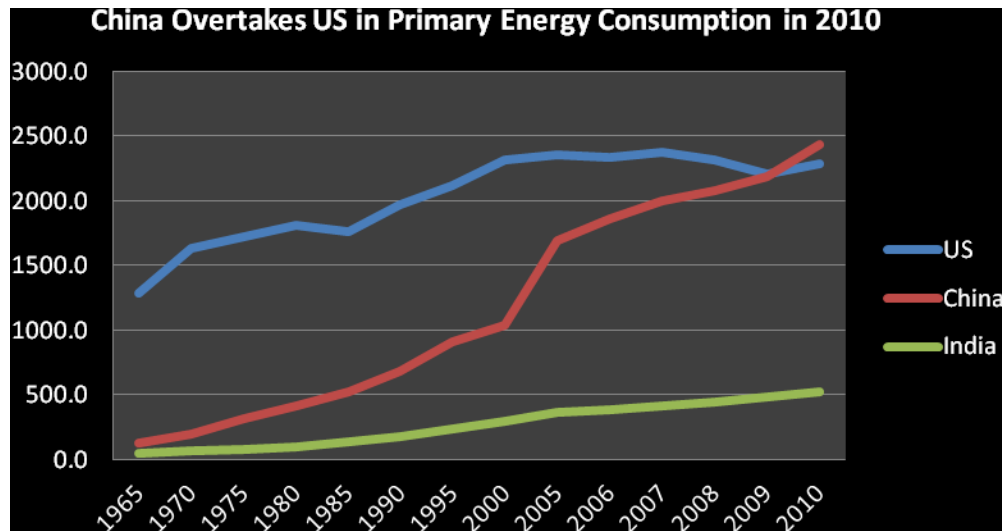
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1. Background

There are new threats and risks to the international energy security system today. These issues include: the depletion of energy resources in developed nations such as the US and European countries; rapid increase in the energy demand and national strategies to acquire resources in countries such as China and India; growing geopolitical risks in the Middle East, concerns about the security of energy transportation and sea lanes; moves to tighten international regulations on nuclear fuel cycling policies, and; international obligations towards the reduction of CO₂ emissions to counter global warming.

The two most populous countries of the world, India and China, once enemy which fought border skirmishes in early 60's, are now prominent trading partner. The economies of India and China are growing among fastest in the world, and so do their energy requirements. Recently, India and China are closely reviewing their existing policies to re-orient energy security to carry out long term energy policy implementation with a more realistic and careful consideration. In their ways to have better access to global energy market both are employing variant policies, in a response to fuel domestic requirements followed by high economic growth, but, there is a general fear that their policies may conversely affect each other's national interests in the long run. Moreover, in their quest to grasp a fair and equitable share in world's energy market, both India and China are trying to legitimize their energy need in a manner which makes them critical to international community. Given the non-availability of sufficient quantities of petroleum and natural gas in India and China, their energy policies and national interests are likely to inflict a series of tension in the continent.

The growth of the Indian economy at 8-8.5% and that of Chinese economy at 10-11% has led to an increase in an energy dependent lifestyle resulting in a high demand for energy sources in these two countries. World Energy Outlook 2011 pegs China with 21% of world's energy demand at the peak position surpassing even the mighty United States.



China and India, that are expected to be the center of energy demand growth on the world energy map. In Asia, about 50% of the consumption increase over next two decades is expected to derive from expanded consumption in China, followed by India at 20%.

Reflecting on these issues and facts now is the most critical time to establish a comprehensive national energy strategy in order to effectively deal with the new circumstances that surround energy issues. That national strategy should be based on future global energy and environmental trends.

2. Aim

The paper aims at delivering the most informed and perspicuous answers to some of the key issues concerning the policy matters with respect to China & India in a scenario impacted by global interplay of energy demand & supply, geopolitical twists & climate concerns. The issue considered here are:

- Analysis & Interpretation of Governments' Energy Policy measures for natural gas in China & India; it's implication on energy dynamics of the two countries.
- Studying Energy Initiatives of India towards Gas based development – Brief Case Studies on change in policy & rise in Gas demand.
- Analyzing the case of Cooperation or competition between the two neighboring countries slated to be the highest consumes of energy combined together.
- Studying the impact of geopolitical relations on energy policy and initiatives

3. Methods

The methods adopted for arriving at the intended aims of this paper, which has been outlined as above are: Data Analysis of gas Industry, Impact of rise of Natural gas on the allied industry. It includes the comparative study and drawing the conclusions from various research papers available through the secondary available documents. An honest attempt has been made towards achieving the aims of this paper by way of engaging and interacting with the Industry leaders in Oil as well as Natural Gas industry.

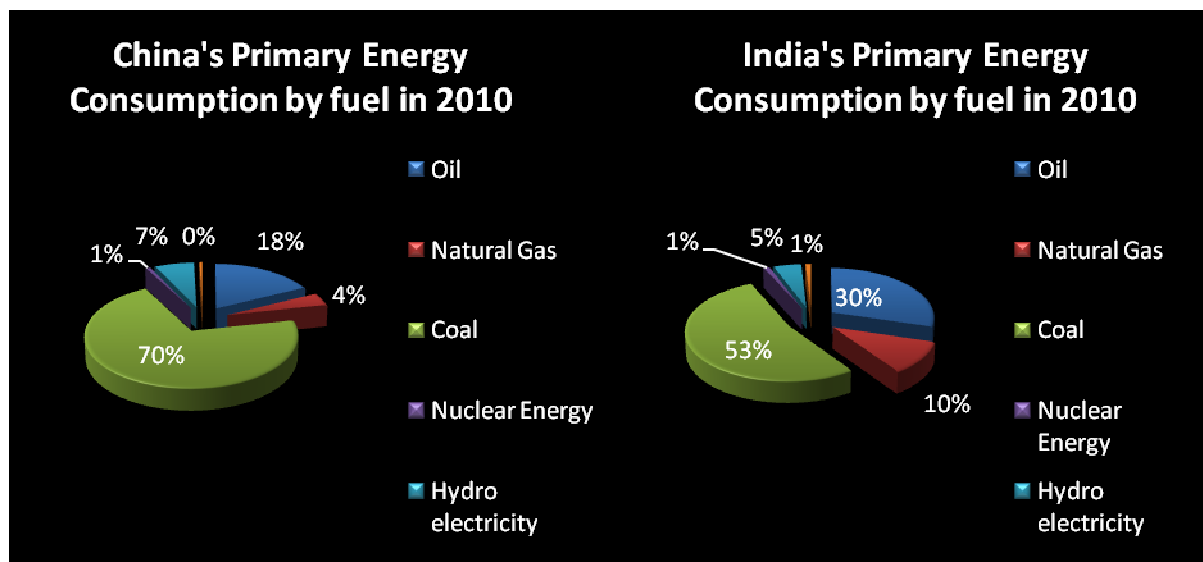
4. Results

Natural gas is a particularly attractive fuel for countries and regions - such as China, India and the Middle East - that are urbanizing and seeking to satisfy rapid growth in energy demand. These countries and regions will largely determine the extent to which natural gas use expands over the next 25 years.

There have been remarkable developments in the natural gas market in recent months. There is a strong potential for gas to take on a larger role, but also for the global gas market to become more diversified and therefore improve energy security. Strong economic growth and progressive motorization are likely to expand the energy demand in Asia, especially China and India, which eventually increase oil-import dependence, reliance on oil import from Middle East, and the oil traffic through the Malacca Straits, because regional oil supply would not be able to commensurate with the swift demand expansion. While it is naturally important for the individual countries to make efforts to secure their own energy supplies, excessive pursuit of the national interest by any single country could damage the energy security of the rest of the region

Energy Profiles of India and China

Energy has an impact on the economy and in turn is affected by it. Energy consumption is both a necessary condition for growth and a consequence of it. The graphs below gives clearly the primary energy consumption by both the countries in 2010



	Oil	Natural Gas	Coal	Nuclear Energy	Hydro electricity	Renewables	Total 2010
China	428.6	98.1	1713.5	16.7	163.1	12.1	2432
India	155.5	55.7	277.6	5.2	25.2	5.0	524

Notes: Oil consumption is measured in million tonnes; other fuels in million tonnes of oil equivalent.

Natural Gas Profile of India and China in 2010

	Reserves At 2010 end TCM	Production in Mtoe	Consumption in Mtoe
China	2.8	87.1	98.1
India	1.45	45.8	55.7

With respect to natural gas, both China & India are net importer. China produced about 3 percent of the total world production of natural gas and consumed about 3.4 percent of total consumption. India's share of the world's natural gas production is only 1.0 percent at the same time it accounts for about 1.9 percent of total natural gas consumption. It is due to increasing use of the environmentally friendly fuel that the demand for natural gas rose in both the countries with an increase of 21.8% & 21.5% over 2009 for China & India respectively. In 2010 China became a net importer.

Coal Profile of India and China in 2010

The dependence on coal as the primary energy source is well highlighted with abundance in coal resources with both the nations.

	Reserves AT 2010 end Million Tonnes	Production in Mtoe	Consumption in Mtoe
China	114500	1800.4	1713.5
India	60600	216.1	277.6

Though China has ample coal reserves, its consumption is usually higher than its production save in 2010 where the difference was 77Mtoe. While China produces about 48.3 percent of the total world coal production, it consumes about 48.2 percent of total world output. More than 90 percent of Chinese coal resources are located in inland provinces, but the biggest increase in demand is expected to occur in the coastal regions. This adds to the pressure on internal coal transport and makes imports into coastal provinces more competitive. China became a net coal importer in the first half of 2007. As far as India is concerned, it produces only 5.8 percent of total world output and consumes about 7.8 percent of total world demand. Thus both India and China have majorly been net coal importers.

Case Study

Gujarat a state in West India has been the hotbed of investments. With a GDP growth rate of 11.58 percent in FY 2011, the state is all set to become a focal point for economic growth in India. The government's investor and industrial-friendly policies has led to the creation of a robust infrastructure and blossoming of trade and business.

The major catalyst to the overall growth in Gujarat has been the availability and reach of natural gas to a greater part of the state. Industries, power sector, small and medium enterprises, trans- port, households and even the co-operatives, all are reaping the benefits of natural gas. Gujarat houses India's only two operating LNG terminals, and has access to multiple domestic gas sources, a state-wide gas grid of 2,000 kms and presence of a booming city-gas distribution business across many cities. Both the cross country natural

gas transmission pipelines operating in India cater to Gujarat and so would be three out of four pipelines which would be commissioned in the next 4-5 years. As a result, nearly 33 percent of power generation in Gujarat is gas based compared to a lowly 10 percent of the national average.

Many gas consumers in Gujarat have shown turnaround performances due to switching to natural gas from other fuels. Gujarat contributes 80 percent to India's production of 500 million square meters of tiles. Morbi, a small industrial town, has pioneered ceramic tile manufacturing at the SME level using natural gas for its furnaces. It is noteworthy to mention that while the Supreme Court directive was needed to initiate the CGD network in Delhi; the various stakeholders in Gujarat including the government, gas suppliers, consumers and gas pipeline players had themselves chartered the path to a gas based economy. The results are there for everyone to see. Natural gas has even reached the village level, with gas supplies reaching 11 villages in Anand district, showing the progress made in creating a robust and reliable gas infrastructure in Gujarat. The larger vision of the Gujarat Government is to connect further 100 villages to prosper rural Gujarat as well as 84 more cities in FY 2012.

India is rightly sitting on the brink of a natural gas revolution. With more than 70 percent of India's crude oil needs being fulfilled by imports, lack of energy densities in renewable energy solutions and the increasing carbon emissions from coal based power plants; natural gas is the most likely energy resource to surge ahead. In this regard, Infraline Energy believes that Gujarat can steer the way for the rest of the nation.

Owing to its strategic location, Gujarat is the most favoured destination for future LNG terminals. Three new LNG terminals are proposed to come up in Gujarat in future. Buoyed by the success of transporting more than 35 mmscmd of natural gas, GSPL has set a very aggressive target of connecting all the districts of Gujarat by a 2,200 km strong pipeline network. The company is also hoping on the possibilities of replicating the Gujarat Gas Grid in the neighbouring state of Rajasthan.

Though KG-D6 natural gas supply has been a boon to Gujarat, this alone would not suffice the burgeoning gas demand, which is estimated to touch 147 mmscmd by 2020 in the state. However, Gujarat is not merely a powerful demand center. It is the second highest onshore gas producer in India after Assam. Cambay basin is one of the seven basins in India which could yield Shale Gas. Test wells drilled by GSPC and Joshi Technologies have shown promising results. With multiple supply sources and a well-diversified consumer base in the state, gas companies have considerable latitude in committing investments and deciding on future expansions. A natural gas exchange similar to Henry Hub in the United States can be set up in Gujarat. Natural gas storage and containing gas flaring are other potential investment models which can be taken up by various companies in Gujarat.

Energy Policy of the two countries towards Gas based economy

Over the past five years, the growing economic and demographic weight of China, India and other emerging economies has led to an impressive shift in the status of these countries regionally as well as globally. The foreign policy of both China and India is rapidly changing. Energy security and climate change are defining elements of this shift from being emerging economy to becoming emerging power, both regionally and more and more of a global scope.

Gas consumption by both countries in the last decade depicts a clear move towards the environment friendly fuel. The increased consumption of the two developing nations has been backed by suitable policy measures. There has been an increase of 345% in 2010 over 2000 in the gas consumption in China & of 135% in India

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
China	22.1	24.7	26.3	30.5	35.7	42.1	50.5	63.5	73.2	80.6	98.1
India	23.7	23.8	24.8	26.6	28.7	32.1	33.5	36.1	37.2	45.9	55.7

China's energy policy is clearly stated in the following statement

“Prioritize energy conservation backed by improving efficiency, diversify sources with coal as the backbone, optimize structure, protect environment and mainly rely on domestic supply while open up to the outside world”.

Mr. Zhang Guobao Vice Chairman, National Development & Reform Commission (NDRC) in his Speech on the Sixth Sino-US Oil and Gas Forum in 2005

As a part of its policy initiative China's in its 12th FYP pledged to have 15 percent of its energy come from non-fossil fuels by 2020 (from 8.3 percent in 2009 to approximately 11 percent by 2015). The plan includes a cap on domestic coal production, China's largest energy source and a major contributor to the country's environmental problems. Domestic natural gas consumption will double over the 12th FYP

China's natural gas strategy is motivated mainly by the country's air quality problems. The leadership in Beijing seems to be willing to supplement part of its cheap domestic coal in its electricity sector through imported natural gas. Until the late Nineties, natural gas played a minor role in China's energy mix as domestic resources are limited. In the medium term, natural gas is being imported from Russia. The necessary pipeline infrastructure is under development. Some domestic production, both on and offshore, is also supplementing the country's natural gas strategy.

In the past few years, India has signed several long-term oil and gas delivery contracts with neighbouring countries in South and Central Asia, one of them being Iran. However, any land based gas transport from Iran would have to cross Pakistan, India's geopolitical rival. A gas deal with Iran would also antagonise the US. India relies mainly on the international engagement of its private energy sector. Other than China's national oil companies and European or US based multinationals, India's private energy companies are seriously undercapitalised.

Policy Push & Energy Efficiency

Evidence suggested that China and India have accelerated their efforts to improve the efficiency with which they use energy. The amount of oil required to produce one dollar of output has been falling in both countries even though they still has a lot of catching up with Japan and Western Europe in energy efficiency. In China, barrels of oil consumed per \$1 million GDP fell from 1,917 barrels in 1984 to 703 barrels in 2008, and in India, during the same period, this ratio fell from 1,332 to 813

In China, energy efficiency has been improving at a faster rate than that of India. Apart from industrial structural adjustments from heavy industries to light and service industries, the government's policies play a very important role in this regard (ADB Development Outlook 2008) In 2004, the Chinese government published the China medium-and-long-term energy conservation plan to emphasize the principles and objectives of energy conservation. Through the 2006 11th 5-year plan, the central government targeted a decrease in energy intensity by 20 percent by 2010 from the 2005 level. The central government has also launched various programs aimed specially at industrial sectors, buildings, and the general public.

Another interesting policy in 11th FYP of Fuel-switching and Conservation to Reduce Petroleum Use Policy 2006 of China stated that The 11th Five Year Period Plan details several measures to reduce petroleum consumption by 38 million tons in transport and industry. From the concrete to the highly-strategic, they include:

- replace fuel oil (light oil) with clean coal, petroleum coke and natural gas in the industries of power, petroleum and petrochemistry, metallurgy, construction material, chemistry and transportation;
- carry out the operation plan on clean automobiles, promote mixed-motor vehicles, popularize gas-burning buses and taxis in cities and speed up promoting methanol and alcohol as fuels, develop coal-liquefaction projects and develop alternative fuels.

Other policies, including stringent vehicle fuel economy standards and a new car-tax regime, that penalizes large cars, were introduced in 2006. The public has also been called to help save energy. In August 2007, the central government implemented the comprehensive work plan for energy conservation and **pollutant discharge reduction campaign** to emphasize the importance of lifestyle change, education, and new technologies.

China's natural gas use policy aims to promote residential gas use and restrict the industrial use of gas. It classifies the gas use categories into 1) priority, 2) allowed, 3) restricted, 4) banned, especially banned usage of gas for power generation in areas where coal is extensive. (<http://www.iea.org/textbase/pm/?mode=weo&id=3743&action=detail>)

Despite minimal growth in gas-fired power generation in China from the year 2000 to 2009, its 12th Five-Year Plan (2011-2015) reflects a major policy shift, which aims to give gas a prominent place in the broader energy system. China's 12th Five-Year Plan has strong implications for gas usage, targeting an 8.3 percent share in the primary energy mix in 2015 or 260 billion cubic meters (cu m) annually, based on China's goal for energy consumption. Focusing on energy efficiency and the usage of cleaner energy, the 12th Five-Year Plan charts a course to more sustainable economic growth. Gas demand in China, now about 100 billion cu m a year and almost equal to Germany's, may soar to match that of the 27-nation European Union by 2035, according to the IEA report.

As one of the most important country in shaping the future of energy markets, China's energy demand and its exponential economic growth mean that its policy can dramatically affect the trajectory of global gas demand.

India has a longer record of promoting energy conservation, and its energy efficiency was once better than that of China (partially because of its industrial structures). Yet the current Chinese energy efficiency campaign, under the leadership of the country's top leaders, is likely to generate impressive results.

China's and India's energy quest overseas

These huge rises in demand for petroleum and other resources do not in themselves presage rising tensions between China and India. It is arguable that it is in the interests of both countries to enhance their collective leverage over energy suppliers such as Russia in an attempt to be a price-maker rather than taker. Yet, the evidence is that competition rather than harmony is increasingly driving the energy security policies of both countries, and that an energy-driven rivalry between China and India will intensify rather than abate.

"ME-FIRST" POLICY

First, the legitimacy of the Chinese Communist Party depends on the continuation of rapid economic growth. China's state-led development model relies heavily on fixed investment to produce growth—an approach that is extremely energy-dependent. Since the regime sees

securing necessary energy resources as a matter of survival, China's energy strategy is increasingly based on owning and controlling foreign petroleum resources in places such as the Middle East and Africa.

Based on the prevailing view that global energy markets and open access can be manipulated and restricted by American-led efforts, China views its "me-first" mindset toward secure energy resources as prudent. Rather than rely on strengthening an international system of open access based on market prices to secure its energy, Beijing gives its state-owned national oil companies (NOCs) what it needs (in the form of cheap loans and other support) to directly source resources for China's exclusive use. Chinese NOCs have 200 energy projects in more than 50 countries worth some \$50 billion.

As two emerging economies, both China and India are facing increasing energy shortages. Production overseas is an effective way to hedge against high energy prices and ensure energy security. Thus acquisitions of equity oil and gas overseas by state companies have formed the core of energy-security policy, as both governments believe that equity oil abroad will "ensure cheap and reliable energy supply".

When China became a net oil-importing country in 1993, the central government's strategy is to develop China's oil industry by "establishing oil fields abroad", and two state-owned companies – CNPC (China National Petroleum Corporation) and Sinopec (China Petroleum and Chemical Corporation) were set up for oil exploration overseas. After a decade of overseas investment, China has made some achievements.

For instance, from 1995 to 2006, total Chinese NOCs investment flows abroad reached \$27.2 billion, covering over 200 oil exploration and development projects in more than 50 countries. Chinese NOCs produced 685 thousand barrels of equity oil per day abroad in 2006, and it is projected that China's equity oil output will reach 1.1 million barrels per day by the years 2013 to 2015. Now China's overseas oil expansion is concentrated in three strategic areas: Middle East-North Africa, Russia-Central Asia and Latin America, covering Sudan, Iran, Kazakhstan, Russia, and Venezuela.

India has been following China in its overseas energy expansion strategies. Indian oil and gas companies are encouraged to invest abroad and build strong relations with strategically important countries. Indian NOCs have ambitious plans — ONGC Videsh Ltd. (OVL) has set a long-term target of producing 60 million tons of oil a year from overseas by 2025, and has spent about US\$4.5 billion abroad. ONGC (The Oil and Natural Gas Corporation) aims to double its reserves by 2020, with 20 million tons coming from OVL.

India has agreed in principle with major oil-producing Gulf countries like Saudi Arabia, Kuwait and the United Arab Emirates to develop long-term strategic relationships in the energy sector involving supply of crude oil, upstream and downstream joint ventures, refineries, petrochemical industries and marketing. During the past few years, India's NOCs such as ONGC and IOC (Indian Oil Cooperation Limited) have made some bids in oil & gas exploration and production deals in a number of countries, including Australia, Egypt, Iran, Myanmar, Syria and Central Asia. ONGC has made investments of US\$3.5 billion in overseas exploration since 2000.

Chinese national companies trumped India's state-run Oil and Natural Gas Corp. (ONGC) between 2005 and 2008 in bids to take over Canada's PetroKazakhstan, which operates in Kazakhstan, and Tanganyika Oil, which works in Syria, and to form a joint venture with Angola's Sonangol. They also beat India's state-owned Gas Authority of India Ltd. (GAIL) in a race for "preferential buyer" status for gas blocks in Myanmar in 2007. Most recently, China has expressed interest in funding the proposed Iran-Pakistan pipeline – a project that India has at times opposed

Aware of the increasing competition from China Minister Shri Jaipal Reddy “We are conscious of the competition from China,” spoke at the sidelines of the third India-Africa Hydrocarbon Conference in New Delhi in December 2011. “We have also worked out a strategy for pooling resources of both state and private firms to take on the financial clout of the Chinese

Indian firms have recently secured shale gas assets in the United States. Indian firms are also beginning to make inroads into Africa. ONGC, for instance, is implementing exploration projects in Nigeria, Egypt and Libya. State-run GAIL, meanwhile, has said that it plans to follow India’s state-run Bharat Petroleum and privately-owned Videocon Industries in investing in Mozambique and Tanzania

As India’s domestic gas output in the near future is not going to meet the growing demand, India has been looking to diversify to more countries and regions to reduce dependence on the Middle East, the traditional suppliers. Africa provides a good option to broaden our sourcing of gas. Today, as much as 21.5% of India’s crude oil imports are from Africa. In the years ahead, the country expects more crude oil and LNG from Africa. Among the countries Indian firms are looking to enter are Angola, Ghana, Sudan, Algeria, DRC, Nigeria, Uganda, Ivory Coast, Mozambique, Chad, Gabon and Tanzania

As part of the government’s effort to geographically diversify its supplies, GAIL also negotiated a deal, in December 2011, to import 3.5 million tons per annum (mtpa) of LNG from the US’ Cheniere Energy beginning in 2017. The contract could help to reduce LNG prices in Asia, since Middle Eastern prices are notably higher than those in the shale gas-rich US, even after incorporating the more costly transportation. The price for US LNG in India now stands at about \$10 to \$11 per million Btu (MMBtu), \$5 to \$6/MMBtu less than contracts from Australia or Qatar. In addition, India is looking to Russia for more oil and gas investment Indian state-run firms are keen to participate in projects such as Gazprom’s Sakhalin-3 and negotiate LNG supply contracts, following on the heels of four memorandums of understanding signed this year for import deals.

China’s energy expansion strategy overseas has been reaping better results than India’s as it has ensured the following

First: China has a high-level energy entity which is in charge of formulating and adjusting its overall energy development strategy. In 2005, China established the Energy Leading Group, a supra-ministerial coordinating body headed by Premier Wen Jiabao, and in March 2008, China established the National Energy Administration, a national-level energy institution. This reflected China’s recognition of the need to strengthen energy sector management by improving coordination across industries and ministries, and promoting the formation, implementation and enforcement of energy policies and strategies.

In India, there is no single central ministry of energy (one existed before 1992). Instead, a number of ministries and groups are jointly responsible for policymaking related to various energy sources.

Second: Chinese NOCs can get more support from the government and soft loans from banks. For example, while crisis-hit international oil companies have been reining in their overseas expansion, China’s top oil giant CNPC recently has inked a US\$5 billion financing deal with Kazakhstan’s state oil company KazMunaiGas with the support from cash-rich state-owned banks. China’s generous funding to support its oil and gas ventures overseas has taken other forms as well. China’s banks have been making headlines for showering tens of billions of loans and funds on emerging markets in Africa, Latin America and Central Asia. Beijing recently provided six

resource-rich countries, including Argentina and Indonesia; with access to more than 640 billion yuan (S\$141.2 billion). And it also announced a US\$10 billion fund for ASEAN countries to support resources, among other things.

India however lags in its financial clout. Its NOCs receive no government support for their overseas investment. Although Indian NOCs overseas upstream development forms a part of the government's energy security policy, they evaluate investment areas and specific deals independently and use their own funds. In this sense, their overseas upstream development is apparently more rational and sustainable than those pursued by their Chinese counterparts.

Third: China's energy diplomacy plays a more effective role in its energy quest abroad. With China's extraordinary economic expansion and its corresponding need for energy and natural resources since the late 1990s, China's diplomacy has become more pragmatic and is mainly motivated by energy security and economic growth.

These years saw China channelling diplomatic efforts into cultivating relations with oil and gas-exporting countries, and successfully using its political capital to influence pariah regions to make policy-decisions tilt to China's favour.

India's energy diplomacy has been restricted by its conflicting interests that may indeed lash with its energy expansion efforts. While it is engaging in more aggressive oil diplomacy with a few countries, considering more acquisitions of oil and gas assets abroad, and planning to participate in the construction of pipelines, these attempts are hindered or affected by some other strategic factors, including the US factor. India is also likely to run into conflict of interests with the US when considering potential energy suppliers like Myanmar, Sudan and Venezuela.

Finally: India's quest for energy supply is also being impeded by its sometimes tense relations with energy suppliers, energy transit countries and energy competitors. While China has either resolved or shelved its border disputes, India has active conflicts on almost all of its borders with neighboring states.

India's tense relations with Pakistan are likely to impact negatively on the proposed gas pipeline from Turkmenistan or Iran to India, which will have to traverse Pakistani territory. India's poor relations with China-friendly Myanmar have impeded its quest for energy Abroad. India has to overcome more serious geopolitical and security challenges than China before it can realize its overland pipeline dreams.

India has advantages in overseas enterprise mergers and internal enterprise governance. Many Indian big enterprises have gone abroad since early last century, and have accumulated a lot of experiences in managing multinational businesses. India's private economy is also more developed than China's. It is more advanced in enterprise supervision and management.

Moreover, for historic reasons, Indian enterprises are more acquainted with Western law systems and regulations, cultures and language than their Chinese counterparts. They are more acknowledged and accepted by the western world, and have more means to merge or buy foreign companies.

Room for cooperation

China and India are the second and third largest economies in Asia. Rapid economic development, industrialization, urbanization and improved lifestyles are driving these two countries' energy demand higher and making them increasingly reliant on world energy markets. Although the energy situation of China is better than that of India in terms of energy

consumption structures, international reserve status, and quest for energy supply abroad, both countries are increasingly exposed to changes in the world energy markets as IEA estimated that China and India's oil import dependence will increase to 80 and 92 percent respectively in 2030.

Thus it is important for these two big oil importing countries to strengthen cooperation in dealing with energy issues. Over-competition will result in unnecessary loss to both sides; as pointed out by the Indian former Petroleum Minister Mani Shankar Aiyar, both countries have to "realize that when we compete in an unhealthy manner to acquire oil fields in third countries, we only end up driving costs for each other."

As "new comers" in the world oil markets, both countries need to learn from each other's strengths. China has advantages in its government-driven energy strategy and energy diplomacy, whereas India has advantages in enterprise governance and management. They can combine these advantages and collaborate to expand their energy venture overseas.

Some achievements have been made in this regard. India in 2005 took the initiative to cooperate with China in its energy quest. In January 2006, China and India signed five memorandums of cooperation in the energy sector, covering a full scope of areas, including strengthening the exchange of information when bidding for oil resources in a third country, enhancing upstream exploration and production, refining and marketing of petroleum products and petrochemicals, laying of national and trans-national oil and gas pipelines, fostering frontier and cutting-edge research and development, and promoting environment-friendly fuels.

Both countries' NOCs agreed to bid jointly for stakes in companies and blocks as part of a larger set of energy cooperation.

China and India can also cooperate in areas of energy diplomacy. Today, more than 50 percent of China's oil imports come from the Middle East, and IEA estimates that China's oil imports from this region will rise to at least 70 percent by 2015. At present, two-thirds of India's imported oil comes from the Middle East, while India will inevitably have to continue to rely on Gulf oil. It goes without saying that the two countries share a large long-term interest in ensuring a steady supply of energy resources from the Middle East to meet the demand of Asian countries. To ensure this, the two countries need to use their clout as large and growing consumers of energy to push for increased influence in this region.

To this end, it is important for the two countries to pursue the following major tasks:

- 1) Fuller exercise of bargaining power given their collective position as a massive regional consumer of oil, and strengthening of ties of dialogue and cooperation with oil producing countries;
- 2) Strategic construction of a shared reserve scheme for response to emergencies to deal with short-term crises such as oil supply disruptions;
- 3) Promotion of cooperative resource development and procurement inside and outside the region;
- 4) Enhancement of regional partnership on effective use of surplus petroleum processing capacity and on enhancing quality standard in petroleum supply;

- 5) Development of regional cooperation on diversification of fuels with oil sands
- 6) Pipeline networking: India and China together can look at the possibilities to building a network of pipelines to tap the Russian, Central Asian and the West Asian energy sources. This could also help the other Asia-Pacific countries for energy supply.
- 7) Transmission and city distribution of gas: GAIL has signed an agreement with China Gas Holdings Limited for a 10 percent equity stake in the Chinese company. The two companies plan to cooperate in the areas of operation and management of city gas pipeline networks, as well as the sale and distribution of natural gas
- 8) Joint bidding: Both the countries have little domestic energy investment in the other's energy sectors; their interaction is mainly overseas. They both have multiple state oil companies and both consider overseas investment to be a vital aspect of energy security. Increasingly they are targeting the same assets in the same host countries. Many of the areas that India and China have targeted for upstream acquisition are high risk and thus by joint bidding risk sharing is attractive (Kang Wu, Jeffrey G. Brown and Vijay Mukherji, 2008). Joint efforts by the two countries in pooling their investments and technology would yield better resource outputs. As a result India and China were able to acquire energy assets in Syria, Sudan, Colombia, Iran and Peru. A memorandum of understanding for energy cooperation was signed by the then Petroleum Minister of India, Mani Shankar Aiyar, and China's National Development and Reforms Commission Chairman, Ma Kai, in January 2006 (Vardharajan, Sidharth, 2006).

Although both India and China are competitors, they recognize the high cost of uneconomic competition. This is the fundamental reason behind the India-China energy cooperation.

5 Summary/Conclusions

Both India and China are net importers of energy sources. According to Daniel Yergin "Global economies have become more interdependent, even though the underlying objective is to become self reliant" (Luttwak. Edward N, 2001). Real energy security requires setting aside the pipe dream of energy independence and embracing interdependence, which is the mantra which both regimes are understood to have inculcated in their revisionist approach to each other. Countries have to work for mutual benefit. China is pursuing a highly leveraged policy of energy security. Bilateral cooperation will increase the bargaining power of both countries in acquiring overseas energy assets. Also, developing domestic sources of gas and oil is a priority for both the countries.

A new "energy foreign policy" which transforms the character of existing geopolitical rivalries is emerging. Outside actors such as the European Union must react to these developments when shaping their policy responses

The two emerging economies of China & India will increasingly shape the global energy landscape.

Policy and regulation set the basic rules for how the domestic gas markets operate. Add a dash of geopolitical factors, a macro framework of energy policy drives the international relations among countries.

Infrastructure planning and building capacity to bring gas to market are key priorities in both countries & more so in case of India.

Global economies have become more interdependent, even though the underlying objective is to become self-reliant. Both China & India are net importers of energy sources. Bilateral cooperation will not only increase the bargaining power of both countries manifold in acquiring overseas energy assets but also help in developing domestic sources of gas, a priority for both the countries in a world increasingly concerned with environmental impact.

Both China and India should extend cooperation activities such as transmission and city distribution of gas, and laying down of national and transnational energy pipelines.

.Use of natural gas could muscle out low-carbon fuels, such as renewable and nuclear energy - particularly after Japan's nuclear accident and the likelihood of a reduced role for nuclear energy in some countries. Real energy security requires setting aside the pipe dream of energy independence and embracing interdependence, which is the mantra which both regimes are understood to have inculcated in their revisionist approach to each other.

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