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India's global energy engagements

Large and growing energy needs, rising crude oil prices, and increasing geopolitical uncertainties have greatly accelerated India's quest for global energy sources and increased its diplomatic initiatives on the energy front. These have taken the form of new and expanded engagements in energy-rich regions: West Asia, Africa, Russia, Central Asia and Latin America; a greater attention to energy-rich neighbours; a greater support for consumer–producer and India–China energy dialogues; and increased attention to the safety of sea-lanes. Partnerships with energy-rich countries are emerging through cross-investments in exploration and production of oil and gas, greater trade flows, and investments in non-energy sectors such as banking, hotels, and petrochemicals. More recent ties with oil-producing African countries take the form of longer-term oil and gas supply contracts, and cooperation in other areas such as defence, diplomacy, and trade. Discussions and commentaries by the strategic and energy security community on investments in transnational gas pipelines as key energy-securing tools, make their periodic appearances and then get buried for a variety of geopolitical reasons, resulting in their actual progress becoming excruciatingly slow.

India's global engagements – its new and old energy ties – have given rise to extensive commentary on India's energy-securing choices, possible implications for its foreign and trade policy, and the use of new foreign policy instruments that may run counter to traditional ones. Concerns have been voiced that these engagements could result in conflict with other countries in search of oil, most notably, China. One also hears that such ties can undermine the ability of the US and other Western countries to impose sanctions and create pressures to address issues such as human rights abuse, nuclear proliferation, and democratic reform. A counter view is that these ties, while being expedient in the short run, can lead to increased stakes in greater stability and peace in regions currently troubled. Longer-term initiatives, it is argued, should be charted, rather than fomenting greater hostility and intransigence through policies of isolation. Domestic debates also centre on whether overseas energy investments do in fact enhance energy security or are they just good commercial investments.

This issue of *Energy Security Insights* focuses on India's energy diplomacy, its perceptions of energy security, and its new and old energy ties. It explores the opportunities and challenges that these ties hold for policy-making, and the issues that are raised by India's energy-securing strategies.

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India's energy security and engagement with West Asia*

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Introduction

India is today the fifth largest consumer of energy in the world, accounting for 3.7% of global consumption. Its total primary energy demand is expected to almost double by 2030. Its primary commercial energy consumption in 2004 stood at 375.8 MTOE (million tonnes of oil equivalent) and included coal, oil, gas, and electricity generated from nuclear, hydroelectric, and renewable sources. India's commercial energy consumption is expected to more than double to 812 MTOE in 2030 (Madan 2006, p.9). Per capita primary energy consumption is still fairly low in the country (520 kg of oil equivalent—less than a third of the world average), with large disparities in the energy consumption pattern. India's energy intensity, however, is still fairly high. This is particularly true of its oil intensity, which in 2004, was double the world average—the country consumed 1.5 million barrels of oil for every $1 billion of gross domestic product (Madan 2006, p.9). In order to fuel growth rates of 8%–9% per annum, which India has been achieving over the last few years, its consumption of oil has grown: it is currently the sixth largest consumer of oil globally and will shortly be the fourth largest consumer. Given the anticipated growth rates, India's demand for oil is expected to increase at 2.9% annually up to 2030 (Madan 2006, p.10).

The *Hydrocarbon Vision 2025* set out in stark terms India's energy security predicament: its crude oil self-sufficiency had declined from 63% in 1989/90 to 30% in 2000/01 (Government of India, cited in Singh 2001). The situation is likely to get worse in the future: India's demand for oil is expected to increase from 122 MT (million tonnes) in 2001/02 to 196 MT in 2011/12, and to 364 MT in 2024/25. Domestic production during this period would increase from 26 MT to 52 MT in 2011/12, and to 80 MT in 2024/25. In 2024/25, crude oil self-sufficiency would be a mere 15%. The situation relating to gas is equally grim. From 49 BCM (billion cubic metres) in 2006/07, India's demand for gas is expected to rise to 125 BCM in 2024/25. As against this, production from existing fields and discoveries would be 52 BCM, leaving a gap of 75 BCM to be filled by new domestic discoveries and from imports.

India's energy diplomacy

Taking into account the energy requirements detailed in the Planning Commission report (Planning Commission 2006, pp.45–48), the following would comprise the various aspects of the country's domestic effort to enhance energy security.

- Augmenting domestic resources
- Maximizing the use of national hydropower potential
- Obtaining the materials and technology to pursue civilian nuclear power projects
- Pursuing energy efficiency and demand side management policies
- Diversifying energy sources through increased use of renewables

However, the Planning Commission report also brings out the following facts.

- Even if India succeeds in exploiting its full hydropower potential of 150 000 MW, the contribution of hydro energy to the energy mix will only be around 1.9%–2.2%.
- Even if a 20-fold increase takes place in India's nuclear power capacity by 2031/32, the contribution of nuclear energy to India's energy mix is, at best, expected to be 4.0%–6.4%.
- Even with a 40-fold increase in their contribution to primary energy, renewables may account for only 5%–6% of India's energy mix by 2031/32.

* The views expressed here are that of the author.

- In all scenarios, fossil fuels will form between 74% and 85% of the energy mix, as against 96% at present.

Given the high level of import dependence for fossil fuels and the need to obtain internationally developed technologies to enhance the country's domestic resources and capabilities, India has committed itself to pursuing a robust 'energy diplomacy.' This consists of substantial, proactive, and multifaceted engagements across the world to promote India's energy security interests. These global engagements are aimed at achieving the following.

- Significant enhancement of domestic resources and capabilities by bringing in state-of-the-art foreign technology and expanding the national knowledge base
- Acquisition of assets abroad, which are of two types.
  1) Equity participation in producing fields
  2) E&P (exploration and production) contracts in different parts of the world, both onshore and offshore
- Participation in downstream projects (refineries and petrochemicals) in producer and consumer countries on the basis of criss-cross investments
- Finalization of long-term LNG (liquefied natural gas) contracts
- Setting up of transnational gas pipelines
- Obtaining technologies to promote sustainable energy use, including conservation, increased use of environment-friendly fuels, and development of unconventional and non-conventional energy resources within the country
- Promotion of intra-Asia dialogue between producers and consumers, encouragement to intra-Asian investment, and development of Asian capabilities, resources, and infrastructure

The contemporary international hydrocarbon environment is highly competitive, pitting corporations and nations against each other, and involving billions of dollars of financial flows and, on occasion, even extra-legal skulduggery. At the same time, this is also a period of unprecedented opportunity, with high oil prices opening up exploration and production prospects and compelling producer and consumer countries to pursue investments in the downstream sector.

India's long-term interests lie in setting up international alliances and partnerships, particularly in the Gulf and Central Asia, which would bring together different capabilities in joint proposals. The potential areas of cooperation range across the hydrocarbon value chain, and include prospecting in each other's territories, as also exchanges in the areas of R&D, technology, safety norms, and training. Beyond bilateral ties, there is the possibility of Indian and foreign national companies working together on specific projects in third countries.

The Gulf region provides two-thirds of India's oil requirements. From amongst the Gulf countries, Saudi Arabia is India's largest supplier of crude oil, meeting 25% of its annual requirements. Following King Abdullah bin Abdul Aziz's visit to India in January 2006, the two countries agreed to transform their present commercial ties into a 'strategic energy partnership.' This partnership is to be concretized through investments in each other's downstream and petrochemicals projects, as also through India's participation in Saudi Arabia's upstream activities in the gas sector. Noting that Saudi Arabia is the world's principal oil producer and India is a major hydrocarbon importer, the two countries 'affirmed the importance of stability in the oil market for the world economy.' The Indian side praised Saudi Arabia as a 'trusted and reliable source of oil supplies to international markets in general and the Indian market in particular.'[1]

Besides Saudi Arabia, Iran is India's other major energy partner in the Gulf. It is the third largest supplier of oil to India (at 2.5 MT per year, after Saudi Arabia and Nigeria), and is emerging as an associate in a number of hydrocarbon-related projects, particularly in the gas sector.

However, it is India's participation in the transnational gas pipeline projects on its western land frontiers that has seized the imagination of

[1] The Delhi Declaration, signed by King Abdullah bin Abdul Aziz Al-Saud of Saudi Arabia and Prime Minister Dr Manmohan Singh of India, on 27 January 2006; details available at <www.mea.gov.in./jedhome.htm>.

strategic affairs and energy security commentators, with robust discussions on these novel proposals (for India) taking place in seminar halls and newspaper columns. This is not surprising since transnational pipelines involving India, though discussed over several years, have till recently been moribund.

India's perceptions of energy security

India does not see the pursuit of national, regional and global energy security interests in competitive and conflictual terms. India's view is that given the central role that energy security plays in the national development of a country, it has to be seen as an integral part of the national security of the country concerned. At the same time, energy security has attributes that distinguish it from other aspects of national security: first, while various aspects of national security are generally status-quoist, in that they protect and sustain the existing order (be it national borders, national political structures or national values), energy security is a dynamic concept—it *enhances* a nation's economic and therefore political status, by providing it with the resources to pull its people out of poverty and pursue national growth and development.

Second, while national security has at its core the maintenance of a country's *national* interest, energy security cannot be attained on a purely national basis; it is inherently *cooperative* in character and is founded on engagements with other countries. Given that hydrocarbon resources will continue to dominate the global energy mix (and, hence, the energy mix of most countries) for at least the next 25 years, if not longer, a cooperative approach at bilateral, regional and international levels is both inevitable and urgent for the world's energy resources to be harnessed efficiently.

India's commitment to a cooperative approach in the pursuit of energy security interests is strengthened by the realization that the next few years will see a steady decline in oil supplies, with implications for prices, economic programmes and political contentions. Though advances in technology will provide the hydrocarbon resources required to meet global demand, at least over the next 30–50 years, new oil will be available in physically challenging areas such as the deep sea or frozen terrain or environmentally sensitive locations. Again, required will be huge investments for its extraction, amounting cumulatively to about $5 trillion up to 2030, at the rate of $20 billion per annum. Meeting the global demand for oil and obtaining the financial resources to ensure supplies requires the rejection of political competition based on narrow national considerations. In its place, it calls for an integrated regional and global effort to pool together the world's human, financial and technological resources in a spirit of cooperation for mutual benefit.

In response to this challenge, the international oil industry is already integrating in significant ways: major companies are merging to pool together their financial resources and technological capabilities. Again, there is a clear trend in favour of national oil companies integrating across the hydrocarbon value chain, from exploration to production, transportation, refining and petrochemicals. Finally, E&P contracts in developing producer countries are increasingly being linked to refinery proposals and, on occasion, even to other infrastructure development proposals such as roads, railways, power, mining, and port development projects.

In line with these perceptions, India's energy diplomacy is being pursued at bilateral, regional and global levels to promote corporate joint ventures and government-to-government partnership. At the same time, India remains conscious of the strategic dimensions of the pursuit of energy security interests by different stakeholders, and through its bilateral and regional engagements, it attempts to ensure that its broad national interests are safeguarded.

India's ties with the Gulf and the Arabian Peninsula

India has enduring interests in the Gulf and the Arabian Peninsula.

- The region is part of India's security perimeter: developments in the region have a direct bearing on India's strategic and security interests.
- The region is the principal source of India's crude oil requirements. Both oil and natural gas imports from the region will increase over the next 20 years as India's energy demands increase. Thus, the security of oil facilities and

sea-lanes is a crucial element of India's long-term energy security interests.

- The region is a major economic partner. It is a market for Indian goods, and a partner in joint ventures and arrangements for transfer of technology. India's annual two-way trade with the six GCC (Gulf Cooperation Council) countries is valued at $52 billion (including $25 billion on account of oil purchases). It is also a principal source of remittances from the resident Indian community. Annual remittances from the Indian community in the GCC countries amount to about $9 billion.
- Concerns relating to the welfare of the four-and-a-half-million-strong Indian community require that India maintain the closest possible political ties with the countries of the region.

After the oil boom of the early 1970s, the oil-rich Gulf countries increasingly turned to the West to obtain the technology and mega-project capabilities required to set up infrastructure and energy-related projects. However, with the gradual increase in the recruitment of Indians as labour, managers, and professionals, to execute and maintain the region's infrastructure and industrial and service projects, Indian presence continued to expand in the region in tandem with increasing purchases of oil by India.

From the late 1990s, there was increasing recognition of India's political and economic strengths based on the consolidation of India's democratic and multicultural order, its high growth rates and firm technological base. All of these convinced the GCC countries that India was poised to play an enhanced regional and even international role in the economic and technological arena. These perceptions led the GCC foreign ministers to invite India as a dialogue partner, only the fourth after the United States, European Union, and Japan. Following this, the GCC–India Industrial Conference took place in Mumbai, in February 2004, when six commerce and industry ministers from the GCC countries, and the then Indian minister for commerce and industry agreed, through the 'Mumbai Declaration', to enhance economic cooperation.

Separately, India engaged with specific Gulf countries for high-value joint projects such as the billion-dollar Oman–India Fertilizer Project and the agreement with Qatar to purchase LNG over the next 25 years. Besides these mega-contracts, Indian companies significantly expanded their economic presence in the region not only through enhanced trade activity but also through several joint ventures in industrial production, consultancy, information technology, engineering, management, and accountancy services. Over the last few years, Indian economic and business delegations have been overwhelmed by the attention they have received from GCC business. The GCC–India Industrial Conferences continue to meet annually.

These expanded economic ties have moved along with enhanced political links. Commencing with the visit of the then Indian External Affairs Minister, Jaswant Singh, to Saudi Arabia in January 2001, there has been a steady expansion in high-level political and economic dialogue. Thus, from mid-2005 onwards, India has received the heads of state/ government of five of the six GCC countries; Oman being an exception, from where a high-level visit is expected in late 2007. The sinews of the relationship are being strengthened with regular meetings of bilateral joint commissions and Foreign Office consultations, along with discussions with regard to agreements in the areas of economy, civil aviation, health, education, security, and crime. India's interest in the security of the Gulf waters and the Straits of Hormuz is affirmed through regular visits of Indian navy ships to various Gulf ports. All of these taken together confirm the high importance the two sides attach to the relationship.

Conclusion

West Asia attracts considerable international attention on account of its significant hydrocarbon reserves, and has a crucial place in the pursuit of India's energy security interests. With about two-thirds of the world's oil reserves, the region is witnessing considerable instability, violence, and uncertainty. It is not surprising that the region is politically volatile in terms of its internal situation, as also because of the interplay of external forces that are competing for power and influence, primarily on account of the availability of oil and gas resources.

This environment of insecurity, distrust and big power competition has led to what the

Indian strategic affairs commentator Brahma Chellaney has described as a 'qualitative re-ordering of power' globally but most conspicuously in Asia. The major players seek to obtain the maximum possible geopolitical advantage for themselves on the basis of 'new equations and initiatives' (Chellaney 2007). Thus, the trilateral Russia–China–India dialogue and the evolving Shanghai Cooperation Organization are attempts by major Asian role players to explore and pursue common strategic, primarily energy-related, interests.

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Gas without borders

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Despite American displeasure, with big stakes involved, India and Pakistan should stand firm on the Iran gas pipeline.

The IPI (Iran–Pakistan–India) gas pipeline was first mooted in 1989 by Dr R K Pachauri, Director-General of TERI, in India, and Dr A S Ardekani of Iran in 1989. Iran has the second largest gas reserves in the world. It made sense to supply gas to India, which was then gas deficit and still is. The main problem was that Pakistan would be a transit country and relations between India and Pakistan seemed to go up and down with the tide. The main worry was that Pakistan could interfere and stop the flow of gas to India, thus holding India hostage. This was notwithstanding the fact that the Indus Water Treaty between the two countries has operated smoothly, to the extent that in the public domain there is hardly any discussion on it. It was the rocky relationship between the two countries, basically on Kashmir, that stymied any progress for the next 15 years.

Matters took a positive turn after Pakistan discovered that it would soon be running short of gas arising from extensive development of its natural gas market and limited domestic resources. There was a revival of interest, including the first detailed assessment of the project by the Anglo-Australian company BHP Billiton in 2003. As conceived by BHP Billiton (see Figure 1), a 44-inch pipeline has to be laid from Assaluyah on the Iranian coast, from where gas from the South Pars field would be pumped 1115 km across Iranian territory to the Pakistan border and a further 760 km through Pakistan to the Indian border. At a distance 70 km short of the Indian border, the pipeline would link up with Pakistan's own gas network, the SNGPL (Sui Northern Gas Pipeline Ltd) as well as its southern counterpart before entering India. Within India, a further 900 km would be required to connect with the North Indian market. It was anticipated that at its full capacity Pakistan would use about 60 MSCMD (million standard cubic metres per day) and India 90 MSCMD. The total cost of the project was estimated at $4 billion.

Arising from the above developments, India's security concerns abated as Pakistan now had a stake in the smooth operation of the pipeline. India's formal commitment to the project was made by Prime Minister Dr Manmohan Singh in September 2004. Despite the unrest in Baluchistan, where Pakistan's own gas lines from

Figure 1 The Iran–Pakistan–India pipeline as conceived by BHP Billiton

the Sui gasfield were regularly blown up by insurgents, it was felt that the project could go forward, provided certain measures were taken to physically protect the pipeline and, if breached, to repair it quickly and at short notice. India has had its own crude oil pipelines blown up in Assam from time to time, and though inconvenient, the situation has been manageable.

Since 2004, while discussions on a bilateral or trilateral basis between the three countries made some progress, there have been roadblocks and changes in the base numbers and costs. First, BHP Billiton revised the cost to around $7 billion because of increase in steel prices and diameter of the pipeline. Then it was rumoured that Pakistan was demanding a transit fee as high as $700 million though this was subsequently denied. Meanwhile, a contract that India had entered into for supply of LNG (liquefied natural gas) from Iran got unstuck because Iran claimed that it had not been given the final seal of approval by the Supreme Economic Council.

The fact that gas prices had gone up substantially in the international market does not appear to be a mere coincidence. This brings into question the sanctity of contracts concluded with Iran, especially as the pipeline contract, despite any commercial agreement between corporate parties, will again need to be approved by the Supreme Economic Council.

In India, two LNG terminals have been set up and gas is flowing smoothly through these terminals to consumers, thereby making up a part of the large gas deficit that India is facing. Also, new and large discoveries have been made on the east coast in the KG (Krishna–Godavari) Basin, with the promise of on-land deliveries by mid-2008. In the case of Pakistan, there are no such alleviating options, and expensive fuel oil continues to be used for generating power, which could be substituted by gas.

What has been surprising is that during the whole of this period there were no discussions on the price of gas, something that should have been the first item on the agenda, well before discussions on the modalities of delivery. This has benefited Iran because the price of gas at the Indian border is now projected at around $5 per mBtu (million British thermal unit) against an earlier expectation of around $2 per mBtu, excluding transit and transportation fees payable to Pakistan. This latter charge arises out of the fact that normally transnational pipelines have one owner/operator but Iran has proposed that each country build its own section of the pipeline. This is not a satisfactory arrangement in terms of operation of the entire network, obtaining international finance and gaining the confidence of customers in terms of reliability of supply.

Besides, there has been a change on the Iranian side. It has laid a pipeline IGAT-7 for domestic use from Assaluyah to Iranshahr, which will be extended 100 km to the Pakistan border to meet Pakistan's and India's requirement. The spare capacity of this pipeline is 60 MSCMD and the availability stands reduced to 30 MSCMD for each country.

In the case of India this is one-third of what was originally planned, which, perhaps, is just as well, as India now has other sources of gas. From an energy security angle, this reduces the dependence on Iranian supplies. Once a gas grid is built within the country this will assure customers of alternative supply options. Strangely, through all these developments, the cost of the pipeline continues to be touted at $7 billion despite its length in Iran having been reduced by about 1000 km.

Then there is the issue of gas demand/supply balance for India as projected by the working group for formulation of the Eleventh

Table 1: Eleventh Plan: demand/supply balances 2011/12 (Unit: MSCMD)

Demand	281
Supply: ONGC	41
Private joint ventures	57
Krishna–Godavari Basin	94
Import potential: LNG and by pipeline	89
Total	281

Five Year Plan for 2011/12 (see Table 1). The demand numbers have been drawn up based on broad parameters of economic growth and conversion of all naphtha-based fertilizer plants to gas. The high demand for gas in the power sector (despite questions of 'affordability') could well be overstated, as anticipated gas prices have not been taken into account.

On the supply side a lot will depend on the extent to which the KG Basin discoveries by Reliance and other companies can be brought onshore and marketed through pipelines. If these numbers are assumed to be realistic, the new LNG plants that are proposed and existing gas plants after expansion could supply as much as 83 MSCMD leaving just 6 MSCMD by the pipeline from Iran, which may be commissioned only after 2011/12. It is vital that these broad numbers are subject to a reality check and scenarios be drawn up for demand at various price levels not only for natural gas but also competing fuels.

In constructing the pipeline, Iran's contribution will be restricted to extending the IGAT-7 pipeline by just 100 km. Pakistan will carry the biggest risk as the capacity of its section of the pipeline will need to meet India's as well as its own requirement, that is, 60 MSCMD. In the framework agreement that is to be drawn up between the three countries in June 2007, Pakistan will be well within its rights to ask India for a 'take or pay' clause. India could also have a problem unless 'take or pay' contracts are entered into with Indian consumers by the importing entity. Otherwise, we might find ourselves in a situation where we have the IPI pipeline but very little demand, against a supply of 30 MSCMD.

Finally, there is the American view of not favouring the IPI pipeline while making the impractical suggestion that nuclear energy can meet all our needs. Much will depend on how firm both India and Pakistan stand on this issue. For whatever reason, in the event the pipeline does not come through (which will be a pity), Iran will use the gas allocated to the pipeline for enhanced recovery of oil from its ageing oilfields, while India would pursue the KG Basin projects and the setting up of LNG terminals more vigorously. It is Pakistan that stands to lose the most, as it has had no major gas finds in the recent past and has not yet started work on an LNG terminal.

(Courtesy: *Hardnews*)

Postscript

Iran has since proposed a three-yearly price revision clause, which India is opposing but Pakistan seems to have accepted. India and Pakistan have agreed on the principles on which the transport charge is to be based, if not the specific charge itself. The transit fee remains an issue. Iran has claimed that India is dragging its feet on the entire deal and says it will sign up with Pakistan if India continues to do so.

The delay in finalizing the transit fee appears to be a ploy by India to keep the gas pipeline on the back burner (no pun intended!) till the nuclear deal with the US plays itself out. Iran appears to have tacitly gone along by giving India another four months to sign up on a framework agreement.

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Do India's overseas energy equity investments add to its energy security?

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Rising import dependence and stagnation in domestic production have urged India to actively seek overseas energy equity. The country has made substantial investments in oil equity, and a similar trend has been observed in the gas and coal sector. In spite of growing engagement in the area, however, divergent views exist on the contribution of equity investment to enhancing India's energy security. The risks associated with such investment, the parameters for decision-making, and the geopolitical implications, have been subject to intense debate.

In view of the need to develop a pragmatic policy paradigm that enhances reliability of external supply, this paper examines some pertinent concerns with regard to equity investments and assesses how their potential can be maximized to contribute to India's energy security.

Energy equity investment: the drivers

Clearly, the strategy of acquiring equity stakes abroad helps in diversification of supply sources. It adds to the resources made available by conventional trade routes and opens up possibilities for reaching out to a range of countries.

Table 1 summarizes India's overseas oil and gas investments. OVL (ONGC Videsh Limited), a wholly owned subsidiary of ONGC (Oil and Natural Gas Corporation Limited), operates exclusively in foreign markets, with the mission to acquire 60 MTPA (million tonnes per annum) of equity oil and gas by 2025 (OVL 2007). Its operations extend across Asia-Pacific, West Asia, Africa, and Latin America (OVL 2007). In 2005/06, OVL acquired nine oil and gas assets in seven different countries and increased its oil and gas reserves from 197.94 MTOE (million tonnes of oil equivalent) in the previous year to 206.19 MTOE.

In the coal sector, in March 2007, the TPCL (Tata Power Company Limited) acquired equity stakes in two major Indonesian thermal coal-producing companies, PT Kaltim Prima Coal and PT Arutmin Indonesia. With substantial capacity additions planned under the 4000-MW (megawatt) UMPP (ultra mega power projects) based on imported coal, such investments are expected to increase in the future. Another developer, REL (Reliance Energy Limited), plans to invest $1 billion to acquire coal blocks abroad for its UMPP based in Krisnapattnam, Andhra Pradesh (Bhaskar 2007).

It is often argued that the decision by Indian companies to invest in equity emanates not from the need to secure India's energy future, but from the availability of surplus funds and the promise of good returns and capacity growth held out by such investment. Depletion in domestic resources brings into companies' focus foreign reserves open for investment. The motivation thus is the exploration of business opportunities for profit-making and not energy security. Further, the risks associated with equity investment imply that its resultant contribution to energy security remains limited.

While there is no fixed strategy for overseas equity investments, and deals are assessed on a case-by-case basis, certain techno-economic parameters do influence the decision to invest in a block/country. Countries/blocks are shortlisted on the basis of geological profile, reserve growth potential, political risk involved, host country regulations, and the terms and conditions

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Table 1 India's oil and gas investment abroad

Country	*Block/Company*	*Investment*	*Equity stake (%)*	*Reserve*	*Acquiring company*	*Year*
Russia	Sakhalin – 1	$12 billion	20	2300 MB oil and 17.1 TCF of gas	OVL	1996
Russia	Sakhalin – 3	$1.5 billion	–	–	OVL	–
Russia	Russian – Kazakh Kurmangazy	$1.5 billion	–	–	OVL	–
Myanmar	Offshore Block A – 1	–	20/10	4–6 TCF	OVL/GAIL	2000
Vietnam	Lan Tay and Lan Do Fields	–	45	2 TCF	OVL	1998
Iran	Farsi Offshore Block		40/40/20	540 MB	OVL (Operator)/ IOC/OIL	2002
Syria	Block XXIV	–	60	–	OVL	2004
Iraq	Block - 8, Western Desert	–	–	645 MB	–	2001
Qatar	Najwat Najem	–	–	–	–	2005
Sudan	GNOP	$720 million	25	1000 MB	OVL	2003
	5A		24.125	267 MB	–	2004
	5B		23.5	3500 MB	–	2004
Egypt	North Ramadan	–	–	–	–	2005
Nigeria	–	–	17.5	–	IOC/OIL	–
Gabon	FT2000		45/45	–	OIL/IOC	2006
Libya	NC-188 (located in Ghadames basin) and NC-189 (Sirte basin)	–	49	–	OVL	2000
Cote d'Ivoire	CI-112	–	23.5/11.5		OVL/OIL	
Cuba	Blocks 25, 26, 27, 28, 29 and 36	–	30	4000 MB	OVL	2005
Colombia	Mansarovar Energy Colombia Limited	–	50	19 000 bbl per day of production	OVL	2006
Yemen	Blocks 34 and 37	–	–	–	Reliance	2006

MB – million barrels; TCF – trillion cubic feet; bbl – barrels
Source TERI (2007, pp. 64–65)

offered. The organization of the energy sector too determines the availability of a country for investment and the viability of the undertaking. For instance, in Saudi Arabia, Kuwait, and Mexico, the NOCs (national oil companies) have a monopoly in the upstream sector. West and North Africa may offer attractive terms to investors, but these call for large investments as often the infrastructure to support operations is lacking (Mitchell and Lahn 2007, p.7).

The autonomy available to Indian NOCs in decision-making is determined by the magnitude of investment: companies can autonomously take decisions up to an investment of $75 million. Beyond this, the proposal needs to be referred to the Cabinet and the ECS (Empowered Committee of Secretaries). Conclusions on the efficacy of this limited autonomy need to be made in view of the fact that in the last few years, OVL has not lost out on any bids due to lack of autonomy.

Assessment of risks and returns

A large proportion of equity investment is made in politically sensitive and conflict-prone countries such as in Africa and West Asia. In many countries where the political situation is uncertain, deals are subject to the risk of sudden nationalization and change in ownership and control. Concession agreements also often have strong sovereignty clauses which require the company to leave the host country if political and economic conditions change.

India's *Integrated Energy Policy* thus attaches significant risks – political, economic, and logistic, to equity investments abroad. According to the Integrated Energy Policy, Report of the Expert Committee (Planning Commission 2006, p.62),

> '*Obtaining equity oil abroad does not particularly increase oil security beyond diversification, if any, of supply sources. The political risk of disruption of the supply of equity oil through embargos or*

nationalization etc. would be similar to risk entailed in oil import from the same country… To the extent that India owns that oil abroad, whether it is brought to India or sold in the international market, the value remains the same. Thus obtaining equity oil abroad should be mainly looked upon as a commercial investment decision. If the amount of money invested in obtaining equity oil were to earn a higher return in an alternate investment, then such investment provides a better level of comfort for accessing oil at even higher prices in the future.'

It is argued that overseas investment in coal could be a better option to enhance India's energy security as compared to overseas investments in oil and gas blocks. While profits in coal equity investments abroad may not be extraordinary, the political risks involved are much lower. The international coal market is relatively open—the major consumers of coal such as the United States have abundant domestic resources, and coal is in limited demand in Western Europe. In addition, coal reserves are located in relatively more politically stable countries such as Australia, South Africa, and Indonesia, as compared to countries with abundant oil and gas.[1] Nevertheless, prospective changes in international market dynamics with India's entry into the market as a big player, and the availability of requisite port capacity in the country, need to be taken into account.

Since equity investment is here to stay as an energy-securing strategy, it is significant that India develops expertise for risk assessment and mitigation. Exploration blocks need to be closely evaluated for prospects and safety of returns. Specifically, India needs to carry out long-term projections of the country's growth and resource requirements, and systematically evaluate political risks in different parts of the world to guide its diversification strategy. Unfortunately, most Indian oil companies do not have a comprehensive setup or database to follow this strategy, with the result that India ends up acquiring blocks that are in the 'very high risk' category (Dadwal and Sinha 2005, p.523).

Energy strategies need to both inform and be informed by the country's overall foreign policy objectives. In addition to contributing to the fossil fuel resources available to the country, the presence of a national oil company in another country through equity investment significantly improves diplomatic ties, and opens up avenues for trade and commerce. Similarly, larger political interests and international engagements may influence a country's decision to invest in a particular country block. Energy deals are often employed as bargaining chips to meet other geopolitical interests, and to determine the host country's political and strategic positions vis-à-vis other countries and international issues (Mitchell and Lahn 2007, p.10).

In an attempt to integrate energy policy with larger international diplomatic initiatives, India has focused development lending initiatives on resource-rich countries of West Africa, whose national oil companies are keen to gain deals from Indian companies (Mitchell and Lahn 2007, p.9). In Nigeria, oil and gas blocks have been reserved for OMEL (ONGC Mittal Energy Limited) in return for investment in infrastructure. In case of some host countries, India may represent an attractive investor that does not make deals conditional on meeting of political requirements, as demanded by some Western countries (Mitchell and Lahn 2007, p.10).

India and China: an unequal competition

The growing energy needs of China and India have pitted them against each other in the 'competition' for energy sources. Often in the last few years, the two countries have engaged in competitive bidding against each other, and the Chinese have considerably outperformed their Indian counterparts. In one instance, India lost a bid to acquire Royal Dutch/Shell's 50% interest in Block 18 offshore Angola, when China offered the Angolan government a 17-year, $2 billion loan at a

[1] The environmental concerns associated with consumption of coal, especially in the case of coal-based power generation, are being addressed by the development of more efficient and cleaner coal technologies. In fact, in the US and China, the use of coal is only increasing due to increasing crude oil and natural gas prices. In view of these factors, India's NTPC (National Thermal Power Corporation) should plan to develop coastal, imported coal-based thermal power projects.

low interest rate along with the offer to build hospitals and electronics manufacturing factories. The Indian government too was prepared to support ONGC, but its offer to the Angolan government was limited to $200 million for a railway (Dadwal and Sinha 2005). Notably, China's acquisition of oil and gas equity abroad is being pursued as part of its larger objective of building strategic alliances, that it embarked upon in the 1990s. This serves to build larger Chinese influence in the supply country through multi-sectoral engagement.

The relative competitiveness of Indian and Chinese national oil companies is influenced by various factors. First, political support to companies from the respective governments is much higher in China than in India. Second, Chinese companies have access to cheap sources of capital for financing such deals. And finally, these companies are integrated and are able to reap the benefits of economies of scale.

Lately, it has been observed that aggressive bidding by India and China is pushing up price of equity stakes, whereby both India and China may end up paying heavy monetary costs that do not justify the expected commercial and energy security returns. The Indian government has voiced its inclination for a collaborative approach, where India and China can collectively bid for equity stakes. In fact, OVL has collaborated with Chinese companies to acquire small assets in Syria and Colombia. The viability of this partnership, nevertheless, is dependent on sustained mutual interest. Even though it is in the interest of Indian companies to seek cooperation from the Chinese, the cash-rich Chinese can afford not to oblige (Dadwal and Sinha 2005, p.526). They may also be reluctant to let go off their position of advantage.

Conclusion

Rapid growth and industrialization are slated to substantially increase India's energy consumption, in the absence of a corresponding increase in domestic energy supply. The overall energy import dependence which was at 27% in 2001, is expected to stand at 90% in 2031 (TERI 2006). This would imply increased vulnerability to fuel price volatility, geopolitical tensions, threats of supply disruption, and maritime threats to shipping lines. To enhance its energy security, India needs to pursue a multi-pronged strategy that emphasizes use of alternative sources of energy, energy efficiency and conservation, but also focuses on exploring new domestic and international energy sources, and securing them. Overseas equity in oil, natural gas, and coal, needs to be pursued in this larger context.

The government and the national energy sector need to work in collaboration to evolve methodologies for risk mitigation and adaptation, and move from a reactive approach to a proactive one. Knowledge sharing and management; establishment of project appraisal mechanisms; state support to national oil companies; and consolidation of strengths through joint ventures, mergers and acquisitions, are issues that need to be deliberated on as part of a comprehensive policy framework.

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The India–Africa energy partnership: prospects and challenges

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The burgeoning demand for energy in India to fuel its economic growth has pushed Africa to the centre of India's energy calculus. As India grows, the need to expand supplies and to diversify its sources of energy is growing with equal urgency. Energy-rich Africa is an important constituent of India's outward strategy for enhancing its energy security. Much of Africa's mineral wealth remains untapped and there is growing interest in Africa for investment in its energy sector.

India's current interest in Africa's mineral wealth must be seen as part of the overall shift in India's Africa policy since the end of the era of decolonization. The solidarity that emerged from their shared history as colonies is now being channellized to enhance trade and business relations between India and Africa in a more concerted manner. And energy is fast becoming the cornerstone of the India–Africa economic partnership—an aspect that can go a long way in strengthening and deepening India's presence in Africa.

India's outward energy strategy vis-à-vis Africa is studied here with a special focus on Nigeria and Sudan. The discussion is broadly divided into four sections.

- The prevailing demand-supply complementarities between India and Africa
- India's current trade and energy linkages with Africa
- The risks associated with investing in African countries
- The need for India to engage with other big players involved in Africa's energy sector.

Nigeria and Sudan are very important for India's energy security. While Nigeria ranks second after Saudi Arabia as India's biggest supplier of oil in the world (and first in Africa), Sudan is a fairly new energy partner for India.[1] Despite the fact that India imports 15.081 MT (million tonnes) of crude oil from Nigeria and only 0.328 MT from Sudan, the countries pose similar challenges for India, such as a disproportionate emphasis on energy relations to the exclusion of trade in other goods and services, similar security and political risks, and the need to take into account the presence of other major players such as the US, UK, and China.

Growing complementarities in energy relations

India's demand for energy is set to grow in the years to come and with it the need for affordable and secure sources of supply. According to the Report of the Expert Committee on India's Integrated Energy Policy, India needs to increase its primary energy supply by three to four times and, its electricity generation capacity/supply by five to six times from the 2003/04 levels, for a sustained growth rate of 8% through 2031/32 (Planning Commission 2006).

Africa holds great promise in helping India meet some of its future energy needs. Albeit unevenly distributed, Africa accounts for 9.7% of the world's proven oil reserves, 7.8% of the world's total natural gas, and about 5.6% of the world's proven coal reserves (BP 2007).[2] Nigeria is the largest oil producer in Africa, the 11th largest producer of crude oil in the world, and also the largest producer of sweet oil in OPEC (Organization of the Petroleum Exporting Countries).[3] Additionally, Nigeria is the seventh largest holder of natural gas reserves, which stand at 182 TCF (trillion cubic feet). Oil is also the

[1] Nigeria accounts for 15.73% of India's total oil import, whereas Saudi Arabia accounts for almost 25%. See *Integrated Energy Policy, Report of the Expert Committee*, Planning Commission, August 2006.

[2] Africa's proven oil reserves are almost as large as Europe's and Eurasia's (144.4 thousand million barrels).

[3] Much of Nigeria's petroleum is largely free of sulphur, thereby making it easy to refine. The majority of the oil reserves are found along the country's Niger River Delta in southern Nigeria; and offshore, in the Bight of Benin, Gulf of Guinea, and Bight of Bonny. Of the 606 oil fields in the Niger Delta, about 355 are onshore.

most important component of Sudan's economy. The country's oil production witnessed a 276% increase after the export pipeline from central Sudan to the Port of Bashair on the Red Sea was operationalized.

Africa's importance as a source of energy is significant not only for developing countries such as India and China, but also for the world at large. An indication of Africa's importance as a source of energy can be evinced from the fact that economists expect sub-Saharan Africa to grow at 7% as a result of higher production in oil-rich countries (Faris 2007). In October this year, the US established a new command structure solely for the African continent. The move signals Africa's strategic importance to the US in particular, which undoubtedly has as much to do with securing a significant source of future energy supplies as with the threat of terrorism.

Linking energy with trade relations

India's involvement in Africa's energy sector, like the endowment of energy resources on the continent, is uneven in terms of geographical reach and the extent to which India has made inroads into the larger economy of the energy-rich countries. It is only recently that India has awakened to the need to strengthen its trade and business linkages with countries in Africa. Serious efforts are being made to this end, and in view of this, the volume of trade has risen markedly. For instance, total trade between India and Nigeria has almost doubled from 2002 to 2006 (Ministry of Commerce and Industry 2007).[4] With Sudan, trade has more than doubled between 2000 and 2005. Companies such as TCIL (Telecommunications Consultants India Ltd), ITI Limited, IRCON, BHEL (Bharat Heavy Electricals Limited), Kirloskar Brothers, Bajaj, Tata buses and trucks, among others, are active in Sudan. Despite recent efforts, however, India's trade with African countries remains small compared to that of China's. China alone accounts for one-third of Asia's exports to Africa (Broadman 2007).

More damaging to India's comprehensive long-term involvement in Africa is the limited focus on energy cooperation to the exclusion of other sectors of the economy. For example, although Nigeria is India's biggest trading partner in Africa, oil constitutes 96% of India's imports from the country. Only now has India begun to use its energy needs to expand its presence in other sectors of Nigeria's economy. In 2005, OMEL (ONGC Mittal Energy Ltd) signed an MoU (memorandum of understanding) with the Nigerian government for a $ 6-billion oil-for-infrastructure deal. In return for equity oil, India will assist Nigeria in the establishment of a 2000-MW (megawatt) thermal power plant, a refinery, and upgrade its railway infrastructure (MEA 2007).[5] Since 2005, India's commercial policy vis-à-vis Sudan has broadened to include infrastructure, agriculture, human resource development, ICT (information and communication technologies), and small and medium industries.

India's outward energy strategy must locate cooperation in the energy sector within the larger framework of trade and business cooperation. India can ensure stable and secure supplies of energy only if there are bilateral and multilateral ties that help stabilize and regularize the relationship beyond the inherently volatile nature of the politics and economics of energy.

The geopolitics of energy relations

Apart from a broad-based engagement with key energy-supplying countries in Africa, India will also need to engage with other countries on the continent. A pragmatic foreign policy will call upon India to balance its economic interests with those of other countries. Already much has been said about how China and India's growth is pushing them towards greater competition for the same resources, particularly in Africa. For instance, in 2006, ONGC (Oil and Natural Gas Corporation Ltd) India was a contender for a deepwater block in Nigeria for a $2.6-billion deal that CNOOC (China National Offshore Oil Corporation) eventually made, thus acquiring a 45% stake in OML 130 (Offshore Oil Mining License 130) (China Daily 2006). The deal was

[4] Total trade between India and Nigeria has grown by 79.5% from $527.21 million in 2002/03 to $946.50 million in 2005/06. (Figures do not include India's import of petroleum products and crude oil.)

[5] Based on this deal, OMEL was awarded two oil blocs in 2006 in Nigeria.

blocked by the Indian government on grounds of it being commercially unviable (AP 2006). Free of opposition to governmental policy, China has the advantage over its competitors to invest in assets without insisting on certain safeguards. A major reason for China's enduring relations with Sudan on the other hand is the sale of arms to Sudan. China has also made substantial contributions in the development of Sudan's oil industry as well as other sectors such as agriculture, light and heavy industry, pharmaceuticals, and arms industry.

Apart from China, India will also need to keep in mind the presence of other big powers in Africa such as the US and the UK. For instance, the US is Nigeria's largest customer for crude oil, accounting for 40% of the country's total oil exports. The UK is Nigeria's largest trading partner and in turn Nigeria is the UK's second largest market in sub-Saharan Africa, after South Africa. The US has also been a big player in Sudan's energy sector, although its policy has undergone several ups and downs following concerns regarding terrorism and the genocide in Darfur.

Risks associated with investing in Africa's energy sector

India's energy calculus vis-à-vis Africa must increasingly incorporate the costs of investing in politically risky countries. Although the resource-rich countries of Africa are attracting greater investment, the political climate there can prove problematic for the conduct of transparent and durable business transactions. A recent survey conducted by US-based Freedom House found that 12 resource-rich countries in Africa were politically more repressive than 20 other agricultural or diversified economies (Freedom House 2007). Political repression in mineral-rich countries of Africa is likely to generate greater societal cleavages, particularly if the wealth generated from the mineral resources fails to percolate to the people.

The deteriorating security situation of the major oil-producing region of Nigeria – the Niger Delta – is an interesting case in point. A militant group known as MEND (Movement for the Emancipation of the Niger Delta) is seeking a more equitable distribution of Nigeria's oil wealth, particularly for the indigenous Ijaw tribe.[6] As per government estimates, some 800 000 BPD (barrels per day) of output has been shut in due to militant activity, with a substantial portion of the lost output resulting from the shutdown of Shell's export terminal at Forcados (Oil and Gas Insights 2007). Similarly, Sudan is also plagued by multiple conflicts that include the internal conflict in Darfur, the religious conflict between Christians and Muslims, between Arabs and Africans, between the resource-rich South and the approach-rich North, and between the government forces and the Sudan's People's Liberation Army—the most influential faction of the Southern rebels. Oil sales have only helped in further financing the government's efforts in controlling the south, and in turn, fuelling the conflict.

The security situation is further complicated by a general absence of transparent procedures for business. Nigeria scores poorly in socio-economic indicators and high in corruption. The legal process is not transparent, enforcement is inconsistent, and infrastructure is weak. Sudan's problems are compounded by the perceived links with non-state actors such as the Abu Nidal group, the Armed Islamic Group, al-Jihad, and so on. The presence of landmines installed during the long civil war also poses a big problem for investments in Sudan. Rampant corruption, weak institutional and regulatory frameworks, lack of international business standards and culture, all add to the poor investment climate.

Although, virtually all sectors in Nigeria's oil and gas industry are open to investors, and Sudan's oil industry comprises a large number of MNOCs (multinational oil companies) (given Sudan's limited technical expertise and capital resources), the risks of investing in the energy sector in Africa need to be worked into India's energy strategy vis-à-vis Africa. Not investing in Africa is not an option for India, given its rising energy demands. Therefore, the associated political and economic risks need to be calculated and managed in the best possible way. One way could be helping Africa

[6] Even though the Niger Delta's oil and gas riches provide about 90% of the country's foreign earnings, the inhabitants of the Delta have been systematically excluded from the wealth generated by the oil and gas riches of the region.

move towards a sustainable future by investing in infrastructure and other sectors, and offering expertise and assistance.

Conclusions

Rising energy needs will naturally draw India into circumstances that will be both demanding and novel, particularly in the context of Africa. Entering Africa will mean that India will need to engage more with countries already present in the energy sector in these countries. At the same time, India will need to address the challenges that will arise from investing in countries where there are considerable security and business risks.

India can ensure the robustness of its energy partnership with Africa by developing deeper trade and business relations—an area that requires greater attention in both Nigeria and Sudan. The current engagement in both countries is limited to the energy sector and this is not a healthy sign for establishing durable partnerships. A multi-layered engagement in diverse sectors of the economy in African countries is the best way forward. For instance, India can help Sudan in its demining activities, help build capacity in governance, and develop its tourism industry. Although India has already started taking important steps in this direction, energy remains the basis of India's engagement with Nigeria and Sudan. India will need to forge ahead with a dynamic foreign policy that will need to balance its own interests with those of the African countries, as well as the interests of the other major oil-importing countries involved in Africa.

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African hydrocarbons and India's foreign policy*

Timothy Riley
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'The quest for energy security is second only in our scheme of things to our quest for food security.' [1]

Dr Manmohan Singh
Prime Minister of India, 2004

Energy security is perceived as one of the greatest challenges faced by the world today. Oil prices have risen dramatically over the last few years; oil-rich Iraq has been occupied, destabilizing much of West Asia; and emerging consumer markets in India and China are putting increasing pressure on the underinvested and increasingly politicized oil industry. A notable development in India's search for energy security is its increased engagement with Africa. In this context, this paper seeks to analyse how Africa 'fits in' with other aspects of India's foreign policy drive for energy security. Second, and more specifically, it attempts to demonstrate how the search for African hydrocarbons has contributed to an important shift in Indian foreign policy away from a Nehruvian/Gujralian 'moral' foreign policy.

Nehru's foreign policy appeared to be based on what his principles determined to be morally appropriate. His pacifism encouraged his desire for disarmament and his sponsoring of NAM (Non-Aligned Movement). His desire for cooperation among states rather than competition led him to turn down a seat for India at the UN Security Council, on the grounds that it should be held by China (Vijapurkar 2004). While this policy was followed in the belief that it was ultimately in India's self-interest, it marked a strong departure from traditional *realpolitik*.

While many diplomats and commentators, both Indian and non-Indian, scoff at the idea that India pays any more than lip service to the Nehruvian moral foreign policy of years gone by, both within political and academic circles in India, the idea remains strong. Former Minister of External Affairs, Yashwant Sinha, spelled this out, claiming that the ideology behind India's foreign policy had been, and would remain 'rooted in the freedom struggle' (Sinha 2003). Similarly, the academic Girijesh Pant has enunciated his belief that India's reaction to its energy insecurity will be qualitatively different from the West's approach. He says, 'Certainly, unlike America, none of the Asian countries could talk of occupying the oilfields... The Western mode of thinking and mechanism on the subject, are neither feasible not ideologically acceptable' (Pant 2005). While this may seem naïve, the foreign policy of Prime Minister I K Gujral between 1996 and 1998 seemed to apply Nehruvian principles. Given India's strength, Gujral noted, that it was seen as threatening by its smaller neighbours, and therefore by demonstrating goodwill without demanding anything in return it would come to be trusted. The resulting improved relations and cooperation would be to the benefit of all involved (Murthy 1999).

This paper is split into three broad areas: first, it provides an analysis of the problem that India faces with regard to energy security—is Manmohan Singh's statement quoted above an exaggeration? Second, it examines India's response to the problems it faces. And third, it considers some of the problems that remain, in part with regard to India's 'moral' stance.

Energy insecurity?

First, one must examine the magnitude of the problem energy insecurity poses to India. On the

* This is an abridged version of a larger paper written during an internship at the Centre for Research on Energy Security, TERI (The Energy and Resources Institute), in 2007.

[1] Manmohan Singh speaking in 2004, quoted in Luce E. 2006. *In Spite of the Gods: the strange rise of modern India*. London: Doubleday, p. 295

Table 1 Energy supply by kind in 2002–30 in MTOE

Source of energy	*2002 energy supply* (MTOE)	*2030 energy supply* (MTOE)	*Average annual growth in demand*
Coal	178	362	2.6%
Oil	119	267	2.9%
Gas	23	90	5.0%
Nuclear	5	29	6.4%
Hydro	5	18	4.3%
Total	**330**	**768**	**3.1%**

MTOE – million tonnes of oil equivalent
Source IEA (2004)

face of it, it seems significant. It is expected that between 2002 and 2030, India's commercial energy requirements will more than double to around 770 MTOE (million tonnes of oil equivalent) (see Table 1). While primarily domestic coal will remain the most important source of energy, and nuclear and hydroelectric energy will increase their contribution, oil and gas will be key in providing energy security in the coming decades (Figure 1). The demand for oil will more than double in less than 30 years. While in 2004 India had to import 68% of its oil, the figure will increase to approximately 91% by 2030 (Mandan 2006). Use of natural gas, popular both because it is abundant and is a clean fuel, is expected to grow by a factor of about four between 2002 and 2030. Estimates of the level of import dependence vary, with some estimates rising to over 90% by 2025 (Khan 2006), although exploration of India's own potential reserves renders these figures approximate.

Certainly, the raw numbers are daunting, and both politicians and analysts have been quick to discuss the possibility both of supplies being disrupted and prices becoming prohibitively high, potentially causing a significant slackening of India's economic growth. It is especially worrying because India's hydrocarbon imports are focused heavily on West Asia. In 2004, 67% of India's imported oil came from West Asia, with Saudi Arabia alone providing a quarter of India's total imports (Mandan 2006). Similarly, due to close physical proximity, India looks likely to rely on Iran and Qatar for natural gas, in the form of shipped LNG (liquefied natural gas) from Qatar and piped compressed gas from Iran through Pakistan. Clearly, reliance on West Asia, a region

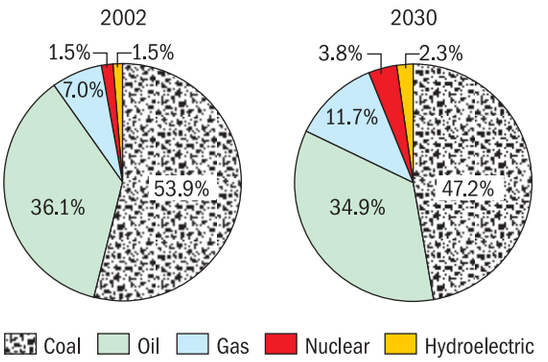

Figure 1 Primary energy consumption by type in 2002 and 2030
Source IEA 2004

wracked by instability, creates uncertainty and worry.

On the other hand, many argue that these problems are exaggerated. They contend that while the current energy situation does look particularly bleak, it can only improve in the future. Current instability in West Asia will diminish as American and British troops are forced out of Iraq in the next year or so and are forced to adopt a more conciliatory diplomatic stance in the region. Increased stability will boost investment and also production capacity, which will in turn lower prices. Moreover, the region has been unstable for decades but oil supplies have never stopped flowing to India, and therefore, to expect them to stop now is unrealistic, particularly as Gulf countries realize that India and China will be their biggest new markets in coming years (Khan 2006). They argue that increased deregulation of oil and gas markets in India and the Gulf heralds a new era of interdependence (Khan 2005). Talk of dangerous energy insecurity, it is claimed, is propagated by people who have vested interests, both inside and outside governments in India and the West. So, how far can this argument be borne out? Does India face a real problem, or is it simply a 'myth' (Khan 2006)?

A number of factors point towards genuine problems. First, while Western states may pull out of West Asia in coming years, it would be wrong to attribute all the instabilities of the region to Western intervention. Western intervention has, whether purposefully or not, exaggerated *internal* tensions within West Asia,

which look likely to persist. Potentially bloody Sunni–Shia conflict in Iraq could push the state's production back, below its pre-invasion levels (in early 2007, output was about 40% of pre-invasion levels) (Bhagwati 2007). Iran's growing strength has created tensions with other large hydrocarbon producers, notably Saudi Arabia, which fears an Iran-supported Shia revival in Iraq. In addition, the rise of extremist political Islam is a constant fear for the oil industry—an industry symbolic of Western power in the region.

Second, underinvestment in the oil industry and streamlining of IOCs (international oil companies) have meant that the slack that was once built into the market has been lost; in 2004 the excess capacity in the industry was only 1.2 million BPD (barrels per day) (Kalicki and Goldwyn 2005), considerably less than in 2000. The high prices and political tensions that have so worried governments in recent years have meant such high profits for oil companies that there has been little incentive to reinvest in infrastructure and reduce the profitable insecurity (Financial Times 2007).

This, coupled with the politicization of energy resources that has been so evident in recent years (notably the standoff between Russia and Ukraine over gas prices in 2006), seems to suggest that the high oil and related gas prices (Figure 2) are set to remain. Crucially, India looks particularly vulnerable to high oil prices, because it pays an unusually high amount of its export earnings to finance oil imports (over one-third of India's export earnings in 2005 compared to only 7% for

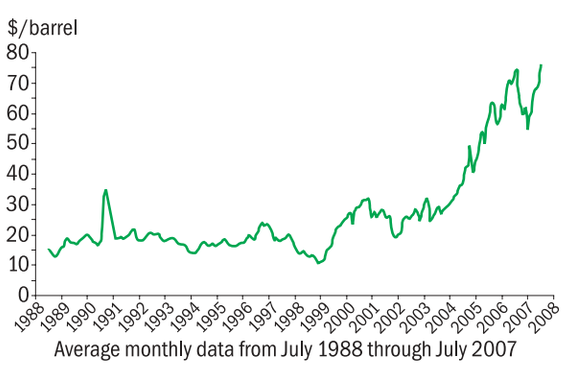

Figure 2 ICE Brent crude oil closing price (beginning July 1988)
Source http://www.oilnergy.com/1obrent.htm

China [Mitchell and Lahn 2007]). In sum, India's energy insecurity is real and potentially damaging.

India's foreign policy reaction

India's effort to enhance energy security has had three notable elements.

- India has aimed to diversify its energy sources, both in terms of maximizing the use of non-hydrocarbon sources and diversifying the sources of hydrocarbon imports, so as to lessen its dependence on West Asia.
- India has tried to foster closer relations between consumers and producers to control the instability caused by 'trust deficit.'
- India has tried to foster economic interdependence through investing in equity oil and infrastructure in producing countries.

First, India has diversified the sources of its hydrocarbon supplies, and Africa, particularly West Africa, has been very important in this regard. India's second largest oil supplier now is Nigeria, which supplies 16% of India's imports, mainly on the spot market (Mandan 2006), but also now with longer contracts derived from purchases of equity oil. India also has large stakes in Sudanese equity oil, as well as smaller ones in São Tomé and Príncipe, Côte d'Ivoire, and Gabon.

India's move into the African hydrocarbon market is a relatively recent development, and it is not simply explained as a hedge against over-reliance on West Asia, although this is clearly an important motivation. Another important reason is the desire of the leaders of India's NOCs (national oil companies) for corporate growth and for tapping investment opportunities, given that other markets are more crowded. Apart from this, there is a perception, as one senior official puts it, that while there are important geopolitical hurdles that one has to take into account when buying oil in West and Central Asia, India's engagements in Africa have less potential to interact with India's broader foreign policy aims. This final claim will be examined in more detail later in this paper.

While India's entry into Africa's energy sector is significant, it should be noted that it is 'not a core component of the Indian government's energy security policy' (Singh 2007). West Asia will remain India's most important source of oil; although the importance of African oil will

increase in absolute terms, it holds a subsidiary role when compared to West Asia.

Second, India has been attempting to foster trusting relations with hydrocarbon-producing countries. This is important because close ties with producers may help India if there is an oil shock and supplies become scarce. Besides, trust-building allows India to enter into stable, reliable and less expensive long-term contracts, rather than relying on constantly negotiating short-term deals on the spot market. Good relations are important for gas exports in particular, given the high overheads of exporting/importing gas, particularly through pipelines, and the necessarily long durations of such contracts.

India, therefore, has been trying to improve relations with countries in all major hydrocarbon-producing regions. This has been done on a bilateral basis, for example, by fêting King Abdullah of Saudi Arabia in 2006 (Luthra 2006), or publicly pronouncing the traditional friendship between India and Iraq and India's willingness to help redevelop Iraq's oil industry (Mukherjee 2006). But it has also been done on a multilateral basis; for example, a roundtable of West Asian and South-East Asian energy suppliers and buyers was hosted in Delhi in January 2005 in an attempt to ratchet down tension within the system. The talks led to an agreement to meet every year to multilaterally find solutions to global energy insecurity (Mukherjee 2006).

Similarly, India has been keenly fostering close relationships with African states, where Indian interest has traditionally been very limited. While India had four small missions in West Africa until recently, the number is expected to double in the next two years, with all of the new missions in resource-rich states (Singh 2007). The ITEC (Indian Technical and Economic Cooperation) scheme and SCAAP (Special Commonwealth African Assistance Programme) have been used to boost goodwill for India by dispensing aid, technical assistance, and training. One such project in Senegal will help the country double its rice production in just three years (Singh 2007). In addition, India's long-standing soft power, derived from its role as a champion of the developing world's interests, is extremely important in this regard.

Third, India has focused on building long-term interdependence with producing countries in order to bind interests more tightly together. This explains the seemingly fruitless policy of buying equity oil and gas. Many in the West suggest that India's equity investments in countries as diverse as Sudan, Nigeria, Libya, Syria, Iran, Myanmar, Russia (the Sakhalin gas field), Venezuela and Colombia (IAGS 2004; Mandan 2006) represent wasted effort. They point out that these deals provide India with only a small amount of oil and gas in return for large outlays of capital. As the IOCs, and East Asian and producing country NOCs already hold the most profitable fields, India is left with relatively smaller, less profitable fields with higher risks, often in countries which Western IOCs (claim to) feel uncomfortable engaging with (Mitchell and Lahn 2007).

Nevertheless, acquiring upstream assets is not just about gaining a stake in energy reserves, but about creating mutual dependence that binds producers and consumers together, creating a situation in which prosperity for one becomes increasingly reliant on the prosperity of the other. While India has not been as active as many commentators would want, the country has been involved in a number of large infrastructural projects in key hydrocarbon-producing areas. For example, in 2003, India and Oman signed a deal to build one of the region's biggest fertilizer plants in Sur, Oman, using Omani gas. More valuable is the IPI (Iran–Pakistan–India) gas pipeline, which India hopes will increase access to Iranian gas, as well as improve relations with Pakistan. The TAPI (Turkmenistan-Afghanistan-Pakistan-India) pipeline is also valuable for this reason.

Similarly, India has been active in acquiring upstream assets in Africa: OMEL (ONGC Mittal Energy Limited) has won at least four prosperous oil blocks in Nigeria. In downstream operations, two oil refineries seem likely to be built in the coming years by Indian firms (Singh 2007). Sudan holds India's next biggest investment in Africa, with about $1.5 billion invested in total (Moosa 2006), including $720 million for a quarter stake in the Upper Nile oilfield, as well as about $200 million in a 741-km pipeline in the country (The Times of India 2004). Apart from these hydrocarbon-

specific investments in 2004, India launched the Techno-Economic Approach for Africa–India Movement (TEAM-9), with eight resource-rich states in West Africa in order to woo important ECOWAS (Economic Community Of West African States) countries. This project has resulted in $500 million in lines of credit being extended to these important states (Singh 2007).

Persistent problems

One can discern certain flaws in India's foreign policy reaction to its energy insecurity. First of all, Africa is a notoriously difficult place to do business, and India's two major country partners are particularly difficult. Nigeria has been increasingly losing control of the oil-rich Niger Delta. Since former President Obasanjo arrested the leader of the NDPVF (Niger Delta People's Volunteer Force) in 2005, the group has fragmented and radicalized. The Movement for the Emancipation of the Niger Delta, or MEND, gave the oil companies a choice to either 'Leave our land while you can or die in it' (Tayo 2007a, b). And their efforts have not been entirely ineffective: Chevron took the decision not to operate in the Delta swamps, and Agip and Shell are losing money. In total, the war is costing the oil companies up to $4 billion per annum and has significantly reduced production. The recent flawed elections have not brought any more stability, and in May 2007 a series of attacks on pipelines managed to disrupt the sale of 100 000 BPD (barrels per day), reducing output by up to 30% in some areas (New York Times 2007).

The wisdom of diversifying into Sudan is also at best questionable. Much of Sudan's oil is in the South of the country, which until January 2005 saw civil war between government forces and the SPLA (Sudan People's Liberation Army). As was the case in Nigeria, part of the grievance of the SPLA was over oil revenues, causing oil installations to be viewed as 'legitimate military targets' in the struggle (Salmon 2002). Many see oil flows from the South of Sudan as vulnerable to disruption despite the 2005 peace deal due to instability in Darfur. Moreover, the good faith of Khartoum towards Indian investors was brought into question when repayments on the pipeline built by OVL (ONGC Videsh Limited) were delayed (Sudan Tribune 2007).

A final uncertainty surrounding Sudan is the possibility of Western humanitarian intervention disrupting supplies. The West has been fiercely critical of India's purchases of equity oil in countries with poor human rights records such as Sudan and Myanmar. However, events in Iraq mean Britain and America will find it extremely difficult to take any strong action that could threaten Sudanese hydrocarbon exports. Western criticism of Indian involvement in Sudan looks toothless in the light of their own cosy relations with repressive hydrocarbon-rich regimes.

One must also question the assertion that involvement in Africa presents India with no significant geopolitical problems. In particular, competition with China for African hydrocarbons and minerals has led to tensions between Beijing and Delhi. For example, just as a contract giving Angola's Block 18 to ONGC (Oil and Natural Gas Corporation) was being finalized in 2004, China thwarted the deal by offering the Angolan government an aid package ten times as big as India's (Varadarajan 2005). Similarly, China opposed India's bid for a stake in Sudan's Greater Nile project (Srinivasan 2005). Souring of relations due to competition in Africa could have knock-on effects in other areas of Sino-Indian competition, such as Central and South-East Asia, and this in turn could affect India's relations with other powers active in those regions, including America and Russia. Clearly, if engagement with Africa adversely affects India's relations with China, doing so would have an important geopolitical cost.

But how far is this competition likely to harm Sino-Indian relations? Some in Western diplomatic circles believe that Sino-India competition in Africa and Central Asia, among other regions, will be a significant source of friction in coming years. They believe that while China is happy to cooperate with India in the coal sector (Srinivasan 2005), and perhaps even nuclear power (Kapila 2006), this is because India and China are not in direct competition for these resources. When it comes to hydrocarbons, on the other hand, they see India and China as competitors.

Moreover, when both states covet a certain oil or gas field, China's strength's compared to India means it has little need to compromise, which may be taken as a serious affront by Delhi. China has the funds, local personnel and infrastructure, diplomatic flexibility and commitment that give China an advantage over India (Mandan 2006). Furthermore, China's permanent position on the Security Council, used recently to defend Myanmar from Security Council proposals in return for a natural gas quid pro quo, provides a structural strength that India currently cannot match.

India implicitly recognized its relative weakness when in January 2006 it pushed for and signed an MoU (memorandum of understanding) with China, which appeared to herald a new cooperative policy, by agreeing to jointly bid for equity oil and gas and other upstream energy projects (Financial Times 2006). The deal meant little in concrete terms, given its status as a non-binding MoU on potential *ad hoc* cooperation. As such it should perhaps be seen as an Indian attempt to reduce competition.

On the other hand, many note that China seems to be reaching out to neighbours, India included, who might perceive it to be a threat. ASEAN+3 and the East Asia Summit are both examples of this, where positive steps have been taken to multilaterally solve individual state's problem of energy insecurity. An example of this is the Cebu Declaration on East Asian Energy Security, signed at the EAS (East Asia Summit) in January 2007. Furthermore, China invited India, Pakistan, and Iran to join the Shanghai Cooperation Organization in 2005 (Price 2007).

In addition to these diplomatic movements, increased economic interdependence between India and China looks likely to limit the scope of this competition. Sino-Indian trade grew from $332 million in 1992 to $13.6 billion in 2005, and this alone means that while competition for African resources may cause tensions, the value of their mutual interests will not allow these tensions to be blown out of proportion. Even so, competition for African resources will need to be actively managed to minimize conflict and this means that India's policy in Africa is important for its geopolitical stance.

Finally, it is important to note how India's thirst for hydrocarbons has affected its ability to conduct a 'moral' Nehruvian/Gujralian foreign policy. As India becomes part of the globalized economy, it is being drawn into regional power structures, and is developing interests that it determines worthy of defending. As India becomes an economic superpower, as opposed to a potential economic superpower, there will be more for it to lose and gain. It will want to ensure that it gets the best deals possible, and will develop interests in stability in certain regions. As Singh puts it: 'ever since economic liberalization started in 1991, India's foreign policy has been increasingly driven towards finding export markets, and attracting foreign capital and technological know-how' and that has meant that 'issues such as disarmament and non-alignment, which India [once] embraced passionately have taken a backseat in the new era of globalization' (Singh 2007). This means that the relations with African states, previously founded on normative criteria in the decolonization and Cold War eras, are now being remodelled in accordance with India's need for resources.

For example, in January 2006, as the extent of the state-sponsored genocide in Darfur became increasingly clear to the world, India's Exim Bank extended lines of credit to Sudan worth $391 million. This should be compared to lines of credit India has extended to other individual African countries, none of which exceed $100 million (Mandan 2006). Similarly, the head of the Indian army visited Nigeria in November 2005, and promised military aid to Nigeria (People's Daily Online 2005), which presumably would be used to try and bring the delta under control. Perhaps the most obvious violations of India's apparently 'moral' foreign policy came in January 2006, when India provided specialist military training to troops in gas-rich Uzbekistan just months after the Andijan massacre (Mandan 2006). India has even established a military presence in Central Asia, having spent Rs 800 million to refurbish an airbase at Ayni, Tajikistan, which it is jointly running with Tajikistan and Russia. This foothold has been developed, one must assume,

to allow India to exert influence in a region that it sees as crucial to its interests (Gupta 2007). These steps are perhaps comparable to the stationing of American troops in Saudi Arabia or Qatar. While one could find examples of similar activities in the past, for example in India's deployments in Sri Lanka and military support to Bangladesh, the new global scope and assertiveness of these actions suggest a qualitative shift in policy.

But that is not to say that India's 'traditional' foreign policy has been totally discarded. In fact, as India has grown in power, the idea of non-alignment has become particularly useful for India. NAM was created when India was in a position of geopolitical weakness: India wanted to group together with other Southern nations in order to ensure that great powers could not exert neo-colonial control over them. In that sense, non-alignment was a *defensive* strategy to maintain India's independence in a bipolar world. Now, however, non-alignment has taken on a different meaning. As an emerging power, India wants friendly relations with all of today's most powerful states, without being too closely linked to any of them for fear of being drawn into potentially antagonistic stances towards any other. For example, India wants to enter the so-called 'Great Game' for hydrocarbons in Central Asia without being too closely associated with America, Russia or China. This aspect of India's foreign policy – friendly and productive relationships with all but alliance with none – is well-suited to the idea of non-alignment. Indeed, the fact that India has not too closely associated with any major power has led to confusion and uncertainty among commentators, some of who talk of the inevitability of an American-Japanese-Indian triangle emerging because of a fear of China whilst others just as surely predict a Chinese–Russian–Indian triangle fearing America (Price 2007).

Moreover, capitalizing on the moral superiority that India gained as leader of NAM can perhaps provide credibility, which China and the West do not have with certain producing countries, particularly in Africa. Thus, while one aspect of India's traditional foreign policy is no longer followed, that is not to say that the ideas that governed foreign policy in Nehru's day cannot be put to use in contemporary times. In fact, India's past principled adherence to high moral standards and NAM makes its current uncommitted stance all the more credible.

In sum, energy insecurity presents India with a real problem, and India's reaction to this challenge, among other things, has led to an alteration in its traditional 'moral' foreign policy in Africa and elsewhere. Nevertheless, the ideals of NAM are still relevant to India's foreign policy, and will be used in a more assertive way. Traditional ideas continue to animate the most 'pragmatic' of foreign policies.

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An approach to addressing the sharing of costs and benefits in energy-trading networks*

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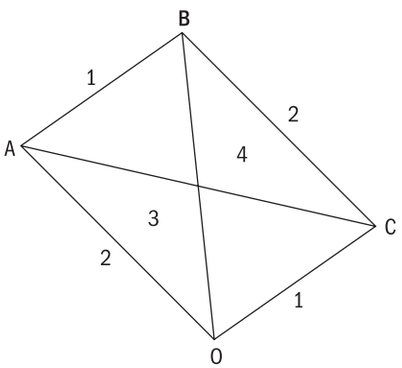
Introduction

Energy transactions amongst various agents have recently become an interesting area of research. Generally, it is observed that actions are driven by benefit-maximizing motives. Energy being a valuable trade product, this often leads to a scenario of conflicting interests amongst agents.[1] As a consequence, strategic moves by agents often result in non-cooperative games, which could spill over into national or international conflicts, depending on whether the agents are states within a country or sovereign countries. Analyses of energy trading patterns suggest that the network structure, which facilitates energy trade, is a key decisive factor in determining the net utility accrued to different agents. This is primarily because of the cost component of the network. This paper takes up the issue of structure of networks in energy trade, and evaluates the interrelationships between energy-trading countries in terms of the costs of different networks. Quite naturally, this leads to an analysis of cost- or benefit-sharing amongst respective agents. We suggest a cooperative framework to attain an equitable, neutral, and efficient solution in a class of network games known as cost spanning tree games in game theoretic literature. We also propose a solution concept for such a framework, which could be applied in specific cases of energy trading. These applications include energy trading arrangements like inter-regional power grids or gas pipeline networks. We briefly discuss the scope for cost minimization in these network structures and suggest the Shapley value as an appropriate solution concept to such games, technically called MCST (minimum cost spanning tree games). We also discuss its properties that could contribute to resolving conflictual national and international issues pertaining to energy trading through networks, and could help in attaining efficient outcomes.

Energy trade, networks, and cost

Consider the following diagram[2], which represents a trading arrangement (for example, gas pipeline or power grid) between countries O, A, B, and C, with the last three (A, B, and C) being importers from O.



Here,
O: origin (exporter country)
A-B-C: nodes (importer countries)
O-A, O-B, O-C: direct paths of trade
{O-A-B, O-C}, {O-C-B, O-A}: linked paths of trade

Suppose O is the exporting country. A, B, and C are importing gas through a pipeline. If these countries were to directly import gas from O, then it would cost them (A, B, and C) 2, 4, and 1 respectively. Thus, the total cost comes to 7. Alternatively, they can cooperate and the gas pipeline can link more than one country. For example, B imports gas through C, that is, the gas

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[1] Agents imply two districts, two states, two countries, or any two players who are engaged in a strategic framework where outcome of a strategy for a player is interlinked with the strategy of the other player.

[2] This is a hypothetical example for illustrative analysis only.

pipeline from O to B comes through C. Naturally, here the total cost is 5, because cost of transport from C to B is 2. We observe that direct paths of trade constitute a network that entails a cost of 7, whereas other networks formed with linked paths of trade entail costs of 5 and 4 units. Thus the path or network that gives minimum total cost (4 units) is O–A–B, O–C. However, one should keep in mind that in a linked path of trade O–A–B, A has to allow the pipeline to B through itself. Thus, the surplus of 3 units is generated because these countries are cooperating. The question that arises then is how to share this benefit among the cooperating countries. The question may also be framed thus: how will the countries share the total cost? To answer this question, we adhere to more formal characterization of the above network system. We consider an appropriate solution concept for the problem and discuss its properties.

Cost spanning tree games

Here, the link between the countries, which yields the maximum joint benefit or the least total cost, is called MCST. In the above example, MCST is {O–A–B, O–C}, leading to a total cost of 4. One possible way to resolve the benefit-sharing problem or cost-allocation problem is to adhere to a cooperative game theory approach. A transferable utility game is generated by considering an MCST for each coalition. One major solution concept for allocation would be the Shapley value (Shapley 1953). This allocation rule takes into account the contributions of each member to all possible coalitions. It takes an expected value of all possible contributions over all possible coalitions. If we denote the set of all countries by A, and 2^A is the set of all possible coalitions, then we define Shapley value in terms of the payoff functions Πi:

$$\Omega_i: \sum \frac{s!(n-s-1)![\Pi(S+i)-\Pi(S)]}{n!}$$

Here S is a coalition, that is, $S \in 2^A$, and summation is taken over all possible coalitions in 2^A. P is the value function of any coalition S, depicting value of the coalition. Thus, $[\Pi(S+i)-\Pi(S)]$ is the increment in the value of coalition due to the inclusion of country i. The first term within the summation is the probability of a particular coalition structure with cardinality s. Ω_i thus gives the expected incremental value of a country to different possible coalitions. We adopt the Shapley value, as it is the only sharing rule that satisfies some reasonable properties (Shapley 1953).

- The player (country) that contributes nothing to any possible coalition should get nothing.
- Payoffs should depend only on players' roles in the game, not on personal bargaining power, and so on.

In case of MCST games, the Shapley value follows some more other relevant properties as stated below.

Theorem (Kar 2002): *The Shapley value is the only allocation rule, which satisfies efficiency, absence of cross-subsidization, group independence, and equal treatment.*

Here efficiency implies that agents together pay the total cost of the project. The second property ensures the absence of cross-subsidization when direct links between the exporter and importers are minimum cost links. Group independence implies that if cost changes occur between any two agents, it does not affect cost allocation in other groups. Equal treatment implies that if cost changes between any two agents, it affects both equally. Thus, the Shapley value is an allocation rule that satisfies the above properties in case of an MCST game.

Multi-agent energy trading network and the Shapely value

We go back to our example discussed earlier. We now assume that A,B, and C follow a cooperative approach. Rather than going for unilateral construction of gas pipelines O–A, O–B, O–C, there is a joint venture, which will lead to the construction of O–A–B and O–C. This is the MCST amongst all sub-graphs of the entire network. We have already noted that this cooperation leads to a total cost of 4 units (less than what direct links result in, that is, 7 units). The interesting question is how much should A, B, and C contribute to pool 4 units. Clearly, B is the top beneficiary. Thus normal intuition says that A and C will pay less than 2 units and 1 unit respectively (that is, what they would have to pay under direct trade paths). This is because B should compensate them partly from the benefit gained

from cooperation. So B should pay more than 1 unit, which is required only for the construction from A to B.

Let us show the Shapley values in this case.

Ω_A: [{(2*2) + (-1) + 2 + 1+ 1}/ 3!] = 7/6
Ω_B: [{(4*2) + 1 + 2 + 1+ 1}/ 3!] = 13/6
Ω_C: [{(1*2) + 1 + (-1) + 1+ 1}/ 3!] = 4/6

We note that B has to pay 13/6 units, which is more than 1 unit but less than 4 units, that is, the cost of direct trade link from O. Also, A and C benefit from the cooperation and they have to pay less than 2 units and 1 unit respectively. Thus, the benefit that B enjoys from the cooperation, is shared by A and C as well. This example also gives a glimpse of the neutrality and anonymity in calculation.

Conclusion

It follows from the above discussion that in an energy-trading network structure, a cooperative approach can lead to a mutually beneficial and also politically viable solution. Though we have given an example of gas pipeline networks, the above stated cost- and benefit-sharing concept, applying a Shapley value approach, could also be applied in determining transit fees for transmitting energy and other resources through a network involving various players. And more generally, it can be used to design cost- and benefit-sharing arrangements for any energy network, such as power grids or resource links such as water canals between different states. We suggest that this solution concept can thus contribute towards arriving at a neutral and efficient outcome in such negotiations, and can facilitate conflict resolution and negotiations pertaining to transit of energy products (like gas, power) and other resources (like water). It can enhance the probability of secured supply of energy products and other resources amongst various agents involved in the network, and contribute towards enhancing resource and energy security within and among nations.

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