

Recently Mikkal Herberg, Research Director for Energy at the National Bureau of Asian Research [stated](#) , “We talk extensively about oil supply security and rising prices, but I frankly believe that Asia’s real energy crisis is electricity.” India today is among the world’s fastest growing economies and its economy is the world’s third largest. In order to sustain this rate of growth, it is imperative that India ensure an adequate supply of energy in the form of electricity and fuel. India’s electricity supply however is highly insecure; nearly 35% of its population does not have access to electricity while those that do suffer periodically from chronic power outages. In a recent report it was surmised that the acute shortage of electricity supply could stem primarily from inefficient generation of electricity – which in itself is due to a [severe shortage](#) of energy sources such as coal and natural gas.

The present electricity generation mix is obviously grossly inadequate to meet the population’s demand. It is thus imperative that options be explored for developing India’s energy sources to an optimal extent. Natural gas is one source of electricity generation that is still vastly underdeveloped and one whose potential has yet to be explored adequately. While indigenous resources are limited, the nearby state of Myanmar could present an extremely important source of natural gas supply – gas which could be imported in the form of LNG or via a transnational gas pipeline from the fields of Myanmar into India for the long-term.

### **The problem with the present power generation mix**

India has traditionally relied on coal as a major source for electricity generation—over 50% of India’s power is generated from it, while hydroelectricity contributes around 25% and natural gas just 11%. Nuclear energy and renewables make up the rest. This over-reliance on coal however presents several problems. It is estimated that at the rate of current usage, indigenous coal could rapidly be [depleted](#) within 40 years. While coal generally is deemed a heavy pollutant and exacerbates GHG emissions, indigenous coal reserves are especially inefficient (see below). Environmental and air pollution are currently major problems within India, and this is only expected to worsen as India’s coal usage increases.

The extraction and production of indigenous coal is carried out by both state-owned and private firms. India’s coal industry is by no means inexpensive, and according to some reports has become [highly cost inefficient](#) : Indian coal has one of the highest production costs in the world; its power plants are often plagued by inadequate coal supplies; and its losses and opportunity costs run very high - currently standing at over US \$200 billion according to some accounts. Therefore, from an economic, environmental or even the prospect of long-term availability stand-point, relying on coal to such a large extent seems ill-advised.

The development of hydroelectricity in India has historically been heavily impeded by staunch opposition due to concerns of environmental depletion and population displacement; the ambitious Sardar Sarovar hydroelectric dam project for instance had to be postponed for several years owing to concerted opposition from various sections of civil-society. The prospect of a Three Gorges Dam in India is thus very low. While nuclear energy has traditionally been touted as a potentially major energy source for India, the post Fukushima era has in many ways hindered its growth. Large-scale protests and opposition towards nuclear energy – specifically on the issue of its safety has led to severe road-blocks that may not easily be overcome in the near future; one Indian state has placed a [suspension](#) on any nuclear power development,

and at least three other proposed plants have faced indefinite postponement in the past year. In addition India is the fifth largest producer of wind-based energy, and it has also invested substantially in the development of solar energy. However neither energy source has successfully been translated into commercial mass-production.

### The importance of Myanmar's gas

One specific energy source has yet to be fully utilized however – natural gas. Natural gas is relatively clean and has a relatively low carbon footprint; India possesses the technology for developing a necessary gas infrastructure; it does not face large-scale opposition, due to its at least perceived low environmental impact including on the human environment. India's indigenous gas reserves, despite significant discoveries in the Krishna-Godavari Basin at the turn of the millennium, [are not unlimited](#). As such India has, at least since the mid-1990s considered the option of LNG imports. By the early 2000s India developed LNG terminals at the Dahej and Hazira ports and began to import substantial quantities of LNG primarily from Qatar and other countries.

As India's economy expands so too does the demand for natural gas; India's has engaged in what one commentator has termed an 'energy quest' in an attempt to import more energy sources worldwide – including natural gas. Myanmar's gas is attractive to India firstly because of its close proximity which renders an overland pipeline a viable possibility; failing this, LNG could be transported through tankers along a relatively short distance through the Bay of Bengal. The presence of large gas reserves as well as potential untapped reserves in Myanmar means that India could be assured of substantial long-term gas imports; indeed it is the assured presence of gas reserves, reputed to be among the world's largest that has made Myanmar, in the words of India's former Foreign Minister, the [lynchpin of Asia](#).

The primary attraction for the 'Myanmar gas rush' lies not in the [gas reserves](#) currently being exploited, but in what are speculated to be largely untapped reserves. Estimates on the extent of its gas reserves ranges from a conservative 11.8 trillion cubic feet by British Petroleum, to 22.5 trillion cubic feet by Myanmar's Energy minister, to a whopping 90 trillion cubic feet by some sections of the Myanmar government; this last estimate would make Myanmar the country with the world's 10th largest gas reserves. While the numbers are in themselves substantial, questions remain as to the veracity of the claims by the Myanmar government, the extent to which such reserves are extractable and recoverable, as well as the percentage of the extracted gas that would be pegged for export.

While India has explored the prospect of gas pipelines with several other countries, in nearly every case, geopolitical concerns have rendered these proposals moot; US and international pressure against trade with Iran, the presence of a hostile transit state in Pakistan, insecurity due to insurgency-prone transit regions in the border regions of Afghanistan, or the unwillingness of Bangladesh to act as a transit state have acted as effective filibusters of the Iran-Pakistan-India (IPI), Turkmenistan-Afghanistan-Pakistan-India (TAPI) and the Myanmar-Bangladesh-India (MBI) pipelines. While the TAPI pipeline has received a resuscitation in the form of an agreement signed between Turkmenistan and India, the chances of such a pipeline being implemented is low. Afghanistan and Pakistan's Northwest is still very much under the grip of insurgency; with US forces due to leave Afghanistan by 2014, there is a very high possibility of Afghanistan descending into another civil war. Only recently insurgents in

Pakistan's tribal regions [blew up](#) an indigenous pipeline. The possibility of the Taliban – which harbors a strong anti-India ideology, [exerting some control](#) over the pipeline's operations is all too real. Finally, Indo-Pakistan relations are yet unresolved; a reprisal of another Mumbai 2008 terrorist attack or escalation of unrest in the Kashmir region could trigger a major deterioration in bilateral relations. In the face of such uncertainty, expecting 'pipeline diplomacy' to succeed is still a long-shot.

India has however not completely exhausted its pipeline options with Myanmar. As Myanmar continues to democratize, international sanctions are set to reduce (the US has resumed diplomatic relations with Myanmar recently), and with it the pressure against trade with Myanmar. Indo-Myanmar relations have been friendly since the mid-1990s and the countries cooperate on a range of issues from energy to counterinsurgency; this is only set to increase.

### Challenges in Indo-Myanmar energy collaboration

The overall investment of Indian state-owned companies into the oil and gas sector is currently estimated to be around US \$ 1.6 billion. Indian state-owned organizations such as GAIL and ONGC have a [significant stake](#) – nearly 30% in the exploration and production in the Shwe offshore gas fields; they also have a nearly 12% combined stake in the Myanmar-China pipeline project since most of the gas is transported from the Shwe fields. Despite this, very little gas is imported into India. Up until now, India's stake in Myanmar's gas projects, though substantial, has only been from a profit-making stand-point; the extracted gas is not slated to make its way back to India, but rather to China. One analyst termed India's investment foray in Myanmar as "somehow (ending) up helping to build a pipeline to transport Indian gas to China."

While India is rapidly increasing its investments into Myanmar, it is simply no match for the Chinese presence. Nearly 35% of Myanmar's trade is with China; and Chinese investments in the energy sector is substantial – a hefty US \$ 8 billion which encompasses hydroelectricity, coal mining, oil and gas. Of this, the initial investment into the gas pipeline project stands at around US \$2 billion, which also takes into account the investment into infrastructure facilities such as deep sea drilling platforms, ports and the 900 kilometer-long pipeline. In addition, Myanmar according to some estimates could stand to earn nearly US \$1 billion per annum as revenue from importing gas through the pipeline for the next 30 years. China's pipeline-based investments—in contrast to India's— have enabled it to import vast quantities of gas from Myanmar for well over an estimated quarter century.

Therefore while India's investments in Myanmar's gas fields are substantial, it has not succeeded in instituting a viable import mechanism for Myanmar's gas. Unless India seriously considers investing into transportation of Myanmar's gas back to India, its energy security prospects would not improve regardless of the profits the present investments may yield. India has [lost out](#) to Chinese, South Korean and Japanese state-owned firms on several significant bids including the Myanmar-India pipeline and a preliminary bid for transporting LNG gas from Myanmar to India. A lack of coordination among Indian public and private firms, combined with limited funding as compared to Chinese and other state-owned firms, have prevented Indian firms from playing a more aggressive role.

Apart from Indian state-owned firms, private enterprises such as Essar and RIL and several mid-sized ones are increasingly investing in Myanmar's gas sector; this is unlike China which

overwhelmingly relies on state capitalism. While this division could potentially ensure fruitful state-private enterprise collaboration and reduce state cronyism, in the case of Myanmar this has unfortunately fallen short of obtaining significant investments. Instead of efficient collaboration, Indian state-owned and private firms have often [engaged in internal competition](#) for Myanmar's gas fields – perhaps restricting the Indian state's ability to compete against Chinese state capitalism. Chinese state-owned enterprises do not face any internal competition and have, unlike India, had a long-established presence in Myanmar, enabling them to substantially invest in the energy sector since the late 1990s. India's late foray was effectively no match for the Chinese presence – which already had had substantial collaborations with the Myanmar Junta. It is therefore essential that Indian companies—both state-owned and private—institute a greater public-private partnership in its operations in the Myanmar energy industry.

Of greater stake also is the safety of India's gas fields or potential gas infrastructure. The recent widespread inter-ethnic clashes between the Rohingya Muslim community and the Buddhists in the Rakhine region are troubling – all the more so since the Shwe gas fields are located in that region. While India's scope in Myanmar's internal security is limited, it may be that India, China, as well as several other countries that have a stake in Myanmar's energy sources want an assurance of socio-political stability.

### **Prospects of a Myanmar-India pipeline**

A proposed transnational pipeline from Myanmar to India through Bangladesh did not take-off chiefly due to a recalcitrant Bangladesh while an alternative pipeline route circumventing Bangladesh was scrapped due to a lack of funding on the Indian side; this enabled China to successfully enter the gas pipeline market in Myanmar and construct a similar transnational pipeline from Myanmar to China. This episode reflects the reasons for India's failure in capitalizing Myanmar's energy potential – its inability to respond to competition, its reliance on an unpredictable transit state, and a lack of state funding for the pipeline project.

A Myanmar-India pipeline that [bypasses Bangladesh](#) , traverses through India's North-east and connects to India's Eastern pipelines is expected to be about 1575 kilometers long, and according to one estimate made in 2005, could cost around US\$2.3-3 billion. In contrast the 900 kilometer-long Myanmar-Bangladesh-India pipeline was estimated at US\$1 billion before the deal fell through. The cost for a Myanmar-India pipeline is admittedly over twice as that of the Myanmar-India-Bangladesh pipeline. Unlike previous Indian investments in Myanmar's gas fields however, the Myanmar-India pipeline offers the prospect of long-term gas import—estimated to be at least 20 years-and opportunities for additional development in India's North-east may well outweigh the cost.

India is by no means a novice in pipeline constructions; several indigenous pipelines linking various parts of India have already been constructed or are under construction by state-owned enterprises such as GAIL and private enterprises such as RIL. Pursuing this in the event that adequate gas reserves in Myanmar are available for transportation would have two key advantages: it could provide an access-point to the gas fields in Myanmar sans the transit state of Bangladesh; it could also potentially contribute to the economic and industrial development of India's underdeveloped and power-starved North-east sector. In this respect, India could emulate China; the Myanmar-China gas pipeline for example has acted as an impetus for development in China's relatively underdeveloped Yunnan province through which the pipeline

passes.

The relatively underdeveloped Yunnan province in China is the principle destination of the Myanmar-China gas pipeline as well as the entry point for the China-Myanmar trade thus providing an impetus for future development in that area. India could emulate this concept in its North-eastern states, which border Myanmar and which are woefully underdeveloped and power-starved. Yet with greater allocation of state finances, and prospects of greater collaborations with multinationals, it is advantageous for India to develop a gas-based power generation sector in its Northeast region; the largely underdeveloped states in this region would witness considerable improvements in energy security if the gas from Myanmar is able to serve the power sector here. Of course, this plan requires the development of considerable gas-based infrastructure in India's North-east; therefore this could be a boon in disguise for India if, like the Yunnan province, a prospective pipeline proves to be an impetus for development.

Indo-Myanmar collaboration in [counterinsurgency](#) has been instrumental in the recent past in vastly limiting the capabilities of anti-India insurgents along the Indo-Myanmar border; if a pipeline were to be operational from Myanmar into India's North-east, it is imperative to ensure its safety from the threat of insurgents. Substantial investment into counterinsurgency is necessary should a pipeline be constructed.

### **Prospects of LNG imports from Myanmar**

India has plans to construct at least half a dozen LNG terminals in the near future – clearly catering to the prospect of drastically increasing LNG imports. Significantly, as part of this expansion India also considered [constructing an LNG terminal](#) on India's Eastern coastline as far back as 2004 evidently with its proximity to Myanmar in mind; this has yet to be implemented. In 2006 India's GAIL lost out to South Korea's KOGAS and Marubeni Japan on a preliminary bid for transporting LNG into India. However the project has been indefinitely postponed perhaps due in part to the cost involved and the lack of a proximate LNG terminal. LNG terminals in India typically have been built at a cost of between US \$640 million (Hazira LNG terminal) to US \$1 billion (Kochi LNG terminal). Constructing another terminal on India's Eastern coast is therefore expected to cost somewhere in between.

Unlike pipelines, LNG transportation is neither continuous nor constant; and the safety of tankers also needs to be considered. However it is much easier to negotiate the quantity of LNG imported based on demand fluctuations. According to the U.S. Energy Information Agency, it is considered more economic in the long-term to transport gas via onshore pipelines rather than via LNG tankers if the pipeline length is less than 3800 kilometers – which is what the Myanmar-India pipeline is. In addition, Myanmar does not by itself possess facilities for LNG liquefaction and transportation. India would thus also have to considerably invest in these if it were to pursue this option. While Chinese and Korean firms did show interest in developing a liquefaction plant, this [option was shelved](#) once the Myanmar-China pipeline began construction.

Transporting LNG using tankers incurs additional investment in the form of an LNG terminal in India's East coast and perhaps also into LNG liquefaction and transportation facilities in Myanmar; not to mention the fact that LNG transportation costs exceed those of a gas pipeline. The need to maintain greater maritime security in the Bay of Bengal region also arises. India does possess naval bases along its east coast; yet greater Indo-Myanmar cooperation is

necessary to combat piracy and other dangers in the seas.

### Conclusion

Indian indigenous coal is limited in quantity, apart from being economically and environmentally inefficient. While the reliance on coal, both indigenous and imported should continue, it must also be augmented with greater imports of natural gas. India's present rate of gas imports are not enough to close its energy gap, and while India's collaboration with Myanmar has not been very successful for its own energy security, India has yet not completely exhausted its options; Myanmar has the potential to be a major gas source for India in the long-term.

It is imperative that India increase its investments in Myanmar's gas sector through greater funding and more efficient public-private partnerships between its state-owned and private enterprises; however for its investments to have an actual bearing on India's energy security, it is also imperative that India finds ways to effectively import substantial amounts of Myanmar's gas thereby reducing its energy deficit either through pipelines or in the form of LNG.

An India-Myanmar pipeline passing through India's North-east is a viable option for ensuring decades-long, continuous gas imports into India; it would also enable much-needed development in India's North-east region. These advantages could be important factors in offsetting the substantial cost (US \$ 2.5–3 billion) that may be required for the project. On the other hand, India could also implement its plans for constructing an LNG terminal on India's eastern coast to facilitate large-scale LNG imports from Myanmar into India. Transportation of LNG does involve usage of tankers and continuous supply may not be as assured; yet supply could be controlled based on demand. While the initial cost of LNG terminals is lower than pipelines (US \$600 million–1 billion) the additional cost of constructing facilities in Myanmar and tanker transportation costs could in the longer term exceed those of a pipeline.

In effect, considering the proximity of Myanmar to India and the length of a Myanmar-India pipeline, in the longer term, it is not simply a more economic option as compared to LNG, but could also potentially lead to further economic development in India's North-east. For the pipeline to become a reality however greater investment into exploration and extraction of gas, as well as into its transportation back to India is required; stronger collaboration between India's state-owned and private enterprises as well as greater state funding is essential. It is evident however that substantial costs would be incurred through this venture; considering the bad shape in which India's current coal-based power mix is, a Myanmar-India gas pipeline may well be able to substantially improve India's energy security in the long-term.

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