



Datum  
2013-06-18

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# Skiffergas i Indien – En underlagsrapport till Näringsdepartementet

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## 1 Overview

India is the fourth largest consumer of energy, with 60 per cent of it being imported<sup>1</sup>. However its per capita energy consumption is still one of the lowest in the world, with approximately 400 million people without any access to electricity. The link between energy consumption and economic growth has been well proven, and the country stands behind its intention to push for growth on the back of continued energy expansion. This growth is to be carbon intensive and fuelled by oil, coal and gas. Renewable energy and actions towards energy efficiency have also been fore-fronted in order to meet the supply-demand gap. It is expected that renewable energy will increase from a low of 3 per cent of the total energy mix in 2003 to 15 per cent by 2020<sup>2</sup>. In this picture, gas consumption is currently 10 per cent of the energy mix but is expected to increase to 20 per cent by 2025<sup>3</sup>. There continues to be supply-demand gap within the country. This has prompted increased international imports of liquefied natural gas (LNG), which now makes up 25 per cent of gas supply.

Shale gas potential in India is estimated to be between 6 – 12trillion cubic feet, which is 0.1 per cent of estimated global supply<sup>4</sup>. Despite the relatively small share of global supply, it is estimated to be enough to run the country's combined gas fired power stations, for the next 20 years. It is not surprising that the Government has pushed to take up shale gas exploration and development as part of its Twelfth Five Year Plan (2012-2017), and a Shale Gas Policy is expected to be released shortly. Beyond the policy frameworks, private sector actors have begun shale gas pilot exploration Indian and foreign partnerships.

This note provides an overview of the current gas demand and supply in India. Although shale gas has some steps still to be undertaken before it can reach commercialization in the country, the Government's strong push for development stems from the need for energy security, and to stem the growing import bill that comes with increased international gas supply.

## 2 India Energy Mix – role of alternative gas supply

India's energy mix is dominated by coal, oil and gas (Figure 1). Of this natural gas was 8 per cent in 2011 and has grown to 10 per cent in 2012. The International Energy Agency's forecasts on demand and domestic production imply a supply gap of 18 billion cubic meters (bcm) by 2015, increasing to 28 bcm by 2020 and 52 bcm by 2030. LNG is set to remain the first source of imports for India for the immediate future.

Currently city gas distribution networks (CGD) make up for a 6 per cent of total gas consumption (Figure 2). CGD can be broken down into specific consumers; vehicular; commercial; industrial and domestic. Although industrial consumption is

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<sup>1</sup> <http://www.eia.gov/todayinenergy/detail.cfm?id=10611>

<sup>2</sup> [www.mnre.gov.in](http://www.mnre.gov.in)

<sup>3</sup> (2012) India Energy Congress, available at <http://indiaenergycongress.in/iec2012/ieb2012/ieb2012.pdf>

<sup>4</sup> Ministry of Petroleum and Natural Gas, Government of India, available at

highest within CGD, this is expected to shift as cities develop gas grids for vehicular consumption of Compressed Natural Gas (CNG). It is estimated that demand in the CGD sector will grow at a compounded annual growth rate (CAGR) of 29 per cent between 2012 – 2017.

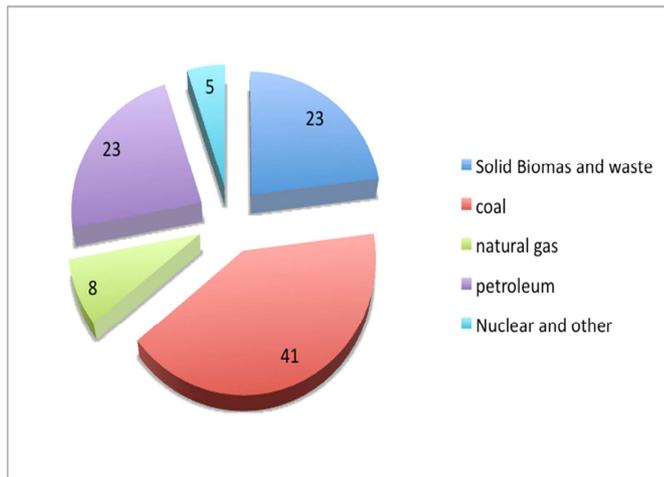


Figure 1 India Energy Mix – 2011 (EIA)

Sector	Present Consumption (MMSCMD)	Percentage of total Consumption
Power	61.41	37%
Fertilizer	37.74	23%
CGD (Domestic and CNG)	7.9	5%
Court Mandated Consumers	1.09	1%
Shrinkage for liquid extraction	7.18	4%
CGD ( Commercial and Industrial)	6.07	4%
Refineries	19.77	12%
Petrochemicals	5.67	3%
Sponge Iron	7.01	4%
Small Consumers having allocation higher than 50,000 SCMD	5.81	3%
Others	4.45	3%
Internal Consumption	2.06	1%
<b>Total</b>	<b>166.16</b>	<b>100%</b>

Figure 2 Natural Gas Consumption by Sector (2012)

## 2.1 Political context

### 2.1.1 Shale Gas Draft Policy

In India, mineral resources are governed by the Central Government. For this reason, public and private extraction of underground minerals requires national policy frameworks regulating access, and benefit sharing as well as procedural

undertakings. Coal and gas regulation is undertaken by the Ministry of Petroleum and Natural Gas (MoPNG). MoPNG with the Directorate of Hydrocarbons, publically released the first draft Shale Gas Policy in March 2012<sup>5</sup>. The policy laid out the process by which shale gas exploration is to be undertaken; the regulatory processes and the roles and responsibilities of different public officials.

Following an extensive evaluation of shale gas reserves, MoPNG will auction blocks through an International Competitive Bidding process. This will be open for full one hundred per cent participation by wholly owned foreign companies, as well as Joint Venture partnerships. Mining leases, for blocks allocated, will be given for a period of 30 years. It is estimated that up to 100 blocks will be opened up for allocation immediately following the release of the National Policy, and worth an initial investment of \$2billion.

One of the main concerns with shale gas in India is the extensive need for water utilization, in a water scarce country. The Government of India estimates that 3-4 million gallons of water would be required per well. The water, following hydraulic fracking would have high levels of total dissolved solids (TDS) and chemical residues. This would have the potential of aquifer contamination and possible surface water contamination, if released without adequate treatment. MoPNG, as part of the draft policy, has taken on responsibility for the required environmental clearances required from other public agencies such as the Ministry of Environment and Forest, Government of India.

### 2.1.2 Knowledge Partnership and Baseline Assessment Development

India's current draft shale policy, baseline understanding of potential shale gas reserves, as well as on-going discussions on technical assistance on shale gas exploration, are being undertaken in collaboration with the US Department of State. In November 2010 a Memorandum of Understanding was signed between India and United States for cooperation in the field of Shale Gas include Shale Gas Resource assessment in India, technical studies to commence on Shale Gas exploration in India and training of Indian personnel in the area of Shale Gas<sup>6</sup>.

As part of this, the US Geological Survey (USGS) has developed the public profile of the baseline estimates on shale gas potential. It is this estimate that is referenced in the current draft Shale Gas Policy. Additionally, between November 2012 and April 2013, Indian public officials and relevant private sector parties, have undertaken study visits to the US for a closer discussion on the legal and financial frameworks that will need to be put in place for effective shale gas exploration. Much of the current discussions on technical knowledge have been based around the concerns for environmental sustainability as a part of shale gas exploration, and potential mitigation actions that might be undertaken<sup>7</sup>.

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<sup>5</sup> Directorate of Hydrocarbons, Ministry of Petroleum and Natural Gas, available at <http://www.dghindia.org/admin/Document/notices/25.pdf>

<sup>6</sup> Press Information Bureau, Government of India, available at <http://pib.nic.in/newsite/erelease.aspx?relid=66820>

<sup>7</sup> Discussion with Apurva Chaturvedi, Programme Specialist, Energy, USAID, June 17, 2013

### 3 Technology and Market - prices of gas in the future

The potential of shale gas, to drive down costs, has become a central focus for the country. Indian attention has been drawn to the fact that the United States is producing shale gas at \$3.3 - \$4 per MMBTU. This is in stark contrast to the current prices India has to pay for domestic natural gas at \$4.2 per MMBTU and spot market purchases of LNG at anywhere between \$12 – 14 per MMBTU. Gas prices in India are subsidised, and the Government has started a process of deregulating the market. In April 2013 the gas price was increased to \$ 6.7 per MMBTU, and this price will now be evaluated ever quarter. This is a nominal increase, to the original doubling of pricing indicated by the Government. It is estimated that for every dollar that the price is increased or subsidy reduced, it will cost India's fertiliser industry Rs 31.6 billion per annum<sup>8</sup> (SEK 3.5 billion), and Rs 100 billion (SEK 11 billion) per annum for India's power sector. These two sectors are the largest consumers of gas in the country. Moves to deregulate gas prices are in line with larger energy reforms that are being undertaken to strengthen the country's precarious fiscal balance. However little discussion has yet to be had on the nature of subsidies to be provided for shale gas, and the pricing regime that will be undertaken.

There is a division of opinion about the role shale gas will have for India, and whether this will be a gamechanger for the country's energy ambition and indeed for the role cleaner energy such as natural gas can play. Given the extent of social reform and legislation that will be needed to conduct exploration in earnest, and together with the unknown environmental impacts this will have, the benefits of shale gas are seen to not be in line with cost of development<sup>9</sup>. The Government of India is unable to ignore the potential shale gas could have for the country, but the truth of the public sector's commitment to developing this resource is still yet to be tested. The auctioning of shale gas blocks will take place soon after the policy is released in early July. It is at this time where the market's value of shale gas will be fully understood.

Various steps have been taken, together with the public and private sector to develop the opportunity for shale gas development within the country. The map below indicates the areas for shale blocks, in line with the upcoming policy. Four major basins have been identified; Cambay, Krishna-Godavari, Cauvery and the Damodar Valley sub-basins such as Raniganj, Jharia and Bokaro. Oil and Natural Gas Corporation of India (ONGC) have recently concluded a successful pilot in the Damodar basin, and have partnered with ConocoPhillips for further exploration<sup>10</sup>.

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<sup>8</sup> Dutta, Sanjay, Oil Ministry recommends gas price hike to \$6.7, *Times of India*, May 20, 2013

<sup>9</sup> Discussion with Sanjay Dutta, *Business and Energy Journalist*, *Times of India*, June 14, 2013

<sup>10</sup> ONGC to go aggressive on shale gas, *Business Standard*, May 31st

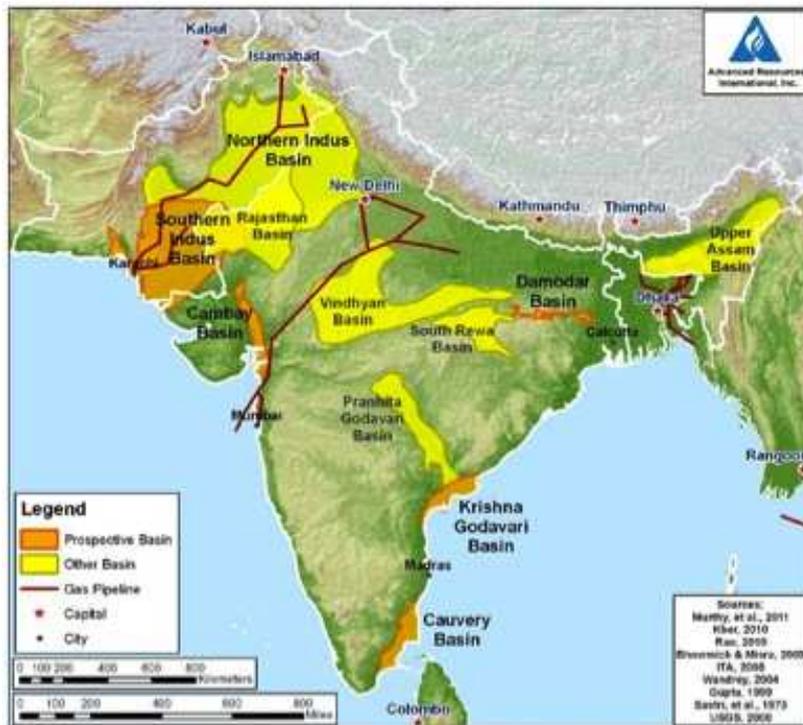


Figure 3 The map above outlines some of the key potential areas for India's shale gas reserves. However, currently it is only the Damodar Basin that has been actively explored by the Oil and Natural Gas Commission (ONGC).

#### 4 Geopolitics and concluding remarks

Although shale gas reserves in India are quite low compared to global supply if this is developed it can provide relief from India's growing reliance on imported gas and spot market purchases. However, more work needs to be done on developing the final policy parameters and potential incentives that might be offered to developers during the shale block allocation process.

The exponential rise of shale gas use in the United States, and the knock on effects of exploration and production in other countries has given rise to a discussion about the geopolitical impacts of a tectonic shift in the globe's consumption and production of oil and coal. In the face of growing domestic shale gas supply, there is a predicted reduction in the need of major economies to procure energy across national boundaries. India is currently not expressing concerns about this forecast. Potential non-FTA related shale gas agreements with the United States<sup>11</sup> are mutually beneficial. At this early stage, indications suggest that if India is unable to exploit its shale gas reserves, and demand for energy continues to increase, there will be a decrease in the negotiating potential with its trading partners. India has extensive coal reserves that are yet untapped. Although the coal is of relatively low

<sup>11</sup> US Clears Shale Gas Export to India, *The Hindu*, May 18, 2013

quality, it is considered viable for electricity production<sup>12</sup>. There is reason to believe that India will continue to push development of its mining policy, and extension of coal block exploration. Previously coal-blocks had been considered 'no-go' for reasons of national security and environmental sensitivity, but such limitations have been overturned<sup>13</sup>. If pushed to a corner, on energy imports, India will increasingly fall back on its coal reserves.

Energy security and cost of investment will continue to drive India's future actions with regard to development of the country's energy system. It will also be these parameters that decide the immediate future steps of shale gas development in the country. More discussion will be needed on the cost of exploration, the costs to the environment and the likelihood of returns being realized.

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<sup>12</sup> *Reserves Untapped in India's 'land of coal'*, Financial Times, April 2, 2012 available at <http://www.ft.com/cms/s/0/24861916-7974-11e1-b87e-00144feab49a.html#axzz2Weh4rzia>

<sup>13</sup> *Singh, Sarita, Economic Times, Government says no-go concept not tenable, Economic Times, July 29* [http://articles.economictimes.indiatimes.com/2011-07-29/news/29829405\\_1\\_environment-ministry-coal-blocks-forest-clearance](http://articles.economictimes.indiatimes.com/2011-07-29/news/29829405_1_environment-ministry-coal-blocks-forest-clearance); <http://www.indianexpress.com/news/coal-india-gets-assurance-to-fully-exploit-mines-report/698405>