India's energy security

Key issues impacting the Indian oil and gas sector
India’s real economic growth averaged around 8 per cent in the past decade, leading to 6.5 per cent growth in the demand for energy. Given the projected economic growth levels, energy demand is expected to continue to rise; rising energy needs, in turn, have drawn attention to the importance of energy security. Energy security is ensured by guaranteeing three factors – availability, accessibility and affordability of energy resources.

Coal, oil and natural gas are the most important sources of primary energy in India. Inadequate domestic supplies of these hydrocarbons are forcing the country to increase its import bill. While the country remains highly dependent on oil imports, it is saddening to note that supply of natural gas, which was expected to alleviate our energy security from the new domestic driven by accelerated capacity addition in power generation and decline in domestic coal production, India’s imports of coal have risen.

On the global front, demand for hydrocarbons is rising; consequently, India faces a challenge in its efforts to ensure energy security. The changing geo-political situation is hampering the accessibility of resources in a number of castes. Increasing strategic reserves, enhancing funds for oil equity and investing in oil diplomacy have acquired much prominence.

On the domestic front, a move towards a diversified fuel basket together with a focus on efficient exploration and consumption of energy resources is needed. Additionally, accelerated development of energy infrastructure, human resource development and technological upgradation are key areas for action. A more conducive policy environment coupled with an effective regulatory regime is, without doubt, the basis for accelerated growth of domestic energy resources. Energy security needs integrated action by all stakeholders.

This initiative - National Seminar for Energy Security - brings together all the stakeholders who will brainstorm on the crucial issues pertaining to energy security in India with to the objective of charting a roadmap for the future. FICCI and Ernst & Young have jointly prepared this knowledge report which provides the basis and guidelines for the discussions. The paper reviews the current scenario of rising energy demand in India which has led to increasing dependence on imports driven primarily by declining domestic production. It also reviews the current policy and regulatory framework governing India’s oil and gas sectors, highlighting the shortcomings and suggesting reforms.

It is our hope that you will find this paper and the outcomes of the National Seminar for Energy Security informative and helpful in ensuring energy security for the country.

Dr. Rajiv Kumar
Secretary General
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India’s impending energy crisis

Current energy deficit scenario

Currently, India is one of the world’s fastest-growing economies. During the period between 2006 and 2010, the country’s gross domestic product (GDP) increased at a CAGR of 8.2%, while global GDP increased at a CAGR of 4.5%. The rapid increase in economic activity has been accompanied by rising energy consumption. During the period between 2006 and 2010, India’s primary energy consumption increased at a CAGR of 8.3%, from 381.4 million tons and natural gas are major sources of primary energy in India, accounting for 52.9%, 29.6% and 10.6%, respectively, of the primary energy consumption. Although the country has the world’s fourth-largest coal reserves, the demand-supply gap of coal has been consistently increasing, with domestic production unable to keep pace with the demand. The deficit, in case of oil and gas, is even more. India holds just 0.7% of the world’s proven oil reserves while accounting for 3.9% of the global oil consumption – thus importing 73% of its oil consumed. Similarly, the country has 0.8% of the world’s proven natural gas reserves, while accounting for 1.9% of the worldwide gas consumption, which results in India importing nearly 20% of its natural gas consumed through LNG.

Rising dependence on imported oil is a cause for concern

Over the past few years, the country’s dependence on imported oil has steadily increased as a result of stagnant domestic production and rising demand. This high dependence on imported crude oil has significant implications on energy security and the overall financial health of the country. Domestic production remained flat, hampered by limited prospectivity, delays in the commissioning of new projects and declining production from existing maturing fields.

Figure 1: India’s rising dependence on oil imports

*FY11: numbers are provisional
Source: Petroleum Planning & Analysis Cell, Ernst & Young analysis

1. World Economic Outlook Database, September 2011, International Monetary Fund
2. BP Statistical Review of World Energy 2011
Disruption in crude oil supplies has always been a cause for concern for India. The Middle East and North Africa, which supplies 60% of India’s oil requirements, have witnessed high degree of geopolitical volatility in recent times. The recent upheaval in the Middle East, especially in Libya and Egypt triggered a drop in crude oil production in the region, resulting in increased crude oil prices driving up inflation in India. According to Goldman Sachs, the increase in oil price by US$10 per barrel could potentially slow India’s GDP growth by 0.2% and may inflate the current account deficit by 0.4%. In addition, the increase in oil prices could result in fluctuations in foreign exchange reserves. The recent depreciation of the rupee raised the cost of crude oil imports for India, which in turn has led to increase in inflationary pressures on the economy. Further, rising oil imports impact our trade deficit. Notably, the import of crude oil and oil products rose from US$50.3 billion in FY06 to US$115.9 billion in FY11. In FY12 (till October 2011), imports touched US$75 billion. Over the long run, the widening trade deficit may result in the paucity of foreign exchange reserves for the country to deploy in other critical infrastructure and social projects.

Gas shortages persist, notwithstanding production commencing from new fields

Currently, around 32% of demand for gas in the country is unmet as domestic supplies are not adequate enough to meet current demand. In FY10, the domestic gas supply scenario improved, with the KG-D6 block coming on stream. Rising production was expected to help bridge the natural gas deficit. However, a steady drop in production from the KG-D6 field – from 60 mmcmd in 1Q11 to 45 mmcmd in 2Q12 - raised concerns over future availability of domestic gas. On the demand front, there is a significant latent demand for gas, which is a function of price affordability and pipeline infrastructure.

Historically, most of the gas production and liquefied natural gas (LNG) terminals were located in the western part of the country. As a result, the pipeline infrastructure was concentrated only in the western India, which has adversely impacted the availability of gas in the rest of the country. The low availability of gas and limited infrastructure has curtailed development of a gas market in the country. Over the next few years, the availability of gas is likely to increase on the back of incremental supplies from the KG-D6 block, as well as from the new gas fields of ONGC and Gujarat State Petroleum, coal bed methane (CBM) and new LNG facilities. In spite of the increase in supplies, shortages are likely to persist due to significant latent demand and overall growth in demand for gas in the country.

Substantial increase in energy supplies needed to meet increased demand

According to the Integrated Energy Policy by the Government of India (GoI), India’s requirement of primary commercial energy is projected to increase from 551 MTOE in FY12 to 1,823 MTOE in FY32.

Rising consumption will be driven by economic growth and high fuel demand. The global average of per capita energy consumption is 1,839 kg of oil equivalent (KGOE), while India’s per capita energy consumption is merely 545 KGOE. This indicates substantial potential for growth in energy demand.

To meet the growing energy demand over the next few years, India will have to enhance its energy security by procuring energy supplies at affordable prices. While the country has surplus refining capacity and is an exporter of petroleum products, major investments will have to be made in the domestic upstream industry and to acquire hydrocarbon reserves abroad.

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3. “Egypt crisis to hit India’s current account deficit,” The Economic Times, 9 February 2011, via Factiva, © 2011 The Times of India Group
4. “Oil and the Arab world's unrest: Oil pressure rising,” Economist Intelligence Unit, 3 March 2011, via Factiva, © 2011 The Economist Intelligence Unit Ltd
5. “Oil price rise to impact India’s GDP growth: Goldman Sachs,” The Press Trust of India Limited, 24 April 2011, via Factiva, © 2011 Asia Pulse Pty Limited
7. PPAC, Data for Crude and Products - Value in Rupees, accessed 7 December 2011
Key issues limiting growth and development of India’s oil and gas industry

The Indian oil and gas industry has to deal with myriad issues. While some of the challenges such as regulatory uncertainty, subsidized petroleum prices and regulated gas prices are specific to the domestic oil and gas industry, players still need to address rampant global issues such as manpower deficit and the impact of inadequate and ageing infrastructure. Some of the important issues faced across the value chain are discussed below.

A. Upstream

Inadequate upstream infrastructure

The upstream oil and gas infrastructure in India is inadequate due to underinvestment in the past. As a result, the production of oil and gas remained stagnant and has not been able to keep up with the rise in demand. The sector has limited participation from foreign and private players as is visible from their declining participation in New Exploration Licensing Policy (NELP) rounds. For instance, a total of 21 foreign companies participated in NELP-VII (2008); ten foreign companies took part in NELP-VIII (2009), while only eight companies took part in NELP-IX (2011). Further, companies have spent just US$7.2 billion, out of their investment commitment of US$20.7 billion until NELP VII. Although the unexplored sedimentary area in the country decreased from 41% in FY99 to 12% in FY10, the level of exploration will have to be further raised to increase hydrocarbon production.

India is finding it difficult to commercialize its oil and gas discoveries. Since the introduction of NELP in 1999, there have been 60 discoveries, out of which 51 are gas discoveries. However, out of these 51 discoveries, only two have entered production phase.

Shortage of oilfield services

The rising demand for oil and gas has resulted in an increase in exploration activities worldwide, leading to the shortage of oilfield services, particularly deepwater rigs. In line with the global trend, India is facing a shortage of oilfield services, especially drilling equipment. Companies are increasingly failing short of their exploration targets with a high incidence of cost overruns and delays in work commitments. The issue is accentuated by the lack of domestic expertise in the manufacture of rigs, particularly deepwater rigs, and the time lag in the delivery of new rigs. Further, most of the rig assets held by Indian companies are aging. Over the next few years, these old rigs either have to be retired or substantially upgraded to remain operational, which is likely to further increase the shortage. In addition to rigs, there is a scarcity of other upstream-related infrastructure such as process platforms, pipelines, collecting stations and other surface facilities to transport oil and gas from wells to delivery points.

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13. “India Oil and Gas,” Macquarie Equities Research, 17 June 2010, via Thomson Research
14. DGH 2010 annual report
15. “India Oil and Gas,” Macquarie Equities Research, 17 June 2010, via Thomson Research
Acute shortage of skilled human resources

The oil and gas industry in India is facing a shortage of skilled manpower due to attrition, retirement and the inability to attract the young workforce. The industry is unable to attract talent from universities due to the lack of awareness of the available career opportunities within the industry and difficult working conditions, especially in the upstream segment. Other industries provide attractive career opportunities. Moreover, domestic national oil companies (NOCs) are losing their employees to the private sector due to significant differences in remuneration levels. Around 11% of the current workforce may retire over the next few years, resulting in significant loss of experienced personnel. Over the next few years, the shortage of talent is likely to increase, which may impact operations across the value chain. There will be a requirement of around 25,000 additional professionals over the next few years due to attrition, retirement and increasing activities in the industry. The upstream segment is likely to have the highest shortfall of skilled manpower of around 7,600 employees.17

Personnel employed by Indian NOCs in the upstream segment have decreased from 41,415 in 2005 to 33,351 in 2010.

Increased competition to procure oil equity abroad18

The acquisition of oil assets abroad is emerging as a key challenge for India as the country is facing stiff competition, especially from China, in its quest to secure oil resources. The aggressive acquisitions of Chinese NOCs are often backed by state financing from China Investment Corp., the country's sovereign wealth fund that has a corpus of around US$375 billion.19 In addition, Chinese companies are supported by diplomatic initiatives of the Chinese Government, offer to invest in social infrastructure projects and the provision of soft loans to countries where they are seeking access to oil and gas reserves. The GoI is encouraging Indian companies to expand their overseas operations. However, India's overseas investments in oil and gas lag behind that of Chinese companies. While Indian companies view overseas projects as a commercial activity and mostly acquire assets based on returns, Chinese national oil companies are often ready to overpay for assets to strengthen energy security, overlooking project economics. Though Indian companies currently have assets in high-risk countries such as Sudan and Syria, they follow a strategy is to purchase additional assets in relatively safe countries. In contrast, Chinese companies are not averse to invest in unstable regions.

From January 2010 to September 2011, Indian NOCs acquired oil and gas assets worth US$8.3 billion, while Chinese companies acquired assets worth nearly US$47 billion.

Some of the other issues hindering the growth of the industry include the following:

Tax and regulatory issues

The GoI has created a robust regulatory framework supporting the growth of the domestic oil and gas industry. Some of the key initiatives include:

- Oil and gas fields are open to domestic as well as foreign companies under the NELP framework.
- Up to 100% Foreign Direct Investment (FDI) is permitted in discovered small- and medium-sized fields through competitive bidding.
- Creation of a downstream and upstream regulator.
- Delicensing of the refinery industry.

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16. Basis Statistics on Indian Petroleum and Natural Gas 2009-10, MOPNG, Government of India
17. “HR challenges in the Indian oil and gas sector,” Ernst & Young, 2010
18. “RBI opposes $20 bn wealth fund from forex reserves,” The Press Trust of India, 13 October 2011, via Factiva, © Asia Pulse Pty Limited
• The refinery sector is open to joint sector (public private partnership) as well as private sector participation for new refineries.
• For petroleum products and pipeline sector, FDI is permitted up to 100% through automatic route.
• FDI up to 100% is permitted for natural gas/ LNG pipeline with prior government approval.
• FDI up to 100% is permitted on automatic route in marketing of petroleum products.

Due to strong regulatory framework and provision of fiscal incentives, participation of private companies until NELP VII was strong. However, subsequent amendments introduced have led to uncertainty and confusion among industry players. The following are some of the tax and regulatory issues impacting the industry:

• Deduction for unsuccessful exploration expenses: Section 42 of the Income-tax Act, 1961 (Act) provides that deduction for unsuccessful exploration expenses is allowed only in respect of an area surrendered prior to the beginning of commercial production. As a result, deduction of expenses on account of abortive exploration is not available in the year when expenditure was incurred and is permitted only on surrender of area. Such requirement of surrendering the area for availing deduction for abortive expenditure induce exploration companies to surrender the area without fully exploring the same, which is not in the interest of the industry and the country.

• No deduction for expenditure incurred on drilling and exploration activities by an Indian company with overseas production block: Section 42 of the Act provides deduction for expenditure incurred on drilling and exploration activities carried out in India. Accordingly, an Indian company with an overseas exploration block is not eligible for any similar tax treatment.

• No tax holiday for production of natural gas: Tax holiday under section 80IB(9) of the Act is available to undertakings engaged in the commercial production of mineral oil and natural gas in blocks licensed under NELP VIII and blocks licensed under Coal Bed Methane (CBM) IV. Accordingly, no deduction is available for production of natural gas in blocks licensed under other NELP and CBM rounds of bidding.

• No option for claiming tax holiday under section 80IB(9) of the Act: Tax holiday under section 80IB(9) is available to an undertaking, which is engaged in the commercial production or refining of mineral oil for seven years including initial assessment year. However, in the initial years there is hardly any profit to take advantage of the tax holiday since undertakings incur considerable expenditure to set off and hence, actual benefit of tax holiday does not flow to them.

• No exemption of oil and gas profits from Minimum Alternative Tax (MAT): The benefit granted by way of tax holiday is partially offset since no exemption has been granted from levy of MAT.

Oilfield services

Reimbursement of expense taxed under section 44BB of the Act (for service providers): A significant number of judgments have held that the amount received as reimbursement of expenses does not accrue or arise from the performance of any services under the contract and hence, are not part of the contractual revenues. The reimbursements are in respect of amounts spent by the contractor on behalf of the principal and accordingly, the same do not constitute income in the hands of the contractor. The Revenue authorities have consistently taken a contrary position that provisions of Section 44BB of the Act apply to all amounts received and there is no scope for a differential treatment in respect of reimbursement expenses. Accordingly, the Revenue authorities have consequently taxed reimbursements of expenses.
B. Midstream

Underdeveloped natural gas infrastructure

The natural gas infrastructure in the country needs an overhaul. The infrastructure is currently underdeveloped due to limited availability of natural gas and inadequate transmission and distribution pipelines. India's gas pipeline density (pipelines spread per square km) is one of the lowest in the world. As a result, the share of natural gas in the overall energy mix is only 10% as against the global average of 24%.20

<table>
<thead>
<tr>
<th>Country</th>
<th>Estimated pipeline density (km/sq. km.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>0.003</td>
</tr>
<tr>
<td>The UK</td>
<td>0.05</td>
</tr>
<tr>
<td>The US</td>
<td>0.05</td>
</tr>
<tr>
<td>Pakistan</td>
<td>0.01</td>
</tr>
<tr>
<td>China</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Source: CIA The World Fact Book and Ernst &Young analysis

Regulated natural gas prices

India currently has numerous pricing mechanisms, which depend on the supplier, customer and region. Companies need government approval for gas price and the pricing formula, despite being given the autonomy to charge market-determined prices under the provisions of the NELP. The price of natural gas needs to be high enough to incentivize producers to invest in exploration and production, while at the same time be affordable for majority of gas consumers. The following are some of the current gas prices prevailing in the country.21

Comparison of pipeline density – 2010

<table>
<thead>
<tr>
<th>Source of gas</th>
<th>Wellhead price (US/mmbtu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fields-APM*</td>
<td>4.2</td>
</tr>
<tr>
<td>KG D6</td>
<td>4.2</td>
</tr>
<tr>
<td>LNG (Contracted) - Dahe</td>
<td>7.5 to 8</td>
</tr>
<tr>
<td>LNG (Spot)</td>
<td>14 to 16</td>
</tr>
<tr>
<td>Panna Mukta</td>
<td>5.57 to 5.73</td>
</tr>
</tbody>
</table>

*APM: Administered gas price
Source: Deutsche Bank

Difficulty in sourcing long-term gas supplies from abroad

The import of gas in the form of LNG and the transmission of gas through transnational pipelines are two options available to meet the rising domestic demand for natural gas. Indian companies are constructing new LNG terminals and expanding the capacities of existing terminals. However, the country is facing difficulties in sourcing long-term LNG supplies due to competition from countries such as China, Japan and South Korea. Qatar – the world's largest LNG supplier – recently agreed to fulfill all the long-term LNG requirements of GAIL India and Petronet. However, discussions were suspended due to pricing issues.22 In the past, India proposed to lay transnational pipelines and was in talks with countries such as Iran, Pakistan, (Iran-Pakistan-India pipeline), Turkmenistan, Afghanistan (Turkmenistan-Afghanistan-Pakistan-India pipeline), and Myanmar (Myanmar-India pipeline). However, differences over gas pricing and geopolitical issues have created hurdles in the construction of these pipelines. The challenge for India will be to arrange long-term supplies at reasonable prices as anchor gas customers – fertilizers and power industries – may not be able to pay market-determined prices.

20. BP Statistical Review of World Energy 2011
22. “India, Qatar disagree on pricing of LNG,” Asia Pulse, 31 October 2011, via Factiva, © 2011 Asia Pulse Pty Limited
Downstream

Subsidized petroleum prices, impacting operations of domestic NOCs

The GoI recently deregulated the prices of petrol; however, state-owned oil marketing companies (OMCs) continue to sell petroleum products such as kerosene, liquid petroleum gas (LPG) and diesel at subsidized rates, which are much lower than the cost of production. This is resulting in significant under-recoveries for OMCs. Under-recoveries are expected to increase further from INR 782 billion in FY11 to nearly INR 1,320 billion in FY12. In FY11, around 52.5% of under-recoveries were compensated by the GoI in the form of oil bonds and cash, 38.7% by upstream companies in the form of discounts, while the remaining 8.8% had to be borne by OMCs. The rising under-recoveries and the current subsidy sharing mechanism followed by the Government have consequences on the financial health of OMCs and energy security of the country. OMCs are facing severe liquidity issues, which, if not addressed at the earliest, may result in disruption in sourcing imported crude, leading to lower refinery utilization and possible shutdown of refineries. The option of borrowing funds is also limited as OMCs are already carrying considerable debt on their balance sheets. For instance, as of 30 September 2011, Hindustan Petroleum had a debt-equity (DE) ratio of 5.1:1, while Bharat Petroleum had a DE ratio of 3:1. The shortage of cash has impacted working capital requirements and may put further strain on the companies to finance maintenance work and smaller projects.

State-owned OMCs plan to increase their upstream activities to de-risk their core downstream businesses. For instance, Indian Oil Corporation (IOC) is planning to either set up an upstream subsidiary or create a separate division within the company that will entirely focus on exploration and production activities. However, huge under-recoveries have reduced cash reserves, which may prevent OMCs from investing substantial amounts to scale up their upstream business.

During FY08 - FY11, the cumulative subsidy, borne by OMCs, the GoI and upstream companies, was INR 2,943 billion. This significant amount could have been invested to secure supply of natural resources globally as well as in enhanced investment to increase domestic supply of oil and gas.

Challenges in developing CGD networks

Insufficient gas supplies, poorly developed pipeline infrastructure and uncertainty over regulatory policies are some of the main factors deterring the growth of the city gas distribution (CGD) networks in India. Although India has a CGD network in 41 cities, the network is not widespread across majority of the cities. Only Delhi, Mumbai and some parts of Gujarat have a prominent gas distribution network. According to India’s gas allocation policy, the power and fertilizer industries get a preferential allotment of domestic gas supplies, which leaves very little domestic gas for CGD companies. To satisfy demand, existing CGD companies may have to source increasing quantities of expensive R-LNG, which may increase the prices of compressed natural gas (CNG) and piped natural gas (PNG) as well as impact margins. It is likely that new CGD networks will have to source R-LNG, which may affect the returns of proposed CGD projects.

The shortage of experienced manpower is yet another issue that needs to be overcome. With the aggressive growth plans of many companies, it is estimated that the

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26. Unaudited Financial Results For The Half Year Ended 30th September, 2011, BPCL and HPCL
industry will require around 4,500 people over the next few years.30 Some of the other challenges that may hinder the growth of the nascent CGD industry in India include the lack of safety standards and network of reliable equipment suppliers.

**Tax and regulatory issues / Regulatory regime**

**Refining**

*Sunset clause for tax holiday for mineral oil refineries:* Tax holiday under section 80IB of the Act will not be available to mineral oil refineries that commence refining after 31 March 2012.

**City gas distribution**

*Absence of a clear regulatory framework for developing CGD networks:* The absence of clear regulatory provisions has hampered the development of the domestic CGD industry. Licenses for CGD projects under round 2 and round 3 of CGD bidding are yet to be awarded. Moreover, the uncertainty over the bidding criteria recently led to the cancellation of the fourth round of CGD bidding. Eligibility criteria for CGD bidding lack provision for commitment and are very flexible. This allows inexperienced players to bid, who may find it difficult to develop and/or operate the network. Moreover, in previous rounds, bids have been invited for areas, which are too small or underdeveloped to sustain the CGD business profitably and hence, attract only a few bids or no bids at all.

India will have to overcome significant challenges, internal as well as external, to achieve energy security. Regulatory uncertainty and opaque natural gas pricing policies have resulted in vast unexplored basins and inadequate upstream activities in the country. In addition, the small pool of skilled manpower and poorly developed upstream infrastructure is resulting in a significant time lag between oil and gas discoveries and production. Given the scarcity of hydrocarbon reserves across the globe amid the rising demand, India will have to increasingly compete with other nations to secure energy supplies. Fossil-based fuels will definitely remain the dominant source of energy in the near future. Nonetheless, in the long term, India will have to explore alternative energy sources to strengthen its energy security.

30. “HR challenges in the Indian oil and gas sector,” Ernst & Young, 2010
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