A cornerstone for energy security

At the end of 2008, India's proven reserves of oil and natural gas were 5.8bn barrels and 38.5tn cf respectively. These estimates are based on limited drilling experience. The total proportion of India's sedimentary basin area explored to date is only 21%, with drill density in places as low as one well per 1,000 sq km. Given India's growing need to import oil and gas, the urgency of a through evaluation of India's petroleum deposits is clear, writes James Camilleri.

India's sedimentary basin is estimated at 3,135mn sq km, comprising a total of 26 basins. Over 44% of these basins lie onshore, with 13% in shallow water and 43% in deepwater regions. The basins are divided into four main categories – proven commercial productivity, identified productivity, prospective basins and potentially prospective basins. In order to improve the knowledge of its basins, India's Ministry of Petroleum and Natural Gas (MPNG) decided to implement an open bidding licence scheme for hydrocarbon blocks nationwide – the scheme was called the New Exploration Licensing Policy (NELP) and inaugurated in 1999.

The main goal of NELP is to increase exploration and production of domestic petroleum and bring in much needed technology, skills and capital. The government anticipated investment of $250mn (Rs 1,100 crore) for the blocks awarded under NELP I. However; initial interest was restricted mainly due to low oil prices at the time, slow demand and the perception there were no significant oil discoveries to be made on the subcontinent. Perhaps the most pervasive criticism of the process was the belief that state-owned companies received preferential treatment from the Directorate General of Hydrocarbons (DGH). Table 1 shows the leaning to public companies in the first four rounds of NELP. However, the emphasis has changed in more recent years and no longer sustains this criticism.

Despite the increase in private and private – joint venture discoveries, national oil companies (NOCs) still accounted for 85% of total crude oil and 78% total natural gas production in 2006/2007. Complaints have emerged the NOCs are making inflated bids to secure fields in desired regions. These exorbitant bidding prices inflict high recovery costs on any hydrocarbons found in the block. To counter this trend, the DGH can reclaim any blocks that have not received a certain level of activity. However, as Table 1 shows, only nine blocks have been reclaimed over the previous six rounds of NELP, so the implementation of this power has been limited. The only recent seizure of exploratory blocks due to inactivity happened in May 2008 when the DGH recovered five blocks from Reliance Industries for failing to meet the minimum work programme.

More recent rounds of NELP have received greater interest, especially from private companies. NELP I in April 2000 offered 48 blocks, with the DGH receiving 45 bids on 28 blocks. Under NELP VI, 55 blocks were offered and 165 bids received before the licences were approved in March 2007.

The increased interest in NELP was sparked in 2002 by a significant natural gas discovery in the Krishna Godavari (KG) basin – the KGD6 field, in which Reliance owns a majority stake and is projected to hold 11.3tn cf of gas. Production started in September 2008 and is expected to reach its peak of 550,000 boe/d in the next two

years. Reliance has made further discoveries in the KG basin, including wells 18, 19, 22, 23, 24, 25, 26 and 28 in the Dhirubhai blocks.

Less than two years after Reliance's discovery, Cairm Energy, an independent Scottish oil company, made what was claimed to be the largest onshore oil discovery in India since 1985. The discovery of the Mangala field in Rajasthan is conservatively estimated to hold 320mn barrels of oil. Cairn has made several subsequent discoveries in the region, increasing reserves to 2.2bn barrels of oil. Production on the five fields discovered to date began in early September this year.

Such discoveries have increased the profile of the companies and put India on the map for oil exploration. Since then, further discoveries have been made in other sedimentary basins. Oil and Natural Gas Corporation (ONGC) has discovered gas in two offshore blocks in the Mahanadi basin, which are estimated to hold between 3tn and 4tn cf of reserves. Elsewhere, ONGC found oil in the Assam and Assam – Arkan basins, producing 1,421 b/d of oil. Perhaps more significantly, ONGC struck oil and gas in the exploratory well Karjan 9 in the Deccan Syneclise. Considered to have vast hydrocarbon potential, this discovery could pave the way for further discoveries in India's largest basin.

Round	Public	Public/Private	Private	Private	Foreign	Blocks
NELP I	7	1	9	2	1	4
NELP II	14	0	2	2	0	5
NELP III	13	1	0	9	0	0
NELP IV	13	5	0	2	0	0
NELP V	3	9	3	3	2	0
NELP VI	18	17	7	7	3	0
NELP VII	17	7	5	13	3	0
Blocks Relinquished	6	0	1	1	1	0
Total	**80**	**40**	**27**	**39**	**10**	**9**

Table 1: Summary of blocks awarded under NELP rounds.

Government Goals

Despite an unpromising start, NELP is starting to fulfil the goals set by the India government. Expected investment in the rounds so far is estimated at around $ 8bn and 49 discoveries have been made, accruing approximately 4.73bn barrels of oil and oil equivalent gas.

At the end of last year, the list of winners for NELP VII blocks were published and suggested a shift in emphasis from NOC to private joint ventures. Of the 45 blocks offered, 17 have been claimed by NOCs, 21 blocks have been taken by private and private joint ventures, with the remainder private – NOC joint ventures. The most notable entrant to the bidding process is the international resources giant BHP Billiton, which along with GVK Infrastructure Oil and Gas has been awarded six blocks in the Mumbai Offshore basin and one in the Kerala – Kokan – Lakshadweep basin.

On 9 April 2009 MPNG launched its 8th bidding round for hydrocarbon exploration rights as well as the fourth round for coal bed methane (CBM) within India. There are an unprecedented 70 blocks being offered under NELP VIII, while CBM IV is offering 10. Of the 70 blocks being offered, 24 are in deepwater, 28 in shallow water and 18 on land. The total area covered is 5.2% of India's entire sedimentary basins. The closing date for bids was originally 10 August, but was put back until last month (as this issue of Petroleum Review was going to press) due to doubts about tax holidays.

The emphasis in this year's bidding will be the Andaman and Nicobar Islands, where 18 deepwater blocks are on offer. Additionally, while NELP VII offered nine blocks in the Mumbai basin, there are seven on offer this year in shallow waters. There are also nine blocks on offer in the Kerala – Konkan basin. Finally, three blocks have been put out to tender in the vast and unexplored Vindhyan basin.

Future prospects

So, what are the prospect for India's upstream oil and gas sectors? Although NELP is starting to fulfil expectations, to what degree can it replace imports?

Consumption of oil has increased dramatically over the last 15 years. Today, India consumes 135mn tonnes (2.88mn b/d), making it the fourth largest consumer of crude in the world. If the Indian economy continues growing at current levels, by 2030 demand could be as high as 486mn tonnes, (10.37mn b/d). Complicating the rapidly escalating demand for oil, production in India is stagnating. On its own, domestic reserves can sustain the current level of oil production for 23 years – but less than seven years at current consumption levels. Projected future oil production is not going to be much higher. Estimated production for the XI five – years plan will average 41.35mn tonnes (0.88mn b/d). Notwithstanding successive major discoveries of oil, the India economy will continue to be heavily dependent on imports.

Meanswhile, natural gas is expanding significantly to match increasing demand. Demand for natural gas is projected to rise from 29mn toe (32.19bn cm) in 2004 to 93mn toe (103.23bn cm) by 2030. Despite not possessing significant gas reserves, India's domestic production has managed to keep up with consumption. With discoveries made by Reliance in the Krishna Godavari basin, domestic production is likely to contribute significantly to overall demand. Domestic production is forecast to double from present levels of 93mn cm/d [Note: This equates to 33.96bn cm, somewhat ahead of the latest BP Statistical Review of World Energy, which cites production of 30.6bn cm for 2008 – Consulting Editor] to 173mn cm/d by 2012. Nevertheless, gas imports are projected to double to 12bn cm (32.87mn cm/d) by 2010, but then stabilize before increasing in the 2020 – 2030 period. By 2025 there could be a shortfall as large as 200mn cm/d (73bn cm).

It is therefore unrealistic to expect that domestic hydrocarbon reserves can ensure self sufficiency in oil and natural gas production. However, it is hard to underestimate the importance to India of the prospect of at least some of its demand being satisfied indigenously. Production from KGD6 alone is expected to save the country some $20bn/y in foreign exchange outflow. If NELP contributes to an easing of the import balance, then the energy security of India will improve immensely.

Footnotes

1. BP Statistical Review of World Energy, 2009.
2. Rai R. ‘India’s current upstream regulatory environment and features of NELP VII’, IP Week Conference ‘Spotlight on India’, February 2008.
3. Khan J, India’s energy security and the Arabian Gulf, Arise Publishers, 2005, p71.
4. TERI Energy Directory yearbook (TEDDY), Teri Press, 2007, p76 and 79.
5. ‘Government seizes 5 blocks from truant RIL’, Economic Times of India, 21 May 2008.
6. TEDDY, Teri Press, 2007, p81.
7. Skrebowski C. ‘Demand outstripping supply’, Petroleum Review, November 2008, p30.
8. ‘Production begins from Krishna Godavari basin’, Offshore Magazine, 25 September 2008.
9. ‘Petroleum exploration and production activities, India 2005 – 2006’, Directorate General Hydrocarbons (www.dghindia.org)
10. ‘Rajasthan: significant exploration potential’, Petroleum Economist, February 2006.
11. Jackson K & Skrebowski C. ‘Gas to fuel Asia’s future?’ Petroleum Review, November 2007, pp35-6.
12. ‘ONCG makes 5 oil and gas discoveries’, Economic Times of India, 7 June 2007.
13. ‘ONGC strikes oil and gas in Deccan Tarps,’ Economic Times of India, 1 May 2008.
14. List of provisional winners – NELP VII blocks, www.dghindia.org
15. ‘Press note by MPNG on launch of NELP VIII and CBM IV’, ministry of Petroleum and Natural Gas (MPNG), 9 April 2009. www.petroleum.nic.in
16. BP Statistical Review of World Energy, 2009.
17. Ramachandran M. ‘Indian hydrocarbon sector’, IP Week Conference ‘Spotlight on India’, February 2008.
18. Integrated Energy Policy, Government of India Planning Commission, August 2006, p34.
19. Petroleum statistics, MPNG, www.petroleum.nic.in
20. World Energy Outlook 2007, international Energy Agency (IEA), p465.
21. Petroleum Statistics, MPNG, www.petroleum.nic.in
22. World Energy Outlook 2007, IEA p501.
23. Dasgupta P. ‘India’s natural gas opportunities and challenges’, IP Week Conference ‘Spotlight on India’, February 2008.
24. ‘Production begins from Krishna Godavari basin’, Offshore Magazine, 25 September 2008.