Strengthen inclusive growth through transparency and allocation efficiency in the gas sector

Note for the Government of India committee on natural resources

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1. Introduction

Gas (natural or from other sources such as coal-bed methane or shale gas) has often been cited as the 'transition fuel' to a low carbon future since its GHG emissions are lower than other fossil fuels and its supplies are likely to outlast petroleum supplies. It has also been cited that gas would be the fuel of the 21st century just as oil was the fuel of the 20th century (Kelkar 2009). India's energy consumption is likely to grow rapidly in tune with its development needs and the share of gas in its energy basket is also expected to increase (Planning Commission 2006, McKinsey 2008). Since gas is also extensively used in the fertilizer sector, which is important from a food security perspective, it is easy to see that gas is a very important fuel and natural resource for India. Therefore, it is imperative that this precious natural resource is managed and used effectively to maximize public interest.

The gas sector is also in the process of going through some significant changes as more discoveries are likely to come online, policies for shale gas exploration and gas pricing are being finalized, transmission pipelines are being authorized through auctioning, negotiations about the Turkmenistan-Afghanistan-Pakistan-India (TAPI) pipeline are progressing and block auctioning may move to Open Acreage Licensing. These developments are likely to have a significant impact on the sector in the years to come, and hence this is an opportune time to ensure that we have a fair, transparent and efficient regime for the gas sector.

This report examines the gas sector from broad perspective of its role in the country's all-round development in issues such as energy security, food security and environmental concerns in addition to viewing it as a natural resource that needs to be well managed. From this perspective, it highlights issues that need greater attention and also suggests some ways forward.

The report is structured as follows. We first discuss some strategic considerations for gas exploration, production and use in the country. This is followed by two broad discussion themes. The first part discusses the upstream segment where we discuss the exploration and production of natural gas ('non-associated' gas found by itself or 'associated' gas found with oil) and shale gas (gas found in shale rock formations). The other possible sources of gas in the future are imports (through LNG or pipeline), 'equity gas' (gas from overseas fields owned by Indian companies) and coal-bed methane (CBM). We do not discuss these in detail as India has no upstream role to play in imported or equity gas and upstream of CBM fits more naturally with coal, as block auctioning etc. for coal and CBM should happen together. The second part discusses the downstream segment, where gas from all sources is considered since they can be used interchangeably. This part deals with issues of efficient pricing and utilization / allocation of gas, and related governance issues. We conclude with a summary of our recommendations based on the two broad discussion themes.

2. Strategic considerations

2.1. Exploration and production

Though some major discoveries – particularly the KG D6 discovery by RIL – have helped increase domestic gas supply, pent up demand for gas and corresponding increase in consumption means that the reserve-to-production (R/P) ratio has actually decreased slightly and LNG imports have been increasing even after KG D6 gas has come on stream (Figure 1). Hence, it is strategically important for the nation to decide on how it wants to exploit and use its domestic resources. It should not happen that the country exploits its precious resources 'too fast' in its eagerness to develop, and face serious energy security

issues in its future. Instead, it needs to develop a balance between meeting its immediate energy and development needs and the country's long term energy security.

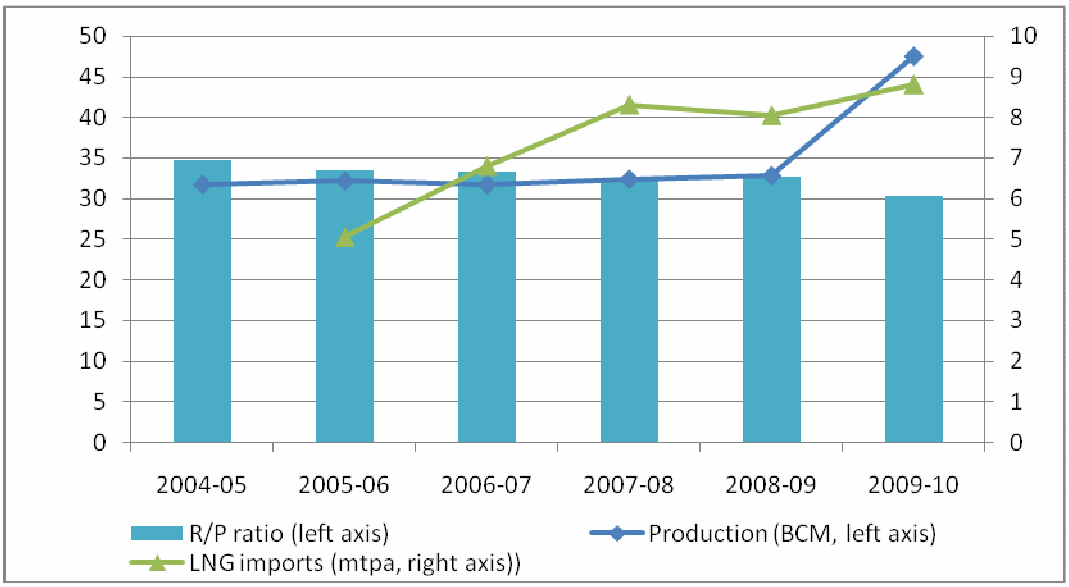

Figure 1: Indian gas production, reserves, imports (Source: MoPNG)

2.2. Usage

India consumed about 47 billion cubic metres of gas in 2009-10, or about 129 million cubic metres per day (mmscmd). Overall gas consumption has been growing at about 9% p.a. for the last 5 years, while gas use in the power sector has been growing at about 12% p.a. over the same period. The power and fertilizer sectors together consume about 73% of the domestically produced gas, with the power sector alone consuming about 45% (MoPNG 2010). This is driven by India's growing energy needs and helped by the flow of gas from the KG basin off the east coast that has made gas available to many gas-fired power plants that were otherwise idle or stranded. Therefore, gas has helped to enhance the country's energy security and food security to some extent.

While there are differences among different projections of growth in India's gas demand, all of them agree that it will increase rapidly. For example, McKinsey predicts that demand would be 230 and 290 mmscmd in 2015 depending on gas price, while the official forecast for the 11th Five Year Plan shows a demand between 245 and 280 mmscmd in 2011-12. All these projections continue to assume that power and fertilizer sectors would be the largest consumers of gas – an assumption that may be questionable from a strategic perspective as discussed below.

Though coal is the largest contributor to India's energy basket, its energy imports are mostly in the oil sector (though coal is also imported and these are likely to rise in future). The net oil imports in 2009-10 were about 132 million tons and worth about Rs. 2.7 lakh crores (MoPNG 2010). These imports formed about 88% of our total oil consumption of 150 million tons and the amount spent on import represents over 4% of our GDP for the year[1]. These imports are at an average cost of import equivalent to about $65/barrel, while it is expected that international crude prices are likely to stay at over $100 per barrel for the foreseeable future. Note that $100/barrel crude oil price is energy equivalent to approximately

[1] In contrast, oil imports are less than 2% of GDP for countries such as US, China or Japan.

$18.5/mmbtu gas price – much more than domestic or even most imported LNG prices. In contrast, domestic and imported coal prices of Rs. 1800 / ton and $ 50 / ton translate to roughly $2.2/mmbtu. These facts, combined with geo-political uncertainties traditionally associated with oil imports (such as the ongoing unrest in North Africa), suggest that oil imports are the largest threat to the country's energy security and it may be better to use gas to substitute for oil where possible, rather than coal.

Table 1 presents approximate gas prices up to which different sectors would be happy to use gas instead of other fuels (coal for power, oil for transport and industry, and LPG for cooking). As can be seen, industry users would be happy to switch to gas up to fairly high gas prices and can thus afford to use imported LNG. Moreover, gas would be a cheaper option even for transport and cooking fuels if they are unsubsidized, and are competitive even at current subsidized rates.

Switchover gas price	**$/mmbtu**
Base load power	5.82
Peak load power	8.59
Unsubsidized MS / HSD	17.06
Subsidized HSD	11.55
LPG	15.46
Subsidized LPG	9.42
Industrial fuel	17.06

Table 1: Approximate gas prices at which alternative fuels would be preferred (Source: Prayas calculations[2])

Note that the best way to reduce oil consumption in the transport sector is by providing efficient mass transit and good non-motorized transport facilities. However, switching vehicles to CNG can also play a role in reducing oil consumption. In practice, the transport sector may only shift to CNG as the older petroleum driven fleet gets replaced by CNG driven fleet, as retrofitting vehicles is expensive. One also has to consider the impact on vehicle maintenance etc. of switching to CNG. But, since vehicle sales in the country are growing at over 10% p.a., it is possible that, with the necessary distribution infrastructure and policy support, a significant part of the fleet would be CNG vehicles in the medium term.

As industry, LPG and transport sectors roughly consumed 50-60% of oil used in the country and it is cost competitive to replace them by gas, replacing oil use in these sectors by gas would not only improve energy security and save foreign exchange, but also contribute towards reducing the Government's subsidy burden. Of course, such a replacement is subject not only to availability of sufficient quantity of gas but also development of good gas transmission and distribution infrastructure.

From a development perspective, if providing clean cooking fuel in the form of LPG to all is a priority, then it may be worth considering whether LPG production to use gas as feedstock if rich gas reserves are found in India, since it would be cheaper than oil based LPG production.

If gas forms 10% of the transport fuel consumed in 2020, it translates to a demand of about 45 mmscmd. If industry grows at 9% p.a. and gas forms 80% of industrial fuel used for

[2] The listed gas prices represent FOB prices. Assumptions made: a) $1.5/mmbtu for transportation, marketing etc., b) Coal-fired base load power available at Rs. 3/kwh, c) peak load power at Rs. 4.5/kwh, d) oil at $100/barrel, e) CNG, MS and HSD taxed similarly, as also LPG and PNG.

heating in 2020, then it could contribute a demand of 110 mmscmd. If the Government chooses to use gas to produce LPG in order to provide clean cooking fuels, it translates to a gas demand of about 80 mmscmd to supply gas-based LPG to 50% of households in the country. This shows that there would be a significant demand for gas, even from an energy security or clean cooking fuel perspective.

Regarding the use of gas in the fertilizer sector, it is possible that locating fertilizer plants close to areas with abundant gas would result in substantially lower input gas price, and thus cheaper fertilizer. For example, the Oman India Fertilizer project based on a MoU between the Governments of India and Oman is assured of gas at $0.77/mmbtu for 10 years commencing 2005, which is much cheaper than current gas prices[3]. This has resulted in lower fertilizer prices at home and the Department of Fertilizers claims that the Oman joint venture has saved about Rs. 500 crores in the subsidy bill. Therefore, this option should be considered seriously and its pros and cons examined, and if beneficial, fertilizer companies should be encouraged to import fertilizer or set up JVs overseas where gas is abundant and cheap. Such a move would release domestic gas for other applications such as those mentioned above and for power generation, which is discussed next.

In the short term, gas does not offer any significant cost advantages for base load power generation compared to coal (Table 1) and the country has fairly large reserves of coal. Since the primary goal of the country should be to supply power to the 40% of the country that still does not receive electricity, and these consumers are highly cost sensitive, it would be preferable to continue using coal for base-load power generation to reduce the subsidy impact of providing improved access to electricity. But in the long term, it is possible that gas would have a role to play in base load power generation, as it is likely that coal would have to be imported and India may have to undertake more climate related obligations.

Therefore, it may be better to discourage new gas-fired power plants, other than those already committed, until gas supply increases substantially (say, through shale gas). Existing plants should ideally not be used for base load power but for intermediate or peaking power with, say, a PLF of less than 50% – perhaps through a time-of-day tariff that is higher at peak load hours – if base load can be met through coal fired plants. Instead, gas should be encouraged as a fuel in industries and for cooking and transport and for decentralized combined heating and power (CHP) applications which are much more efficient than centralized power generation. It should also be examined whether use of gas for domestic fertilizer manufacture is optimum or whether it should be imported.

3. Upstream

3.1. Natural gas

Exploration for oil and gas in India had been controlled and managed by the Government until the late 1980s. In the 1990s, it invited some private sector participation by nominating some consortia to explore some fields under a production sharing contract (PSC). This was further refined into a New Exploration Licensing Policy (NELP) in 1999. Under NELP, the Government has conducted nine rounds of auctions where acreages have been bid out to exploration companies based on their technical competence and willingness to share profits (if oil or gas is found) with the Government. NELP is broadly considered a success for various reasons. It has spurred exploration and the area under exploration in India has gone up from 11% to 68% after eight rounds of NELP. In turn, this has resulted in an increased number of

[3] http://fert.nic.in/projectdivision/completed_project.asp, accessed 8th April 2011

discoveries and India had 10 producing basins in 2009 compared to 2 in 1990. It has also attracted reasonable investor interest with 71 companies (individually or in consortia) participating in bidding so far, while 72 out of 239 blocks awarded have gone to private consortia (IEA 2010).

However, there are also causes for concern. One concern relates to NELP auctions not attracting the 'majors' of the oil industry, thus reducing competition. Many reasons are cited for this such as the poor prospect in Indian basins and concerns regarding the stability and reliability of the Indian policy regime.

Another concern relates to transparency and governance of NELP – particularly after award of exploration contracts. There is no publicly available information about block-wise data such as details of the winning bid, comparison with other bidders, proven and extractable reserves, expected and actual production profile, expected and actual investment, promised and actual exploration activity, and reasons for extensions granted to exploration licenses. This is reflected in allegations of inflated costs and the current confusion about reducing output from the KG D6 basin on the east coast. Much of this can be attributed to non-transparent functioning of the management committees of blocks.

Concerns have also been expressed regarding the impact of oil and gas fields on the local environment (such as possibilities of land subsidence) and lives of affected communities (MoEF 2009). In case of deepwater fields, the impact is at the landfall point and in building access to it. In case of other fields, the impact is additionally on communities in and around the field.

We recommend considering the following steps to address the above concerns. Some of these recommendations may require further public discussion to fine-tune the details.

1. The Government must initiate a public debate by bringing out a white paper on how it plans to balance long term energy security with short term energy needs. The white paper should consider factors such as possibilities of domestic production of different fuels, possibilities of importing fuel or acquiring overseas assets, and short term and long term energy needs of the country. Based on this, it should present a balanced strategy for exploiting its domestic energy resources while meeting its energy needs.

2. The Directorate General of Hydrocarbons should suo-motu publish many important documents on its website. The rationale for this is that the winning bidder is only an operator of the block, with the resource belonging to the nation. The documents that should be published include:
   a) For each block awarded for exploration, the final signed contracts and anonymous comparison of different bids received. Precedence for this exists in the form of competitive bidding guidelines issued by the Ministry of Power for power procurement (MoP 2005).
   b) For each block in operation, the composition of the Management Committee as well as minutes of all meetings of the Management Committee. In particular, information about approved and extractable reserves, approved production profile, details of approved and actual investments, approved and actual exploration activities and schedules, and changes to any of the above must be published.

3. A mechanism must be worked out to compensate affected local communities for exploiting natural resources on lands traditionally used by them and for damage to

environment and livelihoods. This could be done by reserving a fixed portion of the revenue from a successful oil and gas field for local community development. Equity share in the project could also be considered for those who have lost their land. The details of the exact share of revenue/equity to be shared, the mechanism for collecting it and putting it to most effective use can be finalized by the Government in conjunction with the local communities and field operators. For blocks already given out, the revenue-sharing can be initiated using the Government's share of profit petroleum (so as not to violate signed PSCs), while it can be incorporated into PSCs yet to be signed.

4. We suggest some options below to increase investor interest and improve the NELP mechanism. A suitable option must be chosen after a public debate on these.
   a) There has been some discussion of moving towards an Open Acreage Licensing Policy (OALP), which is considered an improvement over the current NELP. However, this may require creation of a National Data Repository (NDR). If moving to OALP is considered desirable, creation of the NDR should be accelerated – by outsourcing to some competent agency if required. However, care should taken to ensure there is no conflict of interest such as the same agency participating in subsequent bidding directly or indirectly leading to possible information asymmetry. All data collected by the agency should be available to all potential explorers.
   b) Alternatively, the country could move to an OALP regime without an NDR where the risk of exploration rests with the exploration company that expresses an interest in a block. Such an approach should be subject to some additional conditions such as i) the company transferring all data and knowledge on the block to the Government if it does not wish to proceed with exploring a block at some stage and ii) the company having first right of refusal to take a block into production subject to its matching the best competing offer.
   c) One may also wish to consider the option of moving to service contracts from profit sharing contracts, where the exploration and production activities are de-linked. In practice, this would eliminate the risk associated with oil and gas exploration, and thus enable greater profits to flow to the Government from producing fields. However, it would also require greater investment from the Government to commission detailed exploration activities throughout the country. This could perhaps be funded by setting aside a share of the profits received by Government.
   d) Countries such as Brazil and Australia employ somewhat different models for exploration licenses where profit sharing is replaced by annual exploration, development and production fees along with royalties and taxes (Deloitte 2010, MinterEllison 2008). These models appear to be more successful at attracting interest from the 'oil majors'. Therefore, it may be worth studying such alternative models and their applicability to India.
   e) It should be noted that one of the reasons cited for lack of interest from the majors in India is lack of confidence in Indian governance in general (such as respecting and enforcing contracts, transparency and level playing field etc.). Therefore, this needs to be addressed irrespective of the chosen model for block auctioning.

3.2. Shale gas

The discovery of new techniques to tap reserves of gas trapped under shale rock formations has revolutionized the gas industry in the U.S., and promises to do so in the rest of the world. Europe and China have initiated steps to explore for shale gas formations. India also has begun taking earnest measures to identify and exploit this source of gas and signed a MoU with the U.S. in this regard during President Obama's visit in November 2010. While proven reserves of conventional gas reserves in the country are around 50 trillion cubic feet

(tcf), preliminary 'speculative' estimates for shale gas reserves in the country are anywhere in the region of 600 to 2000 tcf and a recent EIA study states that extractable Indian shale gas reserves could be around 70 tcf (MoPNG 2010, Schlumberger 2010, EIA 2011). Therefore, it is clear that shale gas has the potential to radically transform the country's gas market in particular and energy situation in general.

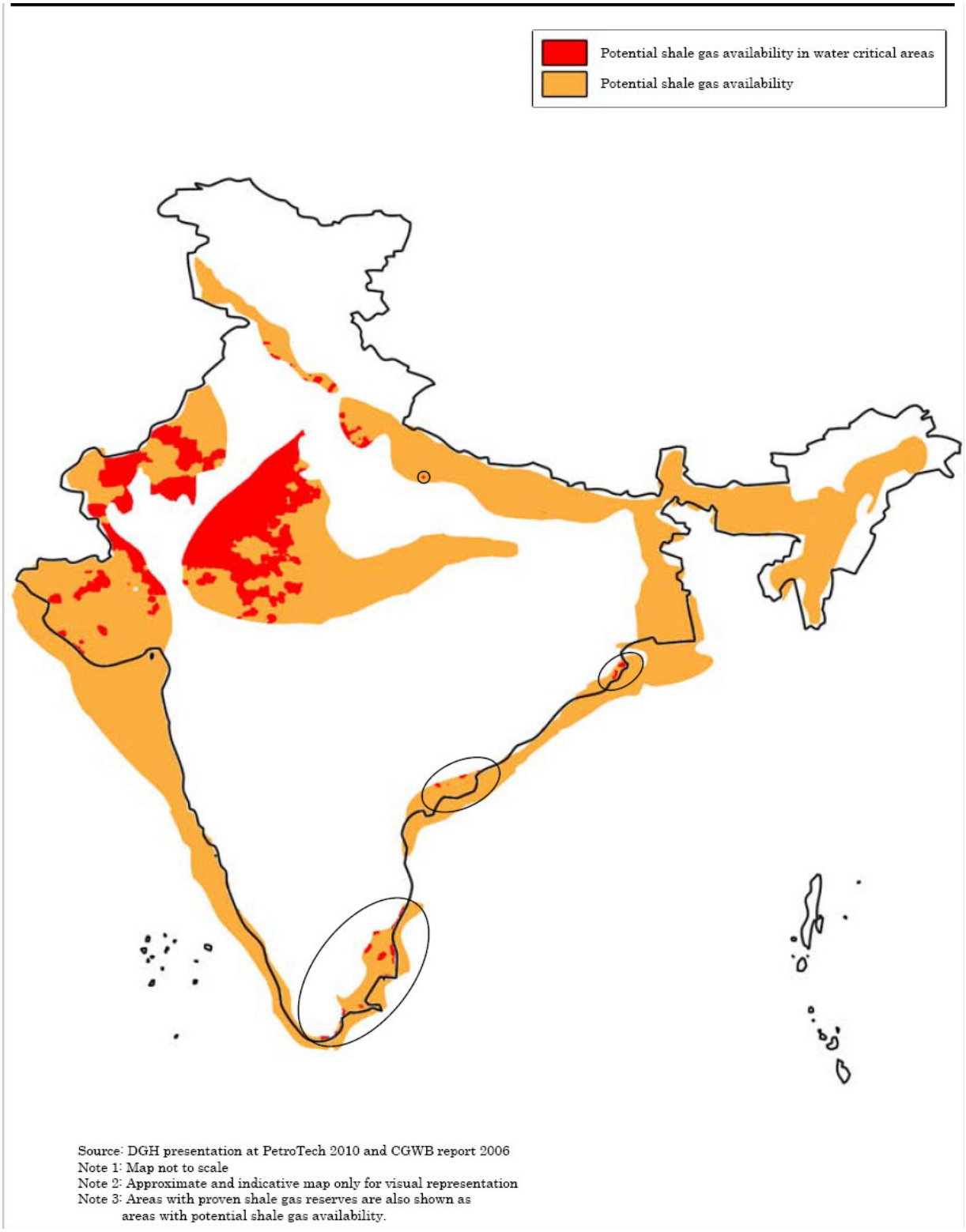

Figure 2: Potential overlap between areas of water scarcity and shale gas availability

The technique to extract shale gas called hydraulic fracturing (or fracking) pumps large quantities of water laced with toxic chemicals into shale gas formations deep underground. As a result, there have been concerns about the possible impact of fracking on groundwater resources as the toxic chemicals may leach into aquifers. Some states in the U.S. such as New York and Maryland have imposed a moratorium on fracking until its impacts are better understood. Since groundwater depletion is already a major concern in many parts of India and there is a reasonable possibility of overlap between areas with water scarcity and areas with shale gas availability (Figure 2), this issue is also important for India.

There is a high possibility that shale gas wells would have to be dug on lands that are privately owned – requiring either land acquisition or leasing of a portion of the land. Given the history of problems with land acquisition for industrial purposes in India, it is advisable to take cognizance of this fact and develop a policy regime that is fair and mutually beneficial to the landowner as well as the gas producing company.

In addition, as with conventional gas, it is important that shale gas exploration, extraction and use are also governed to maximize public and consumer interest. This requires that shale gas exploration policies ensure both transparency in all aspects of dealing with the natural resource and competitiveness in the exploration and production business.

It is clear from the above discussion that shale gas policy formulation needs to balance multiple, potentially competing goals such as enhancing the nation's energy security, protecting environmental interests, offering a fair deal to land owners, making shale gas plays attractive to investors and ensuring adequate competition in shale gas exploration. This reinforces the need for adequate care during policy formulation.

Our recommendations in this regard are as follows.

1. Shale gas exploration policy should be drafted only after understanding the potential environmental impacts of fracking, and conducting a public consultation process (particularly in areas likely to be affected by it).
2. There should be complete transparency regarding the chemicals used in the fracking of each well and their potential impacts, along with clearly defined liabilities for any negative impacts.
3. Land acquisition issues could be made smoother by either giving the land holder some equity in the project or through some other fair deal negotiated between the land owner, gas extraction company and the Government.
4. Adopt an OALP-like policy for shale gas exploration, which is not only attractive to investors but also leads to sufficient competition in the shale gas exploration business. This could perhaps be done by auctioning small blocks at a time.
5. As with natural gas, ensure complete transparency in terms of bids, contracts, reserves, production profiles etc.

4. Downstream

The related issues of pricing and allocation have received greatest public attention on the downstream side of the gas sector. The country currently has many parallel pricing regimes in parallel – the old administered pricing mechanism (APM), the price for pre-NELP gas fields, the price for gas from the KG basin, and the prices for long-term and spot LNG contracts. This naturally does not allow for a smooth market. Further, there have been concerns that the Government has not been adhering to existing PSCs and playing a greater-

than-anticipated role in pricing and allocation of gas. This, it is felt, has also been a reason why NELP auctions do not attract a lot of interest.

The other issues requiring attention in the downstream gas sector are

1. **Transparency and participation:** There is room for improvement in the transparency and public participation in the governance of the downstream sector. For example, public hearings are not held while deciding on transmission tariffs and though pipelines or city gas distribution networks that have been authorized through the bidding route, information about them is not available on the PNGRB website.
2. **Market structure:** The current downstream gas market structure has high degrees of horizontal concentration and vertical integration. The trunk pipeline segment is dominated by two players – GAIL and RGTIL, while many organizations such as GSPC, RIL and GAIL have interests in both upstream as well as downstream activities.
3. **Institutional structure:** Currently, the downstream and upstream sectors are regulated by different agencies. Hence, there are no mechanisms for reconciling upstream and downstream gas flows to match production and consumption.

We believe that most of the above concerns can be addressed through two broad initiatives in the downstream segment: one, bringing in greater transparency and participation in governance and two, move towards fully competitive markets with many sellers and buyers of gas in every part of the gas value chain.

Economic theory suggests that a well functioning market would automatically ensure optimal allocation of resources and enable discovery of a market clearing price. However, such well functioning markets are premised on two pre-conditions:

- It should be easy to buy, sell and use the commodity being traded. For gas, this means a good nation-wide transportation and distribution infrastructure, which is currently missing. Without such infrastructure, a national gas market will not exist.
- A key ingredient of a well-functioning market is competition. However, the Indian gas market is characterised by a few producers, transporters, distributors, and no independent marketers[4] at all (with transportation companies acting as the *de-facto* marketers). It also has some degree of vertical integration.

Given this reality of the Indian gas market and the likely changes on the supply side, our recommendations for the downstream gas sector are given below.

4.1. Short-term recommendations

The Government should develop a time-bound program to ensure a transition to fully competitive markets. Some recommendations that can be taken in the short term to help such a transition and improve transparency and efficiency of gas use are given below.

1. Consider discouraging new gas-fired power plants (other than those committed) until gas supply increases substantially. Existing plants should preferably be used only for intermediate or peaking power – perhaps through a time-of-day tariff. Instead, until the supply situation improves considerably, consider encouraging use of gas as a fuel in industries, cooking, decentralized CHP applications and transport. It should also examine whether use of gas for domestic fertilizer manufacture is optimum or whether it should be imported.

[4] Also called aggregators or shippers

2. Adopt more transparent procedures and publish important documents. Examples include copies of signed contracts and anonymous bid comparisons for pipelines and city gas networks that were auctioned and copies of consultant reports validating investments and/or service parameters of cost-plus pipelines and networks. As stated earlier, precedence for such a practice exists in the power sector (MoP 2005).
3. Aggressively encourage and develop many shippers or marketers to create a competitive sellers market. One possible way to achieve this is for the Government to take its share of profit gas from existing PSC contracts in kind and auction it in small lots. PSU gas producers and LNG importers could also be asked to follow the same practice at their landfall points for gas that has not already been contracted on long-term basis. Future PSCs could also stipulate such a condition whereby gas producers would auction all or a significant portion of the production in small lots. This will ensure that a market develops for shippers, thus driving competition.
4. Open access and affiliate code regulations that have been created by the Petroleum and Natural Gas Regulatory Board (PNGRB) should be enforced. To further encourage competition, it may also be considered whether the percentage of capacity that must be reserved for open access should be increased.[5] It should be noted in well developed gas markets such as the US, the entire pipeline capacity is reserved for open access – that is, transportation is completely unbundled from marketing (OECD 2000).
5. The current institutional arrangement (with the Directorate General of Hydrocarbons regulating upstream activities and PNGRB regulating downstream activities) does not allow for easy reconciliation of upstream gas production with downstream transportation and distribution. An agency that could do such reconciliation is recommended to reconcile and collect data regarding gas production and usage.

4.2. Medium/long term recommendations

1. The most critical need in the medium term is the rapid development of a national gas grid and gas distribution infrastructure. While PNGRB has begun this process, it would be good to expedite this. Of course, it goes without saying that such infrastructure development should be undertaken in a fully transparent manner.
2. Options to improve supply of gas must be considered. In addition to developing domestic resources as discussed in the previous sections, this also includes exploring the possibility of trans-national pipelines such as the TAPI pipeline as well as other possibilities such as the Iran-Pakistan-India pipeline and a pipeline from Myanmar. India is situated reasonably close to gas-rich regions of the Middle East and Central Asia, and international pipelines would be a considerably cheaper option to import gas than LNG. Hence this option should be earnestly explored while paying due attention to geo-political considerations.
3. As gas markets become increasingly competitive and supply improves, Government and regulatory agencies should gradually withdraw from their roles in deciding price and allocation. Instead, they should ensure that markets remain competitive and public as well as consumer interests are protected.
4. If the Government thinks that some consumers of gas deserve to be subsidised or treated preferentially, this can be done through its own share of profit gas or through budgetary allocations.

[5] Currently, transporters are required to have 33% of contracted capacity as open access capacity – that is roughly, 25% of pipeline capacity would be open access capacity.

Report on pooling of gas prices

At the behest of GAIL (which had been asked by the Ministry of Petroleum and Natural Gas), Mercados Energy Markets prepared a report on the desirability and feasibility of a pooled pricing mechanism for gas in the country (Mercados 2010). The stated objective of pooling gas prices is to prevent price shocks to gas consumers, particularly price sensitive users such as power generation and fertilizer companies, as gas supplies in the country are insufficient and therefore consumers have to depend on LNG whose prices are volatile.

The report examines different ways of pooling gas prices and concludes that the best way to pool prices would be to create two sectoral pools, one each for power and fertilizer, while all other gas consumers can purchase gas from the market as they are not as sensitive to gas prices. The gas pools would be managed by a 'pool operator' who would be responsible for sourcing requisite amount of gas from various sources and supplying it to consumers in the pool at a common pooled price. It also recommends that GAIL should be the pool operator given its experience in the field, and that merchant power plants can also be part of the power sector pool, while all power plants have the option of joining the pool or not.

As stated earlier, we believe that using gas for base load power generation (and maybe fertilizers) is perhaps not the best way to use gas. Hence, the point of sectoral pools for these applications is moot. However, if gas is used for power generation, regulatory oversight is required to ensure that gas being purchased for the power sector pool (or a general pool from which a power generator is sourcing gas) is being prudently purchased since fuel cost is often passed through, particularly where the power generation contracts are not bid out.

The proposed idea of sectoral pools is a special case of the many generalized pools that would be created if a multitude of gas shippers or aggregators were to exist. In this case, power and fertilizer companies would be free to source their gas from any shipper(s) that offers them the best deal. Therefore, we believe expediting the creation of a competitive shippers market is more important than creating sectoral pools. If some power and fertilizer plants need to get low cost gas, this could be achieved through direct subsidies or Government using its share of profit gas.

Our comments on the sectoral pool proposal are as follows:

1. Merchant power plants should be kept out of such sectoral pools, merchant power plants should be kept out of them as the pools have the specific aim of price cushioning while merchant power plants are expected to deal with market risks and price shocks.
2. There is an obvious conflict of interest if GAIL is chosen as the pool operator, since it is both a prominent gas transporter (thus going against the principle of separating gas transporters and marketers) and a promoter of Petronet LNG, an LNG importer.
3. There should be very well defined and transparent mechanisms to ensure that the pool operator sources gas responsibly (i.e. at least possible price) and allocates the gas fairly among its consumers. This would require an appropriate oversight authority (which could be PNGRB) along with well defined rules, checks and balances governing the pool operator's functioning.
4. In cases where power and fertilizer companies have existing long term contracts for purchase of gas, these should be respected to eliminate legal complications. Such companies should be encouraged to gradually move towards purchase contracts with gas marketers.

5. Conclusions

Gas will be a critical natural resource for India's development needs in the foreseeable future, primarily for its energy security but also for its food security. Hence, it is imperative

that India explores its basins for available gas and uses the available gas effectively to maximize public interest. This report suggests some ways in which this could be achieved. The significant recommendations are:

1. Undertaking an initiative to balance immediate energy needs with long term energy security.
2. Improving transparency in the governance of the upstream and downstream segments by publishing all relevant information and actively seeking public inputs.
3. Enhancing competition in the upstream and downstream segments through measures such as improving the PSC regime, developing a shippers market and implementing open access to transportation facilities.
4. Expediting development of transmission and distribution infrastructure to develop a national gas market.
5. Ensuring that gas is used efficiently and strategically to maximize energy security until a fully developed market is in place.
6. Protecting and enhancing lives of communities impacted by oil and gas production by ploughing back some of the revenue for all round local development.
7. Ensuring that oil and gas exploration (particularly shale gas exploration) does not happen at the cost of other precious natural resources (such as groundwater) and the environment.

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