Note on utilization of gas to maximize public interest

1. Basic considerations

The Government's current gas utilization policy prioritizes usage of domestic gas for existing fertilizer and power plants, with these two sectors consuming about 73% of gas. As the consumer prices of these are controlled or subsidized, the Government practically controls the price of domestic gas, keeping it lower than a purely market-determined price is likely to be. But generating base load power from domestic coal (of which India has good reserves) is cheaper than gas-fired power, and cost of power from imported coal is also comparable to power from gas. Therefore, there is no economic rationale to produce base load power from gas. Regarding fertilizers, there is an argument that locating fertilizer plants close to gas producing centres would result in low fertilizer costs, as with the Oman India fertilizer project. We have not explored this option in detail, but it appears to be an option worth exploring if it can help reduce fertilizer cost.

On the other hand, India's net petroleum imports were worth about Rs. 2.7 lakh crores in 2009-10, or over 4% of our GDP[1], though the average cost of petroleum in 2009-10 was only about $65/barrel while it is widely expected to stay at $100/barrel or more in the near future. Given the steady increase in quantity of petroleum imports and geo-political uncertainties associated with petroleum imports, oil imports are the greatest threat to our energy security. It is possible to replace oil in transport and cooking fuels by gas in some form. Moreover, given current oil prices, consumers would be happy to switch to gas for these applications even at higher gas prices that may result from a market-determined price for gas (please see the appendix for details). Similarly, fuel oil used by industries for heating can be effectively replaced by gas, particularly as Combined Heating and Power (CHP) installations. Thus, using gas for transport, cooking and industrial heating is economically sound even at higher market determined prices. It would also boost Government revenues (through increased profit shares and reduced subsidies for diesel), increase energy security and increase investor interest in exploring the Indian basin.

2. Proposal

We propose the following steps to transition from the current gas regime to a competitive market for gas:

1. Currently, the gas market in India is not very competitive and is characterized by few players and significant vertical integration. Therefore, there is a need to develop a competitive market for shippers (or marketers / aggregators) [2].
2. This should be accompanied by ensuring that gas pipeline capacities are completely common carrier (or open access), i.e. available to all shippers[3].
3. Development of a nation-wide gas pipeline grid and distribution infrastructure must be expedited to create a nation-wide gas market.
4. 'Unbundling' or vertical disintegration must be implemented effectively in the gas market to prevent transporters or producers dominating the market.
5. Once, such a competitive gas market with associated infrastructure in place (in say, 5 years time), gas prices should be completely freed to be market determined.

[1] In contrast, oil imports are less than 2% of GDP for countries such as US, China or Japan. Imports in 2010-11 are estimated to be about Rs. 3.3 lakh crore.

[2] This note does not go into details of how to do this, though there are some possible levers that the Government can use.

[3] According to current regulations only 25% of a pipeline capacity is common carrier or open access.

6. Gas should not allocated at controlled prices to any new gas-based power plant, while existing gas-based power plants can be allocated gas at controlled prices but for only (say) 40% PLF so that they can function not as base-load plants but as intermediate load plants. This may require addressing some issues with respect to existing power purchase contracts.
7. If the option of establishing fertilizer plants outside is feasible, no new gas-based fertilizer plants should be allowed in India as long as the fertilizer imports do not pose a food security threat, or imported fertilizers contribute, say 20%, of total consumption.
8. Limited quantities of gas at controlled prices (say, 25-30% PLF) may be allocated to CHP applications in commercial buildings with connected load greater than, say, 5MW, so that they can use efficient CHP technology. Even 5 mmscmd allocation for this can help reduce pressure on urban power distribution, particularly at peak hours. This decision can be reviewed when a competitive gas market is established.
9. Piped gas should replace LPG in urban India. The Government should divert subsidized LPG not used by urban households who shift to piped gas to rural households thus significantly improving public health and quality of life[4].
10. Though this note recommends using coal for base-load power generation, it goes without saying that this should not be at the cost of local environment and livelihoods, and appropriate safeguards and compensation mechanisms must be devised to address this.

We believe the above steps will result in gas replacing oil as a fuel, which will enhance energy security and increase Government revenues. The Government can use such increased revenues (and reduced subsidies) to subsidize rural LPG and some fertilizer imports and power generation (if required).

3. Appendix

3.1. Economics of gas for oil-replacement, power and fertilizer

Gas can be an effective substitute for oil in many applications, most notably transport and cooking fuels, and to an extent heating fuels in industry[5]. Compressed natural gas (CNG) can replace gasoline and diesel in cars, three-wheelers and buses[6] while piped gas (PNG) can replace LPG as a cooking fuel in urban areas where it can be supplied.

As shown in Table 1, consumers would be willing to switch from unsubsidized petrol to CNG up to a landed price of almost $25/mmbtu, and from subsidized diesel to CNG up to a landed price of about $16/mmbtu (international spot LNG prices are currently around $12/mmbtu). Preliminary calculations suggest that industrial users using fuel oil would be happy to switch to gas for their heating applications up to fairly high prices, particularly if CHP applications are encouraged as they can then use the gas not only for heating but also generating power. Similarly, preliminary calculations suggest that urban users are also likely to find PNG cost-competitive to subsidized LPG.

Based on 2009-10 consumption figures, a 20% shift from MS and HSD to CNG, and a 20% shift from LPG to PNG (corresponding to about 65% of our urban population) would result in a gas demand of about 45 mmscmd.

[4] Rural women often have to spend many hours a day in fetching firewood for cooking.
[5] Transport, cooking and heating fuels formed about 60% of the total oil consumption in 2009-10.
[6] There have been news reports that Indian two-wheeler companies are also exploring the CNG option.

Table 1: Approximate gas prices up to which gas would be preferred to alternative fuels (Source: Prayas calculations[7])

Fuel	Pre-tax switchover gas price (USD/mmbtu)
Unsubsidized MS at pump price Rs. 63/litre	24.9
Subsidized HSD at pump price Rs. 38/litre	16.3
Industrial fuel (simple energy equivalence at $100/barrel oil)	17.1
Commercial LPG at consumer price Rs. 1300 / 19 kg cylinder	24.2
Domestic LPG at consumer price Rs. 310 / 14.2 kg cylinder	9.0

In contrast, power produced from domestic coal is cheaper than power produced from domestic gas at controlled prices, and power generated from imported coal is also competitive with gas-fired power. The levelized tariff discovered through competitive bidding for both domestic and imported coal has generally been under Rs. 3/kwh with few exceptions, while gas-fired power is available for about Rs. 3.5/kwh. Therefore, using gas for base-load power generation does not seem to be economically justified. Instead, using gas to reduce oil consumption is not only economically justified but would also help improve the country's energy security[8].

3.2. Market transformation

It must be noted that gas may replace oil in the transport sector only as the fleet gets renewed as retrofitting vehicles is expensive. But since vehicle sales in the country are growing at over 10% p.a., it is possible that, given the distribution infrastructure and policy support, a significant part of the fleet would be CNG vehicles in the medium term.

Ashok Sreenivas
Prayas Energy Group (www.prayaspune.org/peg)
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[7] The prices represent pre-tax landed gas prices. Assumptions made: a) US $1.5/mmbtu for transportation, marketing etc., b) An additional US $2/mmbtu for compression, storage etc. of CNG, c) Total tax incidence of 50% on MS, 30% on HSD, 33% on commercial LPG, 4% on domestic LPG.
[8] The best way to reduce oil consumption for transport would be to reduce travel demand, and improve non-motorized and public transport. Switching to CNG is an additional measure to that.