Chapter-1

Natural Gas – An Overview

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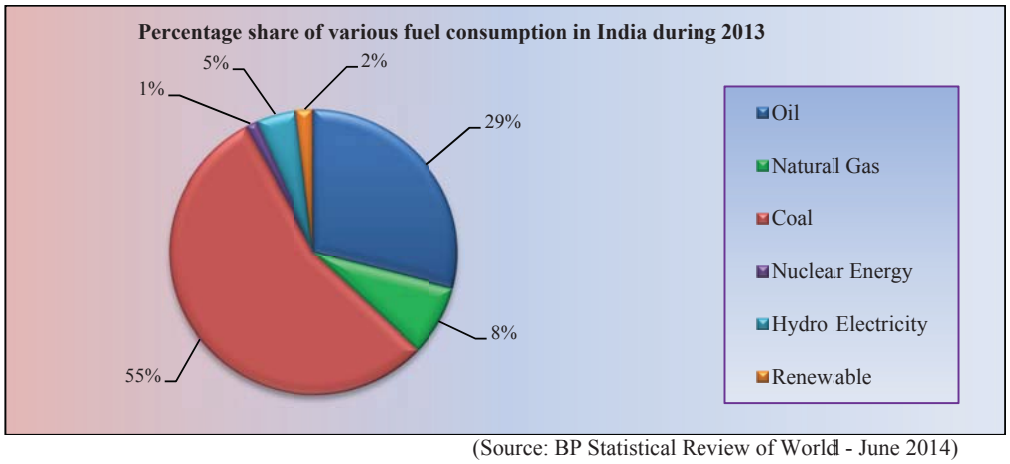
Background

Natural Gas (NG) is a vital component of the world's supply of energy. It is one of the cleanest, safest and most useful of fossil fuels. NG is a combustible mixture of hydrocarbon gases, primarily methane. It is gaining importance day-by-day and increasingly being used in various sectors e.g. Fertilizer, Power, City Gas, Steel, other heavy industries *etc*. It's share in the energy basket of the country was eight *per cent* (Chart 1) in 2013 which is expected to increase to 20 *per cent* by 2024-25.

Chart 1



(Source: BP Statistical Review of World - June 2014)

1.1 NG reserves in the country

As per 'BP Statistical Review of World –June 2014', proved reserves[1] of NG at the end of December 2013 was 185.7 trillion cubic meter (TCM) in the world out of which share of India was 1.4 TCM, less than one *per cent*. Reserves to production ratio[2] indicated that length of time for these reserves to last for the world would be 55 years and that for India would be 40 years. Share of NG in the primary energy supply in the world was 24 *per cent* in the year 2013 as against eight *per cent* in India.

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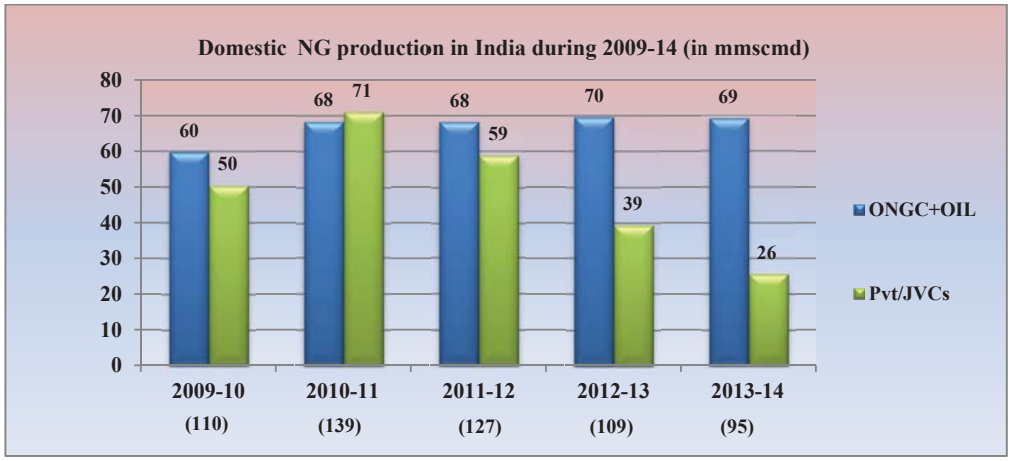
[1] Represents those quantities of NG that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions.

[2] Computed based on the assumption that if reserve remaining at the end of any year is divided by the production in that year, the result is the length of time that remaining reserves would last if production were to continue at that rate.

1.2 Domestic production of NG

Production of NG in the country is mainly from the nominated fields operated by the National Oil Companies (NOCs) *viz.* Oil and Natural Gas Corporation Limited (ONGC) and Oil India Limited (OIL), Panna-Mukta-Tapti and New Exploration and Licensing Policy (NELP) blocks like KG D6 and from few small fields. The overall domestic gas production during the period 2009-10 to 2013-14 was as depicted in Chart 2:

Chart 2



(Source: Natural Gas Production Data from Petroleum Planning and Analysis Cell)

Gas production peaked in 2010-11 mainly due to increase in production from private/ JV fields (KG D6 basin). Thereafter, there has been considerable reduction in production from KG D6 basin. As per projections[3], the indigenous gas availability would be in the range of 129 mmscmd[4] in 2014-15 and 139 mmscmd in 2015-16 which is not commensurate with projected demand as discussed below.

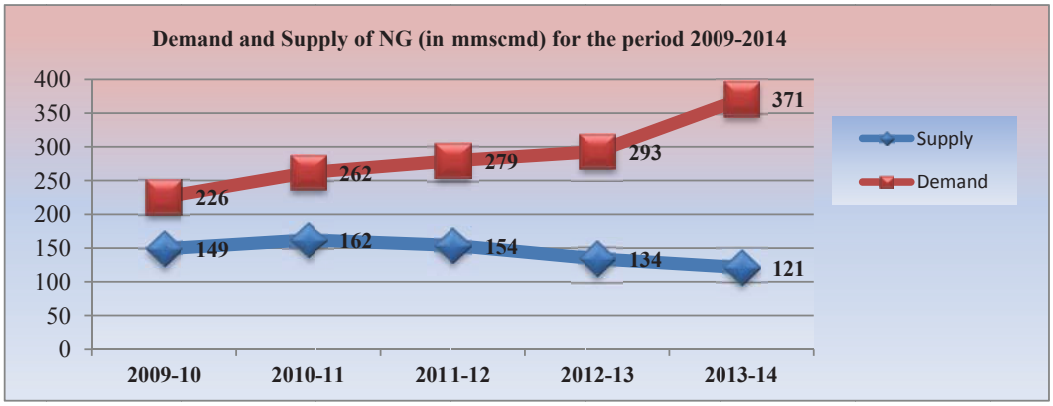
1.3 National demand for NG

Demand of NG was 225.52 mmscmd during 2009-10 which progressively increased to 371 mmscmd during 2013-14. Gap between demand and supply also increased from 77 mmscmd in 2009-10 to 250 mmscmd in 2013-14. Supply from domestic and import sources declined over the years as indicated in Chart 3:

[3] Indian Petroleum and Natural Gas Statistics 2012-13

[4] Million Metric Standard Cubic Meter per day

Chart 3

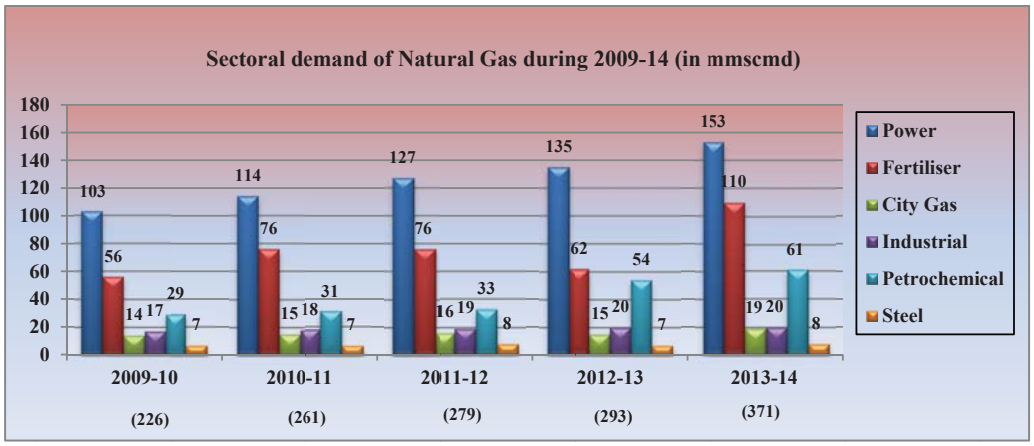


(Source: Working Group on Petroleum and Natural Gas for XI and XII Plan & Report of Parliamentary Standing Committee on Petroleum and Natural Gas 2012-13)

Gas demand in the country is influenced by cost economics and availability of alternate fuels. Another factor that influences demand for NG is its availability. For projections to be realistic, there has to be desired pace of development in domestic production, import and re-gasification of Liquefied Natural Gas (LNG) along with transmission infrastructure.

Primary consumers of NG in the country are in the power and fertilizer sectors. The Working Group on Petroleum and Natural Gas for the XI and XII Plan anticipated increase in requirement of NG from 102.70 mmscmd in 2009-10 to 153 mmscmd by 2013-14 in power sector to meet the projected power generation. Similarly, requirement of NG for fertilizer sector was expected to increase on account of conversion of liquid fuel based plants to NG/Re-gasified LNG (R-LNG) based plants, expansion of plants, revival of closed units, setting up of new plants *etc*. This translated into increase in demand of NG from 55.90 mmscmd in 2009-10 to 110 mmscmd by 2013-14 in fertilizer sector. Sector wise demand is depicted in Chart 4:

Chart 4



(Source: Working Group on Petroleum and Natural Gas for XI and XII Plan)

Demand of NG is met primarily through indigenous production and supplemented by import in the form of LNG. As there was reduction in production from domestic fields and lack of development of import and re-gasification infrastructure for LNG, supply did not improve in proportion to increase in demand.

Ministry of Petroleum and Natural Gas (MoPNG) stated (July 2014) that at present, due to high price of LNG, few customers were willing to purchase R-LNG. Most of the demand of NG was for indigenous gas and not for R-LNG. The entire demand-supply gap of NG could not be met by R-LNG, as demand was highly price sensitive.

The reply needs to be viewed against the facts that (i) LNG procured through long term contracts is economical as compared to Naphtha which is the major alternate feedstock/fuel used in the absence of NG and (ii) Demand for R-LNG is closely related to availability of infrastructure and there was opportunity for saving in cost of production in various sectors by using R-LNG. This has been discussed further in Chapter 3 and 4.

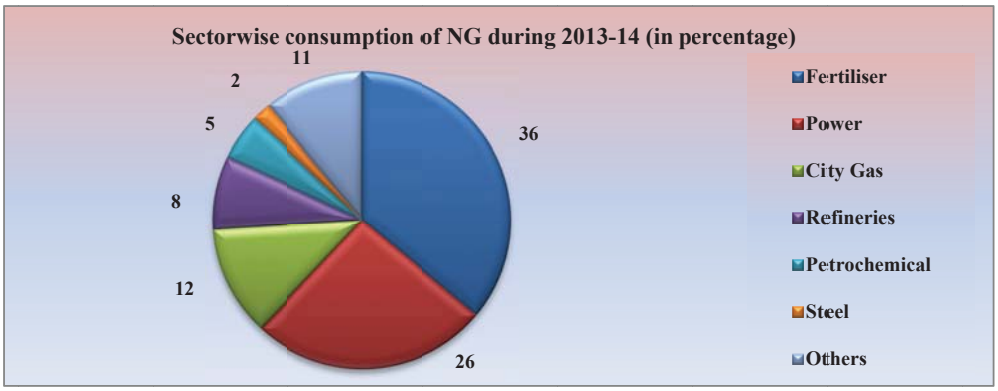
1.4 Consumption of NG

The prime constituent of NG is methane, which is used as feedstock and fuel in fertilizer units and as fuel in power plants. NG is also used as feedstock in the production of petrochemicals and liquefied petroleum gas (LPG).

NG is the most preferred feedstock for production of fertilizers because it has the highest hydrogen to carbon ratio. Hydrogen is used for the production of ammonia and thereafter urea is manufactured with the reaction of ammonia with carbon dioxide. NG is preferred in power sector for its high thermal efficiency and lower emissions.

Details of consumption of NG/R-LNG by various sectors during 2013-14 are depicted in Chart 5 (in terms of percentage):

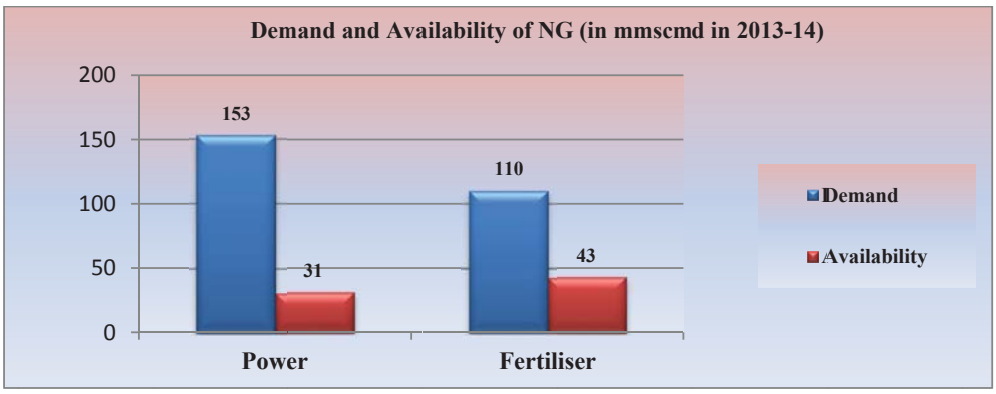
Chart 5



(Source: MoPNG Annual Report 2013-14)

It may be seen that power and fertilizer sectors consumed about 62 *per cent* of NG/R-LNG available in the country. Average availability, however, to these sectors against their respective demands during 2013-14 is indicated in Chart 6:

Chart 6



(Source: Working Group on Petroleum and Natural Gas XI and XII Year Plan & MoPNG Annual Report 2013-14)

Shortfall in supply of NG/R-LNG adversely affected production and cost of production due to use of costlier feedstock in fertilizer and power sector as discussed in paragraphs 4.1 and 4.2.

1.5 India Hydrocarbon Vision 2025

'India Hydrocarbon Vision 2025' (Vision) formulated (March 2000) by Government of India (GoI) to recommend a long term policy framework for hydrocarbon sector, envisaged a demand of about 391 mmscmd NG by 2020-25. Objectives envisaged in 'Vision' *inter-alia* included:

- To encourage use of NG.
- To ensure availability by a mix of domestic gas, imports through pipelines and import of LNG.

To achieve the above objectives, the following medium and long term actions were to be initiated:

- Timely and continuous review of gas demand and supply options to facilitate policy interventions.
- Pursuing diplomatic and political initiatives for import of gas from neighbouring and other countries with emphasis on transnational gas pipelines.
- Expediting setting up of a regulatory framework.
- Import LNG to supplement domestic gas availability and encourage domestic companies to participate in LNG chain.
- Provide a level playing field to all gas players and ensure reasonable transportation tariffs.

Action taken by GoI in line with the above particularly in assessment of demand, allocation of scarce resource, setting up NG/R-LNG facilities and regulatory framework *etc.* has been reviewed and commented in the Report.

1.6 Regulatory framework

NG is a scarce resource and GoI plays an important role in its allocation and utilization, transmission through pipelines, development of R-LNG infrastructure *etc*. Regulatory frame work in vogue is narrated in the succeeding paragraphs:

1.6.1 Allocation of NG

Considering NG as a premium source of fuel and feedstock, MoPNG formulated a 'Natural Gas use policy' in 1990. To rationalise the allocation without any discrimination on the basis of sector/region, GoI constituted Gas Linkage Committee[5] (GLC) in 1991, which was wound up (2005) as there was no additional APM gas available for allocation to new consumers. Thereafter, GoI constituted (2007) an Empowered Group of Ministers (EGoM) to decide issues pertaining to commercial utilization of gas produced under NELP blocks. Subsequently, MoPNG formulated (October 2010) a policy on pricing and commercial utilisation of non-APM gas produced by NOCs which maintained sector wise priority.

1.6.2 Infrastructure

GoI enacted (March 2006) 'The Petroleum and Natural Gas Regulatory Board Act, 2006' (the Act) to provide regulatory and legal frame work for downstream activities. Main objective of the Act was establishment of Petroleum and Natural Gas Regulatory Board (PNGRB) to regulate downstream activities to protect the interests of consumers and entities engaged in specified activities relating to petroleum, petroleum products and NG. GoI in exercise of powers conferred by sub section 3 (1) of the Act established PNGRB with effect from 1 October 2007. Functions of PNGRB are enumerated in Annexure 1. GoI also notified (2012) the Petroleum and Natural Gas Regulatory Board (Eligibility conditions for Registration of Liquefied Natural Gas Terminals) Rules, 2012. In 2013, PNGRB framed draft regulations which were under public consultation process (September 2014).

[5] Committee of Secretaries headed by Secretary, MoPNG