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Report of the
Comptroller and Auditor General of India
on

Supply and Infrastructure Development for Natural Gas

for the year ended March 2014



Union Government
Ministry of Petroleum and Natural Gas
No. 6 of 2015
(Performance Audit)

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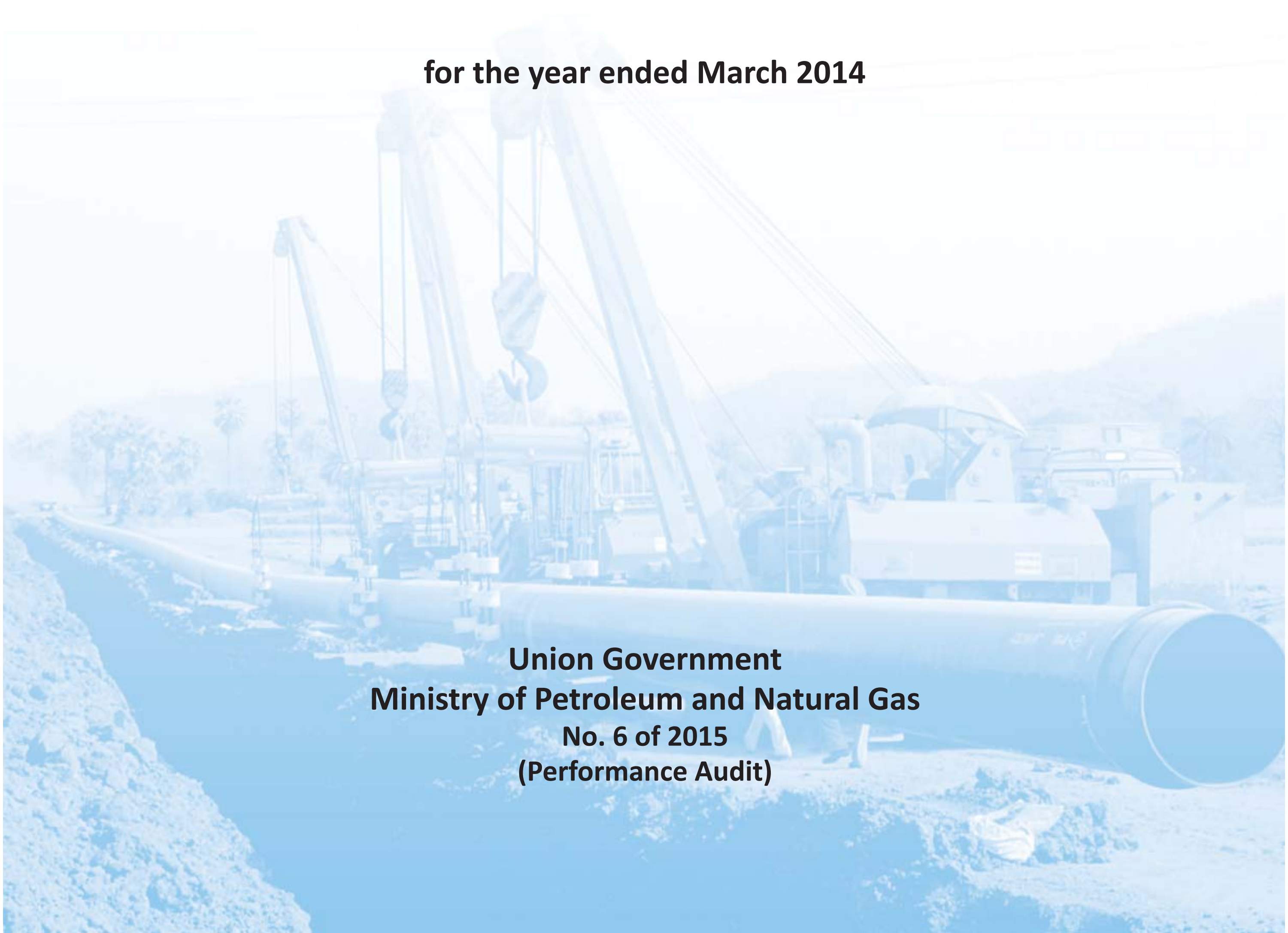

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Preface

This Report of the Comptroller and Auditor General of India has been prepared for submission to the President of India under Article 151 of the Constitution of India for being laid before the Parliament.

The Report covering the five year period from 2009-10 to 2013-14, contains the result of the Performance Audit on 'Supply and Infrastructure Development for Natural Gas' at Ministry of Petroleum and Natural Gas (MoPNG), Ministry of Power (MoP), Department of Fertilizer (DoF) and GAIL (India) Limited (GAIL) with respect to availability, supply/allocation of natural gas, adequacy of transmission infrastructure, development of R-LNG infrastructure and its impact on power, fertilizer sector and pipeline infrastructure providers. Besides, role of MoPNG/GAIL in monitoring of utilisation of APM natural gas in priority sectors has been analysed.

The Audit Report has been prepared in accordance with the Performance Audit Guidelines, 2014 of the Comptroller and Auditor General of India.

Audit wishes to acknowledge the cooperation extended by MoPNG, MoP, DoF and GAIL in providing information, records, clarification and discussion with the concerned officers which facilitated completion of audit.

Executive Summary

Executive Summary

Natural Gas (NG), one of the cleanest, safest and most useful of fossil fuels is being increasingly used in various sectors like fertilizer, power, city gas, steel and other heavy industries. Primary consumers of NG in the country are in the power and fertiliser sectors (62 *per cent*) which are critical to economic development of the country. The Working group on Petroleum and Natural Gas for the XI and XII Plan anticipated increase in requirement of NG in the fertilizer sector to meet expected 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. Similarly, increase in requirement of NG was expected to meet the projected power generation.

Demand for NG in the country was far in excess of its supply from domestic as well as imported sources taken together and gap between demand and supply was 77 Million Metric Standard Cubic Metre per day (mmscmd) in 2009-10. Consequent upon reduction in production from domestic fields from 2011-12, this gap between demand and supply widened further to 250 mmscmd in 2013-14. As domestic demand was far in excess of indigenous production and there were very few new domestic sources available to cater to additional demand, options available to meet the demand were import of NG through transnational pipelines and import of Liquefied Natural Gas (LNG). Government of India (GoI) initiated steps for import of gas through Trans-National pipelines (1989) and for import of LNG (1995) anticipating shortfall in domestic production.

With a view to having a long term policy on Hydrocarbons, a Group of Ministers (GoM) was set up in 1999 for working out a specific framework for developing "India Hydrocarbon Vision- 2025". The report submitted by GoM (2000), *inter alia*, set objectives for NG sector which included steps to ensure adequate availability of a mix of domestic gas, gas imported through pipelines and Re-gasified Liquefied Natural Gas (R-LNG). It suggested various initiatives for import of gas from neighbouring and other countries, expedite setting up of a regulatory framework and encourage domestic companies to participate in LNG chain.

Further, to provide adequate infrastructure for supply of NG, GoI conceptualised (2000) a National Gas Grid to facilitate supply of NG to remote areas of the country. Subsequently, considering the need to provide a policy framework for the future growth of pipeline infrastructure to facilitate evolvement of a nationwide gas grid, GoI notified a Pipeline Policy in 2006. In order to provide regulatory and legal framework for downstream activities, GoI enacted (March 2006) the Petroleum and Natural Gas Regulatory Board (PNGRB) Act and established PNGRB (October, 2007).

Coming to the sale of products that use NG, the selling price of Urea is controlled by GoI which bears subsidy on the difference between the sale price and the cost of production. Similarly, the price of power is regulated by Electricity Regulatory Commissions.

Against this background, a Performance Audit on "Supply and Infrastructure Development for Natural Gas" was conducted with a view to ascertaining:

- Whether GoI has played its wider role in providing adequate pipeline and R-LNG infrastructure to cope with emerging demand in the country;
- The impact of non-availability of NG/R-LNG on Fertilizer/Power Sector and pipeline infrastructure providers; and
- Whether NG allocation and utilization policies of GoI were effective to meet the requirement of NG across the country.

Significant audit findings which emerged from the Performance Audit are narrated below:

I. **Infrastructure Development**:

A. **Pipeline infrastructure**:

a. GoI set up PNGRB in October 2007 as a regulator but notified Section 16 of PNGRB Act (the Act), empowering PNGRB to issue authorisations for new pipelines, only in July 2010. This delay of 33 months acted as a hindrance in development of cross-country pipelines and associated infrastructure, as in the intervening period neither GoI nor PNGRB was able to authorize any project despite demand. This is evident from the fact that even as GSPL/GAIL expressed interest between November 2008 and September 2009 for laying four pipelines, PNGRB was not in a position to issue authorisation on account of non-notification of Section 16 of the Act till July 2010. These projects were subsequently authorised by PNGRB between July 2011 and April 2012, after notification of Section 16 of the Act.

(Para 3.3.5)

b. Till the time PNGRB became fully operational with adequate legal mandate, GoI issued authorisations in 2007 for nine pipeline projects. In respect of five out of these nine pipeline projects, respective entities did not commence execution even after lapse of more than six years since authorization. Audit analysis revealed that authorisations were given without setting a definite start and target date for completion. There was considerable delay in taking administrative decisions (five projects by GAIL) to go ahead with the project as there was delay in determining availability of gas source. In respect of remaining four projects, Reliance Gas Transmission Infrastructure Limited (RGTIL) did not speed up execution of project, citing non development of City Gas Distribution projects and non availability of NG. Thus pipeline infrastructure which is a prerequisite for development of gas market was not taken up for development.

(Para 3.3.4)

c. Out of total 23 corridors identified (2000-2011 under National Gas Grid) for completion till 2013-14, seven pipelines were completed, six were at different stages of construction and 10 pipelines were yet to be taken up (October 2014).

(Para 3.3.6)

B. <u>R-LNG Terminals</u>

GoI created (1997) Petronet LNG Limited, a public limited company, with a mandate to set up LNG terminals for import and regasification of LNG. Twelve other entities also obtained clearance (1997-2000) from Foreign Investment Promotion Board (FIPB) for setting up LNG terminals across the country. A regulatory framework as envisaged in the "India Hydrocarbon Vision 2025" was lacking to authorise entities to set up facilities. Though PNGRB was set up in 2007, GoI took more than five years in taking an executive decision (October 2012) for fixing eligibility conditions of entities to apply for registration to establish and operate LNG terminals. In the absence of regulatory framework and a mechanism to review the progress of LNG projects, progress in this regard was very slow and MoPNG was not able to monitor the LNG projects, for which clearance was given.

(Para 3.2.1 and 3.2.2)

We recommend that:

1. MoPNG should develop a mechanism, with clearly defined responsibility centres, in coordination with implementing agencies and authorities, to ensure and assess timely completion of NG pipeline and R-LNG projects across the country and cut down delays so that the desired growth in the NG sector is achieved.

II. Impact of Non-availability of NG/R-LNG on fertilizer sector

- Sale price of Urea products is controlled by GoI which bears subsidy. NG is considered the most suitable feedstock for producing urea. Urea production in the country remained by and large stagnant during XI Plan. To enhance domestic production capacity, GoI formulated various schemes envisaging new plants, expansion of existing units and revival of closed units through which production capacity of urea was to be enhanced by approximately 122 Lakh Metric Tonne Per Annum (LMTPA) in different stages from 2010-11 to 2012-13 through NG based urea plants.

  (Para 4.1.1)

- Non availability of NG, however, remained one of the main constraints in increasing indigenous production capacity of urea. Out of envisaged enhancement of production capacity of 122.25 LMTPA of urea during XI Plan, achievement was negligible, at only 3.30 LMTPA. Though it was evident that subsidy on import of urea was higher than subsidy on domestic production, action taken by GoI to facilitate import NG/LNG and produce urea through NG was not adequate. This was mainly due to shortfall in materialisation of plans for LNG terminals, re-gasification facilities, construction of pipelines and facilitating long term agreements to make available NG/RLNG. Such a situation led to non-enhancement of urea production capacity and consequently led to import of urea to meet the gap between demand and availability. Thus, the objective of enhancement of production capacity of urea production through use of NG as feedstock could not be achieved. During the period 2011-12 and 2012-13, the actual domestic production was only 445.58 LMT against the requirement of 604.36 LMT. The shortfall of 158.78 LMT was imported. Accordingly, due to non-expansion of urea production capacity as envisaged, GoI lost an opportunity of saving subsidy by ₹ 4202.12 crore for the same period even after taking into account Capital Related Charge taken on basis of estimated investment in expansion, revamp and revival projects.

  (Para 4.1.1)

- GoI in its policy for stage III of new pricing scheme for urea manufacturing units (2007) targeted conversion of all existing (nine units) naphtha and FO/LSHS based units to NG/RLNG based within a period of three years (by 2009-10) with a view to reducing the cost of production and subsidy burden. Uninterrupted supply of NG at affordable price to the plant is a prerequisite for such conversion. Owing to absence of adequate pipeline connectivity and non-availability of gas, there was delay in conversion of all units planned. Out of the nine units planned for conversion, five units converted to gas during 2012-13 and one unit was converted in 2013-14. Resultantly, urea units continued production by using costlier feedstock. This resulted in loss of opportunity to reduce subsidy burden by ₹ 7673.82 crore on the exchequer during 2010-11 to 2012-13, by the units which were not converted, even after taking into account Capital Related Charge taken on the basis of estimated investment required for planned conversions.

(Para 4.1.2)

III. <u>Impact of non availability of NG/R-LNG on Power Sector</u>

- As per National Electricity Policy, use of NG as fuel for power generation depends on its availability at reasonable price. It was envisaged that new power generation capacity based on indigenous NG at reasonable price could emerge. The existing power plants using liquid fuel were to shift to use of NG or R-LNG at the earliest to reduce cost of generation. During XI Plan, the actual capacity addition of gas based plants was 5936 MW including projects carried over from X Plan. Against the total requirement of 90.70 mmscmd NG for operating these plants at 90 per cent PLF, actual availability was 40 mmscmd only. Steps taken to meet shortage of NG viz. import of NG/R-LNG at affordable rate were inadequate and led to a situation where gas based power plants suffered generation loss of 66,129 Million Units during 2008-09 to 2012-13. Financial impact on account of above loss of generation could not be worked out by Audit as cost of production as well as supply price of electricity varies from state to state.

(Para 4.2)

- Where there is provision for use of alternate fuel in gas based plants, generation loss on account of non-availability of NG was compensated by using Naphtha and HSD. As cost of these liquid fuels is comparatively higher, cost of power is proportionately increased. During 2008-09 to 2012-13, gas based plants had used 31.35 Lakh Kilo Litres Naphtha and 5.01 Lakh Kilo Litres of HSD to make up non-availability of NG/R-LNG. Based on the computation of cost of power by 'Expert Committee on Fuels for Power Generation', increase in cost of power due to using Naphtha instead of R-LNG at long term contract rate would work out to an estimated ₹ 2375.33 crore during 2010-11 to 2012-13 which was ultimately passed on to consumers.

(Para 4.2)

We recommend that:

2. MoPNG in coordination with DoF and MoP may consider setting up of Inter Ministerial Committee that could suggest:

i. A time bound action plan for synchronising implementation of NG pipeline projects and revival of fertilizer units so that benefit of NG as feedstock may be derived optimally besides reducing import of urea.

ii. Measures to create required infrastructure to provide NG/R-LNG to Power Sector at affordable price so that capacity created in the sector is adequately utilised.

IV. Supply of Natural Gas

A. Absence of mechanism for monitoring end use of NG

Power and Fertilizer sectors receive about 69 per cent of domestic gas at Administered Price Mechanism (APM) price through allocation.

a. MoPNG directed (June 2006) that as far as power sector consumers were concerned, APM price would be applicable only for those quantities of gas which were used for generation of electricity for supply to the grid for distribution to consumers through public utilities/licensed distribution companies and market rate was to be charged for NG used for other than above purpose.

(Para 5.3.2)

b. MoPNG directed (July 2006) that products other than fertilizers were not covered under supply of APM and the quantity of APM gas utilized for manufacturing products other than fertilizers should be charged at market price. However, there was no mechanism available to ensure compliance to above instructions either with MoPNG/DoF or GAIL, as a result of which there was under recovery in gas pool account to the extent of ₹ 630.60 crore in the cases of mis-utilisation of NG revealed in limited test check by Audit.

(Para 5.3.1 to 5.3.3)

c. Cases of underutilization of available NG were noticed during test check in Audit which not only resulted in loss of production but also led to import of more urea. This led to payment of extra subsidy (₹ 637.07 crore) as the subsidy paid on imported urea was more than the subsidy paid on indigenously produced urea.

(Para 5.4)

B. <u>Marketing Margin on supply of NG</u>

Marketing Margin on supply of domestic NG for GAIL was approved by GoI in Rupee terms, whereas the Contractor for KG D6 block was charging marketing margin in US dollar terms. DoF was not reimbursing marketing margin as demanded by the Contractor to the fertilizer units and subsidy claims on account of marketing margin on KGD6 gas were pending since 2009-10. If DoF decides to reimburse marketing margin as demanded by the Contractor and requested by fertilizer units, additional subsidy burden would be ₹ 201.40 crore from May 2009 to March 2014, being the difference between marketing margin demanded by the Contractor and marketing margin allowed to GAIL.

(Para 5.5)

We recommend that:

3. MoPNG may work out modalities by involving all the implementing agencies for implementing a control system/mechanism to detect and prevent diversion/mis-utilization of NG supplied at regulated price. The modalities so worked out may also include decision on rate at which recovery would be made for utilisation of such NG for other than specified purposes as there would be no difference between APM and non-APM price with effect from November 2014.

4. GAIL may critically review NG supply contract management system and put in place specific measures, such as incorporation of a clause in Gas Sales and Transmission Agreement enabling GAIL to verify end use of NG and reviewing Article 17 that permits buyer to use the NG for purposes other than those contemplated with mutual agreement between buyer and seller *etc*., that would empower it adequately to track ultimate utilisation of NG supplies at regulated price and prevent its diversion towards unauthorised purposes.

5. MoPNG should ensure that same methodology, i.e. charging marketing margin in Indian Rupee, is adopted for supply of NG from domestic source for use in sectors where GoI bears subsidy burden.

Chapter-1

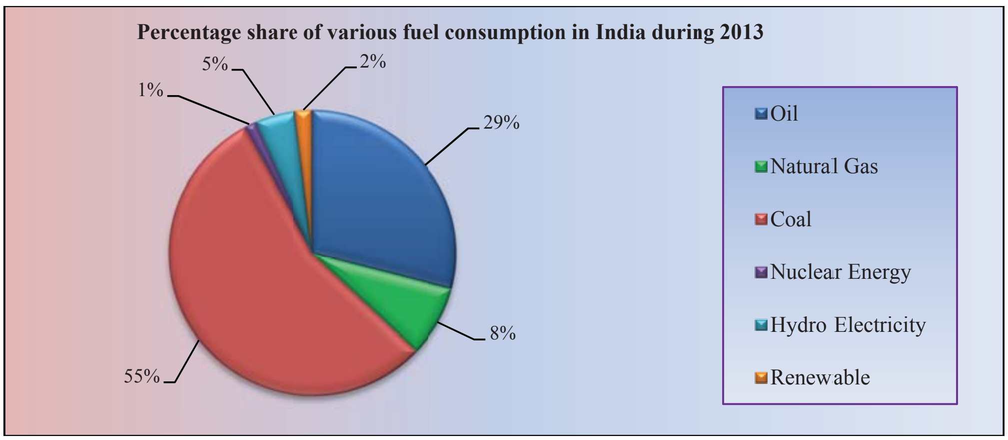
Natural Gas – An Overview

Chapter 1 Natural Gas – An Overview

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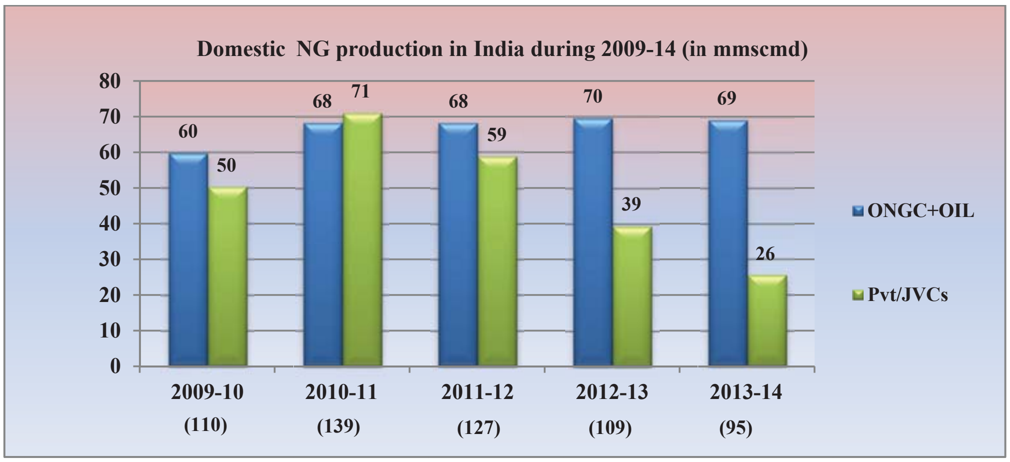
1 Represents those quantities of NG that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions.

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:

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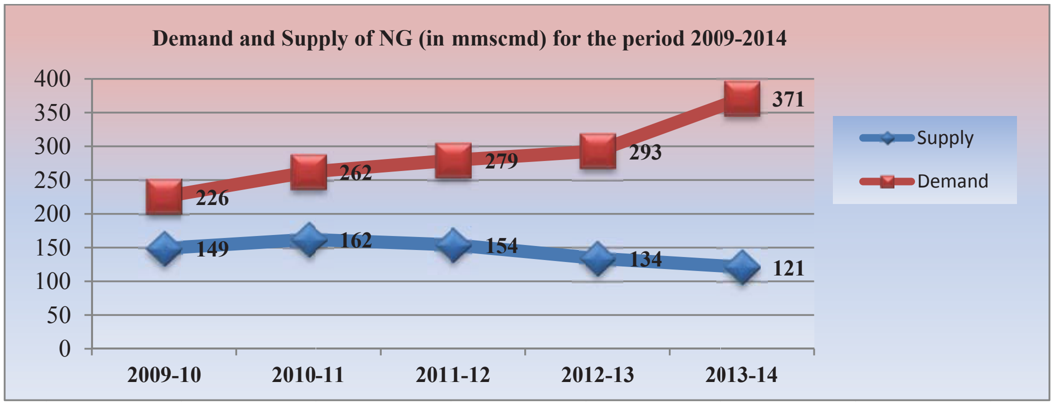
[3] Indian Petroleum and Natural Gas Statistics 2012-13

[4] Million Metric Standard Cubic Meter per day

Chart 3

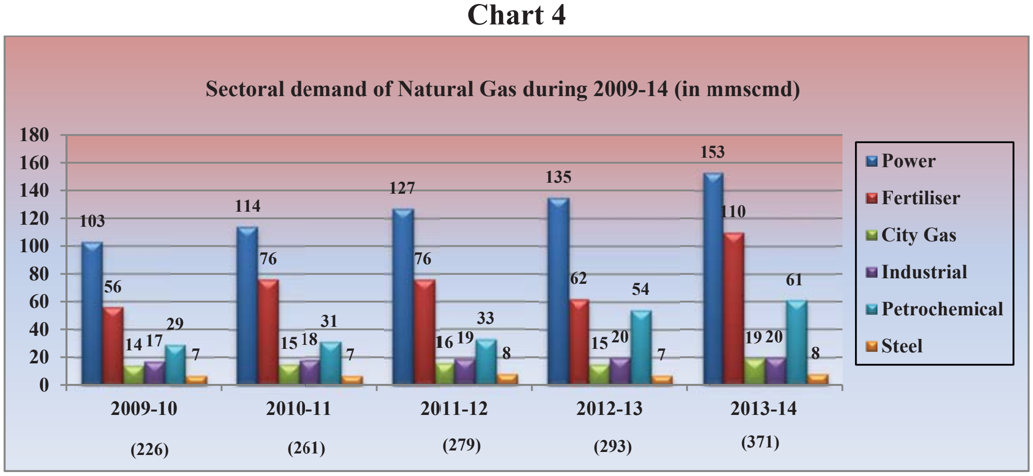


(Source: Working Group on Petroleum and Natural Gas for XI and XII Plan & Report of Parliamentary Standing Committee on Petroleum and Natural Gas 2012-13)

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.

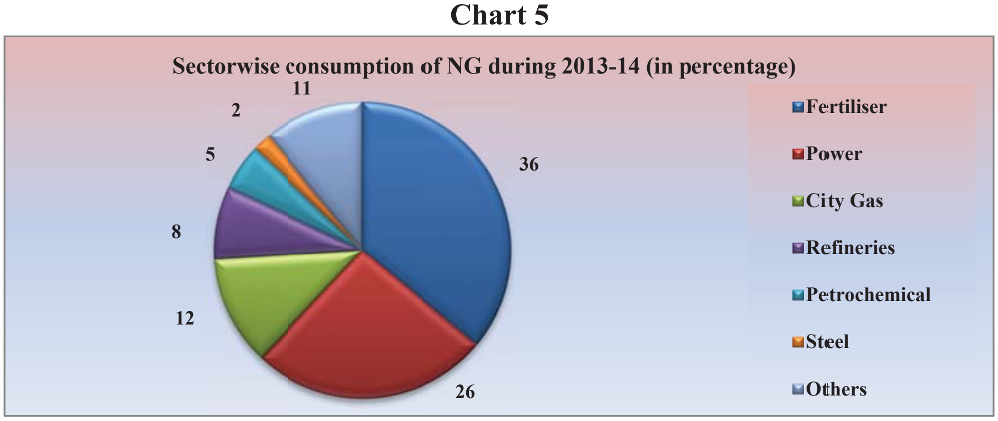
1.4 Consumption of NG

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):

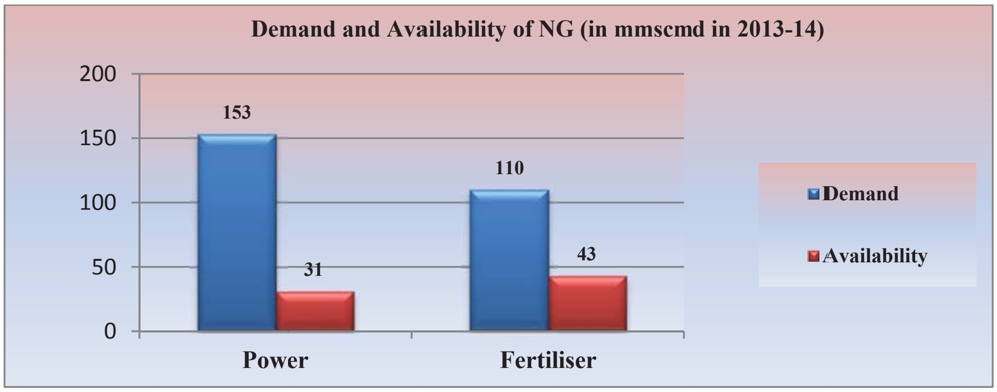
Chart 5



(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

Chapter-2

Audit Framework

Chapter 2 Audit Framework

2.1 Audit objectives

Gap between demand and availability of NG including R-LNG is widening in the country due to shortfall in domestic production and insufficient import and re-gasification infrastructure.

Domestic demand of gas is far in excess of indigenous production and there are very few new domestic sources available to cater to additional demand. Options available to meet the demand were import of NG through trans-national pipelines and import of LNG.

Pipeline network is a pre-requisite for developing gas supply network. Though a formal pipeline policy was notified (2006) and a regulator (PNGRB) was established in 2007, the present pipeline infrastructure is insufficient to reach the demand centres in the country. There were instances of non-development of new pipelines and underutilization of existing pipelines due to non-availability of NG.

Similarly, instances of underutilization of capacity of plants in fertilizer and power sectors on account of non-availability of NG leading to loss of production and increase in cost of production due to use of alternate costlier feedstock/fuels have also been noticed. In fertilizer sector, GoI meets the deficit of urea production through import. This leads to excess payment of subsidy as the cost of imported urea is higher than that of indigenously produced urea.

In the backdrop of these concerns, Performance Audit on 'Supply and Infrastructure Development for Natural Gas' was taken up to ascertain:

- Whether GoI has played its wider role in providing adequate pipeline and R-LNG infrastructure to cope with emerging demand in the country;
- The impact of non-availability of NG/R-LNG on fertilizer/power sector and pipeline infrastructure providers; and
- Whether NG allocation and utilization policies of the GoI were effective to meet the requirement of NG across the country.

2.2 Scope of audit

Performance Audit covered the period 2009-10 to 2013-14. During the Performance Audit, records of MoPNG relating to assessment of demand, allocation of NG, pipeline authorisations, steps taken to create import and re-gasification infrastructure for LNG, records of Ministry of Power (MoP) and Department of Fertilizers (DoF) relating to demand projections and utilisation of available NG were test checked. Records relating to payment of subsidy on domestic production/import of urea, details of plant utilisation in DoF and MoP respectively were also test checked. Audit also test checked record of GAIL (India) Limited (GAIL) in respect of major pipeline projects, utilization of pipeline capacity, supply of APM gas, procurement of R-LNG *etc*. Entry conference with representatives of MoPNG, MoP, DoF, GAIL and PNGRB was held on 11 January 2013.

This audit did not cover examination of the records of PNGRB because of their contention that "decisions of the Board taken in the discharge of its functions under Petroleum and Natural Gas Regulatory Act, 2006, being matters appealable to the Appellate Tribunal, shall not be subject to Audit" as per explanation given below sub-Section (2) of Section 40 of the Act.

2.3 Audit criteria

Performance Audit was carried out with reference to:

- Policies, procedures, guidelines of MoPNG regarding
    - allocation and utilization of NG;
    - creation of pipeline and R-LNG infrastructure; and
    - marketing margin for supply of NG

- Annual plans of MoPNG, MoP and DoF;
- Expansion/revival plans of units under power and fertilizer sectors;
- Agreements for pipeline infrastructure projects of GAIL; and
- Contracts for supply of NG/R-LNG by GAIL

2.4 Response to Draft Audit Report

The Draft Audit Report (DAR) was issued to MoPNG, MoP, DoF and GAIL on 6 June 2014 with the request to send their response within four weeks. Audit received the response from MoPNG and GAIL in July 2014 and August 2014 respectively. MoP and DoF furnished their response in October 2014. The responses of audited entities have been duly considered and relevant portions have also been incorporated in the report.

As per the Comptroller and Auditor General of India standard practice, an Exit Conference was held on 10 September 2014 to provide an opportunity to the audited entities to discuss the audit findings and present their views. The views expressed during the Exit Conference have been duly considered while finalising the report.

Draft Final Report (DFR) after incorporating views expressed during Exit Conference was issued to audited entities on 5 December 2014 soliciting response thereto within two weeks. Replies to DFR were received from MoPNG (23 December 2014), GAIL (30 December 2014), DoF (14 January 2015) and MoP (9 February 2015). These replies have also been considered while finalising the Report.

Chapter-3

Infrastructure Development

Chapter 3 Infrastructure Development

'India Hydrocarbon Vision-2025' (2000) identified issues such as energy security, use of alternative fuels and inter-changeability of technology as vital to ensure that the mix of energy sources used in the economy is optimal and sustainable and that adequate quantities of economically priced clean and green fuels are made available to the Indian consumers.

The 'Vision' therefore set objectives for NG sector which included steps to ensure adequate availability of a mix of domestic as well as gas imported through pipelines and R-LNG. To achieve this, it was suggested that diplomatic and political initiatives be pursued for import of gas from neighbouring and other countries with emphasis on transnational gas pipelines, expedite setting up of a regulatory framework and import of LNG to supplement domestic gas availability and encourage domestic companies to participate in LNG chain.

3.1 Transnational pipelines

Transnational pipelines are difficult and complex ventures since they involve different countries with different economic and political interests. GoI had entered into various stages of negotiations for import of NG with Myanmar[6], Iran[7] and Turkmenistan[8]. Status of these transnational pipeline projects is discussed below.

- **Myanmar-Bangladesh-India (MBI)**

  The concept of 900 Km, Tri-national MBI pipeline was initiated in 1997. This pipeline sought gas supplies from Myanmar and Bangladesh. GoI had reached (2005) an agreement with Bangladesh and Myanmar for constructing the pipeline. As Bangladesh withdrew from the project in 2005, GoI opted for re-routing the pipeline from Myanmar *via* Mizoram, Tripura and Assam to reach Kolkata. Meanwhile (2008), Myanmar Government concluded a gas deal with China. Since no gas was tied up for Myanmar-India pipeline, the project had been kept in abeyance.

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[6] Myanmar exports 8.5 Billion Cubic Meter (BCM) gas through transnational pipelines to Thailand.

[7] Iran exports 8.4 BCM gas through transnational pipelines to Turkey and former Soviet Union countries.

[8] Turkmenistan exports 41.1 BCM gas through transnational pipelines to Russia, other former Soviet Union countries, Iran and China.

- **Iran-Pakistan-India (IPI)**

The concept of IPI pipeline originated in early 1989 and Iran-Pakistan working group was formed in 2003 to move the project forward. India joined the group in 2005. In 2007, India and Pakistan provisionally agreed to pay Iran US$ 4.93 per mmbtu[9] of NG. The pipeline was expected to carry 150 mmscmd NG to be shared equally between India and Pakistan. In 2009 India and Iran agreed to hold next joint working group meeting for discussion on IPI project which had not taken place, so far.

MoPNG stated (January 2014) that due to certain unresolved contractual issues and in the light of UN sanctions, future of the IPI project remained uncertain.

- **Turkmenistan-Afghanistan-Pakistan-India (TAPI)**

The idea of TAPI project was mooted by the Asian Development Bank originally as Turkmenistan-Afghanistan-Pakistan pipeline. An agreement for laying transnational gas pipeline was signed in December 2002 by Turkmenistan, Afghanistan and Pakistan. India joined the project in 2008. Construction of 1680 Km pipeline was planned to start in 2012. India was expected to get 38 mmscmd NG through this line. GAIL and Pakistan's Inter-state Gas System signed (May 2012) GSPA[10] with Turkmenistan State Gas Company which envisaged gas supply in 2018.

TAPI project has been in discussion for long presenting a significant potential for the energy security of the country. Issues relating to security and gas certification, however, remained unresolved.

MoPNG/GAIL stated (January/August 2014) that broad agreement had been reached on transit fee among India, Pakistan and Afghanistan and the issue of indexation and modalities of transit fee payment were under discussion. Formation of pipeline consortium with participation of four nominated gas companies from TAPI countries is currently under way, outcome of which is crucial for the project to move forward.

Audit noticed that success of these projects depended on factors that involved political, technological and security concerns. There was uncertainty in these projects since beginning. Import of LNG, therefore, emerged as a comparatively better option to meet the deficit of NG in the country.

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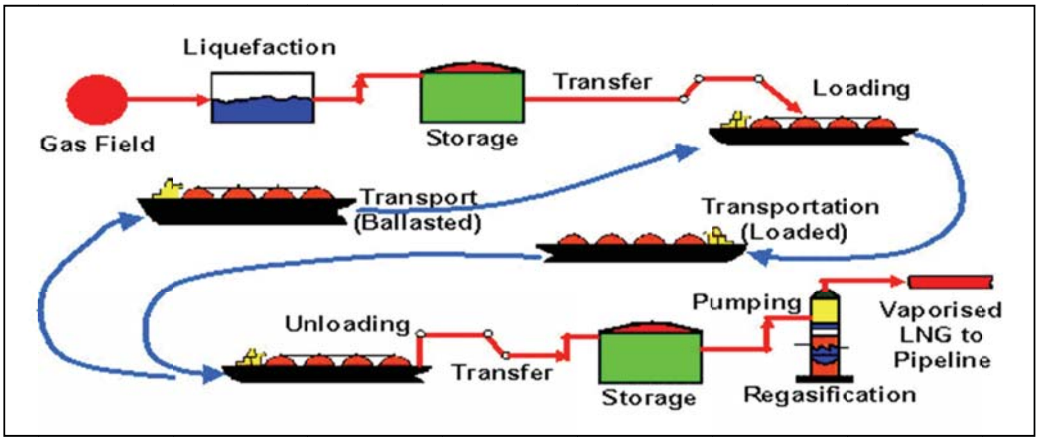
[9] Million Metric British Thermal Unit

[10] Gas Sales Purchase Agreement

3.2 R-LNG infrastructure

NG condensed at minus 160.5° C at normal pressure to liquid form is known as LNG and is typically transported by specialized tanker with insulated walls and received at terminals. LNG terminal includes infrastructure to receive and store LNG, re-gasify and transport re-gasified LNG to outside boundaries of the facility for onward transmission through pipelines as NG. A typical LNG chain in upstream and downstream sector is depicted in Chart 7:

Chart 7



(Source: website of Petronet LNG Limited)

3.2.1 Initiatives for creating R-LNG infrastructure

At the instance of MoPNG (December 1995), GAIL initiated project related work for LNG terminals at Ennore and Mangalore and proposed (August 1996) to set up a Joint Venture Company (JVC) with Indian Oil Corporation Limited (IOCL) and ONGC for import of LNG. GoI approved (July 1997) formation of JVC with an authorized capital of ₹1200 crore limiting equity participation of Public Sector Undertakings (PSUs) to 50 *per cent*. Objective of JVC was to set up LNG terminals with an initial capacity of 2.5 Million Metric Tonnes Per Annum (mmtpa) each at Mangalore, Kochi/Kayamkulam, Hazira/Dahej, Ennore and any other suitable locations. JVC was registered (April 1998) in the name of Petronet LNG Limited (PLL).

Import of LNG was under Open General License (OGL)[11]. Multinational companies were permitted to establish LNG terminals and organize LNG business in India with 100 *per cent* foreign direct investment (FDI). Besides, pricing of LNG was not regulated and was purely dependent on market forces. Under these circumstances, 13 private entities obtained clearance (1997 to 2000) from Foreign Investment Promotion Board (FIPB) for 15 LNG terminals (Annexure 2) across the country with an initial capacity of 40.2 mmtpa[12].

3.2.2 Development of R-LNG infrastructure

Stages of development of R-LNG infrastructure are depicted below:

Prior to 2000 (Before 'India Hydrocarbon Vision 2025')

- **1997 – MoPNG approved formation of PLL**
- **1997-2000: FIPB cleared 15 LNG terminal projects to 13 entities**

After 2000 i.e. after 'India Hydrocarbon Vision 2025'

- **2000-12: No fresh clearance for LNG terminals**
- **Up to 2001-02: None of the LNG terminals materialized**
- **2004-05: Two LNG terminals at Dahej and Hazira were set up by PLL and Hazira LNG respectively**
- **2007: GoI set up a Regulator, PNGRB**

2012 onwards

- **2012: MoPNG empowered PNGRB to notify regulations for registration of LNG terminals**
- **2012-13: PNGRB received applications for registration of four LNG terminals**
- **2013-14: LNG terminals at Dabhol (GAIL/NTPC) and Kochi (PLL) were set up**

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11 Open General License is issued by the GoI in pursuance of the Imports (control) order, 1955. It is the most liberalized type of license for imports for freely traded items for which no specific permission is required.

12 Million Metric Tonne Per Annum. One mmtpa LNG is equal to 3.6 mmscmd NG.

Year wise position of development of R-LNG infrastructure is given in Annexure 3. It could be seen that out of the 15 LNG terminals for which FIPB clearance was given till 2000, four[13] terminals with 22 mmtpa capacity had commenced operation so far (October 2014). Reasons for delay/non creation of R-LNG infrastructure as analysed in Audit are discussed below:

(i) Delay in/non taking up of LNG projects by PLL irrespective of mandate

GoI created (1997) PLL with a mandate to set up LNG terminals at Mangalore, Kochi/Kayamkulam, Hazira/Dahej, Ennore with initial capacity of 2.5 mmtpa each. PLL decided to establish LNG terminals in the first phase at Dahej and Kochi with capacities of five mmtpa and 2.5 mmtpa respectively. Land required for Dahej and Kochi was already kept reserved (November 1997) for PLL to commence activities. Inspite of autonomy given to PLL, it did not commence LNG related activity in Kochi till 2008[14] . The project at Dahej was completed in 2004 and capacity enhanced from five to 10 mmtpa in 2009. However, terminals at Mangalore and Ennore were not developed by PLL despite mandate given to it.

(ii) Restriction on Promoters of PLL to take part in other LNG projects

MoPNG directed (June 1997 and January 1999) promoters of PLL (ONGC, IOCL, BPCL and GAIL) that LNG projects in India would be pursued by PLL and promoters would not compete with each other through separate business arrangements for LNG projects promoted/offered by other companies. Subsequently, MoPNG directed (November 1999) promoters not to take up any project/activity which would have adverse effect on the projects of PLL at Dahej and Kochi. GAIL's proposed LNG terminal at Trombay[15] and IOCL's proposal for LNG terminals were not taken up further due to restriction placed by MoPNG on PSUs in participating in LNG activities on individual basis. Though MoPNG decided (November 1999) to evolve a separate policy regarding participation of PSUs in different LNG ventures at different locations, no such policy was formulated (October 2014).

MoPNG stated (January 2014) that the substantial investment was made in the Dahej re-gasification plant of PLL and pipelines. To make the project commercially viable, it was considered important that the market for R-LNG was protected from competition at least from the promoters of PLL.

[13] Dahej, Hazira, Dabhol and Kochi
[14] LNG terminal at Kochi was completed in September 2013.
[15] In collaboration with TOTAL (France) and Tata Electric Company (TEC)

As import of LNG was under OGL, putting such restriction on PSUs was in contradiction with the objectives set in 'India Hydrocarbon Vision 2025' wherein it was envisaged that domestic companies were to be encouraged to participate in the LNG chain. However, after 13 years GAIL[16] and IOCL are going ahead (2012-13) with their R-LNG projects in offshore Andhra Pradesh (Floating storage and Re-gasification unit) and Ennore respectively. GAIL also signed (October 2013) a Memorandum of Understanding with Paradip Port Trust for setting up LNG terminal in Paradip Port.

(iii) **Lack of monitoring in progress of LNG projects**

There was no mechanism to review the progress of LNG terminal projects in MoPNG due to which it was not able to monitor the LNG terminal projects to which clearance was given by FIPB during 1997-2000.

MoPNG stated (January 2014) that:
(i) Development of LNG chain was a complex endeavour. Therefore, it was not anticipated that all LNG terminals which were conceived would reach implementation stage and (ii) due to low affordability of gas consumers in India and non-availability of a country wide gas grid of pipelines, there was an apprehension that the capacity utilisation of even the existing terminals might go down. Hence the companies in their commercial prudence had not executed the concerned projects.

The stand taken by MoPNG needs to be viewed against the following:

(i) 'India Hydrocarbon Vision 2025' set a long term objective to ensure availability of NG through a mix of domestic gas and LNG to meet the increasing demand. MoPNG, however, did not define a policy on LNG import/infrastructure, set a target for completion of LNG projects and insist on performance guarantee from prospective LNG infrastructure providers *etc*. to accomplish this objective and (ii) MoPNG had not set up a legal framework to ensure coordinated development of infrastructure envisaged in the 'Vision' as discussed in para below.

3.2.3 Development of R-LNG infrastructure after India Hydrocarbon Vision 2025

GoI took various initiatives for development of R-LNG infrastructure as discussed in paragraph 3.2.1 but a regulatory regime as envisaged (2000) in "India Hydrocarbon Vision 2025" was lacking to cover the aspects of authorisation of entities to set up facilities, size and location of facilities, tariff/price of services *etc*. Instead of coming

[16] Andhra Pradesh Gas Distribution Corporation Limited (APGDC), a company jointly promoted by GAIL Gas Limited (wholly owned subsidiary of GAIL) and Andhra Pradesh Gas Infrastructure Corporation Private Limited

up with a regulatory framework to expedite import of LNG immediately after 2000, GoI came up with PNGRB Act only in 2007.

One of the functions of PNGRB envisaged in the Act (Section 11) was to register entities to establish and operate LNG terminals. Section 60 (sub section 1) *inter alia* empowered GoI to make rules prescribing eligibility conditions which an entity shall fulfil for registration. MoPNG, however, did not notify the rules under which LNG infrastructure was to be established, till October 2012.

Thus, it could be seen that (i) there was a delay of seven years in setting up the regulator and thereafter there was a further delay of five years in taking an executive decision in fixing eligibility conditions for entities to apply for registration; (ii) the regulator appointed for the purpose was not able to notify the regulations and create a legal framework for development of infrastructure so far (October 2014). Though, PNGRB developed draft regulations in 2013, same was under public consultation process (October 2014). PNGRB had received applications (January 2014) from four[17] entities for registration of LNG terminals for creation/ expansion of LNG facilities.

While a total capacity of 145 mmscmd for import/re-gasification was expected by 2004, a capacity of 79.2 mmscmd only was materialised (including subsequent capacity enhancement) over a period of 17 years (1997 to October 2014). Considering the fact that an LNG terminal would take about three to four years to complete, the delay had a significant adverse impact on creation of required infrastructure.

MoPNG stated (January 2014) that development of LNG chain is a complex endeavour involving substantial investment. Notification of eligibility criteria and issue of regulations for registration thereupon by PNGRB had, therefore, no connection with the pace of development of LNG terminals. It was further stated (July 2014) that until the actual gas consumer was ready to receive and pipeline connectivity was established, there was risk of entire investment going infructuous. The R-LNG capacity created at Kochi was remaining underutilised for want of pipeline connectivity.

Reply of MoPNG needs to be viewed against the fact that a regulatory system is essential for an orderly and efficient development of infrastructure. "India Hydrocarbon Vision 2025" in 2000 suggested creation of such a regime. The delay as mentioned above, however, acted as a constraint on PNGRB to come up with the required regulation and facilitate the required infrastructure.

Though R-LNG was more expensive than domestic gas, it owned a defined space in the domestic market owing to the substantial gap between demand and supply. A sizeable demand was in existence for R-LNG from consumers currently using expensive liquid fuels. This could be observed from the fact that while formulating

[17] PLL, Swan energy, GSPC LNG Limited and H-Energy

the expansion/revamp/revival projects of fertilizer sector for XI Plan, DoF had considered cost of NG above prevailing APM rates. Also, LNG procured through long term contract was economical as compared to Naphtha which was the major alternate feedstock/fuel used in the absence of NG. Table 1 gives a comparison between cost of production by using R-LNG and Naphtha in both the sectors:

Table 1

Year	Cost of LNG[18] per MT (₹)	Cost of Naphtha[19] per MT (₹)	Power Sector			Fertilizer Sector		
			Cost of power generation[20] per kWh (₹)			Cost of Urea[21] per MT (₹)		
			With R-LNG	With Naphtha	Increase in %	With R-LNG	With Naphtha	Increase in %
2010-11	19488.35	37282.00	6.89	9.56	39	15083	25081	66
2011-12	22079.22	48800.00	7.80	12.51	60	18982	32816	73
2012-13	31659.80	53792.00	11.19	13.79	23	25188	39241	56

Availability of import and re-gasification infrastructure is one of the critical features that facilitate sourcing of LNG on long term basis. Lack of sufficient re-gasification capacity, however, remained a constraint in making available sufficient quantity of LNG through long term contract to meet additional requirement for substituting costlier feedstock/fuel as indicated in Table 2:

Table-2

(Quantity in mmscmd)

Year	LNG import through long term contract (1)	LNG import (spot) (2)	Require-ment of Gas for proposed schemes under Fertilizer sector (3)	Require-ment of Gas to avoid use of costlier feedstock in Fertilizer sector[22] (4)	Require-ment of Gas to avoid use of costlier fuel in Power sector[23] (5)	Total require-ment of R-LNG (6) (1 to 5)	Actual re-gasification capacity (7)	Minimum additional requirement for re-gasification capacity (8) (6-7)
2010-11	27.00	8.05	12.37	6.33	1.75	55.50	48.96	6.54
2011-12	27.00	12.62	12.37	6.81	1.02	59.82	48.96	10.86
2012-13	27.00	13.07	20.37	2.88	1.58	64.90	61.20	3.7

18 Basic price of LNG as per the long term contract between PLL and Ras Gas at 9500 kCal

19 Basic price of Naphtha (Annual average of Refinery Transfer Price– IOCL) at 10500 kCal

20 As per the Report of 'Expert Committee on Fuels for Power Generation'; cost of power generation using LNG was ₹2.29/ kWh and that of Naphtha was ₹ 4.46/kWh in 2004-05. Generation cost is estimated for the subsequent years by apportioning the proportionate increase in fuel cost – Annexure 14.

21 for 2010-11; Annexure 11 (b) – Column 7 for R-LNG, Column (5-4) for naphtha
for 2011-12; Annexure 11 (c)- Column 9 for R-LNG, Column (5-4) for naphtha
for 2012-13: Annexure 11 (d)- Column 7 for R-LNG, Column (5-4) for naphtha

22 Calculation based on Annexure 11 b, c, d

23 Calculation based on actual quantity of naphtha used

Thus available re-gasification capacity was not sufficient to meet the total requirement of R-LNG during the period and in the absence of sufficient re-gasification capacity, fertilizer and power sectors could not substitute costlier feedstock/fuel (Naphtha) with R-LNG through long term contracts.

MoPNG's reply that there was insufficient demand needs to be viewed against the fact that demand for R-LNG is closely related to availability of infrastructure (both R-LNG and pipeline connectivity) and there was opportunity for saving in cost of production in various sectors. Delay in creation of R-LNG infrastructure has strong bearing on non-availability of R-LNG at competitive price. This was also evident from the fact that till 2014, LNG import was being made under only one long term contract (entered into between PLL and Ras-Gas in July 1999 for import of 7.5 mmtpa i.e. 27 mmscmd LNG for 2004 to 2028). Subsequently, four long term contracts had been entered into (August 2009 to April 2013) under which supply was expected from early 2015 in anticipation of completion of new LNG terminals which highlights a gap of more than ten years in entering into a long term contract.

MoPNG also stated (July 2014) that policy framework of GoI provides an investment friendly environment such as infrastructure project status to LNG terminals, eligibility for 100 *per cent* FDI through the FIPB route, import under OGL etc. to LNG investors for establishing LNG terminals based on its own techno-commercial feasibility.

The fact, however, remains that inadequate development of LNG terminals led to a situation where the consuming sectors were denied the option of importing LNG at an affordable price through long term contracts, as spot gas is costlier than R-LNG procured through long term contract as could be seen from Table 3:

Table-3

Year	**Long-term LNG price ranging (US $/mmbtu)**		**Spot-LNG price ranging (US $/mmbtu)**	
	From	**To**	**From**	**To**
2010-11	5.29	6.81	8.20	10.54
2011-12	6.97	9.07	11.80	15.00
2012-13	9.29	11.81	17.82	20.99

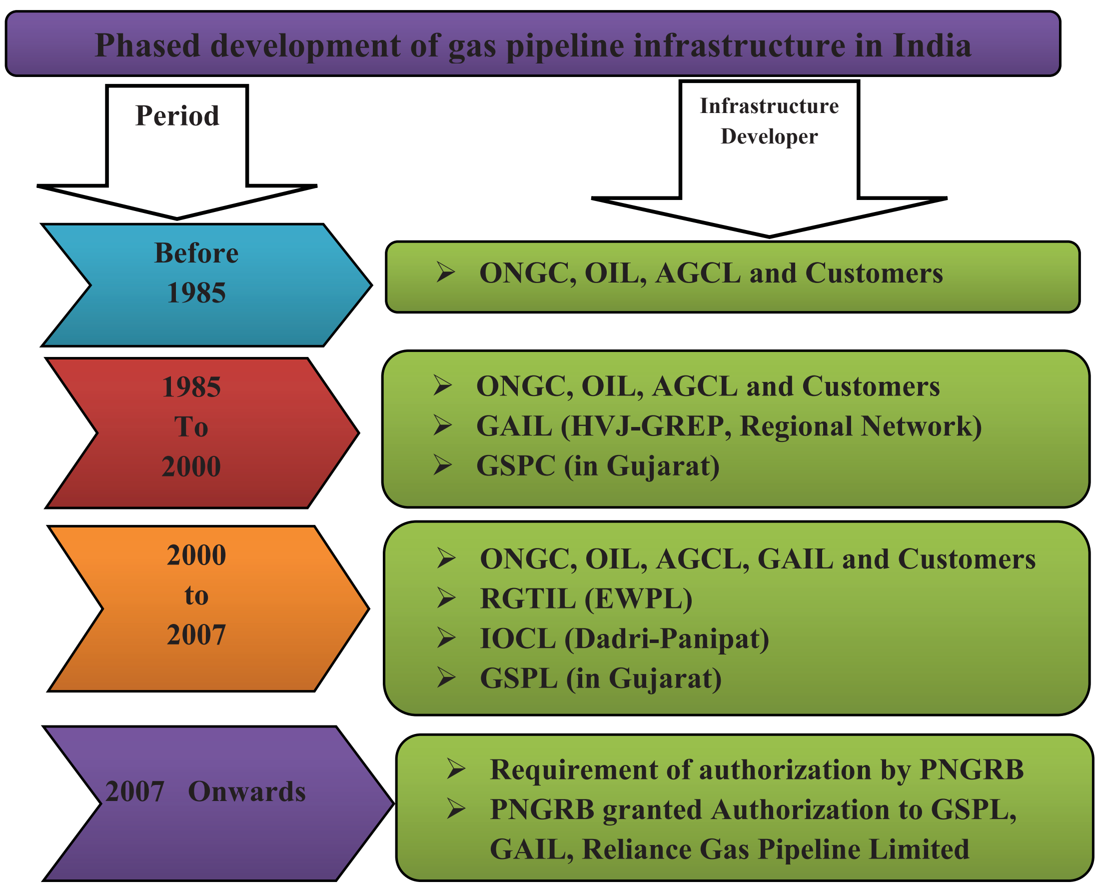
The impact of non-materialisation of various expansion plans of urea plants, under-utilisation of power plants, delay in gas pipeline projects, underutilisation of existing pipeline capacity etc., due to non- availability of affordable NG, is discussed in Chapter 4.

3.3 Pipelines

Transmission pipelines are a pre-requisite for supply of NG across the country. As availability of a robust transportation infrastructure is crucial for development of NG market, there is a need to create sufficient infrastructure ensuring coordinated development across the entire value chain.

NG in India is primarily sourced from Mumbai & Ravva offshore fields, Krishna-Godavari, Cambay & Cauvery basins and from R-LNG facilities in the western coast[24]. Major producing fields are located in offshore Maharashtra, Gujarat, Andhra Pradesh, Tamil Nadu and North Eastern states while import/re-gasification facilities are positioned in Gujarat and Maharashtra. In order to have a reasonable distribution of this natural resource to all parts of the country on a fairly equitable basis, an extensive and elaborate pipeline network was required.

Phases of development of pipeline infrastructure in the country are depicted in the diagram below:



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24 Dahej, Hazira, Dabhol and Kochi (commissioned in September 2013)

Present position of gas pipeline infrastructure operational in India is given in Annexure 4.

3.3.1 Regional imbalance in pipeline infrastructure

Total length of NG pipeline in the country is around 15,340 Km (March 2014)[25], out of which 13871 Km (90 *per cent*) was under public sector. Additional 11700 Km was under various stages of construction. Pipeline infrastructure existed only in 17 states[26]. Lack of gas pipeline infrastructure to transport gas across the country has restricted development of gas based industries close to source of gas. Limited pipeline connectivity has also led to a skewed pattern of NG consumption in the country[27]. There are several areas in the country, especially remote and under developed, which are deprived of NG due to absence of pipeline infrastructure.

Connectivity of eastern and southern states to LNG terminals positioned in western coast is also limited[28]. East-West pipeline of Reliance Gas Transmission Infrastructure Limited (RGTIL)[29] is the only link between western and eastern coast of the country. This pipeline, however, is not designed for bi-directional flow of gas which acts as a restraint for supply of R-LNG to customers in eastern part of the country. A map depicting present and future (targeted) pipelines in the country is given in Annexure 5.

3.3.2 Non development of National Gas Grid

The prospect of supply of NG was increasing owing to intensified exploration activities under NELP rounds and proposed development of LNG terminals. In view of this, GoI conceptualized (2000) a National Gas Grid (NGG) to facilitate supply of NG to the remote areas of the country.

To meet the growing demand from power and fertilizer sectors for their expansion plans, city gas entities and other consumers, GAIL accorded (September 2000) approval to undertake works on seven trunk pipelines[30] under NGG. Thereafter, GAIL identified 15 pipeline projects[31] (including seven trunk pipelines mentioned above) and carried out preliminary studies by 2003.

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25 Major entities that control these pipelines are GAIL - 71 per cent, Gujarat State Petroleum Corporation Limited - 12per cent, Reliance Gas Transportation Infrastructure Limited – 10 per cent and Assam Gas Company Limited seven per cent.

26 Gujarat, Maharashtra, Delhi, MP, UP, Rajasthan, Punjab, Haryana, Assam, Tripura, AP, Telangana, TN, Karnataka, Goa, Uttrakhand and Kerala

27 More than 70 per cent in western and northern regions

28 GAIL has commissioned a pipeline linking LNG terminal at Dabhol to Bangalore in February 2013.

29 Commissioned in 2009.

30 (1) Hazira-Uran-Mangalore/Bangalore (2) Kochi-Kasargod-Mangalore (3) Mangalore-Hassan-Bangalore (4) Banagalore-Chennai (5) Uran-Hyderabad-Kakinada (6) West Bengal-Bihar-UP and (7) West Bengal-Orissa-AP-TN

31 (1) Dahej-Vijaipur (2) Dahej-Uran (3) Dadri-Panipat-Nangal (4) Vijaipur-Kota-Mathania (5) Kakinada-Uran (6) Kakinada-Chennai (7) Kakinada-Kolkata (8) Kolkata-Jagdishpur (9) Dabhol-Banglore-Chennai-Tuticorin (10) Kochi-kayamkulam-

During 2013-14, MoPNG identified the requirement of 15,000 Km of pipelines (16 pipelines in all including 15 identified by GAIL mentioned above) to complete NGG. Authorisation for seven pipelines[32] (9,684 Km) had already been granted. In respect of remaining nine pipelines, PNGRB had initiated bidding process for two sections[33]and three sections were identified by MoPNG for implementation through Public Private Partnership (PPP) mode with viability gap funding while the remaining four pipelines[34] were under progress. MoPNG has further decided (September 2014) to review the progress of NGG every month. A separate proposal for taking up certain sections of gas pipelines which were strategic but might not be economically viable at this stage, with budgetary support from GoI was also being examined.

Examination in audit revealed that owing to various deficiencies in authorisation and monitoring of pipeline projects, there was no appreciable growth in this sector as discussed in the succeeding paragraphs.

3.3.3 Pipeline policy

As gas pipeline networks require large economies of scale, Integrated Energy Policy of Planning Commission (2006) suggested that the development needs of this sector were required to be co-ordinated and their functioning regulated. Working group on Petroleum and Natural Gas for XI Plan also identified (November 2006) the thrust areas like increasing the coverage of pipelines across the country and building a sound gas transportation infrastructure to support growth of gas market.

Considering the need to provide a policy framework for the future growth of pipeline infrastructure to facilitate evolution of NGG and growth of city or local gas distribution networks, GoI notified (December 2006) a 'Policy for Development of Natural Gas Pipeline and City or Local Natural Gas Distribution Network'. The policy envisaged progressive development of a transmission and distribution pipeline network in a competitive environment involving both public and private sectors.

Manglore (11) Banglore-Coimbatore-Kayamkulam (12) Myanmar-Mizoram-Assam-Bihar (13) Hyderabad-Vijaipur (14) Vijaipur-Jaghdishpur (15) Dahej-Jamnagar-Porbandar

[32] Jagdishpur-Phulpur-Haldia, Shahdol-Phulpur, Kakinada-Vizag-Srikakulam, Malavaram-Bhopal-Bhilwara via Vijaypur, Mehsana-Bhatinda, Bhatinda-Jammu-Srinagar and Surat-Paradip

[33] Ennore-Nellore, Ennore-Thirulvalur-Bengaluru-Puducherry-Nagapattinam-Madurai-Tuticorin

[34] Kochi-Koottanad-Banglore-Manglore, Spur line to Dadri-Bawana-Nangal, Chainsa-Jhajjhar-Hissar, Dabhol-Banglore

3.3.4 Authorization of pipelines by MoPNG

To create gas transportation infrastructure across the country for the benefit of regions which were starved of gas, MoPNG permitted (February-March 2007) GAIL and RGTIL to invite Expression of Interest (EoI) from interested parties for nine[35] pipelines across the country for creating capacity on common carrier basis. MoPNG subsequently authorized (July 2007) GAIL and RGTIL to construct five[36] and four[37] trunk lines respectively. Authorizations were granted on the basis of guidelines for laying petroleum product pipelines (2002) and supplementary guidelines (2004). No bidding was carried out for these pipelines.

Details of these pipelines *viz* date of authorization, anticipated anchor consumers and status as on June 2014 are given in Annexure 6. It would be seen that in respect of five (all four projects of RGTIL/Relog[38] and one[39] of GAIL) out of nine projects, respective entities failed to commence execution even after a lapse of more than six years since authorisation.

On account of inordinate delay in execution of four pipeline projects, MoPNG cancelled (October 2012) the authorisation issued to RGTIL/Relog on the recommendation of PNGRB and was yet to take action (October 2014) in respect of Jagdishpur- Haldia pipeline which was authorised to GAIL.

Reasons for non-commencement/completion of the projects as analysed in Audit were as follows:

(i) Non-fixing of target date for completion of pipeline projects

In respect of all nine projects authorized by GoI, activities such as invitation of EoI (April 2007) by the proposer, evaluation of offers and grant of authorisation (July 2007) were completed in the intervening period of enactment (March 2006) of the Act and establishment (October 2007) of PNGRB.

Terms of authorization, stipulated that these projects were to be commissioned within 36 months from the date of start of the project. The date of start of the project was mentioned as the date of publication in official gazette of the

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35 (1) Dadri-Bawana-Nangal (2) Chainsa-Gurgaon-Jhajjar-Hissar (3) Jagdishpur-Haldia (4) Dabhol-Banglore (5) Kochi-Koottanad-Banglore-Manglore (6) Kakinada-Howrah (7) Chennai-Tuticorin (8) Chennai-Banglore –Manglore (9) Kakinada-Chennai

36 (1) Dadri-Bawana-Nangal (2) Chainsa-Gurgaon-Jhajjar-Hissar (3) Jagdishpur-Haldia (4) Dabhol-Banglore (5) Kochi-Kanjirkod-Banglore-Manglore

37 (1) Kakinada-Howrah (2) Chennai-Tuticorin (3) Chennai-Banglore –Manglore (4) Kakinada-Chennai

38 Relogistics Infrastructure Limited, a subsidiary of RGTIL

39 Jagdishpur-Haldia

notification[40] under sub-section 1 of Section 3 of the Petroleum and Minerals Pipeline Act, 1962 (PMP Act). A definite time frame, however, for publication of above notification was not specified in the authorisation order whereas 'Supplementary Guidelines for Laying Petroleum Product Pipelines', on the basis of which authorisations were granted to the pipelines, had prescribed a time frame of 36 months from the date of sanction/approval for completion of project.

(ii) Pipelines authorized to GAIL

- In all the five projects there was delay ranging between three and 24 months in according administrative approval from date of authorization. Administrative approval was given for implementing the project in 42 months from the date of Board approval. GAIL had completed two (Dadri-Bawana-Nangal in March 2012 and Dabhol-Bangalore in February 2013). Physical progress achieved in the remaining two projects was about 17 *per cent* (Phase-2 Sultanpur-Jhajjar-Hissar) and 83 *per cent* (Phase-2 Kochi-Bangalore-Mangalore) (June 2014). One pipeline project (Haldia-Jagdishpur) was not taken up. It is interesting to note that GAIL had conducted feasibility study on these projects way back in 2003 under NGG.

  GAIL stated (August/December 2014) that the pipeline projects were envisaged considering NG from various projected gas sources like KGD6 field through Relog's Kakinada-Haldia pipeline, ONGC's Mahanadi gas fields, Dabhol and Kochi RLNG terminals. There was delay in availability of sources due to slow progress on Kakinada- Haldia pipeline, delay in development of gas blocks in Mahanadi and delay in completion of R-LNG terminals at Dabhol and Kochi.

- In respect of Haldia-Jagdishpur pipeline[41], project under NGG, no work has commenced so far. MoPNG had earlier (July 2005) issued 3 (1) notifications[42] (notification under this section is the first step in land acquisition process for laying of pipeline which declares the intention of GoI/State Government/Corporation to acquire right of use for any land and is valid for one year) under PMP Act. As there was delay of more than one year in taking further action, 3 (1) notification issued under PMP Act in July 2005 had lapsed.

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[40] Under 3 (1) notification of PMP Act, Central Government in the public interest declare its intention to acquire the right of user for laying of pipeline for the transport of petroleum or any mineral by that Government or by any State Government or a corporation through notification in the Official Gazette,

[41] conceptualized as bi-directional with source of gas identified as R-LNG from PLL terminal at Dahej through Dahej-Vijaipur pipeline or NG from KG and Mahanadi basins through RGTIL's proposed Kakinada-Haldia/Howrah Pipeline

[42] in respect of 467 km out of 896 km main line

One of the major objectives of construction of this pipeline was to meet the prospective demand of 11 mmscmd NG from five fertilizer plants[43] on their revival. In addition to this, five power plants[44]with the requirement of 19.4 mmscmd, four industrial units[45] with 4.5 mmscmd and seven city gas networks[46] were the other prospective consumers along the pipeline route. GAIL also entered into agreements with 26 customers for supply of NG[47] and incurred an expenditure of ₹ 13.50 crore (June 2014) on the project towards Project Management Consultancy and other administrative charges. The project, however, was yet to commence even after a lapse of six years from the date of authorization.

MoPNG stated (January/July 2014) that GAIL was directed (October 2013) to furnish their plan for capacity booking and construction of pipeline but the latter was yet to submit a proposal for land acquisition notification to MoPNG (December 2014).

GAIL stated (December 2014) that the project was not taken up essentially due to lack of clarity on source of gas because of non-implementation of Kakinada-Howrah/Haldia pipeline by RGTIL/Relog.

GAIL further stated (August/December 2014) that (i) execution of pipeline would depend on finalisation of agreements by fertilizer plants along the pipeline and considered for revival, which was yet to be taken up and (ii) revival of two fertilizer plants and direct authorization of at least five CGD projects[48] on the route would ensure commercial viability of the pipeline.

MoPNG stated (January 2014) that GAIL had apprehension that if the pipeline was constructed, it might have remained under-utilized as there was uncertainty in availability of NG. Moreover, revival of gas based fertilizer plants would require 42 to 48 months, whereas the pipeline could be executed within a span of 40 months. Thus, GAIL could immediately commence construction of pipeline once a final decision was taken on the revival of fertilizer units.

The fact, however, remains that as the project was conceptualized as bi-directional (gas flow from Haldia to Jagdishpur as well as from Jagdishpur to Haldia), there was an opportunity to link the line with the existing HVJ pipeline, which supplies NG to Jagdishpur from Hazira/Dahej terminals. On cancellation of authorization (October 2012) to Relog's Kakinada-Haldia

[43] (1) FCIL, Gorakhpur (2) FCIL, Sindri (3) HFC, Barauni (4) HFC, Durgapur and (5) DIL, Kanpur
[44] CESC Haldia, CESC-Kashipur, DPL-Durgapur, WBPDC-Bundel, WBPDC-Sagardighi
[45] SAIL-Durgapur, SAIL-Bokaro, IOCL-Barauni&Haldia
[46] Allahabad, Varanasi, Gorakhpur, Patna, Ranchi, Jamshedpur & Kolkata
[47] 10.57 mmscmd in 2006-07 to 28.39 mmscmd in 2012-13
[48] Varanasi, Gorakhpur, Patna, Ranchi & Jamshedpur

pipeline by GoI, GAIL has now considered (December 2014) R-LNG available from Dahej/Dabhol terminal as new source.

Further, reply of MoPNG needs to be viewed against the fact that (i) creation of pipeline infrastructure cannot be delayed linking it with availability/demand as the pipeline infrastructure was a prerequisite for development of gas market and further, (ii) Standing Committee on Petroleum and Natural Gas (2011-12) in its Report (July 2012) had also expressed the view that laying of pipeline infrastructure or any part thereof should not be linked to availability of gas as the same could be sourced from international market too.

Thus, there was lack of coordination (i) in MoPNG to streamline various pipeline and R-LNG projects to create necessary infrastructure as mentioned in paragraph 3.3.6 and (ii) between MoPNG/GAIL and DoF in synchronizing revival of fertilizer plants and pipeline projects as discussed in paragraph 4.1.1 and 4.1.2.

- The second phase of Kochi-Koottanad-Bangalore-Mangalore Pipeline, which was scheduled for completion in March 2013 was affected by objections from various fora *viz.* farmers, environmentalists *etc*. in Kerala and Tamil Nadu (TN). In Kerala, a ministerial level meeting suggested (May 2014) diversion of route, which was later (October 2014) declared not feasible. MoPNG decided (August 2014) to take up the matter of laying pipeline in TN and Kerala and also consult Ministry of Road Transport and Highways (GoI) for laying pipelines on the road median which again was not agreed on technical reasons. Under the circumstances, it was decided (October 2014) in a meeting with the Government of Kerala to conduct a review after successful implementation of CGD projects in Kochi, which was likely to be commissioned by December 2014.

  Pipeline laying in TN was sub judice and completion date of second phase, therefore, could not be ascertained (December 2014).

(iii) Pipelines authorized to RGTIL/Relog

- MoPNG authorized RGTIL for construction of four pipelines in March-July 2007. Subsequently, RGTIL had sought concurrence from MoPNG to implement the pipeline through Relog, its subsidiary in line with conditions of authorization order. MoPNG gave concurrence in January 2009 which delayed the entire process by 18 months.

- In all four projects, notification under PMP Act was issued during June to August 2009. Relog, however, did not commence construction activities even after a lapse of 36 months citing non development of CGD projects along the pipeline route and non-availability of NG.

- MoPNG directed (April 2009) RGTIL/Relog to advance completion date to meet requirement of existing/new market especially for Kakinada-Howrah/Haldia pipeline. The completion of Kakinada-Howrah/Haldia pipeline was critical as far as GAIL's Haldia-Jagdishpur line was concerned. Moreover, several fertilizer and industrial projects in eastern states of India were critically dependent on these lines. RGTIL/Relog did not comply with the directives and had not commenced the project.

- As per the terms and conditions of authorization order, RGTIL furnished (2007) Bank Guarantees (BG) amounting to ₹ 80 crore to the GoI for commissioning the pipeline projects as per the approved time schedule and in accordance with other specified conditions. The BGs expired in 2010. On expiry of 36 months from date of first notification under PMP Act, GoI cancelled the authorization order (October 2012) citing inordinate delay. However, as the BGs had already expired, the guaranteed amount of ₹ 80 crore could not be forfeited.

3.3.5 Authorization of pipelines by PNGRB

Section 16 of PNGRB Act, provides powers to PNGRB for issuing authorizations to lay, build, operate or expand any pipeline as a common carrier or contract carrier *etc*. GoI notified Section 16 empowering PNGRB to authorise entities with effect from 15 July 2010, after a delay of 33 months since formation of PNGRB.

Meanwhile, PNGRB notified 'Petroleum and Natural Gas Regulatory Board (Authorising Entities to lay, build, operate or expand Natural Gas Pipeline) Regulations 2008 on 6 May 2008.

During the period October 2007 to March 2013, PNGRB received EOIs from six entities for nine trunk lines in compliance to clause 4 (1) of Regulations 2008. However, as section 16 of the PNGRB Act was notified on 15 July 2010 as mentioned above, PNGRB gave its first authorisation in July 2011 whereas maximum time prescribed in 'Regulations 2008' for issue of authorization from date of EoI was 165 days. PNGRB granted authorization to six[49] pipelines so far (October 2014).

In respect of four pipelines (Mallavaram-Bhopal-Bhilwara-Vijaipur, Mehsana-Bhatinda, Bhatinda-Jammu-Srinagar and Surat-Paradeep) though entities (GSPL and GAIL) expressed interest between November 2008 and September 2009, PNGRB was not in a position to issue authorization on account of restriction till 15 July 2010. Authorizations were issued between July 2011 and April 2012.

Thus, delay of 33 months in notification of Section 16 from the date of formation of PNGRB delayed development of cross-country NG pipelines and associated infrastructure as in the intervening period neither GoI nor PNGRB was able to authorize any project inspite of demand for pipeline as discussed above.

3.3.6 Lack of effective monitoring of pipeline projects

GoI issued authorizations in 2007 for nine pipelines without setting definite start and target date for completion of project which resulted in entities not completing/commencing the projects in time. In all, out of the 23 corridors identified (Annexure 7) during 2000-2011 for completion till 2013-14, seven pipelines were completed, six were at different stages of construction[50] and 10 pipelines (7,908 km) were yet to be taken up (October 2014).

There was no effective coordination of LNG projects and pipeline projects in MoPNG which resulted in non-synchronization of LNG projects executed by PLL at Kochi and the pipeline linking project by GAIL. The customers directly affected on account of delay are FACT, Kochi and MFCL, Mangalore (two urea producing units under conversion to NG), Vypeen CCGT[51] and Kannur CCGT.

MoPNG stated that (January 2014) Kochi LNG terminal was running at about five *per cent* capacity since its commissioning in September 2013 and hence it was not correct to state that delay in execution of Kochi LNG terminal has affected the customers.

The reply ignores the possibility that the low utilisation was, in turn, due to absence of pipelines linking major demand centres.

[49] Mallavaram – Bhilwara (GSPL), Mehsana - Bhatinda (GSPL), Bhatinda - Srinagar (GSPL), Surat - Paradeep (GSPL), Shahdol - Phulpur (RGPL) and Kakinada-Srikakulam pipeline (APGDCL)

[50] Six pipelines under construction includes Bhatinda-Srinagar and Mallawaram-Bhilwara sections authorized by PNGRB in 2011 and 2012.

[51] Combined Cycle Gas Turbine

The first cross country pipeline in India was established in 1987. Thereafter, GoI could achieve a total spread of about 15,340 Km of pipelines, so far. This works out to 4.67 km/ 1000 square km of the country which is far below the gas pipeline coverage (km/square km) of other major gas consuming countries {USA (53.57/1000 square km), France (47/1000 square km)}. Thus, failure in implementing various pipeline projects which were conceived long back has resulted in non-achievement of infrastructure development envisaged in X and XI Plans.

Recommendation:

1. MoPNG should develop a mechanism, with clearly defined responsibility centres, in coordination with implementing agencies and authorities, to ensure and assess timely completion of NG pipeline and R-LNG projects across the country and cut down delays so that the desired growth in the NG sector is achieved.

Chapter-4

Impact of non-availability of NG/R-LNG

Chapter 4 Impact of non-availability of NG/R-LNG

Sale price of urea is controlled by GoI which bears subsidy on the difference between sale price and cost of production. Similarly, price of power is regulated by electricity regulatory authorities. Accordingly, any increase in cost of production in these sectors has a direct impact on exchequer/consumers. NG is considered as most suitable feedstock for producing urea and preferred fuel for power generation. Providing NG to these sectors, therefore, assumes significance. Accordingly, in addition to prioritising allocation of domestic gas to these sectors, GoI initiated various steps *viz.* to intensify domestic exploration and production activities, import NG through trans-national pipelines and in the form of LNG etc. These initiatives turned out to be inadequate to meet the demand of NG/R-LNG and these sectors either reduced production or used costlier alternate feedstock/fuels for production. Companies which were engaged in transmission of NG/R-LNG also suffered on account of non-availability of NG/R-LNG.

4.1 Fertilizer sector

Fertilizers have played a vital role in raising agricultural productivity. There has been significant improvement in domestic consumption of fertilizer, especially urea, over the years. Production capacity of urea in the country was almost sufficient to meet domestic demand up to 2004-05. Thereafter, a gap between indigenous production and demand was noticed due to lack of significant increase in production capacity commensurate with the steep growth in domestic consumption. Owing to shortfall in production, it was inevitable for GoI to import urea. Details of available production capacity, envisaged capacity enhancement, demand, production and import of urea are given in Annexure 8.

To enhance domestic production capacity, GoI formulated new pricing scheme for fertilizers (2004) and new investment policies (2008 and 2012) to attract additional investments in urea sector[52]. These schemes envisaged increase of urea production capacity through expansion of existing units, revamp of existing gas based urea plants, setting up new plants and savings on cost of production by converting existing Naphtha/FO/LSHS[53] based urea plants to NG/R-LNG based. These schemes were expected to be completed within a period of two to three years from implementation.

[52] GoI subsequently issued New Investment Policy 2012 in January 2013 which was amended in October 2014. The New Investment policy, 2012 is under implementation.

[53] Fuel Oil/ Low Sulphur Heavy Stock

Non-availability of NG has been a major constraint in implementing these projects. Therefore the envisaged increase in indigenous production capacity of urea could not be achieved so far (December 2014). Though it was evident that subsidy on import of urea was always higher than subsidy on domestic production, action taken by GoI for import of LNG and produce urea was insufficient. This was mainly due to shortfall in materialisation of plans for setting up LNG terminals, re-gasification facilities, construction of pipelines and facilitating long-term agreements with international suppliers to make available the required quantity of NG/R-LNG to priority sectors as discussed in Chapter 3. Such a situation necessitated import of urea which meant additional outgo of subsidy during the last two years upto 2012-13 as discussed in paragraph 4.1.1. The impact on subsidy burden owing to delay in conversion of existing naphtha/FO/LSHS based urea plants to NG/R-LNG based is discussed in paragraph 4.1.2.

4.1.1 Payment of subsidy on imported urea

Subsidy on fertilizers is one of the important features of Fertilizer Policy of GoI with an objective to provide adequate fertilizers to farmers at affordable prices so as to induce consumption of fertilizers at optimum level. GoI reimburses difference between statutorily notified selling price[54] of urea and domestic production cost/imported price of urea as subsidy to manufacturers/importers. The cost of domestic production of urea even using the imported R-LNG was much less than the cost of imported urea as is clear from Annexure 9 (a).

(i) Expansion of existing units and setting up of Greenfield[55] project.

There was a plan for expansion of urea projects by KRIBHCO, IGFL, RCF and IFFCO to enhance capacity by 45.05 lmtpa[56] during XI Plan. Further, after notification of new investment policy in 2008, fertilizer companies viz. KRIBHCO, IGFL, RCF, CFCL, TCL[57], NFCL[58], IFFCO, KSFL[59] had shown interest in expansion projects (85.48 lmtpa including 45.05 lmtpa envisaged in XI Plan) while Matix Fertilizers and Chemicals had shown interest in setting up a greenfield project (13 lmtpa) during XII Plan. In the absence of commitment from MoPNG on firm allocation of NG on long term basis, the investments proposed by the above companies did not fructify. Therefore, the expected capacity addition through expansion did not materialize.

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54 ₹ 5310 per MT urea w.e.f 2010 and ₹ 5360 w.e.f. 01.11.2012.
55 New ammonia-urea unit at a project site where no previous similar manufacturing facilities existed. (The identified Greenfield Project is Matix, Burdwan)
56 Lakh metric tonne per annum
57 Tata chemicals Limited, Babrala.
58 Nagarjuna Fertilizers Corporation Limited, Kakinada.
59 Kribhco-Shyam Co-operative Limited, Shahjahanpur

(ii) Revamping/modernisation of existing fertilizer plants

There was a target for enhancement of production capacity by 27.20 lmtpa through revamp of 17 existing urea manufacturing units during XI Plan. The actual achievement was only 3.30 lmtpa upto 2012-13 i.e. from 197.00 lmtpa in 2006-07 to 200.30 lmtpa in 2013-14.

(iii) Revival of closed units of Central PSUs

GoI considered feasibility of reviving closed fertilizer units[60] with a view to meeting growing demand of urea. Closed five units of Fertilizers Corporation of India Limited (FCIL) and three units of Hindustan Fertilizers Corporation Limited (HFCL) had well developed infrastructure and were strategically located in the vicinity of proposed NGG. It was envisaged in Report of Working Group for XI Plan that revival of these closed urea units in Eastern India would add an additional urea capacity of 50 lmtpa during XI Plan.

Audit examination revealed that:

- None of the units identified for revival was revived (October 2014).
- There was requirement of 17.6 mmscmd NG from MoPNG for proposed eight units of FCIL and HFCL to be revived which was to be met from Jagdishpur-Haldia pipeline (GAIL)/Mallavaram-Bilwara pipeline (GSPL)/ Kakinada-Basudebpur-Howrah pipeline (RGTIL-Relog). GoI authorized (July 2007) Jagdishpur-Haldia pipeline of GAIL to connect Barauni, Durgapur, Sindri and Haldia. Execution of this pipeline was, however, yet to commence (October 2014).
- Though the proposal for Mallavaram-Bilwara pipeline for providing connectivity to Ramagundam unit of FCIL was initiated in 2008, execution of pipeline work was yet to commence (October 2014).
- Authorisation for Kakinada-Basudebpur- Howrah pipeline was cancelled in October 2012, due to delay in implementation of the project by Relog.

Thus, none of the closed units identified for revival had been revived so far. The expected capacity addition of approximately 50 lmtpa through revival of closed urea units of HFCL and FCIL, therefore, remained unfulfilled.

Domestic production capacity of urea plants remained stagnant since 2004-05 upto 2010-11. Agricultural sector remained dependent on import of urea to the extent of 477.09 lmt during the period from 2004-05 to 2012-13 (upto March 2013) due to

[60] Units which were closed by Government in 2002 on account of technical obsolescence and financial losses: Five units of FCIL, three units of HFCL and one unit each of Rashtriya Chemicals and Fertilizers Limited (RCF), Fertilizers And Chemicals Travancore Limited (FACT) and Neyveli Lignite Corporation (NLC).

shortfall in domestic production. Subsidy outgo on import of urea during the period 2004-05 to 2012-13, was ₹ 84,359 crore.

Non-availability of NG/R-LNG has been the major constraint in further addition to indigenous capacity for production of urea. GoI could not provide assured supply of NG on a long term basis while pipeline connectivity remained insufficient which was crucial to attract fresh investment and modernization of plants in fertilizer sector. This delayed the implementation of capacity enhancement schemes. Thus the objective of enhancement of production capacity, self-sufficiency in urea production and savings on subsidy burden also could not be achieved.

Audit noticed that during 2011-12 and 2012-13, the actual domestic production of urea was 445.58 lmt against the requirement of 604.36 lmt. On account of non-implementation/materialisation of urea production enhancement projects, the entire shortfall was met through import leading to additional subsidy outgo.

MoPNG stated (July 2014) that most of demand for NG is for domestic gas and not for R-LNG.

Reply needs to be viewed against the fact that though R-LNG was expensive compared to domestic NG, it was still economical when compared to Naphtha which was the major alternate fuel used in absence of NG as is clear from figures given in Table 1. Further, demand for R-LNG is closely related to availability of infrastructure. Insufficiency of infrastructure (both pipelines and R-LNG) has already been discussed in detail in Chapter 3. Audit feels that availability of functional regulatory as well as monitoring mechanism for parallel creation of R-LNG and pipeline infrastructure would have enabled effective development of market for R-LNG as well.

Completion of revival/revamp projects was expected to take two-three years from implementation. Projects identified for implementation during XI Plan could not be commenced (October 2014) due to non-availability of pipeline and R-LNG infrastructure. Therefore, GoI lost an opportunity of saving of subsidy of ₹ 3559.96 crore[61] and ₹ 642.16[62] crore on urea during 2011-12 and 2012-13 respectively. This impact has been worked out considering use of long term R-LNG (not domestic NG) and also after considering the Capital Related Charge[63] (CRC) on the basis of estimated investment in expansion, revamp and revival projects. (Annexure 9 a, b and c).

[61] Based on subsidy savings of ₹ 4,738.22 per MT calculated as:
{Subsidy on imported urea *less* (average normative cost of urea per MT using R-LNG at the rate of ₹ 1933 per G Cal considering energy norms of each fertilizer unit *plus* average estimated capital related charge per MT)}

[62] Based on Subsidy savings of ₹ 808.03 per MT calculated as:
{Subsidy on imported urea *less* (average normative cost of urea per MT using R-LNG at the rate of ₹ 2847.62 per G Cal considering energy norms of each fertilizer unit *plus* average estimated capital related charge per MT)}

[63] Capital Related Charge is derived after considering (1) interest rate of 12% *pa* on the debt (2/3 of capital cost) (2) return on equity 18 (1/3 capital cost) and (3) depreciation 15% (95% of capital cost)

4.1.2 Increase in cost of production due to use of costlier feedstock

GoI in its policy for stage-III of new pricing scheme for urea manufacturing units (March 2007) targeted conversion of all[64] functional naphtha and FO/LSHS based units to NG/R-LNG based within a period of three years (i.e. by 2009-10). None of the nine fertilizer units planned for conversion were converted to NG till 2011-12, five units got converted in 2012-13 and one unit was converted in 2013-14 (October 2014) (Annexure 10). Three units were in the process of conversion. (October 2014).

Accordingly, till October 2014 there were 30 urea producing units in the country of which 27 were gas based and remaining were based on other feedstock. Other feedstocks viz. naphtha, fuel oil (FO) and low sulphur heavy stock (LSHS) are costlier than NG/R-LNG. Moreover, the naphtha/FO/LSHS based units are less energy efficient and have a higher production cost.

GoI reimburses the difference between the cost of production and the statutorily notified sale price of urea as subsidy. Hence any increase in cost of production on account of use of costlier feedstock results in extra subsidy burden on the exchequer. Conversion of these nine units to NG prior to 2010 as targeted, would have resulted in savings in cost of production of urea of ₹ 2330.43 crore, ₹ 3827.98 crore and ₹1515.41 crore, for the years 2010-11, 2011-12 and 2012-13 respectively (Annexure-11 a, b, c & d) even after considering the CRC[65] on the basis of estimated investment in conversion projects.

DoF stated (January 2014) that uninterrupted supply of NG to the plant was a pre-requisite for conversion of Naphtha-FO/LSHS based urea plants to NG based urea plants. This was possible only when there was pipeline connectivity to the plant and assured gas allocation. Gas allocation was in the hands of MoPNG and establishment of gas pipeline was done by companies under the administrative control of MoPNG. In addition, R-LNG terminals had not yet been built to supply R-LNG to three units. Conversion, therefore, got delayed and this was beyond the control of DoF. MoPNG accepted (July 2014) that one of the constraints was non-connectivity of pipeline.

64 MCFL (Magalore), DIL (Kanpur), ZACL (Goa), NFL (Bhatinda, Panipat and Nangal), SPIC (Tuticorin), GNVFC (Bharuch) and MFL (Manali, Tamil nadu) : DIL, Kanpur was not functional upto May 2013.

65 Capital Related Cost is derived after considering (1) interest rate of 12% pa on the debt being 2/3 of capital cost) (2) return on equity 18% being 1/3 capital cost and (3) depreciation 15% being 95% of capital cost

4.2 Power sector

Electricity is an essential requirement on which socio-economic development of the country depends. National Electricity Policy (NEP), formulated (2005) by GoI therefore, aimed at accelerated development of this sector. NEP estimated requirement of need based capacity addition of more than one lakh MW during X and XI plans to provide over 1000 Kwh per capita electricity by 2011-12. Against this estimate, the country could achieve capacity expansion of 94,831 MW and 883.66 Kwh per capita electricity till the end of XI Plan[66].

During 2002-03 to 2012-13, the energy demand and peak hour demand registered 83 *per cent* and 66 *per cent* increase respectively. The actual generation, however, fell short of demand mainly due to limited availability of fuels. This led to energy deficit and peaking deficit at an identical nine *per cent* at the end of 2012-13[67]. Though there was 113 *per cent* increase in generation capacity, the deficit could not be wiped out on account of inadequate fuels (all types of fuels including coal, NG *etc*.).

As per NEP, use of NG as fuel for power generation depends on its availability at reasonable price. NEP envisaged that new power generation capacity based on indigenous NG at reasonable price would emerge as a major source of power. NGG covering various parts of the country could facilitate development of such capacity. Imported LNG based power plants are also a potential source of electricity generation and the pace of their development would depend on their commercial viability. The existing power plants using liquid fuel were to shift to use of NG or R-LNG at the earliest, to reduce cost of generation.

NG based power plants have low gestation period, low capital cost and lesser strain on resources like land and water. Moreover, NG based projects are ideally suited for meeting peaking requirements.

Based on preparedness of projects, Working Group on Power for XI Plan envisaged capacity addition of about 68,869 MW including 2,114 MW from NG/R-LNG fired plants. As availability of NG supply to the existing gas based power stations was inadequate and the plants had been operating at around 58 *per cent* to 60 *per cent* Plant Load Factor (PLF), the Working Group *inter alia* recommended GoI to ensure that assets like gas based power plants which had been set up with substantial investments were not stranded/idle or inadequately utilized on account of constraints of NG/infrastructure availability and should get priority over new units.

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66 Installed capacity increased from 1.05 lakh MW at the end of IX Plan to 2.23 lakh MW on 31.03.2013, an increase of 1.18 lakh MW. The per capita electricity at the end of 2012-13 was 917.2 units (Source: Growth of Electricity sector in India- Table 1- CEA).

67 Energy demand increased from 545674 GWh in 2002-03 to 998114 GWh in 2012-13 and Peak demand increased from 81492 GWh to 135453 GWh during the same period (Source: Growth of Electricity sector in India- Table 9 - CEA)

During XI Plan, the actual capacity addition of gas based plants was 5,936.58 MW including projects carried over from X Plan. Year wise capacity addition of gas based stations for the last 10 years ending March 2013 is given in Annexure 12. At present, (2012-13) gas based plants account for nine *per cent* of all India installed capacity[68]. As there was moderate capacity addition to gas based stations, demand of NG increased from 48.26 mmscmd in 2002-03 to 135 mmscmd in 2012-13 to run these plants at 90 *per cent* PLF.

A report submitted to GoI in 2004 by the 'Expert Committee on Fuels for Power Generation' under the aegis of Central Electricity Authority (CEA) assessed the competitiveness of NG for power generation. The Committee analysed various fuel options for varying distances between the location of fuel source and the load centre for base load (80 *per cent* PLF) and peaking plants (30 *per cent* PLF). The study included LNG as an optional fuel and concluded that for base load operating plants (at 80 *per cent* PLF and 800 Km between the source and load centre) LNG ranked (Rs 2.29/ kWh) above the liquid fuels like Naphtha (₹ 4.46/kWh) and Diesel (₹ 5.96/kWh) in terms of cost of generation.

MoP opined that (October 2014) in view of substantial increase in LNG price in international market, the findings of the study might not be true in the present context as LNG based power generation was very costly and non-despatchable. MoP also stated (January 2015) that price of imported RLNG rose to a level which rendered power generation based on imported RLNG completely uneconomical.

Reply of MoP and audit observation need to be viewed in the context that there were gas based plants in the country which were suffering generation loss on account of non-availability of NG/R-LNG and plants having arrangement for alternate fuel had to use costlier fuels as mentioned in subsequent paragraphs.

Further, audit analysis given in Table 1, reveals that generation cost of power based on long term R-LNG would have been economical as compared to generation cost on Naphtha. This analysis was based on comparison of year wise long term R-LNG price availed by GAIL with corresponding prices of Naphtha. This underlines the deficiency in planning at various levels due to which, on the one hand, gas based power plants were established and on the other hand, co-ordinated approach for infrastructure development for supply of NG/R-LNG such as NGG, R-LNG infrastructure to facilitate procurement of NG on long term contract basis, was lacking.

Inadequate steps taken to meet shortage of NG/R-LNG led to a situation where gas based power plants suffered losses as observed below:

- As on 31 March 2013, there are 55 major gas based power plants with a total installed generation capacity of 18,362.27 MW. As against total requirement of

[68] Coal is the main fuel (fifty *per cent*) in India's energy sector followed by hydro (eighteen *per cent*)

90.70 mmscmd NG for operating these plants at 90 *per cent* PLF, actual availability was 40 mmscmd only. Availability of NG/R-LNG to these plants was short of demand during the ten years period ending 2013 resulting in underutilization of installed capacity. CEA had worked out loss of generation of power to the extent of 66,129.10 Million Units (MUs) for the period 2008-09 to 2012-13 due to short supply of NG[69] as reported by power units. (Annexure 13**).** Financial impact on account of above loss of generation could not be worked out by Audit as cost of production as well as supply price of electricity varies from state to state.

- Where there is a provision for use of alternate fuel in gas based plants, generation loss on account of non-availability of NG was compensated by using Naphtha and HSD. As cost of these liquid fuels is comparatively higher, cost of power is proportionately increased. It could be seen from Annexure 13 that during the period 2008-09 to 2012-13, gas based plants had used 31.35 Lakh Kilo litres Naphtha and 5.01 Lakh Kilo litres HSD to make up non-availability of NG/R-LNG. Based on the computation of cost of power by 'Expert Committee on Fuels for Power Generation', increase in cost of power due to using Naphtha instead of R-LNG[70] would work out to an estimated ₹ 482.34 crore, ₹ 1023.08 crore and ₹ 869.91 crore during 2010-11, 2011-12 and 2012-13 respectively (Annexure 14) which was ultimately passed on to consumers.
- Combined Cycle Power Plant of NTPC at Kayamkulam (set up in 1998-99) was planned with Naphtha as primary fuel and later to be operated on NG available from the proposed LNG terminal at Kochi. LNG terminal which was originally planned for commissioning in 2001-02, was commissioned in September 2013. Pipeline connectivity linking LNG terminal and power plant though envisaged in the gas grid project (2000) was yet to be undertaken (October 2014). As LNG project/pipeline was indefinitely delayed, Kayamkulam plant is yet to be converted to NG (October 2014), and was using costlier fuel (Naphtha) for generation of electricity. During the period 2008-09 to 2010-11, a quantity of 14.83 lakh Kilo litres Naphtha and HSD was used to produce 6342.87 MUs in the absence of NG/R-LNG.

Thus, non-availability of NG/R-LNG at affordable rate and inadequate pipeline infrastructure resulted in higher generation cost of power. Moreover non-availability of NG had forced CEA to issue (March 2013) an advisory to all the developers of power plants not to plan any gas based power plants till 2015-16.

[69] This generation loss is computed after considering the power generated by using costlier fuels like Naphtha and HSD
[70] Rate of R-LNG at long term contract rate is taken for computation

4.3 Pipeline infrastructure providers

Underutilization of pipeline capacity

At present, the country possesses 15,340 km length of NG pipeline infrastructure with a capacity to transmit 395 mmscmd NG (Annexure 15). NG domestic production available for sale fell substantially from 126.14 mmscmd (2010-11) to 79.4 mmscmd (2013-14) leading to widening gap between demand and supply. Resultantly, R-LNG gained importance as a viable option for meeting the demand. LNG is imported either under long term agreement or through spot[71] purchase from major LNG suppliers. Currently (2013-14), total LNG imports to the country is 10.76 mmtpa (38.74 mmscmd), out of which 7.5 mmtpa (27 mmscmd) LNG is being procured under long term contract[72]. At present, the total re-gasification capacity is 22 mmtpa (79.2 mmscmd).

It was noticed that up to 2004-05, the country had two LNG terminals with re-gasification capacity of 7.5 mmtpa which increased to 22 mmtpa only during 2013-14. Delay in creation of R-LNG infrastructure (as discussed in Chapter 3) led to non-availability of LNG at affordable price through long term arrangement and obstructed development of LNG trade in the country. In the absence of long term arrangements, spot cargoes were imported at costlier price based on demand. This again was hampered due to slot availability constraints at LNG terminals.

Non availability of LNG at affordable price along with substantial reduction in domestic production of NG led to underutilization of existing pipeline capacity as discussed below:

- Total transmission capacity in the country was increased from 309 mmscmd in 2011-12 to 395 mmscmd in 2013-14. The average capacity utilization, however, reduced from 64 *per cent* in 2011-12, 60 *per cent* in 2012-13 to 47 *per cent* in 2013-14 (Annexure 15).
- Total length of pipelines owned by GAIL (2013-14) is 10,841 Km making it the leading pipeline infrastructure provider[73] in the country (71 *per cent*) with transmission capacity of 244 mmscmd. Average utilization of transmission capacity, however, fell from 72 per cent (2011-12) to 68 per cent (2012-13) and 45 per cent in 2013-14**.**

[71] Spot trading is market, where R-LNG is bought and sold on daily basis.

[72] Long term contract between Petronet LNG Limited (PLL) and Ras gas, Qatar

[73] Gujarat State Petronet Limited (GSPL) 1874 Km (twelve *per cent*) and Reliance Gas Transportation Infrastructure Limited (RGTIL) 1469 Km (ten *per cent*)

Thus, existing capacity of pipeline infrastructure is underutilized for want of NG/R-LNG. Low capacity utilization would have an adverse effect on commercial interest of companies providing transmission infrastructure.

GAIL stated (August 2014) that utilisation of gas pipeline infrastructure takes place over the years. Major factors upon which gas pipeline utilisation depends are availability and affordability of gas, industrialisation, Government policies etc. Specific reasons for underutilisation were low production from KG D6 field; non development of consuming sectors especially CGD, high price of R-LNG e*tc.*

MoPNG stated (January 2014) that in view of lack of customers, gas marketers were cautious in entering into long term gas purchase agreement with exporters. Therefore, slow development of LNG terminal was not the only cause for underutilisation of existing pipelines.

Reply needs to be viewed against the fact that actual utilisation of pipelines is much below even compared to en-route demand as assessed by respective entities before setting up the pipeline. GAIL replied (December 2014) that this was mainly due to non-materialisation of projects planned by various NG consuming sectors.

Recommendation:

2. MoPNG in coordination with DoF and MoP may consider setting up of Inter Ministerial Committee that could suggest:
   i. A time bound action plan for synchronising implementation of NG pipeline projects and revival of fertilizer units so that benefit of NG as feedstock may be derived optimally besides reducing import of urea.
   ii. Measures to create required infrastructure to provide NG/R-LNG to Power Sector at affordable price so that capacity created in the sector is adequately utilised.

Chapter-5

Supply of Natural Gas

Chapter 5 Supply of Natural Gas

5.1 Gas allocation/ utilization policy

Considering the demand, availability and imputed economic value of NG in various sectors, Gas Linkage Committee (GLC) allocated (till 2005) NG (APM Gas) from nominated blocks of NOCs to various consumers. Allocations were made based on the requests received from prospective consumers and the recommendations of concerned Ministries, depending on the availability of NG in the concerned region. In view of the importance of fertilizer and power sectors in the national economy, preference in allocations was given to these two sectors. As there was no further APM gas available for allocation to new consumers, GLC was wound up in November 2005.

Thereafter, GoI constituted (2007) an Empowered Group of Ministers (EGoM) to decide issues pertaining to commercial utilization of gas produced under NELP. Meanwhile, GoI allowed (2010) NOCs to sell NG from new fields in their nominated blocks at approved non-APM rate. Accordingly, MoPNG formulated (October 2010) a policy on pricing and commercial utilisation of non-APM gas produced by NOCs which maintained sector wise priority[74].

As far as allocation of NG from NELP fields was concerned, EGoM had decided following principles:

i) As a matter of general policy, NG produced/imported should be stripped off its higher fractions[75], subject to availability, to ensure maximum value addition before supply to consumers.

ii) Sale of NG by NELP contractors would be based on the following guidelines:

   a) Contractors would sell NG from NELP in accordance with the marketing priorities determined by GoI and the sale would be on the basis of the formula determining the price as approved by GoI.

   b) Consumers belonging to any of the priority sectors should be in a position to actually consume gas as and when it becomes available. So the marketing priority did not entail any 'reservation' of gas. It implies

[74] Order of priority :- Gas based fertilizer units, LPG plants, Power plants supplying power to grid, CGD for domestic and transport, steel, refineries & petrochemicals for feedstock, CGD for industrial and commercial customers, any other customer for captive & merchant power, feedstock or fuel purpose

[75] Methane (C1) is the predominant component in Natural Gas. Extraction of other components with higher carbon content viz Ethane (C2), Propane (C3), Butane (C4) etc for being used in production of other products such as polymers, LPG etc is known as stripping of higher fractions.

that in case consumers in a particular sector, which is higher in priority, were not in a position to take gas when it became available, it would go to the sector which was next in order of priority.

c) In case of default by a consumer under a particular priority sector and in the event of alternative consumers not being available in the same sector, the gas would be offered by the contractor to other consumers in the next order of priority.

d) The priority for supply of gas from a particular source would be applicable only amongst those customers who are connected to existing pipeline network connected to the source. So, if there was a marginal or small field that was not connected to a trunk pipelines or grid network, the contractor would be allowed to sell to consumers who were connected or could be connected to the field in a relatively short period (of say three to six months).

EGoM then decided to allot NG in the following order of priority:

- Existing gas-based urea plants
- Existing gas-based LPG plants
- Existing grid-connected and gas-based power plants
- CGD network for domestic and transport sectors

A decision was also taken to supply NG to steel, petrochemicals and refineries for feedstock purposes, CGD networks for industrial and commercial customers, other gas based fertilizer plants and to captive power plants.

The sector wise priority for allocation of indigenous gas was formulated to serve the larger public interest. Details of sector wise allocations made so far are given in Annexure 16**.** It could be seen that the allocation of domestic NG was to the tune of 236.79 mmscmd which was far in excess of available domestic production of 95.00 mmscmd.

5.2 Role of GAIL (India) Limited in supply of NG at regulated price

GAIL was incorporated in August 1984 as a Central Public Sector Undertaking under MoPNG. GAIL plays a key role as a NG market developer in India and holds around 60 *per cent* share in India's gas market. Major supplies of NG include fuel to power plants, feedstock for gas-based fertilizer plants, LPG extraction *etc*.

GAIL as a GoI nominee holds the right to procure and sell gas from existing fields of ONGC, OIL, Tapti, Panna-Mukta and Ravva. NG from existing fields of nominated blocks of ONGC and OIL is supplied at the price fixed by GoI and as per allocations whereas NG from pre-NELP/NELP fields is sold at the price as per respective Production Sharing Contracts.

GAIL also maintains a gas pool account on behalf of GoI to take care of gain or loss from supply of APM/non-APM gas to consumers of APM/non-APM gas. Therefore, GAIL is required to exercise prudent control over the gas supply transactions to ensure that supply of NG is in line with the gas allocation policy and takes care of financial interests of GoI.

5.3 Absence of mechanism for monitoring end use of NG

Power and fertilizer sectors being critical to economic development of the country, receive about 69 *per cent* of domestic gas at APM price through allocation. GoI decided (June 2005) to supply all available APM gas to power and fertilizer sector consumers against their existing allocation along with other specific end users committed under Court orders/small scale consumers having allocation up to 0.05 mmscmd at the revised price of ₹ 3200/mscm[76]. It was also stipulated that consumers other than those specified in the order and getting existing gas supplies through network of GAIL, would be supplied NG at market related price.

Audit noticed instances where available APM gas was not utilised for the specified purpose mentioned in the GoI order. In fertilizer sector this results in loss of production of urea with resultant avoidable extra burden on subsidy/under realisation in Gas Pool account. In other sectors, non-recovery of market rate results in under realisation in the Gas Pool account. These issues are discussed in paragraphs 5.3.1 to 5.3.3.

5.3.1 Fertilizer sector

There are 30 urea units in the country (as on October 2014). Out of these, 27 units use NG (either domestic/R-LNG or both) as feedstock and fuel and remaining three urea units[77] use naphtha as feedstock and fuel. Regarding utilization of NG from domestic source in fertilizer sector, MoPNG directed (July 2006) that products other than fertilizers were not covered under supply of APM and the quantity of APM gas utilized for manufacturing products other than fertilizers should be charged at market

76 Metric Standard Cubic Meter
77 Mangalore Chemicals and Fertilizers Limited (MCFL), Madras Fertilizers Limited (MFL) and Southern Petrochemicals Industries Limited (SPIC)

price. Market price was defined as price depending on the producer price being paid to joint venture and private operators at land fall point subject to a ceiling of ex-Dahej R-LNG price.

MoPNG directed (October 2009) GAIL to charge market rate for the APM gas utilized by fertilizer units for manufacturing products other than fertilizers from 1 January 2009. As regards period before 1 January 2009, it was directed that GAIL should examine financial implication of charging APM rates for chemicals, both on Gas Pool account/GAIL in terms of revenue forgone as well as on GoI subsidy and losses to the concerned companies *etc*.

GAIL, repeatedly requested Fertilizer Industry Coordination Committee[78] (FICC) and DoF to provide details regarding usage of NG for fertilizer and non-fertilizer purpose for which they did not receive reply till July 2014.

Audit noticed instances of use of APM gas for other than specified purpose by three fertilizer units[79]. Non- implementation of GoI directives for billing of gas utilised in production of products other than fertilizer at market rate and extra burden on subsidy were commented upon in the Reports of the Comptroller and Auditor General of India, Union Government (Commercial)[80]. It was also pointed out in the Reports that there was lack of effective coordination between MoPNG and DoF in resolving the issue. For the period beginning January 2009, the chances of sub-optimal recovery in Gas Pool account and excess payment of subsidy on fertilizer production in the absence of mechanism to verify usage of NG in GAIL were also reported.

Audit subsequently noticed (2013) that four fertilizer units (CFCL I and II, KSFL, IGFL and TCL) had not utilised entire quantity of APM gas received by them during 2010-11 and 2011-12 for specified purpose. GAIL, however, was yet to recover non APM price amounting to ₹ 5.34 crore[81] (Annexure- 17 a) for the quantity of APM gas not utilised for production of urea. This shows that a mechanism for ascertaining utilisation of NG supplied at regulated price was still not effective in MoPNG/GAIL and DoF.

Regarding utilization of NG supplied at APM rate, DoF stated (February 2012) that quantity of NG used by units for any other purpose apart from production of urea would be ascertained and differential price from either imported ammonia or any other benchmark would be recovered from the units. EGoM directed (February 2012) DoF

[78] FICC, an attached office under DoF, is responsible to evolve and review periodically, the group concession rates including freight rates for units manufacturing nitrogenous fertilizers, maintain accounts, make payments to and to recover amount from fertilizer companies, undertake costing and other technical functions and collect and analyse production data, costs and other information. FICC computes concession rate for urea (as per the norm fixed by the GoI) based on which quantum of subsidy for urea is decided.

[79] Deepak Fertilizers and Petrochemicals Corporation Limited, Rashtriya Chemicals & Fertilizers Limited and Gujarat Narmada Valley Fertilizers & Chemicals Limited.

[80] Para No. 13.2.1 of Audit Report no. 9 of 2009-10 & Para no. 11.6 of Audit Report no. 8 of 2012-13.

[81] Amount recoverable has been estimated as the difference between APM price charged to respective units and non-APM price approved by GoI along the HVJ pipeline as per the methodology adopted by GAIL.

to frame specific guidelines by May 2012 to exercise control over usage of APM gas. DoF, subsequently referred (September 2014) the issue of framing guidelines for effecting the undue gains by Phosphatic and Potassic Fertilizer units to the Inter-Ministerial Committee[82].

MoPNG stated (January 2014) that despite follow up with DoF to furnish quarterly utilisation certificates for APM gas, the requisite details had not been furnished by DoF. As GAIL did not have a mechanism to evolve a system on its own to ascertain the quantity of NG utilised by fertilizer units for manufacturing non fertilizer products and for its billing at market rate, MoPNG suggested following modalities (July 2014) to GAIL for necessary action:

- For all future gas supplies to fertilizer units, GAIL would insist on quarterly returns certified by FICC, failing which GAIL would charge non APM rates for entire gas.
- For past period, GAIL would issue notice to all fertilizer units to submit utilisation certificates indicating usage of supplied gas within a period of three months from 29 November 2013 duly certified by FICC, failing which GAIL would raise invoices for differential amount between non APM and APM gas price for the entire period and quantities of past supplies.

GAIL accordingly informed (August 2014) fertilizer units to furnish the required certificate to which compliance by fertilizer units is awaited. DoF, however, stated (October 2014) that there is a practical difficulty in giving certificate of NG usage by FICC in respect of urea units. FICC relied upon invoices raised by GAIL for quantity of NG supplies and as GAIL had its manpower deployed at supply points, GAIL should develop a system to check the usage of NG.

Regarding non recovery of market price from four fertilizer units (CFCL I and II, KSFL, IGFL and TCL) for the quantity of APM gas not utilised for production of urea, DoF stated (October 2014/January 2015) that, in the production process of urea, ammonia and carbon dioxide (CO_2) are produced first and ammonia so produced is converted into urea with available CO_2. However, it often happens that entire ammonia produced cannot be converted into urea due to reasons like interruptions in plant, limitation of quantity of available CO_2 in the NG *etc*. Further, due to limited storage facility and safety reasons, the surplus ammonia beyond safe level is sold off by units. The gain to the fertilizer unit by sale of this surplus ammonia is shared between GoI and the fertilizer unit and this revenue was more than market rate recoverable from the unit for NG not utilised for production of urea. Hence production of surplus ammonia by using APM gas was not to be viewed as diversion of APM gas.

[82] Constituted under the Nutrient Based Subsidy Policy with representatives from MoPNG, DoF and Ministry of Law.

In respect of four units mentioned above, amount recovered towards share of GoI in the gain on sale of surplus ammonia as intimated by DoF was ₹ 35.85 crore. This should be viewed against the following facts:

- In all these cases there was sufficient achievable capacity. Non production of urea, therefore, led to shortfall in meeting the demand which was met by means of import.

- Subsidy on imported urea was always higher than the subsidy on domestically produced urea.

- One of the reasons put forth by DoF for non conversion of excess ammonia to urea was non availability of sufficient CO_2 in the lean gas. This may be viewed against the fact that GAIL removes CO_2 from NG in HVJ pipeline as per production process of petrochemicals. Lean gas, which is stripped off higher fractions and CO_2, is then sent back to HVJ pipeline for supply to other consumers. KSFL, CFCL, TCL and IGFL draw NG from this pipeline. Therefore, on the one hand, GAIL is removing CO_2 from NG and on the other hand, fertilizer units are facing shortage of CO_2. DoF/MoPNG may examine possibilities of augmenting availability of CO_2 to fertilizer units on the basis of economic feasibility and viability as this would go towards reducing the burden of subsidy on GoI. In the case of only four units mentioned above, non conversion of excess ammonia led to production loss of urea to the extent of 147.79 TMT during the year 2010-11 and 2011-12. Average differential subsidy on urea produced by these units and urea imported was ₹ 8998 and ₹ 16199 per MT during 2010-11 and 2011-12 respectively. Therefore, estimated amount of subsidy that could have been saved by converting entire ammonia into urea would be ₹ 196 crore (Annexure 17 b), which is far more than ₹ 35.85 crore recovered by GoI towards share of gain on sale of surplus ammonia. Other reasons attributed by DoF are urea plant interruptions and lack of storage facility for ammonia which are required to be tackled separately at plant level.

- GAIL recovers non-APM rate for the quantity of APM gas used for other than specified purpose as per the existing orders. It was, however, noticed that after implementation of new gas price policy, price of APM gas and non-APM price have become equal with effect from 1 November 2014. In this scenario, rate at which recovery would be effected for quantity of NG diverted for other than specified purposes needs to be decided.

5.3.2 Power sector

MoPNG directed (June 2006) that as far as power sector consumers were concerned, APM price would be applicable only for those quantities of gas which were used for generation of electricity for supply to the grid for distribution to consumers through public utilities/licensed distribution companies.

Instances of use of APM gas for other than specified purposes were commented in the Reports of Comptroller and Auditor General of India, Union Government (Commercial)[83]. It was pointed out that GAIL failed to comply with directions of MoPNG and extended undue benefit to seven private power producers[84] generating and supplying power to their end users at commercially agreed rate under wheeling arrangement. At the instance of Audit, GAIL started recovering market driven price for the gas consumed by these consumers from November 2011. These consumers, however, invoked arbitration clause against the action taken by GAIL for recovery of ₹ 246.16 crore for the period prior to November 2011. The matter is under various stages of arbitration and recovery is pending (October 2014).

Audit further noticed that GAIL failed to evolve an effective system to arrest such unauthorized use of APM gas despite deficiencies being pointed out. Two instances, where GAIL failed to detect unauthorized use of APM gas by consumers timely and to take action for recovery of market rate from them as noticed in Audit are discussed below:

- Andhra Pradesh Gas Power Corporation Limited (APGPCL) is a public limited company formed (October 1988) to set up a gas based power generating station in Andhra Pradesh (AP). The company was initially promoted by Andhra Pradesh State Electricity Board (APSEB) along with other Central and State PSUs and private sector entities. The Company was later transformed into Public Private Partnership (PPP) model with 26 per cent equity participation of APSEB. As per Memorandum of Understanding (MoU) entered into between shareholders (October 1988 and April 1997), the power generated is distributed among its shareholders (Annexure 18) on cost to cost basis.

- APGPCL was getting APM gas as per allocation and in accordance with the agreement between APSEB and GAIL (November 1990). The agreement was revised (January 1997) by increasing the quantity[85] and

83 vide Para no. 12.2 of Audit Report No 3 of 2011-12 and para no. 11.5 of Audit Report No 8 of 2012-13

84 Sai Regency Power Corporation Private Limited, Arkay Energy (Remeswaram) Limited, Coromandel Electricity Company Limited, OPG Energy Pvt. Limited, Saheli Exports Private Limited, Kaveri gas power Limited and MMS steel & Power Limited

85 Quantity of gas to be supplied was increased from 0.4 to 0.5 mmscmd (0.4 on firm and 0.1 on fall back basis)

extended from time to time. The present Gas Sales and Transmission Agreement (GSTA) is valid upto 31 December 2015 for supply of 1.22 mmscmd gas as per allocation at APM rate of US$ 4.2/mmbtu[86].

- GAIL entered into gas supply contract for supply of gas to Andhra Fuels Limited (AFL) in May 1996 which was extended from time to time. Present agreement was entered into (December 2010) for supply of 0.1 mmscmd gas on firm and/or fallback basis as per allocation at APM rate of US $ 4.2 per mmbtu.

Both APGPCL and AFL were using APM gas for captive consumption since beginning. APGPCL was sharing power at the price fixed by a committee of Directors, among its shareholders under wheeling arrangement and AFL was reselling NG to another consumer. Utilisation of APM gas, therefore, was not in conformity with the MoPNG directives. It was mandatory for GAIL to charge market rate for the quantity of gas consumed in accordance with pricing order of June 2005.

Audit noticed that market rate was not charged till 2013 owing to deficiencies in the system of gas supply contract management as discussed below:

- Article 17 of GSTA stipulated that buyer shall neither sell gas to any other party nor use it for any other purpose other than those contemplated unless and otherwise approved by GoI and/or mutually agreed to in writing by the buyer and the seller. It may be noted that GAIL is acting as GoI nominee with the right to procure and sell APM Gas as per allocations. Therefore, incorporation of a clause in GSTA, permitting buyer to use the gas for purpose other than those contemplated therein with mutual agreement between buyer and seller, defeated the very principle behind allocation of a scarce natural resource.

- The agreement did not include a clause/article permitting GAIL to verify end use of NG and charge non-APM rate in case of misuse.

- Government of AP constituted an institutional arrangement viz. Andhra Pradesh Power Coordination Committee (APPCC) in June 2005 to co-ordinate the affairs of distribution licensee companies of AP. GAIL had an option to verify the credentials of APGPCL and AFL with APCC in 2005. However, GAIL obtained information from APPCC only in September 2012.

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[86] Million Metric British Thermal Unit

APPCC confirmed (September 2012) that APGPCL supplied 21 *per cent* (share of APSEB) of power generated by it to the grid for public purposes under Power Purchase Agreement (PPA) and AFL did not supply power to the grid (AP TRANSCO). Based on this information, GAIL raised (January 2013) debit note of ₹ 308.91 crore[87] on APGPCL towards difference of APM and non-APM price for the quantity of NG consumed to the extent of 79 *per cent* for the period July 2005 to December 2012. Similarly, debit note of ₹ 27.18 crore[88] towards difference of APM and non-APM price for the quantity of gas supplied to AFL for the period July 2005 to February 2013 was issued in February 2013.

In both cases GAIL supplied APM gas as per allocations and in terms of agreement with consumers. The agreement *inter alia* specified the applicable rate for gas as APM. The agreement was revised periodically with the same terms and conditions. Consumers in both the cases proceeded for legal remedy. As a decision in this regard was awaited, GAIL had not demanded (October 2014) market rate even for the subsequent period from both consumers.

GAIL stated (October 2013) that it delivered gas to consumers at delivery point where the quantity of gas supplied was measured by a single meter. Beyond delivery point, it was the customer who made arrangement to take the gas for usage at various locations. Since delivery of gas was completed as per contract at the delivery point, GAIL had no authority to ascertain the usage of power produced by the gas supplied to customers. GAIL further stated (August/December 2014) that specific clarification sought from MoPNG in 2006-07 regarding applicability of APM price to various groups of power customers was not received.

MoP stated (January 2015) that verification would be carried out if there was complaint or doubt about utilisation of gas, but that no such case had come to notice of the Ministry, so far, regarding gas supplied by GAIL.

The replies need to be viewed against the facts that:

(i) GAIL, being the GoI nominee for supply of NG, should have verified the utilization of gas supplied at APM rate by incorporating an enabling provision in the agreement to that effect. Moreover, as allocation of APM gas to the units in power sector was made on the recommendation of MoP, a proper mechanism to verify the end use of power produced by them should also have been in place in MoP.

(ii) Instances of utilisation of APM gas for other than specified purposes by seven power producers were reported in previous Audit Reports of CAG (para no. 12.2 of Audit Report no. 3 of 2011-12 and para no. 11.5 of Audit Report no. 8 of 2012-13). An amount of ₹ 246.16 crore was pending recovery by GAIL in these cases. Further,

87 ₹ 308.91 crore includes ₹ 39.12 crore towards VAT@ 14.5%
88 ₹ 27.17 crore includes ₹. 3.44 crore towards VAT @ 14.5%

cases of two more power producers i.e. APGPCL and AFL have also been mentioned in this Report where power was being used for captive consumption instead of being supplied to the grid for distribution to consumers, which was not an authorised use of APM gas. Recovery of ₹ 308.91 crore and ₹ 27.18 crore was pending from APGPCL and AFL respectively, on this account.

5.3.3 Small scale consumers

GAIL was supplying APM gas to small scale consumers as per the allocations and in terms and conditions of GSTA. MoPNG *inter alia* stipulated (June 2005) that any supply beyond APM allocation would have to be made at non-APM/market related price. Audit noticed that though GSTA provided for recovery of price at any time in future as per directive, GAIL did not enforce the clause within the validity period of existing agreement with consumers in Vadodara region.

MoPNG issued a further directive (February 2010) clarifying that any supply beyond APM allocation would have to be made at non-APM rates in accordance with gas pricing order of June 2005. On the above direction, GAIL started recovering non-APM price prospectively i.e. with effect from April 2010 for supply made beyond allocation. However, GAIL did not initiate action for recovery of arrears for the past period i.e. 1 July 2005 to 31 March 2010 before expiry of existing agreement until May 2012. Raising a claim for past period after the expiry of existing agreement led the consumers to go for legal remedies. This resulted in non-recovery of ₹ 43.01 crore (Annexure 19).

GAIL stated (November 2013) that MoPNG had addressed the issue of utilization of gas from small/isolated fields through revised guidelines (July/August 2013). The guidelines stipulated that if the average drawal quantity in last six months of a customer drawing gas from small/isolated fields had been more than its allocation (APM and/or non-APM allocation taken together), such excess quantity over and above its allocation should be allocated on 'fall back' basis. This additional fall back allocation was to be at non-APM price as notified by GoI from time to time.

GAIL further stated (August/December 2014) that pricing order dated 20 June 2005 had no provision for charging non-APM price for quantities supplied beyond allocation. The reply needs to be viewed against the fact that point no. (iv) of the said pricing order inter alia stipulated that "Consumers other than fertilizer, power and specific end users committed under Court Orders/Small Scale Consumers having allocations up to 0.05 mmscmd and getting existing gas supplies through GAIL network, would be supplied natural gas at market related price". Moreover, MoPNG order dated 9 February 2010 was only an order reiterating the terms of order dated 20 June 2005.

The fact, therefore, remains that GAIL did not recover market rate from 18 small scale consumers in Vadodara region who were using NG in excess of allocation and by not enforcing the pricing order of June 2005 timely led to non-recovery of ₹ 43.01 crore.

5.4 Low off-take of allocated quantity by fertilizer units

As per computation of Fertilizer Association of India (FAI) in June 2011, by using one mmscmd KG D6 Gas (based on energy content of 8200 KCL/SCM which makes approximately 1400 MT urea) instead of other alternative feedstock,the saving in production cost of urea would be ₹ 556 crore per annum. Therefore, it was essential to utilize available NG at APM rate to the maximum extent possible for production of urea. Underutilization of available NG not only results in loss of production but also leads to import of more urea. This leads to payment of extra subsidy as the subsidy paid on imports is more than the subsidy paid on domestic production.

Test check revealed instances where certain units did not fully utilize NG supplied to them at APM rate to optimum level, causing loss of production. All these units had further achievable production capacity. During the same period, none of the gas based fertilizer units received NG in excess of quantity allocated which indicated that the quantity underutilized by the units were not used in any other fertilizer units. Certain units utilised costlier NG instead of using available APM gas which increased the cost of production of urea.

Loss of production/increase in cost of production of urea deprived the opportunity for GoI to reduce subsidy burden by ₹ 637.07 crore (Annexure 20) as detailed below:

I. GoI allocated 1.72 mmscmd APM gas to Brahmaputra Valley Fertilizer Corporation Limited (BVFCL), a GoI undertaking situated at Namrup in Assam. BVFCL underutilized 0.30 mmscmd in 2008-09 and 0.27 mmscmd in 2011-12 out of the NG available to it during the period. The resultant surplus NG was not used elsewhere to compensate the loss of production of urea, as there was no pipeline infrastructure to transmit the same.

   DoF replied (January 2014) that BVFCL plants at Namrup-II and III were 35 and 26 years old respectively and built on technology considered outdated. Considering the actual status of plants FICC had also relaxed norms of operation for these units. DoF also stated (January 2015) that there were many technical reasons viz. frequent equipment breakdowns, restriction of gas supply, strikes, blockades etc for low on streams days leading to loss of production of urea.

Constraints of the plant as stated by DoF were considered and subsidy burden of ₹ 55.72 crore (Annexure 21) was estimated on the production loss based on the quantity of APM gas not utilized as accepted by BVFCL.

II. Actual consumption of NG by Nagarjuna Fertilizers and Chemicals Limited, (NFCL) Kakinada (AP), was less than the actual supply available during 2011-12 and 2012-13. Underutilization of one mmscmd NG results in loss of production of 1.3399[89] TMT. Production loss on account of underutilization was 0.51 LMT. Resultant extra expenditure on subsidy works out to ₹ 98.04 crore (Annexure 22).

DoF stated that (January 2014) actual production during the period was in excess of reassessed capacity of the unit. Production beyond the reassessed capacity was under incentivized production which the company might or might not produce. DoF further stated (January 2015) that NFCL receives its NG requirement from ONGC, CAIRN and RIL. There was not much disparity between the landed cost of NG from these sources. Similarly as explained by NFCL, when there was occasional excess NG availability some margin was kept by it while nominating NG from different sources.

Reply needs to be viewed against the fact that the production loss was estimated based on the data on consumption of NG made available by FICC in respect of the unit which indicated that there was under utilisation of NG at APM rate. Moreover, GoI had incentivized urea units to produce more than their assessed capacity to ensure that the available cheaper gas was utilized to the maximum possible extent for production of urea and this would have saved additional outgo of subsidy.

III. A. GoI allocated 2.24 mmscmd APM gas to NFL, a GoI undertaking, situated at Vijaipur (MP) during 2012-13. Actual availability, however, was ranging between 1.39 mmscmd to 2.08 mmscmd during the year, against which, actual consumption was less in all the months during the period and costlier gas[90] was consumed fully, against the supply. Underutilization of one mmscmd per day results in loss of production of 1.3215[91] TMT. During nine months from April 2012 to December 2012, NFL

[89] Production target 15.65 LMTPA /(required NG 3.2 mmscmd X No. of days in a year 365 days) ie 0.013399 LMTPA ie 1.3399 TMT

[90] PMT, RIL, Non-APM and Spot-RLNG

[91] Annual production target 20.5 LMTPA /(required gas 4.25 mmscmd X No. of days in a year 365 days) *i.e.* 0.013215 LMTPA *i.e.* 1.3215 TMT

underutilized APM gas from 0.01 mmscmd to 0.61 mmscmd from NG available to it. This resulted in loss of production of 0.65 LMT urea and consequent extra burden of subsidy amounting to ₹ 139.63 crore (Annexure 23) on GoI.

III. B. Actual supply of APM gas to KRIBHCO, a co-operative society at Hazira, Gujarat was ranging between 1.62 mmscmd and 2.31 mmscmd during 2011-12 and 2012-13 which was less than the required quantity (3.0 mmscmd). However, during the period July 2011 to October 2012, short consumption of APM gas (0.01 mmscmd to 1.16 mmscmd) was noticed. One of the reasons for underutilization of gas was shut down of ammonia stream. Audit, however, noticed that during the period other costlier gas[92] was consumed instead of available cheaper gas. As underutilization of one mmscmd per day resulted in loss of production of 1.2254[93] TMT, this meant loss of production of 1.66 LMT with consequent extra burden on GoI of ₹ 340.45 crore towards subsidy (Annexure 24).

III. C. Gujarat State Fertilizer Corporation (GSFC) consumed NG from costlier source instead of using the cheaper gas available during six months in 2011-12 and five months in 2012-13. Resultantly, cost of production increased by ₹ 3.23 crore which was extra subsidy burden on exchequer (Annexure 25 a & b).

DOF replied (October 2014) that:

(a) Units sometimes had to take costlier gases to avoid penalties due to 'take or pay' clause;

(b) APM gas was underutilized due to shutdown/revamping of plants *etc*.;

(c) Priority of usage of gas was drawn on day to day basis and calculating usage of APM and non-APM gas on monthly basis would give misleading conclusions *i.e.* long term data would show that a unit has used costlier gas inspite of possible availability of cheaper gas whereas in reality on day to day basis the units exhausted the usage of cheaper fuel before going to procurement of costlier gas.

DoF further stated (January 2015) that actual production was above the reassessed capacity (of NFL); hence there was no loss of production due to low off-take. Data available with audit, however, revealed that plants can operate even above the reassessed capacity as per the demand. Therefore, DoF should ensure that units make full utilisation of NG supplied at APM price so that subsidy burden of GoI is kept at minimum.

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[92] RIL, Non-APM and Spot-RLNG

[93] Annual production target 22.14 LMTPA /(required gas 4.95 mmscmd X No. of days in a year 365 days) *i.e.* 0.01225405 LMTPA ie 1.2254 TMT

Above reply of DoF needs to be viewed against the following facts:

(a) APM gas should have been used fully to keep the cost of production of urea low, as cost of production has direct impact on the subsidy being paid by GoI.
(b) Audit noticed instances that during the period where DoF had given shutdown/revamping as reasons for low off-take of APM gas, respective units utilized other costlier gases fully.
(c) No documentary evidence was furnished by DoF in support of their argument that calculation on the basis of monthly data would give misleading conclusions. It may also be noted that FICC had expressed their inability to certify usage of NG even on quarterly basis which shows that a mechanism to ensure the utilization of APM gas is yet to be derived.

5.5 Marketing margin on supply of NG

Fertilizer sector receives about 23 *per cent* of domestic gas at APM price as per the priority set by GoI which includes about 15 mmscmd from KG D6 field operated by the contractor[94]. GAIL, being the GoI nominee, supplies NG produced by NOCs.

Both GAIL and the contractor levy marketing margin on the NG supplied over and above APM price. Marketing Margin so levied is included in the delivered price of NG which forms a part of the normative cost of production of urea.

Production Sharing Contract for KG D6 block did not provide for marketing margin component. The contractor, however, has been charging marketing margin based on the energy equivalent of gas supplied i.e. 0.135 US$/mmbtu. Ministry of Chemicals & Fertilizers (MoCF) brought (March 2009) this issue to the notice of MoPNG as the fertilizer companies were regularly representing for reimbursement of marketing margin charged by the contractor.

MoPNG stated (March 2009) that GoI had not fixed or approved the quantum of marketing margin till date for sale of NG by any contractor. Thereafter, MoPNG fixed (May 2010) marketing margin only for GAIL at ₹ 200/mscm.

Marketing margin for GAIL was fixed in Indian Rupee whereas contractor was charging this in terms of US dollar.

Audit observed that:

[94] Reliance Industries Limited (90%) and NIKO (10%)

i. Charging of marketing margin for KGD6 gas in US$ instead of Indian Rupee for a commodity produced, marketed and consumed domestically is incongruous with Indian market. The amount charged towards this was equivalent[95] to ₹244.31/mscm in 2010-11 and it increased to ₹325.51/mscm in 2013-14 owing to US$ exchange rate fluctuations[96] (Annexure 26).

ii. Considering the fact that availability of NG is limited and its price is administered by GoI for fertilizer sector where GoI bears substantial financial burden as subsidy, leverage given to contractor to charge marketing margin needs justification. In this regard, MoCF estimated that charging of marketing margin of US$ 0.135/mmbtu on KG D6 gas would lead to additional subsidy outgo of approximately ₹ 125 crore per annum.

    DoF stated (January 2014) that in the absence of any policy of MoPNG in this regard, DoF/FICC has not considered marketing margin paid to the contractor (KG D6 basin) in the determination of cost of production and reimbursement to the urea units so far. Hence, subsidy claims on account of marketing margin on KG D6 gas was kept pending from 2009-10 i.e. since beginning of supplies by contractor.

    Point being made by Audit, however, is that additional impact of charging of marketing margin by contractor as given above, on 15 mmscmd KG D6 gas (supplied to fertilizer units on an average) in excess of marketing margin allowed to GAIL, for the period from May 2009 to March 2014 works out to ₹ 201.40 crore. This additional burden would have to be borne by GoI, in case a decision is taken to reimburse the same (Annexure 26).

GoI entrusted (December 2011) PNGRB to determine quantum of marketing margin on the basis of actual marketing cost. PNGRB, however, was empowered to deal only with notified petroleum products and NG. As GoI has so far not notified NG for the purpose, PNGRB was not in a position to evolve any system and fix marketing margin. No decision, therefore, could be arrived at on charging of marketing margin of KG D6 gas (October 2014).

MoPNG stated (July 2014) that there was a need to regulate marketing margin for supply of domestic gas to urea and LPG producers, as the same had implication on the subsidy outgo. In all other cases, marketing margin should be decided by the buyer and seller mutually and any complaint about restrictive trade practices followed by any entity should be addressed by PNGRB and/or the Competition Commission of India. Accordingly, MoPNG requested (November 2013) PNGRB to determine marketing margin for supply of domestic gas for Urea and LPG producers.

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[95] Marketing margin per mmbtu = USD 0.135 X Exchange rate per USD X 1000 scm /25.2

[96] Exchange rate of USD for the year 2009-10 considered is ₹ 45 and it increased to ₹ 60.14 for the year 2013-14.

MoPNG informed (December 2014) that PNGRB has decided to engage a consultant to assist in the task and has sought time upto December 2014 keeping in view the fact that that process involves collection/analysis of data from various entities.

The fact remains that there was a need to regulate marketing margin especially for NG supplies to sectors where GoI has to bear subsidy burden.

Recommendations:

3. MoPNG may work out modalities by involving all the implementing agencies for implementing a control system/mechanism to detect and prevent deviation/mis-utilization of NG supplied at regulated price. The modalities so worked out may also include decision on rate at which recovery would be made for utilisation of such NG for other than specified purposes as there would be no difference between APM and non-APM price with effect from November 2014.

4. GAIL may critically review NG supply contract management system and put in place specific measures, such as incorporation of a clause in Gas Sales and Transmission Agreement enabling GAIL to verify end use of NG and reviewing Article 17 that permits buyer to use the NG for purposes other than those contemplated with mutual agreement between buyer and seller *etc.*, that would empower it adequately to track ultimate utilisation of NG supplied at regulated price and prevent its diversion towards unauthorised purposes.

5. MoPNG should ensure that same methodology, i.e. charging marketing margin in Indian Rupee, is adopted for supply of NG from domestic source for use in sectors where GoI bears subsidy burden.

Chapter-6

Conclusion and Recommendations

Chapter 6 Conclusion and Recommendations

6.1 Conclusion

Natural Gas is the most sought after feedstock in fertilizer sector and one of the best fuels in power sector. It also has utility in other sectors. Its availability at affordable price, therefore, has significant influence on the economy. Various agencies involved in allocation of indigenous NG, utilization and supply of NG from all sources have important roles to play.

Performance Audit on 'Supply and Infrastructure Development for Natural Gas' revealed:

- Lack of co-ordination within GoI in monitoring development of pipeline and R-LNG infrastructure projects, which resulted in non-availability of NG at affordable price to priority sectors viz. Fertilizer and Power.
- Time lapse in taking executive decisions such as notification of Section 16 of PNGRB Act providing powers to PNGRB for issuing authorisations for laying, building, operating and expanding pipelines, notification of Rules prescribing eligibility conditions which an entity shall fulfill for registration for setting up R-LNG terminal led to a situation where the statutory authority created for the purpose remained ineffective for a considerable period of time in facilitating development of cross country pipelines and R-LNG infrastructure.
- Non-availability of an assured supply of NG on a long-term basis and inadequate pipeline connectivity remained one of major constraints for non-revival of the closed fertilizer units identified for revival and non-conversion of some of the units. This led to production loss and increase in cost of production of urea with resultant increase in subsidy burden on GoI for imported urea.
- Lack of availability of NG at affordable price to power sector resulted in underutilisation of gas based power plants with resultant generation loss and higher generation cost due to use of alternate fuels.
- Non-establishment of a control system/mechanism in MoPNG/DoF led to diversion of NG supplied at regulated price for unauthorised purposes.

- System lapses in the NG supply contract management by GAIL led to non-recovery of market rate for APM gas utilized for other than specified purposes.
- Marketing Margin on supply of domestic NG for GAIL was approved by GoI in Rupee terms, whereas the Contractor for KG D6 block was charging marketing margin in US dollar terms. DoF was not yet reimbursing marketing margin as demanded by the contractor to the fertilizer units and subsidy claims on account of marketing margin on KG D6 gas were kept pending from 2009-10. If DoF decides to reimburse marketing margin as charged by the contractor and requested by fertilizer units, additional subsidy burden would be ₹ 201.40 crore from May 2009 to March 2014, being the difference between marketing margin demanded by the contractor and marketing margin allowed to GAIL.

6.2 Recommendations

We recommend that:

1. MoPNG should develop a mechanism, with clearly defined responsibility centres, in coordination with implementing agencies and authorities, to ensure and assess timely completion of NG pipeline and R-LNG projects across the country and cut down delays so that the desired growth in the NG sector is achieved.
2. MoPNG in coordination with DoF and MoP may consider setting up of Inter Ministerial Committee that could suggest:
   (i) A time bound action plan for synchronising implementation of NG pipeline projects and revival of fertilizer units so that benefit of NG as feedstock may be derived optimally besides reducing import of urea.
   (ii) Measures to create required infrastructure to provide NG/R-LNG to Power Sector at affordable price so that capacity created in the sector is adequately utilised.
3. MoPNG may work out modalities by involving all the implementing agencies for implementing a control system/mechanism to detect and prevent diversion/mis-utilization of NG supplied at regulated price. The modalities so worked out may also include decision on the rate at which recovery would be made for utilisation of such NG for other than specified purposes as there would be no difference between APM and non-APM price with effect from November 2014.

4. GAIL may critically review NG supply contract management system and put in place specific measures, such as incorporation of a clause in Gas Sales and Transmission Agreement enabling GAIL to verify end use of NG and reviewing Article 17 that permits buyer to use the NG for purposes other than those contemplated with mutual agreement between buyer and seller *etc.*, that would empower it adequately to track ultimate utilisation of NG supplied at regulated price and prevent its diversion towards unauthorised purposes.
5. MoPNG should ensure that same methodology, *i.e.* charging marketing margin in Indian Rupee, is adopted for supply of NG from domestic source for use in sectors where GoI bears subsidy burden.

New Delhi
Dated: 27 March 2015

(PRASENJIT MUKHERJEE)
Deputy Comptroller and Auditor General and Chairman, Audit Board

Countersigned

New Delhi
Dated: 30 March 2015

(SHASHI KANT SHARMA)
Comptroller and Auditor General of India

Annexures

Annexure-1 (Referred to in Para no. 1.6.2)

Enumeration of PNGRB functions

Section 11 of the PNGRB Act, 2006

The Board shall-

(a) protect the interest of consumers by fostering fair trade and competition amongst the entities
(b) register entities to –
   (i) market notified petroleum and petroleum products and, subject to the contractual obligations of the central Govt, natural gas
   (ii) establish and operate liquefied natural gas terminals
   (iii) establish storage facilities for petroleum, petroleum products or natural gas exceeding such capacity as may be specified by regulations
(c) authorise entities to –
   (i) lay, build, operate or expand a common carrier or contract carrier
   (ii) lay, build operate or expand city or local natural gas distribution network
(d) declare pipelines as common carrier or contract carrier
(e) regulate, by regulations-
   (i) access to common carrier or contract carrier so as to ensure fair trade and competition amongst entities and for that purpose specify pipeline access code
   (ii) transportation rates for common carrier or contract carrier
   (iii) access to city or local natural gas distribution network so as to ensure fair trade and competition amongst entities as per pipeline access code
(f) in respect of notified petroleum, petroleum products and Natural Gas-

   i) ensure adequate availability,
   ii) ensure display of information about the maximum retail prices fixed by the entity for consumers at the retail outlets,
   iii) monitor prices and take corrective measures to prevent restrictive trade practice by the entities,
   iv) secure equitable distribution for petroleum and petroleum products,
   v) provide, by regulations and enforce retail service obligation for retail outlets and marketing service obligations for entities
   vi) monitor transportation rates and take corrective action to prevent restrictive trade practice by the entities

(g) levy fees and other charges as determined by regulations,
(h) maintain a data bank of information on activities relating to petroleum, petroleum products and natural gas
(i) lay down, by regulations, the technical standards and specifications including safety standards in Activities relating to petroleum, petroleum products and Natural Gas, including the construction and operation of pipeline and Infrastructure projects related to downstream petroleum and Natural Gas sector.
(j) perform such other functions as may be entrusted to it by the Central Government to carry out the provisions of this act.

Annexure-2 (Referred to in Para-3.2.1)

Statement showing list of LNG terminals that received FIPB clearance during 1997-2000

Sl. No	Company	Foreign Collaborator	Location		Capacity in mmtpa	
					Initial	Future Expansion
1	Enron International	Enron International	1	Dabhol (Maharashtra)	2.5	5 &10
2	British Gas	British Gas	2	Pipavav (Gujarat)	2.5	5
3	Ispat Group of Industries	Ispat Energy	3	Kakinada (Andhra Pradesh)	2.5	Not Available
4	Reliance Industries	GDR/ADR private placement	4	Jamnagar (Gujarat)	5	N.A.
			5	Hazira (Gujarat)	5	N.A.
5	Royal Dutch Shell group of companies	Shell	6	Hazira (Gujarat)	2.7	N.A.
6	Petronet LNG Limited	Gaz de France	7	Dahej (Gujarat)	5	N.A.
			8	Kochi (Kerala)	2.5	N.A.
7	BHP Petroleum	BHP Petroleum	9	Not specified	Not specified	N.A.
8	Hardy oil/Nagarjuna Holdings	Hardy oil and BHP petroleum	10	Kakinada (Andhra Pradesh)	1	5
9	Tractebel	Tractebel	11	Not specified	Not specified	N.A.
10	Dakshin Bharat Energy Consortium	Unocal,Woodside, Siemens, CMS Energy	12	Ennore (Tamil Nadu)	2.5	N.A.
11	GAIL-TEC-TOTAL	TOTAL	13	Trombay (Maharashtra)	3	6
12	Consortium of Fertilizer Companies	Not Available	14	Kishoriprasad	3	6
13	AL Manhal	Al Manhal, UAE	15	Gopalpur (Orissa)	3	N.A.
		Total	**15**		**40.2**	

Note: Thirteen entities for 15 terminals with **40.2** mmtpa/145 mmscmd approximately.

Annexure-3 (Referred to in Para- 3.2.2)

Statement showing year wise position of LNG terminals

Year	Status of development of LNG terminals	Location	Envisaged Capacity (mmtpa)	Actual capacity created (mmtpa) cumulative
1997	MoPNG approved formation of Petronet LNG Limited (PLL) to implement LNG projects	Ennore, Manglore, Kochi, Hazira and Dahej and any other suitable location	--	--
1997-2000	FIPB cleared 15 LNG terminals across the coastal states (As per Annexure-2)	(As per Annexure-2)	40.2	
2000-04	None of the LNG terminals were materialised			Nil
2004-05	LNG terminals commissioned at Dahej (5 mmtpa) by PLL and at Hazira (2.5 mmtpa) by Shell in Gujarat		7.5	7.5
2005-12	No further development during this period		NIL	Nil
2012-13	PNGRB received applications for setting up of 5 LNG terminals	1. Dahej (Gujarat)	5	
		2. Gangavaram (Andhra Pradesh)	5	
		3. Pipavav (Gujarat)	3	
		4. Mundra (Gujarat)	5	
		5. Jaigarh	8	
		Total	26	
	LNG terminal commissioned at Dabhol (Maharashtra) in January 2013		2	9.5
2012-13	Dahej terminal upgraded from 5 mmtpa to 10 mmtpa and Hazira upgraded from 2.5 to 5 mmtpa		7.5	17
2013-14	LNG terminal at Kochi set up		**5**	**22**
At present four LNG terminal at (Dahej, Hazira, Dabhol and Kochi are operational in India with 22 mmtpa/79.2 mmscmd)				

Annexure-4 (Referred to in Para-3.3)

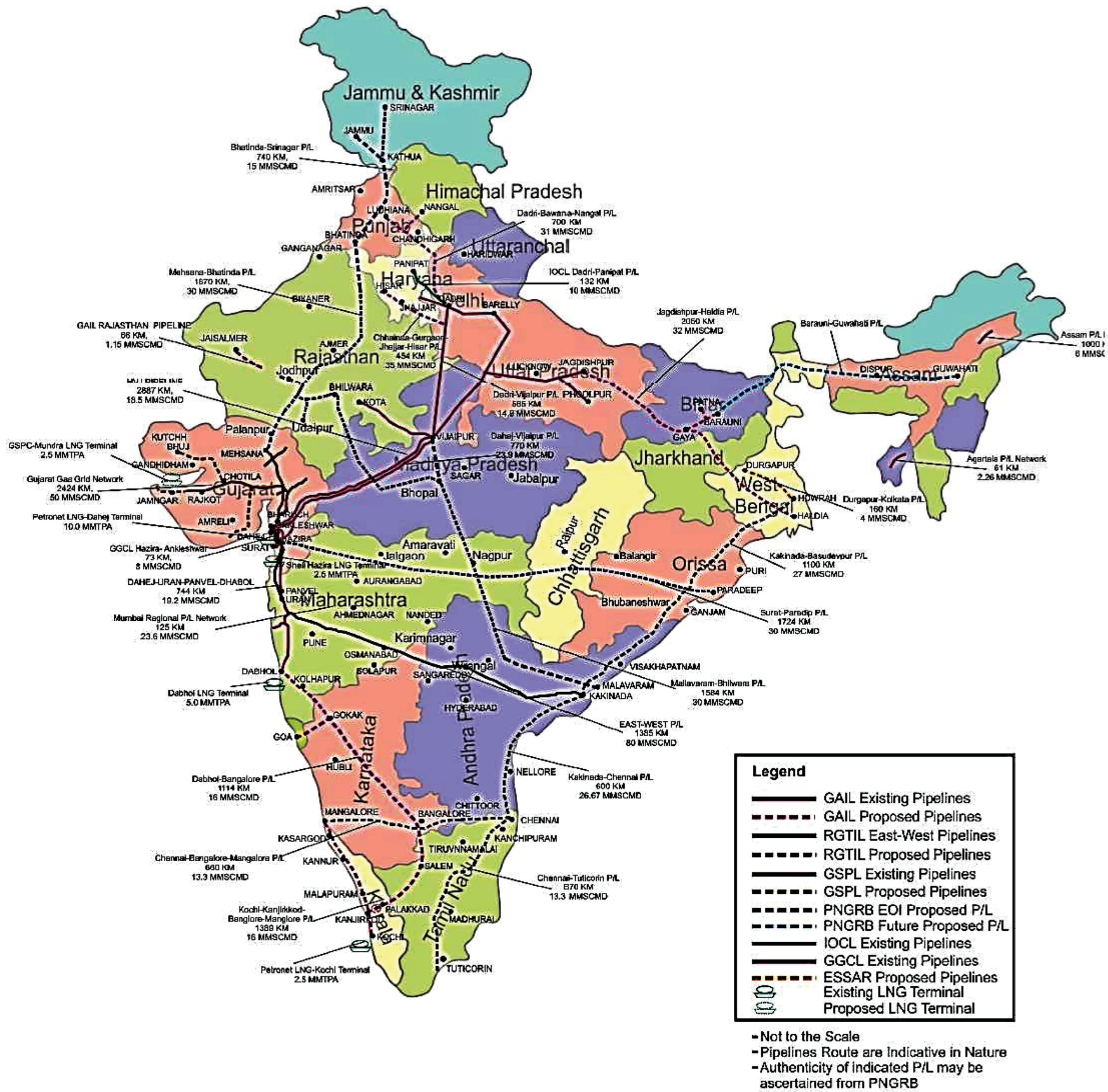
Statement showing status of pipeline infrastructure operational in India

Pipeline	Entity	Length Km	Source of gas	Region of supply
Commissioned before 2000				
Hazira -Vijaipur- Jagdishpur (HVJ)	GAIL	4435	Mumbai offshore, Cambay, Hazira LNG Terminal	Gujarat, Madhya Pradesh, Uttar Pradesh, Rajasthan, Delhi
Vijaipur- Dadri*	GAIL	247	Link to HVJ & DVPL	Madhya Pradesh, Rajasthan, Delhi, Uttar Pradesh
Assam (Lakwa)	GAIL	8	Assam gas fields	Assam
Tripura (Agartala)	GAIL	61	Tripura gas fields	Tripura
Ahmedabad	GAIL	144	Link to HVJ & DVPL	Gujarat
Rajasthan (Focus Energy)	GAIL	154	OIL fields	Rajasthan
Bharuch-Vadodara	GAIL	670	Link to HVJ & DVPL	Gujarat
Mumbai	GAIL	129	Link to HVJ & DVPL	Maharashtra
KG Basin	GAIL	877	KG basin	Andhra Pradesh
Cauvery Basin	GAIL	268	Cauvery Basin	Tamil Nadu
Asssam Gas Company Duliajan-Numaligarh	AGCL	1000	Assam gas fields	Assam
Commissioned after 2000				
Dahej – Vijaypur*	GAIL	865	Dahej LNG Terminal	Gujarat, Madhya Pradesh
Dahej – Uran – Panvel including spur lines	GAIL	873	Dahej LNG Terminal	Gujarat, Maharashtra
UranTrombay	ONGC	24	Bombay offshore	Maharashtra
East- West Pipeline	RGTIL	1469	KG basin	Andhra Pradesh, Maharshtra, Gujarat
GSPCL Network	GSPC	1874	Cambay Basin	Gujarat
Dadri -Panipat	IOCL	132	Link to Dahej, Hazira LNG Terminal	Delhi, Punjab
Chainsa-Jhajjar-Hissar	GAIL	262	Link to HVJ & DVPL	Rajasthan, Haryana
Dadri-Bawana-Nangal	GAIL	803	Link to HVJ & DVPL	Delhi, Punjab
Dabhol-Bangalore	GAIL	1004	RGPPL LNG Terminal	Maharashtra, Goa, Karnataka
Kochi-Koottanad-Banglore-Manglore (Phase-I)	GAIL	41	Kochi LNG Terminal	Kerala, Karanataka
Total		**15,340**		
Source : MoPNG Annual Report 2013-14				

* These are Pipeline sections of DVPL-GREP Up-gradation (DVPL-2 & VDPL-Total length 1112 Km).

Annexure 5 (Referred to in Para no 3.3.1)

Map of India depicting present and future (targeted) Natural Gas pipelines in the country



Note: Map of India before formation of Telangana State.

Annexure-6 (Referred to in Para no. 3.3.4)

Statement showing details of pipelines authorised by MoPNG

Sl No.	Section of pipeline	Entity	Date of authorisation	Date of 3 (1) notification	Scheduled date of completion	Source of gas	Anchor consumers	Status of pipelines as on 31.06.2014
1	Kakinada-Vijayavada-Nellore-Chennai	RGTIL/ Relog	19.03.2007	17.06.2009	16.06.2012	KG D6	IFFCO- Nellore, MFL- Manali (Tamil Nadu) Industrial and CGD in Chennai	MoPNG cancelled authorisation in October 2012
2	Dabhol-Bangalore	GAIL	02.07.2007	06.02.2010	05.02.2013	R-LNG from Dabhol	Zuari-Goa	Dabhol to Bangalore, spur lines to Goa and Bangalore city commissioned in February 2013 (Phase-I) (Phase-II) Spurlines to Ratnagiri, Bijaipur,Kolhapur, Dharwad,Devengere,Tumkur is in progress.
3	Chainsa-Jhajjar-Hissar	GAIL	06.07.2007	01.02.2008	31.01.2011	Link to existing HVJ- DVPL pipeline	Power plants of Reliance, Tata and Jindal.	Chainsa-Sultanpur (Phase-I), gas Charged in March 2010. Sultanpur-Jhajjar-Hissar, physical progress up to 17 % (Phase-II)
4	Dadri-Bawana-Nangal	GAIL	11.07.2007	20.04.2009	19.04.2012	Link to existing HVJ-DVPL pipeline	NFL-Panipat NFL-Bhatinda NFL-Nangal	Dadri-Bawana, commissioned in January 2010 (Phase-I), Bawana-Nangal, gas charged in March 2012. (Phase-II), Spur lines (Phase-I) completed in November 2012 and (Phase-II- Dehradun and Rishikesh) in progress. I stage Permission from Forest & NHAI is received in February 2014
5	Jagdishpur-Haldia	GAIL	06.07.2007	NIL	NIL	R-LNG from Dahej /Hazira or NG from KG basin/ Mahanadi through Kakinada-Howrah	Fertilizer plants- DIL-Kanpur, MATIX-Burdwan, FCIL-Sindri, FCIL-Talcher, FCIL-Korba, FCIL-Gorakhpur, HFCL-Barauni, HFCL-Durgapur. Steel plants of SAIL in Bokaro, Durgapur, Rourkela Upcoming power projects of Calcutta Electric Supply Corporation and West Bengal Power Development Corporation.	Not yet commenced
6	Kochi-Koottanad-Bangalore-Mangalore	GAIL	13.07.2007	12.03.2010	11.03.2013	R-LNG from Kochi	MFCL-Mangalore FACT-Kochi BSES Kerala BPCL-Kochi	Kochi region (Phase-I, 41 Km) completed in September 2012, supply of gas commenced in August 2013 on completion of LNG terminal FACT to Mangalore and Bangalore (Phase-II) physical progress 83%-Work in Tamilnadu (310 Km) suspended due to legal disputes, in Kerala (50 Kms). Slow progress due to RoU hindrance.
7	Kakinada-Basudebpur-Howrah	RGTIL/ Relog	15.07.2007	23.06.2009	22.06.2012	KG D6	HFCL-Haldia	MoPNG cancelled authorization in October 2012
8	Chennai-Tuticorin	RGTIL/ Relog	23.07.2007	19.08.2009	18.08.2012	KG D6	SPIC-Tuticorin	
9	Chennai-Bangalore-Mangalore	RGTIL/ Relog	23.07.2007	12.08.2009	11.08.2012	KG D6	CGD	

Annexure-7 (Referred to in Para 3.3.6)

Statement showing list of pipelines identified for development during 2000-2011

<table>
<tr><th>S.No</th><th>Pipeline Corridor</th><th>When identified</th><th>Present status</th></tr>
<tr><td>1</td><td>Dahej-Vijaypur</td><td>2000 under NGG</td><td>Completed</td></tr>
<tr><td>2</td><td>Dahej-Uran</td><td>2000 under NGG</td><td>Completed</td></tr>
<tr><td>3</td><td>Dadri-Panipat-Nangal</td><td>2000 under NGG, authorised in 2007</td><td>Completed</td></tr>
<tr><td>4</td><td>Vijaypur-Kota-Mathania</td><td>2000 under NGG</td><td>Vijaypur-Kota completed</td></tr>
<tr><td>5</td><td>Kakinada-Uran</td><td>2000 under NGG</td><td>East-West pipeline Completed</td></tr>
<tr><td>6</td><td>Kakinada-Chennai</td><td>2000 under NGG, authorised in 2007.</td><td>Not taken up</td></tr>
<tr><td>7</td><td>Kakinada-Kolkata</td><td>2000 under NGG, authorised as Kakinada-Howrah in 2007</td><td>Not taken up</td></tr>
<tr><td>8</td><td>Kolkata-Jagdishpur</td><td>2000 under NGG, authorised as Haldia-Jagdishpur in 2007</td><td>Not taken up</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">Dabhol-Bangalore-Chennai-Tuticorin</td><td>2000 under NGG Dabhol-Bangalore, authorised in 2007</td><td rowspan="2">Ongoing</td></tr>
<tr><td>Chennai-Tuticorin authorised in 2007</td></tr>
<tr><td>10</td><td>Kochi-Kayamkulam-Mangalore</td><td rowspan="2">2000 under NGG
Kochi-Banglore-Manglore authorised in 2007</td><td rowspan="2">Ongoing*</td></tr>
<tr><td>11</td><td>Bangalore-Coimbatore-Kayamkulam</td></tr>
<tr><td>12</td><td>Myanmar-Mizoram-Assam-Bihar</td><td>2000 under NGG</td><td>Not taken up</td></tr>
<tr><td>13</td><td>Hyderabad-Vijaypur</td><td>2000 under NGG</td><td>Not taken up</td></tr>
<tr><td>14</td><td>Vijaypur-Jagdishpur</td><td>2000 under NGG</td><td>Completed</td></tr>
<tr><td>15</td><td>Dahej-Jamnagar-Porbandar</td><td>2000 under NGG</td><td>Completed</td></tr>
<tr><td>16</td><td>Chainsa-Jhajjar-Hissar</td><td>Authorised in 2007</td><td>Ongoing</td></tr>
<tr><td>17</td><td>Chennai-Bangalore-Mangalore</td><td>Authorised in 2007</td><td>Not taken up</td></tr>
<tr><td>18</td><td>Vijaywada-Nagpur-Vijaipur</td><td>2009 under National Gas Highway, authorised as Mallavaram-Bhilwara in 2011</td><td>Ongoing</td></tr>
<tr><td>19</td><td>Barauni-Guwahati</td><td>2009 under National Gas Highway</td><td>Not taken up</td></tr>
<tr><td>20</td><td>Thane-Nashik-Nagpur</td><td>2009 under National Gas Highway</td><td>Not taken up</td></tr>
<tr><td>21</td><td>Raipur-Bhilai</td><td>2009 under National Gas Highway</td><td>Not taken up</td></tr>
<tr><td>22</td><td>Kota-Jaisalmar</td><td>2009 under National Gas Highway</td><td>Not taken up</td></tr>
<tr><td>23</td><td>Amritsar-Jammu</td><td>2009 under National Gas Highway
Bhatinda-Srinagar authorised in 2011</td><td>Ongoing</td></tr>
</table>

Identified in 2000 : 15 projects
Authorised in 2007 (Fresh) : Two projects
Identified in 2009 : Six projects
Total : 23 projects (seven completed, six on-going and 10 not yet taken up)

* Two pipelines at no. 10 and 11, Kochi-Kayamkulam segment linking PLL terminal and NTPC has not been taken up

Annexure-8 (Referred to in para no. 4.1)

Statement showing details of available production capacity, envisaged enhanced capacity, demand, domestic production and import of urea

(in lakh metric tonne)

Year (1)	Production capacity (2)	Envisaged enhanced capacity (3)	Projected Demand (4)	Domestic Production (5)	Import (6)	Requirement (7 = Col. 5+ Col. 6)
2004-05	197.00	N.A.	N.A.	202.39	6.41	208.80
2005-06	197.00	N.A.	N.A.	200.85	20.57	221.42
2006-07	197.00	N.A.	243.05	202.71	47.19	249.90
2007-08	197.00	N.A.	253.60	198.58	69.28	267.86
2008-09	197.00	N.A.	262.75	199.21	56.67	255.88
2009-10	197.00	224.20	271.35	211.12	52.09	263.21
2010-11	200.30	269.25	279.45	218.80	66.10	284.90
2011-12	200.30	269.25	287.55	219.84	**78.34**	298.18
2012-13	200.30	319.25	303.47	225.74	**80.44**	306.18
					477.09	

N.A.: Not Available

Annexure-9 (a) (Referred to in Para 4.1.1)

Statement showing calculation of Subsidy savings (in ₹)

S.N.	Particulars	Formula	2011-12	2012-13
1	Average normative rate per MT urea using RLNG	---	17103.54&	23660.87@
2	Average capital related charge/MT	---	5774.24	5774.24
3	Delivered cost of urea/MT	(Sl. No 1+2)	22877.78	29435.11
4	Subsidy payable on urea produced using RLNG	(Sl. No. 3 –MRP^)	17567.78	24075.11
5	Subsidy on imported urea/per MT	------	22306.00	24883.14
6	Excess subsidy on imported urea than domestic urea/MT)	(Sl. no. 5-4)	4738.22	808.03
7	Quantity of urea imported MT	Table Below	**7513291***	**7947209***
8	Subsidy savings envisaged (₹ in crore)	(Sl. No. 6 X 7)	3559.96	642.16
	Total for 2011-12 and 2012-13 (₹ in crore)			**4202.12**

& Column 4 of annexure 9 (b)
@ column 4 of annexure 9 (c)
^ MRP ₹5310/MT and ₹ 5360/MT for 2011-12 and 2012-13 respectively

Sl no	Source	Particulars	2011-12	2012-13
1	Annexure 8	Import	7834000	8044000
2	Annexure 17 b	Loss of Production (MT)	87075	NIL
3	Annexure 21		48684	NIL
4	Annexure 22		32486	18552
5	Annexure 23		0	64558
6	Annexure 24		152464	13681
	Net {1- (2+3+4+5+6)}		***7513291**	***7947209**

Annexure--9 (b) (Referred to in Para 4.1.1)

Statement showing Normative cost per MT using R-LNG for year 2011-12

S. No	Unit[†]	Normative cost per MT* (₹)	Normative cost per MT using R-LNG ** (₹)
1	**2**	**3**	**4**
1	IFFCO Kalol	11327.00	17328
2	TCL	10346.00	15362
3	SFC	12812.00	20380
4	GSFC	11224.00	18830
5	IFFCO- P1	16164.00	20211
6	IFFCO- P2	15928.00	16739
7	KSFL	10059.00	15436
8	RCF Tr	12511.00	23604
9	RCF Thal	9970.00	17383
10	NFL-V2	10315.00	15335
11	NFL-V1	9959.00	14814
12	IGFL	12069.00	14570
13	CFCL-II	13327.00	16149
14	CFCL-I	11476.00	15349
15	KRIBHCO	8456.00	15063
Average rate (per MT urea) of 15 units		**11729.53**	**17103.54**

* Means Concession rate as worked out by FICC. This is for all the Gases/feedstock used by unit taken together.

** Worked out by Audit by substituting all gases/feedstock with R-LNG at the highest rate for that particular year (₹ 1933 R-LNG price for IFFCO Phulpur-II has been considered for all the units for the year 2011-12).

[†] Source; Escalation/De-escalation statement maintained by FICC

Annexure 9 (c) (Referred to in Para 4.1.1)

Statement showing Normative cost per MT using R-LNG for year 2012-13

Sl.No.	Unit	Normative Cost per MT (₹)	Normative Cost per MT using R-LNG (₹)
(1)	(2)	(3)	(4)
1	IFFCO Kalol	11802	23914.07
2	TCL	12079	21004.04
3	SFC	13506	28752.95
4	GSFC	11453	26000.53
5	IFFCO -P1	21196	27920.37
6	IFFCO-P2	21360	22950.65
7	KSFL	11000	21412.34
8	RCF Thal	11435	24275.24
9	NFL-V2	12251	21358.00
10	NFl-V1	11364	21091.10
11	IGFL	15530	20371.40
12	CFCL-II	16850	22084.58
13	CFCL-I	14860	21277.35
14	KRIBHCO	9735	21332.89
15	NFCL-I	9816	22021.18
16	NFCL-II	10077	22090.06
17	IFFCO Aonla-I	10987	20987.45
18	IFFCO Aonla-II	11028	20814.72
19	ZIL	41966	26938.53
20	GNVFC	23132	28567.49
21	NFL Panipat	32065	28029.55
22	NFL Bhatinda	31598	27344.64
Average Rate (per MT of Urea) of 22 units		**16595**	**23660.87**

Note: (1) RCF Trombay unit is not considered for computation as the normative cost of urea per MT using R-LNG is higher.

(2) Worked out by Audit by substituting all gases/feedstock with R-LNG at the highest rate for that particular year (₹ 2847.62 being R-LNG price for IFFCO Aonla has been considered for all the units for the year 2012-13).

Annexure-10 (Referred to in Para 4.1.2)

Statement showing details of conversion of urea units from Naphtha/FO/LSHS to Natural Gas and pipeline connectivity up to 2013-14

Sl. No.	Name of the Unit	Capacity (LMTPA)	Gas requirement after conversion (mmscmd)	Envisaged year of Conversion	Actual conversion	Pipeline Connectivity and entity	Planned date of completion for pipeline connectivity	Status of Pipeline Connectivity as on 31 March 2014
1	MCFL Manglore	3.800	1.00	2009-10	Not completed	Kochi-Banglore- Manglore - GAIL	2010-11	Not Yet Completed
2	DIL Kanpur (KFCL)	7.220	1.70	2009-10	2013-14	Spur line from Haldia-Jagdishpur-GAIL	2009-10	Not yet commenced
3	ZACL	3.993	1.28	2009-10	2012-13	Dabhol-Gogak-Banglore - GAIL	2009-10	Completed & gas charged in Feb-2013
4	NFL Bhatinda	5.115	0.90	2009-10	2012-13	Dahej-Dadri-Bawana -Nangal pipeline GAIL	2009-10	Completed & gas charged in Mar-2013
5	NFL Panipat	5.115	0.90	2009-10	2012-13	Dahej-Dadri-Bawana -Nangal pipeline- GAIL	2009-10	Completed & gas charged in Mar-2013
6	NFL Nangal	4.785	1.00	2009-10	2012-13	Dahej-Dadri-Bawana -Nangal pipeline -GAIL	2009-10	Completed & gas charged in March 2013
7	SPIC Tuticorin	6.200	1.66	2009-10	Not completed	Chennai-Tutikorin-Relogistic Infrastructures Limited (Subsidiary of RGTIL)	2009-10	GOI cancelled Authorisation
8	GNVFC Bharuch	6.360	0.95	2009-10	2012-13	Existing Hazira- Vijaipur- Jagdishpur -GAIL		
9	MFL, Manali	4.868	1.54	2009-10	Not Completed	Spur line from Kochi-Manglore-Banglore-GAIL	2009-10	Not yet completed

Annexure 11(a) (Referred to in Para no 4.1.2)

Statement showing Calculation of subsidy savings by using R-LNG in place of Naptha/LSHS/Fuel Oil (in ₹)

Sl no	Particulars	Year		
		2010-11	2011-12	2012-13
1	Average normative rate per MT urea using R-LNG	18224.57@	22153.70#	28688.72$
2	Average capital related charge per MT	2369.86	2369.86	2369.86
3	Delivered cost of urea per MT using R-LNG (1+2)	20594.43	24523.56	31058.58
4	Average cost of urea using Naphtha	28221.86^	35987.71&	42741.70*
5	Difference in Cost of production ie Avoidable subsidy per MT (4 - 3)	7627.43	11464.15	11683.12
6	Quantity of urea produced using Naphtha (in MT)	3055330!	3339090+	1297090#*
7	Subsidy avoidable (₹ In crore) (5 X 6)	**2330.43**	**3827.98**	**1515.41**
	Total for 2010-11 to 2012-13 (₹ in crore)			**7673.82**

@ column 8 of annexure 11 (b)
# column 10 of annexure 11 (c)
$ column 8 of annexure 11 (d)
^ column 5 of annexure 11 (b)
& column 5 of annexure 11 (c)
* column 5 of annexure 11 (d)
! column 6 of annexure 11 (b)
+ column 8 of annexure 11 (c)
#* column 6 of annexure 11 (d)

Annexure-11 (b) (Referred to in Para no 4.1.2)

Statement showing subsidy savings by using R-LNG for production of urea during 2010-11							
S. No	**Unit**	**Energy norm (G'cal per MT)**	**Other Expenses per MT (₹)**	**Actual cost per MT (₹)**	**Actual production TMT**	**Feedstock cost per MT using R-LNG (₹)**	**Normative cost per MT using R-LNG (₹)**
1	**2**	**3**	**4**	**5**	**6**	**7 (Col.3X ₹1472 X 120%)***	**8 (Col.4 + Col. 7)**
1	ZIL	7.308	3058	29234	397.85	12909	15967
2	NFL-P	9.654	3076	24692	470.00	17053	20129
3	NFL-N	9.517	2940	25156	478.50	16811	19751
4	NFL-B	10.221	2816	25257	553.00	18054	20870
5	MCFL	7.356	2871	28392	379.50	12994	15865
6	SPIC	7.382	2947	31689	297.65	13040	15987
7	MFL	8.337	4277	33133	478.83	14726	19003
	Average	**8.54**	**3140.71**	**28221.86**	**--**	**15083.86**	**18224.57**
Total					**3055.33**		

**R-LNG price of ₹ 1472 (which was the highest R-LNG basic price during 2010-11) plus 20 per cent (Other charges) per G'Cal are considered for calculation.*
$ GNVFC uses mixed feedstock of NG, LSHS, COAL etc. and DIL Kanpur suspended production. Hence these two units were not considered.

Annexure 11 (c) (Referred to in 4.1.2)

Statement showing subsidy savings by using R-LNG for production of urea during 2011-12

S. No.	Unit Name	Actual cost of feedstock (₹)	Other expenses (₹)	Actual cost Per MT (₹)	Energy norms (G cal/MT)	Costs by using R-LNG			
						Cost of R-LNG per G'Cal* (₹)	Actual Production (TMT)	Feedstock cost per MT by using R-LNG (₹)	Total cost per MT (₹)
1	2	3	4	5(3+4)	6	7	8	9 (6X7)	10(4+9)
1	ZIL	34394.85	3060.15	37455	7.308	2222.95	365.47	16245.32	19305.47
2	NFL -P	27419.15	3109.85	30529	9.654	2222.95	500.36	21460.36	24570.21
3	NFL -N	30385.55	2962.45	33348	9.517	2222.95	503.58	21155.82	24118.27
4	NFL -B	31224.44	2846.56	34071	10.221	2222.95	483.02	22720.77	25567.33
5	MCFL	34366.19	2982.81	37349	7.356	2222.95	379.5	16352.02	19334.83
6	SPIC	34734.96	2949.04	37684	7.382	2222.95	620.41	16409.82	19358.86
7	MFL	37190.05	4287.95	41478	8.337	2222.95	486.75	18532.73	22820.68
	Total	**229715.20**	**22198.81**	**251914**	**59.775**	**15560.65**	**3339.09**	**132876.80**	**155075.70**
Average cost of production		**32816.50**	**3171.26**	**35987.71**	**8.53929**	**2222.95**	**477.012857**	**18982.40**	**22153.70**

$ GNVFC uses mixed feedstock of NG , LSHS, COAL etc. and DIL Kanpur suspended production. Hence these two units were not considered

*Cost per G'Cal is calculated based on R-LNG price of ₹ 1933 plus 15% other charges

Annexure – 11 (d) (Referred to in 4.1.2)

Statement showing subsidy savings by using R-LNG for production of urea during 2012-13

S. No	Unit	Energy norm (Gcal per MT)	Other Expenses per MT (₹)	Actual cost per MT (₹)	Actual production TMT	Feedstock cost per MT using R-LNG (₹)	Normative cost per MT using R-LNG (₹)
1	2	3	4	5	6	7 (Col.3X ₹ 2847.62 X 115%)*	8 (Col.4 + Col. 7)
1	MCFL	7.356	3046	41715	379.50	24089.16	27135.16
2	SPIC	7.382	3163	41000	481.82	24174.30	27337.30
3	MFL	8.337	4292	45510	435.77	27301.70	31593.70
			Total	128225	**1297.09**	--	**86066.16**
			Average	**42741.70**	**--**	--	**28688.72**

**R-LNG price of ₹ 2847.62 (which was the highest R-LNG basic price during 2012-13) plus 15 per cent (other charges) per G'Cal are considered for calculation.*

$ ZIL unit uses mixed feedstock of NG, Naptha and FO. Hence not considered for calculation.

Annexure-12 (Referred to in Para 4.2)

Statement showing year wise capacity addition of gas based stations during last ten year ending March 2013

Plan Period	Year	Capacity at the end of the year (Mw)	Year wise capacity addition (MW)	Gas required (mmscmd)at 90% PLF	Average gas supplied (mmscmd)	Shortfall (mmscmd)
X plan (2002-07)	2002-03	9949.00	---	48.26	25.12	23.14
	2003-04	10154.90	205.90	49.25	25.62	23.63
	2004-05	10224.90	70.00	49.73	30.70	19.03
	2005-06	10919.62	694.72	53.38	35.37	18.01
	2006-07	12444.42	1524.80	61.18	35.10	26.08
	Total (a)		**2495.42**			
XI Plan Period (2007-12)	2007-08	13408.92	964.50	65.67	38.14	27.53
	2008-09	13599.62	190.70	66.61	37.45	29.16
	2009-10	15769.27	2169.65	78.09	55.46	22.63
	2010-11	16639.77	870.50	81.42	59.31	22.11
	2011-12	18381.00	1741.23	86.07#	56.28	29.79
	Total (b)		**5936.58**			
	2012-13	20110.00	1729.00	135.00	40.00	50.70
	Total (c)		**1729.00**			
	Grand Total (a+b+c)		**10161.00**			

Gas requirement is considered for the available capacity of 17721.47 MW only.

Annexure- 13 (Referred to in Para 4.2)

Statement showing status of supply of NG, liquid fuel, generation loss in power sector

Year	No of power stations	Installed capacity in MW	Generation in MUs	Gas requirement at 90% PLF (mmscmd)	Gas allotted (mmscmd)	Average gas supplied/ consumed (mmscmd)	Naphtha used (KL)	FO used (KL)	Generation loss (Mu)
2008-09	46	13599.62	67398.65	66.61	N/A	37.45	1839812.53	297451.86	11994.98
2009-10	47	15769.27	92517.10	78.09	61.56	55.45	671220.52	194550.95	3237.43
2010-11	50	16639.77	97580.23	81.42	65.87	59.31	154100.73	8933.14	6394.67
2011-12	50	16926.27	92022.77	81.78	67.11	56.37	185288.42	225.60	10855.84
2012-13	55	18362.27	59910.90	90.70	81.73	40.00	285405.00	519.60	33646.18
						Total	**3135827.20**	**501681.15**	**66129.10**
							(31.35 lakh KL)	**(5.01 lakh KL)**	

Annexure 14 ((Referred to in Para 4.2)

Statement Showing increase in cost of generation due to using Naphtha due to non-availability of R-LNG

Year	Cost of R-LNG* per MT with 9500 kCal (₹)	Cost of Naphtha# per MT (₹)	Cost of Power per kWh*#		Increase in cost of power due to use of Naphtha instead of R-LNG (per kWh) (₹)	Quantity of Naphtha@ used for power generation (KL)	Million Units (Million kWh) generated by using Naphtha (@ 0.01172304 Mu/KL)^	Increase in generation cost (In million ₹)	₹ In Crore
			With R-LNG (₹)	With Naphtha (₹)					
1	**2**	**3**	**4**	**5**	**6 (5-4)**	**7**	**8**	**9 (6 X 8)**	**10**
2010-11	19488.35	37282.00	6.89	9.56	2.67	154100.73	1806.53	4823.43	**482.34**
2011-12	22079.22	48800.00	7.80	12.51	4.71	185288.42	2172.14	10230.78	**1023.08**
2012-13	31659.80	53792.00	11.19	13.79	2.60	285405.00	3345.81	8699.10	**869.91**
						624794.15	7324.49		**2375.33**

Assumption for Estimation

* Cost of R-LNG is worked out based on the landed cost of LNG as per the long term contract between PLL and Ras Gas

\# Cost of Naphtha is the Annual average of Refinery Transfer Price – IOCL

*# As per the Report of 'Expert Committee on Fuels for Power Generation' cost of power generation using LNG was ₹ 2.29/ kWh and that of Naphtha was ₹ 4.46/kWh in 2004-05. Generation cost is estimated for the subsequent years by apportioning the proportionate increase in fuel cost.

@ Data as per fuel consumption statement available with CEA

^ Based on the computation - 1 Kg Naphtha with 10500 kCal is equivalent to generation of 0.001163 kWh and one Litre of Naphtha = 0.96 Kg.

Annexure-15 (Referred to in Para 4.3)

Statement showing capacity utilisation of major pipelines												
				2011-12			2012-13			2013-14		
Sl. No.	NETWORK/REGION	Entity	Length Kms as on 31.03.2014	Design Capacity (mmscmd)	Average Flow of gas (mmscmd)	Average % capacity utilization^	Design Capacity (mmscmd)	Average Flow of gas (mmscmd)	Average % capacity utilization^	Design Capacity (mmscmd)	Average Flow of gas (mmscmd)	Average % capacity utilization^ (31.03.2014)
1	HVJ GREP -DVPL & Spur (Hazira -Vijaipur-Jagdishpur) HVJ+Vijaypur Dadri Pipeline	GAIL	4435	33	30.4	92	33	47.5	93	57.3	42.9	80.98
2	DVPL-GREP Upgradation (DVPL-2 & VDPL)	GAIL	1112	34	31.8	91	34	28	82	54	15.33	28.39
3	CHHAINSA- JHAJJAR -HISSAR P/L	GAIL	262	5	0.75	15	5	0.75	15	5	0.68	15
4	DAHEJ-URAN-PANVEL(DUPL/ DPPL) including Spur Lines	GAIL	873	20	19.9	98	20	12.64	68.5	20	8.92	44.82
5	DADRI BAWANA NANGAL P/L, Dadri-Bawana:106Km, Bawana - Nangal:501 KM, Spur Line of BNPL : 196 Km.	GAIL	803	11	*	35.5	11	1.43	13	11	2.40	21.81
6	DABHOL -BANGLORE-PIPELINE (Including spur)	GAIL	1004	Commissioned in 2013-14			16	0.06	0	16	0.97	6.09
7	KOCHI-Koottanad-Banglore- Mangalore (Phase-1)	GAIL	41	Commissioned in 2013-14			Commissioned in 2013-14			6	0.31	5.21
8	ASSAM (Lakwa)	GAIL	8	2.5	0.60	25.2	2.5	0.58	23.2	2.5	0.55	22.0
9	TRIPURA (Agartala)	GAIL	61	2.3	1.46	64.8	2.3	1.45	64	2.3	1.46	64.4
10	AHMEDABAD	GAIL	144	3	0.45	15	3	0.41	14.1	3.0	0.38	13.0
11	RAJASTHAN (Focus Energy)	GAIL	154	2.35	0.84	36.0	2.35	0.75	31.8	2.35	1.09	46.5
12	BHARUCH , BADODARA (UNDERA) included R-LNG+ RIL	GAIL	670	15.4	11.2	73	15.4	2.94	19.1	15.4	2.25	14.6
13	MUMBAI	GAIL	129	24	12	50	24	22.9	95.4	24.0	22.9	95.4
14	KG BASIN (included R-LNG+ RIL)	GAIL	877	16	14.7	91.9	16	8.6	54	16.0	6.0	37.4

15	CAUVERY BASIN	GAIL	268	9	3.42	35	9	3.2	37	9.0	3.57	41.22
16	EAST- WEST PIPE LINE (RGTIL)	Reliance	1469	80	48.0	60	80	48	60	80.0	48.0	60
17	GSPCL Network including Spur Lines	GSPCL	1874	50	22	44	50	22	44	50.0	22.0	44
18	Assam Gas Company (Duliajan to Numaligarh)	AGC	1000	2	1.50	75	6	4.5	75	6.0	4.50	75
19	Dadri -Panipat	IOCL	132	0	0	0	11	2.63	28	9.5	3.11	32.8
20	Uran Trombay	ONGC	24	0	0	0	6	0	0	6.0	*	*
	Total		**15340**	**309.55**	**199.02**	**64.29**	**346.55**	**208.34**	**60.11**	**395**	**187**	**47**

* Data not available.
^Average percentage capacity utilization is worked out by PAPC.
Source: PPAC

Annexure 16 (Referred to in Para 5.1)

Statement showing sector-wise allocation of domestically produced Natural Gas

(Quantity in mmscmd)

Sl. No	Sector wise allocation of natural gas	Total
1	Fertilizer	55.08
2	Gas Based LPG plants for LPG extraction	6.88
3	Power	108.30
4	CGD (PNG, Transport)	10.19
5	Taj Trapezium Zone consumers	1.10
6	Small consumers having allocation less than 0.05 mmscmd	2.91
7	Steel	9.95
8	Refineries	14.93
9	Petrochemicals	12.73
10	Others (include Court–mandated customers other than CGD, internal consumption for pipeline)	14.72
	Total	**236.79**

Annexure-17 (a) (Referred to in Para 5.3.1)

Statement showing non-recovery of market price on APM gas consumed for other than production of urea

Sl. No.	Name of Unit	NG consumed as per annual consumption report (mmbtu)	NG consumed for urea as allowed by FICC (mmbtu)	NG (APM) used for other purposes (mmbtu)	APM price charged (₹./G'cal)	APM price charged (₹/mmbtu)	Non APM Rate (₹/mmbtu) HVJ/DVPL price applicable	Differential price (₹)	Amount under-recovered (₹)
1	2	3	4	5 (Col. 3-col. 4)	6	7 (Col.6 X 25.2/100)	8	9 (Col. 8-Col. 7)	10 (Col. 5 X Col. 9)
2010-11									
1	**KSFL**	8474049	8317563	156486	684.20	172.42	234.25	61.83	9675529
2	**CFCL-I**	8571274	8215718	188246	702.00	176.90	234.25	57.35	10795908
3	**CFCL-II**		167310						
4	**TCL**	8492111	8473024	19087	685.67	172.79	234.25	61.46	1173087
								Total	**21644524**
2011-12									
1	**KSFL**	7807241	7527722	279519	791.46	199.45	249.26	49.81	13922841
2	**CFCL-I**	8192795	7784873	145950	790.85	199.29	249.26	49.97	7293122
3	**CFCL-II**		261972						
4	**IGFL**	7903923	7748825	155098	718.21	180.99	249.26	68.27	10588540
								Total	**31804503**
Grand total (2.16 + 3.18)									**5.34 crore**

Source:

1. Escalation/De-Escalation Statement prepared by FICC (DOF) for calculating subsidy payable on urea.
2. Details of Allocation and consumption of feedstock as furnished by fertilizer units to FICC.

Annexure 17 (b) (Referred in to Para 5.3.1)

Statement showing loss of production of urea on account of non-utilisation of APM gas for specified purpose with resultant subsidy outgo

		2010-11			2011-12		
	Particulars	**KSFL**	**CFCL-I & II**	**TCL**	**KSFL**	**CFCL I & II**	**IGFL**
1	Available production capacity (MT)	1030500	2100200	1116700	1164600	2146000	1162200
2	Urea production during the period (MT)	909810	1845690	957330	909810	1845690	990000
3	Capacity utilisation in *per cent*	88	88	86	78	86	85
4	NG consumed for Urea (mmbtu)	8317563	8383027	8473024	7527722	8046845	7748825
5	Urea (MT)/NG (mmbtu)	0.109384203	0.220169874	0.112985635	0.120861265	0.229368156	0.127761306
6	NG not used for Urea (mmbtu)	156485	188246	19087	279518	145950	155097
7	Production loss of urea (5X6) in MT	17117	41446	2157	33783	33476	19815
8	Cost of production of urea/MT in ₹	9098	10861	9392	10059	12401	12069
9	MRP of urea/MT in ₹	5310	5310	5310	5310	5310	5310
10	Subsidy on urea in ₹/MT (8-9)	3788	5551	4082	4749	7091	6759
11	Subsidy on imported urea in ₹/MT	14000	14000	14000	22306	22306	22306
12	Differential subsidy in ₹/MT (11-10)	10212	8449	9918	17557	15215	15547
13	Avoidable subsidy (₹ in crore) (7 X 12)	**17.48**	**35.02**	**2.14**	**59.31**	**50.93**	**30.81**

Source: Annexure 17 a, Escalation de-escalation statement from FICC, Annexure 9 (a)

	2010-11	**2011-12**	**Total**
Loss of production in MT	60720	87074	147794
Average differential subsidy ₹	8998	16199	--
Total differential subsidy (₹ in crore)	**55**	**141**	**196**

Annexure-18 (Referred to in Para 5.3.2)

Statement showing list of shareholders of APGPCL and share of power supplied to them

Sl. No	Shareholder	Equity Participation- No. of shares in crore (%)	Corresponding Share of electricity (%)	Share in Electricity (MW)
1	APTRANSCO (State Electricity utility)	15758427 (21.62 %)	21.62	58.80
2	Public Sector Undertakings	14568517 (19.99%)	19.99	54.36
3	Private Sector	42569245 (58.39%)	58.39	158.84
	Total	**72896189**	**100**	**272.00**

Annexure-19 (Referred to in Para 5.3.3)

Statement showing List of small scale consumers and market rate (non-APM) pending recovery from such consumers

Sl. No	Customer	Amount pending recovery (₹ in crore)
1	Gopal Glass Works Ltd.	5.88
2	Bajrang Refractories Private Ltd.	0.13
3	J P Chemicals.	0.86
4	Jalaram Ceramics Ltd.	1.80
5	Nahar Colours and Coating Ltd.	1.09
6	Spire cera frit Private Ltd.	0.92
7	Somany Ceramics Ltd.	8.30
8	Bhavani Chemicals.	1.92
9	Ajita Silchen Private Ltd.	2.63
10	Akik Tiles Private Ltd.	5.45
11	Bisazza India Private Ltd.	2.59
12	Akash Ceramics Private Ltd.	1.93
13	Sterling Ceramics Private Ltd.	5.69
14	Victory Ceratech Private Ltd.	2.15
15	Swastik Sanitarywares Ltd.	0.44
16	Pioneer Industries.	0.07
17	Ashok Ceracon Private Ltd.	0.13
18	Mahek Glazes Private Ltd.	1.03
	Total	**43.01**

Annexure 20 (Referred to in Para 5.4)

Statement showing loss of production and excess subsidy payment on imported Urea

Sl. No	Fertilizer unit/ (NG source)	Quantity of NG underutilized in mmscmd/ Period	Loss of production of urea (LMT)	Excess subsidy paid (₹ in crore)	Reference
1	BVFCL (APM)	Ranging between 0.30 and 0.27 (2008-09 and 2011-12)	1.09	55.72	Annexure 21
2	NFCL (KG D6 and JV)	0.001 to 0.148 (July 2011 to March 2013)	0.51	98.04	Annexure-22
3	NFL (APM)	0.01 to 0.61 (April to December 2012)	0.65	139.63	Annexure- 23
4	KRIBHCO (APM)	0.01 to 1.16 (July 2011 to October 2012)	1.66	340.45	Annexure- 24
5	GSFC	0.034 (11 Months in 2011-13)	Increase in cost of production	3.23	Annexure- 25 (a) & 25 (b)
Total				**₹ 637.07**	

Annexure 21 (Referred to in Para 5.4)

Statement showing excess subsidy payment owing to production loss of urea due to short lifting of NG by BVFCL during 2008-09 and 2011-12

Year of allocation	contracted quantity of gas	Mutually agreed billed quantity	Consumption per day considering 300 on-stream days per year (as per FICC norm)	Less consumed	Production loss due to short consumption as confirmed by BVFCL	Excess of subsidy per TMT	Total Excess subsidy
	mmscmd	*mmscm*	*mmscmd*	*mmscmd*	*MT*	*(₹ in lakh)*	*(₹ in lakh)*
1	**2**	**3**	**4 (3/300)**	**5 (2-4)**	**6**	**7**	**8 (6 X 7/1000)**
2008-09	1.72	426.57	1.42	0.30	61044.00	40.28	2458.85
2011-12	1.72	434.10	1.45	0.27	48684.00	63.95	3113.34
				Total	109728.00		5572.19
					1.09 LMT		**₹ 55.72 crore**

Annexure-22 (Referred to in Para 5.4)

Statement showing production loss due to low off take of NG by Nagarjuna Fertilizers and Chemicals Ltd, I & II Units, Kakinada with resultant extra payment of subsidy during 2011-12 (July 11 to March 12)

Month	Type of gas	Actual Supply (scm)	Actual Consumption	Short consumption in month (3-4) scm	Short consumption Per day (Col. 5 / (Days in month x10 lakh)) MMSCMD	Per day Production loss (Col.6 X 1.3399) TMT	Production loss for the month (Col.7 X Days in month) TMT	Subsidy payable to NFCL per TMT (₹.9341.88-₹.5310) x1000 (₹)	Subsidy paid on imports per TMT(₹)	Excess subsidy paid per TMT (₹) (Col.10-Col.9)	Total extra subsidy paid(₹) (Col.8 X Col.11)
1	2	3	4	5	6	7	8	9	10	11	12
Jul'11	RIL	50685502	48978557	1706945	0.0551	0.0738	2.2871	4031880	22306000	18274120	41794740
Aug'11	RIL	52108634	47735575	4373059	0.1411	0.1890	5.8595	4031880	22306000	18274120	107077206
Sep' 11	JV(Non APM NG)	5477825	5114431	363394	0.0121	0.0162	0.4869	4031880	22306000	18274120	8897669
	RIL	48412544	46339557	2072987	0.0691	0.0926	2.7776	4031880	22306000	18274120	50758196
Oct'11	JV(Non APM NG)	7467083	7094162	372921	0.0120	0.0161	0.4997	4031880	22306000	18274120	9131578
	RIL	50074255	48839982	1234273	0.0398	0.0533	1.6538	4031880	22306000	18274120	30221740
Nov' 11	JV(Non APM NG)	4230631	3634515	596116	0.0199	0.0266	0.7987	4031880	22306000	18274120	14595540
	RIL	48420155	43989498	4430657	0.1477	0.1979	5.9366	4031880	22306000	18274120	108486141
Dec' 11	JV(Non APM NG)	5516370	5007294	509076	0.0164	0.0220	0.6821	4031880	22306000	18274120	12464777
	RIL	50186700	49877781	308919	0.0100	0.0134	0.4139	4031880	22306000	18274120	7563658
Jan' 12	JV(Non APM NG)	4452288	3887057	565231	0.0182	0.0244	0.7574	4031880	22306000	18274120	13840818
	RIL	50310305	46231367	4078938	0.1316	0.1763	5.4654	4031880	22306000	18274120	99875375
Feb' 12	JV(Non APM NG)	5125706	4722081	403625	0.0144	0.0193	0.5408	4031880	22306000	18274120	9882644
	RIL	48911364	48182900	728464	0.0260	0.0349	0.9761	4031880	22306000	18274120	17837369
Mar' 12	JV(Non APM NG)	4176741	3723364	453377	0.0146	0.0196	0.6075	4031880	22306000	18274120	11101528
	RIL	53873270	51826113	2047157	0.0660	0.0885	2.7430	4031880	22306000	18274120	50125911
						Total (a)	**32.48 TMT**				**59.36 crore**

Continued…

Statement showing production loss due to low off take of NG by Nagarjuna Fertilizers and Chemicals Ltd, I & II Units, Kakinada with resultant extra payment of subsidy during 2012-13 (April to March)

Month	Type of gas	Actual Supply (scm)	Actual Consumption	Short consumption in month (3-4) MMSCM	Short consumption Per day (Col. 5 / Days in month x10 lakh) MMSCMD	Per day Production loss (Col.6 X 1.3399) TMT	Production loss for the month (Col.7 X Days in month) TMT	Subsidy payable to NFCL per TMT (₹ 9341.88-₹ 5310) x1000 (₹)	Subsidy paid on imports per TMT(₹)	Excess subsidy paid per TMT (₹) (Col.10-Col.9)	Total extra subsidy paid(₹) (Col.8 X Col.11)
1	2	3	4	5	6	7	8	9	10	11	12
Apr	JV(Non APM)	3164817	2646306	518511	0.0172837	0.02315843	0.694752889	4031880	24883140	20851260	14486473
	RIL	52079435	49556331	2523104	0.084103467	0.112690235	3.38070705	4031880	24883140	20851260	70492002
May	JV(Non APM)	5474752	4695215	779537	0.025146355	0.033693601	1.044501626	4031880	24883140	20851260	21779175
	RIL	53062193	51431117	1631076	0.052615355	0.070499314	2.185478732	4031880	24883140	20851260	45569985
June	JV(Non APM)	4972833	4339503	633330	0.021111	0.028286629	0.848598867	4031880	24883140	20851260	17694356
	RIL	48696738	48020396	676342	0.022544733	0.030207688	0.906230646	4031880	24883140	20851260	18896051
Jul	JV(Non APM)	7791165	6993260	797905	0.025738871	0.034487513	1.06911291	4031880	24883140	20851260	22292351
	RIL	53130003	51895537	1234466	0.039821484	0.053356806	1.654060993	4031880	24883140	20851260	34489256
Aug	JV(Non APM)	7585078	7010962	574116	0.018519871	0.024814775	0.769258028	4031880	24883140	20851260	16039999
	RIL	49868630	49120028	748602	0.024148452	0.03235651	1.00305182	4031880	24883140	20851260	20914894
Sep	JV(Non APM)	6858738	6389000	469738	0.015657933	0.020980065	0.629401946	4031880	24883140	20851260	13123824
	RIL	48055359	47579774	475585	0.015852833	0.021241211	0.637236342	4031880	24883140	20851260	13287181
Oct	JV(Non APM)	7450422	7052454	397968	0.012837677	0.017201204	0.533237323	4031880	24883140	20851260	11118670
	RIL	50798499	50152694	645805	0.020832419	0.027913359	0.86531412	4031880	24883140	20851260	18042890
Nov	JV(Non APM)	7004050	6902514	101536	0.003384533	0.004534936	0.136048086	4031880	24883140	20851260	2836774
	RIL	50044271	49718206	326065	0.010868833	0.01456315	0.436894494	4031880	24883140	20851260	9109801
Dec	JV(Non APM)	7704675	7687411	17264	0.000556903	0.000746195	0.023132034	4031880	24883140	20851260	482332
	RIL	51562754	51010243	552511	0.017822935	0.023880951	0.740309489	4031880	24883140	20851260	15436386
Jan	JV(Non APM)	7847385	7566383	281002	0.009064581	0.012145632	0.37651458	4031880	24883140	20851260	7850803
	RIL	51024520	50859774	164746	0.005314387	0.007120747	0.220743165	4031880	24883140	20851260	4602773
Feb	JV(Non APM)	7310832	7193957	116875	0.003770161	0.005051639	0.156600813	4031880	24883140	20851260	3265324
Mar	JV(Non APM)	7696452	7516573	179879	0.005802548	0.007774835	0.241019872	4031880	24883140	20851260	5025568
						Total (b)	**18.55 TMT**				**38.68 crore**
						Grand total	**51.03 TMT**				**98.04 crore**

Production loss per mmscmd=1.3399TMT per day (Targeted production 15.65 LMTPA / NG required 3.2 mmscmd/365 days in the year)

Note: As the actuals of subsidy paid and escalation statements of FICC for 2012-13 were not available, the normative cost of production and the subsidy paid on import of urea during the year 2011-12 were considered for calculations.

Annexure 23 (Referred to in Para 5.4)

Statement showing loss of production of urea during 2012-13 (April to December 12) due to underutilisation of APM gas in respect of Vijayapur-I & II Units of National Fertilizers Limited and consequent extra payment of subsidy

Month	Allocation per month (mmscmd)	Actual Supply (mmscmd)	Actual consumption (mmscmd)	Short consumption in month (mmscmd)	Short consumption Per day (col 5 / Days in month) (mmscmd)	Per day Production loss (6 X 1.3215) TMT	Production loss for the month (col 7 X Days in month) TMT
1	2	3	4	5	6	7	8
Apr-12	67.2000	41.8300	30.1660	11.6640	0.3888	0.5138	15.4140
May-12	69.4400	64.4700	58.7240	5.7460	0.1854	0.2449	7.5919
Jun-12	67.2000	45.2800	37.1770	8.1030	0.2701	0.3569	10.7070
Jul-12	69.4400	59.3300	40.3480	18.9820	**0.6123**	0.8092	25.0852
Aug-12	69.4400	60.2200	58.6650	1.5550	0.0502	0.0663	2.0553
Sep-12	67.2000	57.3000	56.8210	0.4790	0.0160	0.0211	0.6330
Oct-12	69.4400	60.2900	59.8700	0.4200	**0.0135**	0.0178	0.5518
Nov-12	67.2000	58.7800	57.8490	0.9310	0.0310	0.0410	1.2300
Dec-12	69.4400	56.0000	55.0240	0.9760	0.0315	0.0416	1.2896
Total	616.0000	503.5000	454.6440	48.8560	1.5988	2.1128	64.5578
							0.65 LMT

Extra subsidy calculation

Details of cost, MRP and subsidy paid on urea	In ₹
1.Normative rate of urea per MT	8564.00
2.MRP of urea	5310.00
3.Subsidy per MT (1-2)	3254.00
4.Subsidy on Import per MT	24883.14
5.Difference (*subsidy savings*) (4-3)	21629.14
Excess subsidy (21629.14 X 64.5578 X 1000)	**₹ 1396329694**

Say ₹ 139.63 crore

Note: As the actuals of subsidy paid and escalation statements of FICC for 2012-13 were not available, the normative cost of production and the subsidy paid on import of urea during the year 2011-12 were considered for calculations.

Annexure-24 (Referred to in Para 5.4)

Statement showing production loss in KRIBHCO during 2011-12 & 2012-13 (July 2011 to October 2012) due to non-utilization of APM Gas and consequent extra payment of subsidy

Month	Actual availability of APM gas (Total mmscmd in month*)	Actual Consumption (Total mmscmd in month*)	Short consumption in month (Total mmscmd in month*)	Short consumption Per day (Col.4 / Days in month) mmscmd	Per day Production loss (Col.5 X 1.2254) TMT	Production loss for the month (Col.6 X Days in month) TMT	Subsidy payable to KRIBHCO per TMT (₹ 7338- MRP ₹ 5310)x1000 (₹)	Subsidy paid on imports per TMT(₹)	Excess subsidy paid per TMT (₹)	Total extra subsidy paid(₹)
1	2	3	4 (Col. 2-Col. 3)	5	6	7	8	9	10 (Col. 9 – Col. 8)	11 (Col. 10 X Col. 7)
2011-12										
Jul-11	55.00	54.50	0.50	**0.01613**	0.01976	0.61256	2028000	22306000	20278000	12421492
Sep-11	60.30	53.10	7.20	0.24000	0.29410	8.82300	2028000	22306000	20278000	178912794
Oct-11	52.70	36.20	16.50	0.53226	0.65223	20.21913	2028000	22306000	20278000	410003518
Dec-11	50.30	25.00	25.30	0.81613	1.00008	31.00248	2028000	22306000	20278000	628668289
Jan-12	54.36	45.44	8.92	0.28774	0.35260	10.93060	2028000	22306000	20278000	221650707
Feb-12	55.10	21.57	33.53	**1.15621**	1.41682	41.08778	2028000	22306000	20278000	833178003
Mar-12	71.44	38.97	32.47	1.04742	1.28351	39.78881	2028000	22306000	20278000	806837489
Sub-total						**152.46432**				**3091672292**
2012-13										
Apr-12	62.30	57.33	4.97	0.16567	0.20301	6.09030	2028000	24883140	22855140	139194659
Aug-12	54.82	54.65	0.17	0.00548	0.00672	0.20832	2028000	24883140	22855140	4761183
Oct-12	54.93	48.90	6.03	0.19452	0.23836	7.38916	2028000	24883140	22855140	168880286
Sub-total						**13.68106**				**312836128**
Grand Total						**166.14538**				**3404508420**

Say ₹ 340.45 crore

During these 10 months in 2011-12 and 2012-13, there was low off-take of APM gas.
**** Total mmscmd in month is the sum of mmscmd of each day in that month.***
Note: As the actuals of subsidy paid and escalation statements of FICC for 2012-13 were not available, the normative cost of production and the subsidy paid on import of urea during the year 2011-12 were considered for calculations.

Annexure-25 (a) (Referred to in Para 5.4)

Statement showing low off-take of cheaper gas by GSFC and extra expenditure on account of utilisation of costlier gas during the period May 2011 to March 2013)

From May 2011 to March 2012									
Month	**Capacity of Urea (MT)**	**Production (MT)**	**Feedstock**	**Availability (MT) or (Scm)**	**Price (₹)/ Unit**	**Consumption (MT) or (SCM)**	**Under Consumption SCM (col.5-col.7)**	**Difference in rate**	**Extra cost on feedstock (₹)**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 (col 8 X col 9)**
May	34813	26510	HP APM (SM3)	14840000	8.27	14542032	297968	16.48 – 8.27	2446317
			PMT-APM(SM3)	2740646	8.27	2564215	176431	16.48 – 8.27	1448499
			PMT-PSC	1808557	11.03	1642483	166074	16.48 – 11.03	905103
			R-LNG(SM3)	10026710	**16.48**	2462025	--	--	--
Jul	34813	21960	LP APM (SM3)	4443783	7.80	4443095	688	16.91 – 7.80	6268
			PMT-APM	2757338	8.33	2749921	7417	16.91 – 8.33	63638
			PMT-PSC(SM3)	1829391	10.87	1657640	171751	16.91 – 10.87	1037376
			R-LNG(SM3)	23028577	**16.91**	3135048	--	--	--
Sep	33690	4404	LP APM (SM3)	3768406	7.98	3521797	246609	10.30 – 7.98	572133
			RIL(GSPL)	316949	**10.30**	316949	--	--	--
Oct	34813	28250	LP APM (SM3)	3878209	8.44	3875906	2303	19.52 – 8.44	25517
			PMT-APM	2660073	8.76	2627628	32445	19.52 – 8.76	349108
			PMT-PSC(SM3)	1740475	11.85	1628425	112050	19.52 – 11.85	859424
			R-LNG(SM3)	20810838	**19.52**	7239947	--	--	--
Feb	32567	32855	LP APM (SM3)	3183387	8.66	3179344	4043	21.24 – 8.66	50861
			ONGC Non-APM(SM3)	4296000	16.32	4128268	167732	21.24 – 16.32	825241
			R-LNG(SM3)	14340816	**21.24**	2126273	--	--	--
Mar	34813	30471	LP APM (SM3)	4860702	8.69	4394031	466671	22.13 – 8.69	6272058
			PMT-APM(SM3)	2518085	9.11	2465755	52330	22.13 – 9.11	681337
			PMT-PSC	1697298	12.35	1419848	82770	22.13 – 12.35	809490
							194680	16.00 – 12.35	710582
			ONGC Non-APM(SM3)	4208000	**16.00**	1926783	--	--	--
			R-LNG(SM3)	15860188	**22.13**	601771	--	--	--
			Total (a) ₹						**9349569**

Annexure 25 (b) (Referred to in Para 5.4)

From April 2012 to March 2013									
Month	**Capacity of Urea (MT)**	**Production (MT)**	**Feedstock**	**Availability (MT) or (Scm)**	**Price (₹)/ Unit**	**Consumption (MT) or (SCM)**	**Under Consumption SCM (col.5-col.7)**	**Difference in rate**	**Extra cost on feedstock (₹)**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 (col 8 X col 9)**
April	33690	29859	LP APM (SM3)	3806667	8.97	3802875	3792	23.57 – 8.97	55363
			ONGC Non-APM	4607000	16.29	3880174	726826	23.57 – 16.29	5291293
			R-LNG(SM3)	13725590	**23.57**	1325900	--	--	--
May	34813	30574	LP APM (SM3)	3876733	9.12	3872094	4639	25.69 – 9.12	76868
			ONGC Non-APM	5438000	16.59	4864221	573779	25.69 – 16.59	5221389
			R-LNG(SM3)	14668479	**25.69**	2479095	--	--	--
Sept	33690	24672	HP APM (SM3)	14050000	10.07	13914532	135468	27.35 – 10.07	2340887
			LP APM (SM3)	4085299	9.54	4079281	6018	27.35 – 9.54	107181
			PMT-APM(SM3)	2109242	10.07	1965527	143715	27.35 – 10.07	2483395
			PMT-PSC(SM3)	1385261	12.96	1290818	94443	27.35 – 12.96	1359035
			ONGC Non-APM	5553000	13.55	3643955	142293[Ω]	27.35 – 13.55	1963643
			R-LNG(SM3)	13945455	**27.35**	521937	--	--	--
Oct	34813	30021	LP APM (SM3)	3292128	9.44	3289625	2503	27.27 – 9.44	44628
			ONGC Non-APM(SM3)	6200000	13.35	6127237	72763	27.27 – 13.35	1012861
			R-LNG(SM3)	15724408	**27.27**	1365063	--	--	--
Feb	31444	26486	LP APM (SM3)	3257866	9.28	3255575	2291	29.56 – 9.28	46461
			ONGC Non-APM	5411000	13.3	5227892	183108	29.56 – 9.28	2977336
			R-LNG(SM3)	13726868	**29.56**	4935148	--	--	--
			Total (b) ₹						**22980340**
			Total (a + b) ₹						**32329909**
								₹ in crore	**3.23**

[Ω] **limited to 521937 utilised at the highest rate of 27.35**

Annexure-26 (Referred to in Para 5.5)

Statement showing marketing margin paid to the Contractor in excess of marketing margin allowed to GAIL									
Year	**NG in mmbtu/ mscm**	**Marketing margin payable to contractor / mmbtu**	**Average KG D6 gas supplied (mscm)**	**Marketing margin charged /mscm**	**USD exchange rate in ₹**	**Marketing margin charged for KG D6 gas Per mscm**	**Subsidy impact on KG D6 gas**	**Marketing margin if rate allowed to GAIL is charged (₹/mscm)**	**Excess Marketing margin over & above the rate applicable to GAIL (₹/mscm)**
1	**2**	**3**	**4**	**5** (Col. 2 X Col. 3)	**6**	**7** (Col. 5 X Col. 6)	**8** (Col. 4 X Col. 7)	**9** ₹ 200 X (Col. 4)	**10** (Col. 8 - Col. 9)
	mmbtu (1000 scm/25.2*)	**USD**	**(15 mmscmd X 365 days)/ 1000)**	**USD**	**₹**	**₹**	**₹ in lakh**	**(₹ 200 X mscm) ₹in lakh**	**₹ in lakh**
2009-10	39.6825	0.135	5018750Ω	5.36	47.42	254.17	12,756.16	10,037.50	2,718.66
2010-11	39.6825	0.135	5475000	5.36	45.58	**244.31**	13,375.97	10,950.00	2,425.97
2011-12	39.6825	0.135	5475000	5.36	47.92	256.85	14,062.54	10,950.00	3,112.54
2012-13	39.6825	0.135	5475000	5.36	54.39	291.53	15,961.27	10,950.00	5,011.27
2013-14	39.6825	0.135	5475000	5.36	60.73	**325.51**	17,821.67	10,950.00	6,871.67
								Total	**20,140.11**

Say ₹ 201.40 crore

**25.2 scm equals to one mmbtu*

Ω less than 365 days

Glossary

Glossary

Bi-Directional Pipeline	Gas pipelines wherein gas can transmit from both ends of the pipeline. Depending on where gas is removed and where the Compressors create pressure differential gas may flow in either direction.
Captive Consumption	Captive Consumption means the consumption of goods/power manufactured/generated by same organization or related undertaking for manufacturing another product.
CGD Network	City Gas Distribution Network means an interconnected network of gas pipelines for transporting NG to the service pipes supplying NG to domestic, industrial or commercial premises and CNG stations.
Common Carrier capacity	Under common carrier system, designed capacity of NG pipeline, over and above the entity's own requirement and capacity allocated on a contract carrier basis, shall be available to third party on non-discriminatory basis.
Contract Carrier capacity	Under contract carrier system, capacity of NG pipeline, over and above the entity's own requirements, is available to any other entity subject to the latter entering into a firm contract for transportation of a volume of NG for a period of minimum one year, on such other terms and conditions as may be mutually agreed.
Downstream Sector	Downstream sector involves the actual processing, selling and distribution of NG and oil based products.
Fallback Basis	Fallback basis allocation of NG by Government of India to optimally use the temporary available surplus gas.
Feedstock	A feedstock is a material that can be used directly as a fuel, or converted to another form of fuel or energy product.
Floating Storage and Re-gasification Unit (FSRU)	Floating storage and re-gasification unit is an onboard system providing basic functions like receipt, storage, pressurization and re-gasification of liquefied NG, metering and send out of gas into onshore gas pipeline grid. FSRU are easier to implement, cheaper to build with fewer onshore planning procedure issues, more flexible location with relocation advantage.
Gas field	Within the contract area, a NG Reservoir/group of NG Reservoirs within a common geological structure.
Hydrocarbon Gases	Hydrocarbons are derived from crude oil/NG like ethane, propane and NG liquids obtained from NG.
Hydrocarbons	Organic chemical compounds of hydrogen and carbon atoms. There are a vast number of these compounds and they form the basis of all petroleum products. They may exist as gases, liquids or solids.

Isolated Gas Fields	Small discoveries where production is small and fields are isolated and peak production is less than 0.1 mmscmd and they are situated more than 10 Km away from the gas grid.
Liquefied Petroleum Gas	Liquefied petroleum gas is a flammable mixture of hydrocarbon gases (composed of propane or butane) used as a fuel in heating appliances, cooking equipment and vehicles.
Liquid Fuel	Liquid fuels are combustible or energy-generating molecules derived from fossil fuels.
LNG	NG condensed at minus 160.5° C at normal pressure to liquid form is known as LNG and is typically transported by specialized tanker with insulated walls and received at terminals.
LNG Value Chain	LNG supply chain consisting of four functions *viz.* NG exploration and production (E&P), liquefaction, shipping, receiving and distribution. E&P involves extraction of oil, NG from natural reservoirs. Liquefaction converts NG into liquid form through refrigeration processes at liquefaction plants reducing its volume, thus allowing for easy transportation to centers of demand. After liquefaction, LNG is loaded onto specifically designed ships built around insulated cargo tanks to keep the LNG in liquid state throughout the voyage. An LNG receiving terminal comprises LNG storage tanks and re-gasification facilities that convert LNG back to its gaseous state by the application of heat, also known as vapourisation. Thereafter it is send into the pipeline system, for distribution to end-users.
LNG Terminals	An LNG receiving terminal comprises LNG storage tanks and re-gasification facilities that convert LNG back to its gaseous state by the application of heat, also known as vapourisation. Thereafter it is sent into the pipeline system, for distribution to end-users.
Low Off-Take	Low off-take is contrary to an Off take agreement wherein a buyer enters in to agreement with seller for buying a certain contracted quantity of future production.
LSHS	Low Sulphur Heavy Stock (LSHS) is a residual fuel processed from crude oil with advantage of having low sulphur content and high calorific value.
Market Related Price	Market price is the economic price for which goods or services are offered in the marketplace and is not influenced/subsidized by government.
Naphtha	Naphtha refers to a number of flammable liquid mixtures of hydrocarbons, i.e. a component of NG condensate or a distillation product from petroleum, coal tar, or peat boiling in a certain range and containing certain hydrocarbons. It is a broad term covering

	among the lightest and most volatile fractions of the liquid hydrocarbons in petroleum.
NELP Blocks	Award of oil/NG exploration blocks by GoI under different round of New Exploration and Licensing Policy based on international competitive bidding to any company either foreign, private or public sector company.
Nominated Fields	Oil/gas exploration fields offered by GoI to National Oil Companies on nomination basis prior to implementation of New Exploration and licensing policy. The price of gas so produced from nominated fields are regulated and priced at APM price regime.
Non-APM gas	NG priced at market rate or non-subsidized rate.
Normative cost of production	Normative price working is based on estimation of cost at acceptable level of efficiency parameters having bearing on cost such as capacity, capacity utilization and production level, raw material consumption, energy consumption etc.
Petrochemicals	Petrochemicals are hydrocarbons derived from crude oil and NG.
Production Sharing Contract	The contract between Government and International/National Exploration and Production (E & P) Company. The E&P Company bears the cost of exploration, drilling and production. The E&P Company is reimbursed for expenditures from the sale of oil/gas. After reimbursement, the oil/gas proceed is split by an agreed formula.
Ras Gas	RasGas Company Limited is a liquefied NG (LNG) producing company in Qatar.
Re-gasification Facilities	Re-gasification terminals/facilities are where the liquefied product is returned to the gaseous state after shipment by sea from the area of production and fed into transmission and distribution grids.
Spot LNG	Spot Cargo is purchase in a short period of less than one year
Stage III of new pricing scheme	New Pricing Scheme (NPS) Stage-III for urea introduced by GoI under New Urea Policy for the period October 2006 to March, 2010. NPS Stage-III seeks to promote the usage of NG, which is the most efficient and comparatively cheaper feedstock, for production of urea.
Statutorily Notified Selling Price	Statutorily notified selling price is generally lesser than the cost of production. The difference between the cost of production and the selling price is paid as subsidy/ concession to manufacturers.
Subsidy	Subsidy is an economic benefit or financial aid provided by a government to support a desirable activity, regulated the end consumer price and maintains the income of producers of critical and strategic products. Basic objective of subsidy is to reduce market price of an item below its cost of production.

Take or Pay	A take-or-pay contract is a rule structuring negotiations between companies and their suppliers. With this kind of contract, the company either takes the product from the supplier or pays the supplier a penalty.
Transmission Infrastructure	NG Transmission Infrastructure connects various gas sources to different gas markets/demand of various Power, Fertilizer, CGD and other industries and include pipeline, compressor station etc.
Upstream Sector	The upstream petroleum sector includes all petroleum exploration and extraction activities such as exploration, development and processing of crude oil and NG.
Wheeling Arrangement	Wheeling is the transportation of electric power over transmission lines. Under a wheeling arrangement power is transmitted through Licensee's distribution system and associated facilities.

Abbreviations

Abbreviations	
AFL	Andhra Fuels Limited
AGCL	Assam Gas Company Limited
APGDCL	Andhra Pradesh Gas Distribution Corporation Limited
APGPCL	Andhra Pradesh Gas Power Corporation Limited
APM	Administered Price Mechanism
APPCC	Andhra Pradesh Power Coordination Committee
APSEB	Andhra Pradesh State Electricity Board
BCM	Billion Cubic Meter
BG	Bank Guarantee
BoD	Board of Directors
BPCL	Bharat Petroleum Corporation Limited
BVFCL	Brahmaputra Valley Fertilizer Corporation Limited
CCGT	Combined Cycle Gas Turbine
CEA	Central Electricity Authority
CESC	Calcutta Electric Supply Corporation
CFCL	Chambal Fertilizer and Chemical Limited
CGD	City Gas Distribution
DIL	Duncan Industries Limited
DoF	Department of Fertilizers
DPL	Durgapur Project Limited
DVPL	Dahej-Vijaipur Pipeline Limited
EGoM	Empowered Group of Ministers
EoI	Expression of Interest
EWPL	East West Pipeline
FACT	Fertilizer And Chemicals Travancore Limited
FAI	Fertilizer Association of India
FCI	Fertilizers Corporation of India
FDI	Foreign Direct Investment
FICC	Fertilizer Industry Coordination Committee
FIPB	Foreign Investment Promotion Board
FO	Fuel Oil
GAIL	Gas Authority of India Limited
GDR/ADR	Global Depository Receipt/American Depository Receipts
GLC	Gas Linkage Committee
GNVFCL	Gujarat Narmada Valley Fertilizers & Chemicals Limited
GoI	Government of India
GoM	Group of Ministers
GSFC	Gujarat State Fertilizer Corporation
GSPA	Gas Sales Purchase Agreement
GSPC	Gujarat State Petroleum Corporation
GSPL	Gujarat State Petronet Limited
GSTA	Gas Sales and Transmission Agreement

HFCL	Hindustan Fertilizer Corporation limited
HPCL	Hindustan Petroleum Corporation Limited
HSD	High Speed Diesel
HVJ	Hazira-Vijaipur-Jagdishpur Pipeline
HVJ-GREP	Hazira-Vijaipur-Jagdishpur Pipeline-Gas Rehabilitation Expansion Project
IFFCO	Indian Farmers Fertiliser Cooperative Limited
IGFL	Indo Gulf Fertilisers Limited
IOC	Indian Oil Corporation Limited
IPI	Proposed Tri-national natural gas pipeline of **I**ran-**P**akistan-**I**ndia
JVCs	Joint Venture Companies
KCL/SCM	Kilo Calories per Standard Cubic Meter
KG Basin	Krishna Godavari Basin
KG D6	Krishna Godavari D6 gas block
KRIBHCO	Krishak Bharati Cooperative Limited
KSFL	KRIBHCO Shyam Co-operative Fertilizers Limited
Kwh	Kilo Watt Hour
LMT	Lakh Metric Tonne
LMTPA	Lakh Metric Tonne Per Annum
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LSHS	Low Sulphur Heavy Stock
MBI pipeline	Proposed Tri-National Natural Gas Pipeline of **M**yanmar-**B**angladesh-**I**ndia
MCFL	Mangalore Chemicals and Fertilizers Limited
MFL	Madras Fertilizers Limited
MMBTU	Million Metric British Thermal Unit
MMSCMD	Million Metric Standard Cubic Meter per day
MMTPA	Million Metric Tonne Per Annum
MoCF	Ministry of Chemicals & Fertilizers
MoP	Ministry of Power
MoPNG	Ministry of Petroleum and Natural Gas
MoU	Memorandum of Understanding
MSCM	Million Standard Cubic Meter
MW	Mega Watt
NLC	Neyveli Lignite Corporation Limited
NELP	New Exploration and Licensing Policy
NEP	National Electricity Policy
NFCL	Nagarjuna Fertilizers and Chemicals Limited
NFL	National Fertilizers Limited
NG	Natural Gas
NGG	National Gas Grid
NOCs	National Oil Companies

NTPC	National Thermal Power Corporation
OGL	Open General License
OIL	Oil India Limited
ONGC	Oil and Natural Gas Corporation Limited
PLF	Plant Load Factor
PLL	Petronet LNG Limited
PMP Act	Petroleum and Minerals Pipeline Act, 1962
PMT	Panna-Mukta-Tapti gas field
PNGRB	Petroleum and Natural Gas Regulatory Board
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PSC	Production Sharing Contract
PSU	Public Sector Undertaking
RCF	Rashtriya Chemical and Fertilizers Limited
Relog	Relogistics Infrastructure Limited, a subsidiary of RGTIL
RGPL	Reliance Gas Pipeline Limited
RGPPL	Ratnagiri Gas and Power Private Limited
RGTIL	Reliance Gas Transmission Infrastructure Limited
RIL	Reliance Industries Limited
R-LNG	Re-gasified Liquefied Natural Gas
RoU	Right of Usage
RoW	Right of Way
SAIL	Steel Authority of India Limited
SCM	Standard Cubic Meter
SPIC	Southern Petrochemicals Industries Limited
TAPI	Transnational gas pipeline envisaged passing through four countries **T**urkmenistan-**A**fghanistan-**P**akistan-**I**ndia
TCL	Tata Chemicals Limited
TCM	Trillion Cubic Meter
TMT	Thousand Metric Tonne
USD	US Dollar
WBPDC	West Bengal Power Development Corporation Limited