

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 Myanmar⁶, Iran⁷ and Turkmenistan⁸. 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.

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 mmbtu⁹ of NG. The pipeline was expected to carry 150 mmcmd 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 mmcmd NG through this line. GAIL and Pakistan's Interstate Gas System signed (May 2012) GSPA¹⁰ 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.

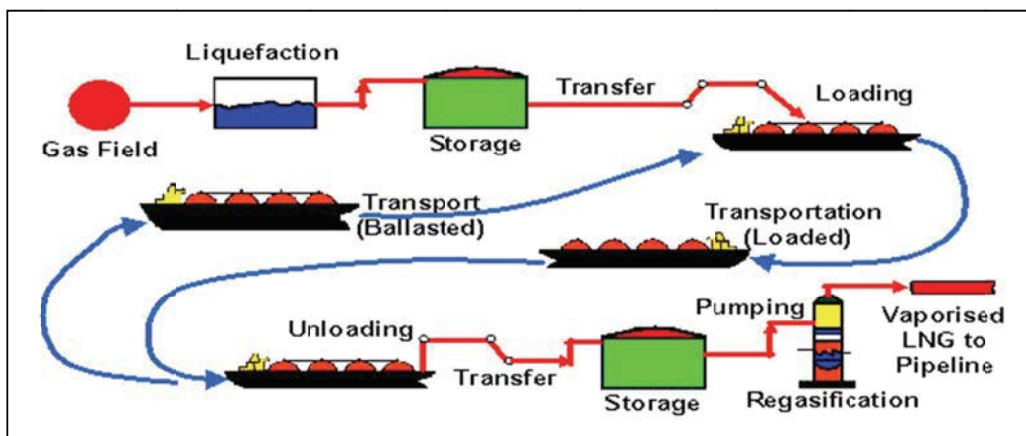
⁹ Million Metric British Thermal Unit

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)

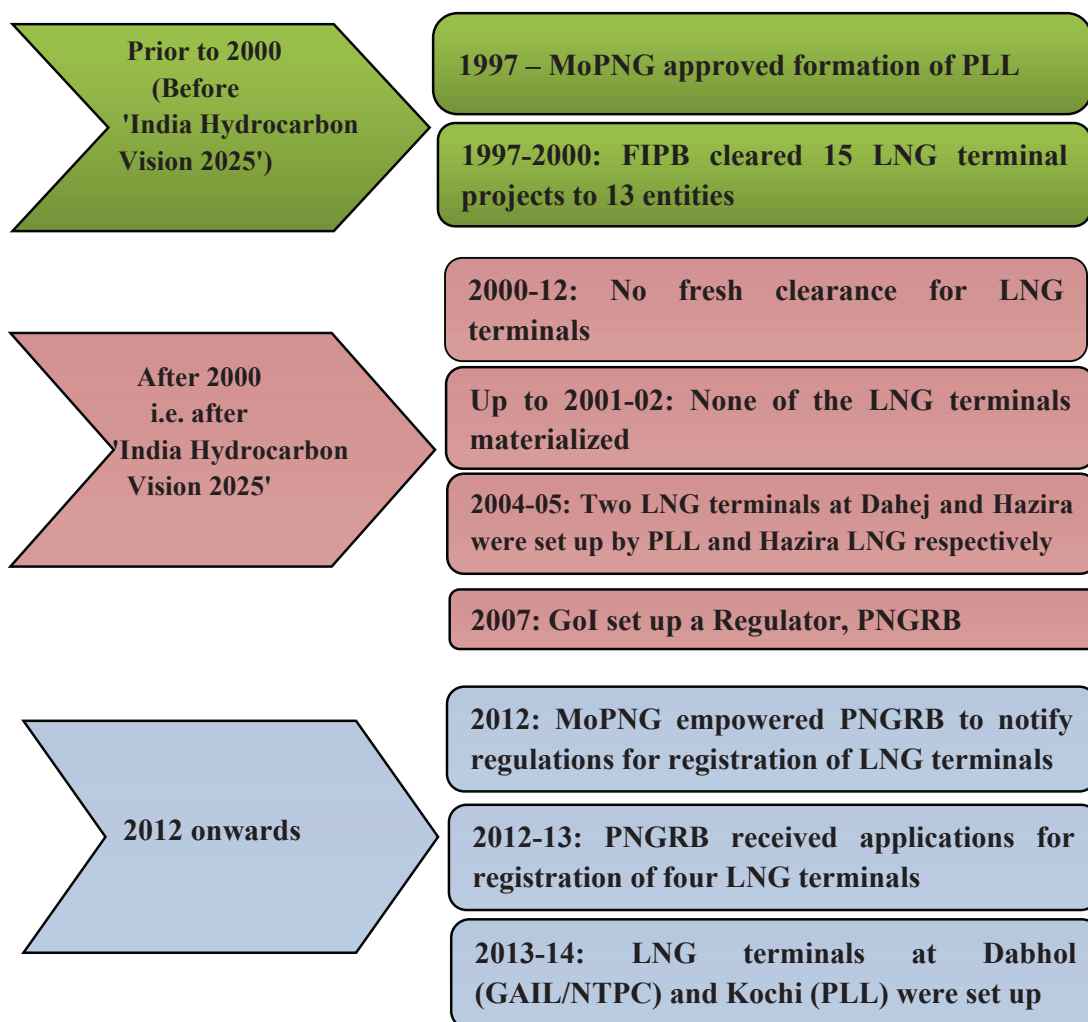
3.2.1 Initiatives for creating R-LNG infrastructure

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 mmtpa¹².

3.2.2 Development of R-LNG infrastructure

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



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 mmcmd 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, four¹³ 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. In spite of autonomy given to PLL, it did not commence LNG related activity in Kochi till 2008¹⁴. 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 Trombay¹⁵ 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 GAIL¹⁶ 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 four¹⁷ entities for registration of LNG terminals for creation/ expansion of LNG facilities.

While a total capacity of 145 mmcmd for import/re-gasification was expected by 2004, a capacity of 79.2 mmcmd 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

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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	LNG import (spot)	Requirement of Gas for proposed schemes under Fertilizer sector	Requirement of Gas to avoid use of costlier feedstock in Fertilizer sector ²²	Requirement of Gas to avoid use of costlier fuel in Power sector ²³	Total requirement of R-LNG	Actual re-gasification capacity	Minimum additional requirement for re-gasification capacity
	(1)	(2)	(3)	(4)	(5)	(6) (1 to 5)	(7)	(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 mmcmd 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.

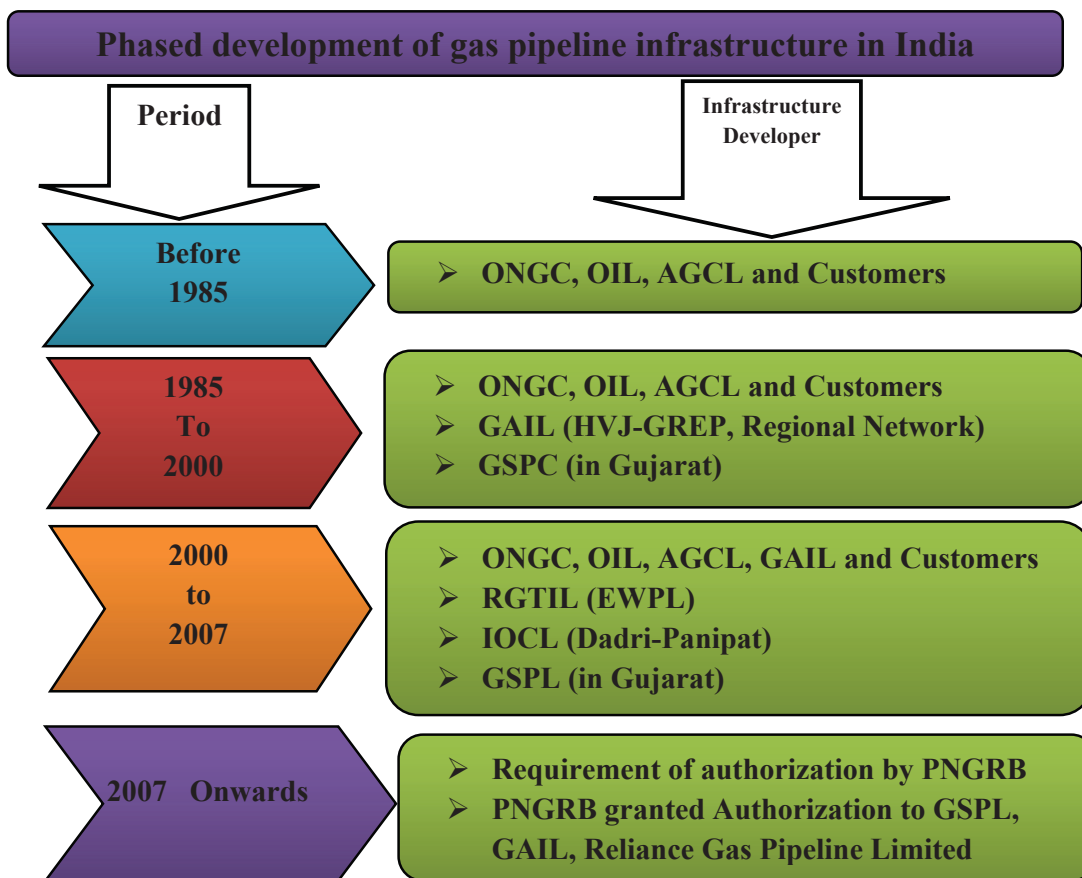
3.3

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 coast²⁴. 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:



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 states²⁶. 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 country²⁷. 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 limited²⁸. 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 pipelines³⁰ under NGG. Thereafter, GAIL identified 15 pipeline projects³¹ (including seven trunk pipelines mentioned above) and carried out preliminary studies by 2003.

²⁵ Major entities that control these pipelines are GAIL - 71 per cent, Gujarat State Petroleum Corporation Limited - 12 per 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-Bangalore-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 pipelines³² (9,684 Km) had already been granted. In respect of remaining nine pipelines, PNGRB had initiated bidding process for two sections³³ and three sections were identified by MoPNG for implementation through Public Private Partnership (PPP) mode with viability gap funding while the remaining four pipelines³⁴ 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.

Mangalore (11) Bangalore-Coimbatore-Kayamkulam (12) Myanmar-Mizoram-Assam-Bihar (13) Hyderabad-Vijaiapur (14) Vijaiapur-Jagdishpur (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-Bangalore-Mangalore, Spur line to Dadri-Bawana-Nangal, Chainsa-Jhajjar-Hissar, Dabhol-Bangalore

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 nine³⁵ pipelines across the country for creating capacity on common carrier basis. MoPNG subsequently authorized (July 2007) GAIL and RGTIL to construct five³⁶ and four³⁷ 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/Relog³⁸ and one³⁹ 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

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

notification⁴⁰ 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 pipeline⁴¹, project under NGG, no work has commenced so far. MoPNG had earlier (July 2005) issued 3 (1) notifications⁴² (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.

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 mmcmd NG from five fertilizer plants⁴³ on their revival. In addition to this, five power plants⁴⁴ with the requirement of 19.4 mmcmd, four industrial units⁴⁵ with 4.5 mmcmd and seven city gas networks⁴⁶ were the other prospective consumers along the pipeline route. GAIL also entered into agreements with 26 customers for supply of NG⁴⁷ 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 projects⁴⁸ 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 mmcmd in 2006-07 to 28.39 mmcmd in 2012-13

⁴⁸ Varanasi, Gorakhpur, Patna, Ranchi & Jamshedpur

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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

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prescribed in 'Regulations 2008' for issue of authorization from date of EoI was 165 days. PNGRB granted authorization to six⁴⁹ 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 construction⁵⁰ 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 CCGT⁵¹ 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 Mallavaram-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.