

Chapter-4
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of NG/R-LNG

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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 sector⁵². 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/LSHS⁵³ 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 price⁵⁴ 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 Greenfield⁵⁵ project.

There was a plan for expansion of urea projects by KRIBHCO, IGFL, RCF and IFFCO to enhance capacity by 45.05 lmtpa⁵⁶ during XI Plan. Further, after notification of new investment policy in 2008, fertilizer companies viz. KRIBHCO, IGFL, RCF, CFCL, TCL⁵⁷, NFCL⁵⁸, IFFCO, KSFL⁵⁹ 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.

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 units⁶⁰ 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 (RGTEL-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).

Report No. 6 of 2015

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 crore⁶¹ and ₹ 642.16⁶² 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 Charge⁶³ (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 all⁶⁴ 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 CRC⁶⁵ on the basis of estimated investment in conversion projects.

DoF stated (January 2014) that uninterrupted supply of NG to the plant was a prerequisite 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

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 Plan⁶⁶.

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 2012-13⁶⁷. 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.

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 capacity⁶⁸. 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 NG⁶⁹ 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-LNG⁷⁰ 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 spot⁷¹ 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 contract⁷². 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 provider⁷³ 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 (RGTEL) 1469 Km (ten *per cent*)

Report No. 6 of 2015

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 *etc.*

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.