



# Optimising LNG Supplies from Terminals in India



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## Preface

From identifying potential demand and tying up for competitive LNG supply sources to cover the domestic demand deficit in past years, the country is at a stage where we need to get deeper into strategizing about bridging this demand-supply gap in the most cost-effective manner. This is more relevant today because imported gas may be the principal source in meeting increments to the country's future gas demand.

This paper provides a discussion on one of the most important infrastructure constituents in the LNG supply chain, the LNG regassification terminals, and how terminals can be better utilised, their efficiency improved, and supply chain optimised.

With the advent of LNG supply contracts in India in 2003, terminals came up at Dahej and later at Hazira which served as gateways to LNG supply with trunk gas pipelines flowing gas from Gujarat Coast to Central and Northern demand centres of India. The system catered to the vast anchor load of fertilizers and power plants in the country and the terminal utilization benefitted. However, the terminals that came up in later years at different locations along the coast could not be utilized as envisaged and are hampered by various bottlenecks with some of them even failing to break even. During the recent years we see various players working on developing plans to build new infrastructure to bring the LNG to consumers, while the existing players are working on expanding their capacities. This also leads to the concern of infructuous investment in a capital scarce nation like ours.

In this context, it is paramount to have an overarching development strategy to support this growing infrastructure in sync with pipelines and CGD infrastructure development. This strategy can help enhance logistical reach of RLNG and bring down the cost of delivering it to the consumers. The paper highlights the issues hampering the LNG terminals, and how the terminal utilisation can be optimised. Also, it highlights the way supply chain can be made efficient by having a well-coordinated infrastructure development and utilization approach.

The aim of the paper is to disseminate information and invite discussion on a strategic well-coordinated terminal development and supply chain efficiency in the country so that the national aspiration of achieving share of 15% gas in the Indian energy mix can be achieved.





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## Foreword

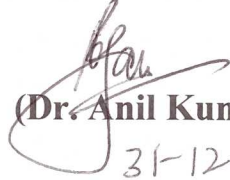
The growing demand for natural gas, along with the critical role of LNG in India's energy transition, has brought attention to the challenges and opportunities that lie within the LNG supply chain. This paper addresses a central issue – the optimization of LNG terminal infrastructure – which is essential to meeting India's ambitious energy goals.

As India continues to strive for an increased share of natural gas in its energy mix, the efficient utilization of LNG regasification terminals is key to supporting this transition. With the establishment of LNG terminals in Gujarat, followed by other terminals across the country, we have witnessed the evolution of India's LNG landscape. However, the development has not been without its challenges, including bottlenecks in infrastructure and underutilization of some terminals. This study offers valuable insights into these challenges while proposing actionable strategies for optimizing terminal capacities and improving overall supply chain efficiency.

The study highlights the need for a coordinated approach to infrastructure development, involving LNG terminals, pipelines, and city gas distribution (CGD) networks. It also provides important perspectives on how various stakeholders can collaborate to create a more resilient and efficient LNG ecosystem in India.

I commend Sunit for his thorough analysis and dedication to this subject. This study not only contributes to the ongoing dialogue about LNG infrastructure but also lays the foundation for further exploration of sustainable strategies for India's energy future.

I hope this paper sparks further discussion among industry stakeholders and experts ultimately leading to concrete solutions that will enhance India's LNG sector and support our country's energy security and sustainability goals.

  
**(Dr. Anil Kumar Jain)**  
31-12-2024

## **Acknowledgement**

I would like to take this opportunity to express my heartfelt appreciation to my team. The collaborative efforts and support from team members ensured that the study progressed smoothly and met its objectives within the required timeframe. My sincere thanks also go to Secretary PNGRB and the esteemed Board Members of PNGRB and for offering their expertise on the topic. Their insights have been instrumental in helping refine the approach and direction of this study.

Finally, I am extremely grateful to the Chairperson of PNGRB for providing expert guidance and continuous encouragement throughout this study. His valuable inputs and strategic direction have been essential in navigating the challenges of the study. The Chairperson's leadership and mentorship and strategic guidance has truly been instrumental in ensuring the study's successful completion.

**Sunit Verma**  
**Principal Consultant, PNGRB**



## 1. Current LNG Landscape

- 1.1 India is the third largest energy consumer and the fourth largest LNG importer globally. Limited domestic gas availability has pushed the country to rely increasingly on LNG since 2003, with dependence growing to around 50% in recent years. India currently has around 21.44 MMTPA of long-term contract LNG sourcing and has announced an additional 4.15 MMTPA of long term contracts since 2023.
- 1.2 To foster demand growth, it is crucial to focus on the highly price-sensitive Indian customer, ensuring that natural gas remains competitive with cheaper and more carbon-intensive alternatives. The fertilizer sector is the largest consumer of natural gas, accounting for 31%, followed by the City Gas Distribution (CGD) sector at 20%. The CGD sector, driven by rising CNG demand, has seen a CAGR of nearly 12% over the last five years and going forward, will need to absorb a significant amount of LNG in the mix. Gas-based power plants also require efficient pricing structures to remain competitive with alternative energy sources. Natural Gas can be an effective instrument to de-carbonise the industry. Hence there is a strong case for enhancing the gas demand.
- 1.3 Commodity prices are influenced by global factors, but ensuring easy accessibility of LNG to demand centres and reasonable infrastructure tariffs is vital. Once LNG arrives at Indian shores, it must reach the end customer cost-effectively and efficiently.
- 1.4 India began importing LNG in 2004 with the first regasification terminal at Dahej. This marked the first long-term LNG deal. This was followed by a 5 MMTPA LNG import terminal at Hazira in 2005. With increasing LNG consumption, import facilities were established at Dabhol and Kochi (2013) and Ennore (2019). Currently, India has seven operational LNG terminals, all onshore, with an operational regasification capacity of around 170 MMSCMD (47.7 MMPTA) and a total investment of around Rs. 37,000 Crore.



## 2. LNG Infrastructure and Investments in Terminals

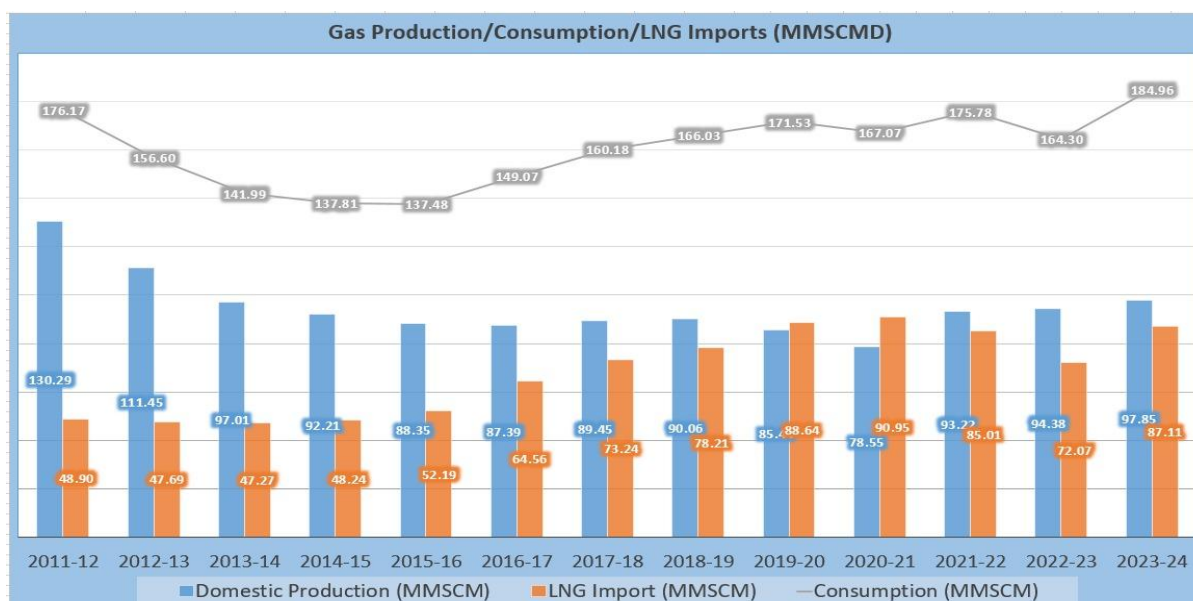
### 2.1 LNG Demand Outlook:

In the past five years, natural gas consumption in India has shown limited progress, with demand remaining relatively flat from FY20 to FY23 due to various geopolitical events impacting LNG prices. However, consumption reached 185 MMSCMD last year against 164 MMSCMD in FY 23, thanks to increased domestic production and softening of LNG prices. **(Figure-I)**

**2.2** Different agencies have forecasted India's future natural gas demand. The International Energy Agency (IEA) projects a demand of 311 MMSCM by 2030 driven primarily by transportation and industrial sectors. In the recent studies conducted by Deloitte, for PNGRB, Natural Gas demand is forecasted at 306 MMSCMD by 2030 with growth primarily coming from CGD sector. However, ICF's recent study for PNGRB projects a demand of only 236 MMSCMD by 2030 in a business-as-usual case, with demand largely from the transportation sector.

**2.3** In 2024, India's domestic natural gas production was 97.85 MMSCMD. ICF's market study projects that domestic gas availability will remain flat until 2030 and will show a decline from 2030.

**Figure-I:**



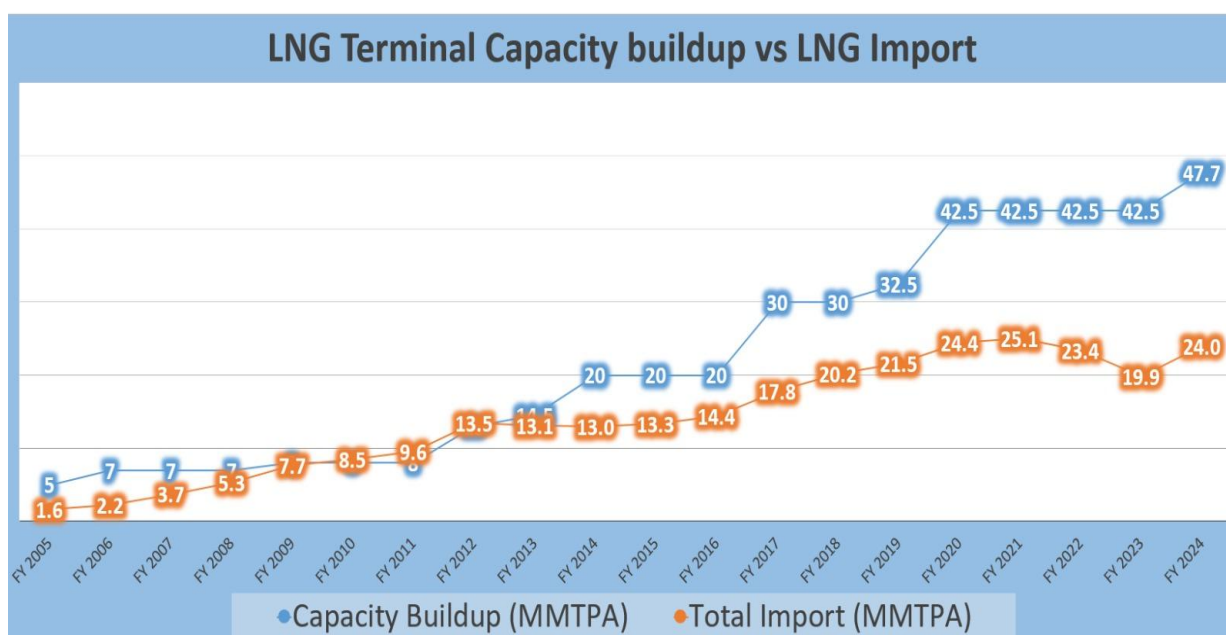
- 2.4** Taking a considered view on demand, based on these projections and no significant change in domestic production, this may leave a gap of around 202 MMSCMD (56 MMTPA) for LNG imports by 2030.
- 2.5** While 47.7 MMTPA of re-gas capacity currently exists, an additional 10 MMTPA is nearing completion at Chhara and Jaffrabad. Several land-based terminals and FSRUs are in various stages of planning and implementation at Jaigarh, Gangavaram, Kakinada, and Krishnapattanam that will add 19.2 MMTPA capacity. Additionally, Dahej and Dabhol terminals are planning capacity expansions by 5 MMTPA each. With these developments a total regasification capacity of around 87 MMTPA will be available against an expected LNG import demand of 56 MMTPA. Completion of these planned capacities and expansions will require additional pipeline infrastructure and major capital investments.
- 2.6** Historical average capacity utilization of LNG regasification terminals from 2015-16 to 2022-23 shows that, except for Dahej (98.23%) and Hazira (67.17%), all other terminals combined have had a utilization of around 26%. This suggests that many terminals may struggle to financially break even. Most of the LNG terminals are of 5 MMTPA capacity and have cost between Rs 4000 crores to Rs 5000 crores to construct. Their underutilization is a major concern for the financials of the Public Sector Oil and Gas Companies, with CPSEs having promoted a major part of the existing capacity.
- 2.7** As terminals have been connected with trunk pipeline, even the pipelines are underutilised with gas consumers in the country bearing this cost by way of unified tariff regime. While Kochi and Ennore terminals are connected by pipelines serving Kerala and Tamil Nadu respectively but the extension connecting them with the gas hub at Bengaluru is in final stages of connectivity. It is notable that Bengaluru is already connected with Dabhol with very low utilisation of DBPL. Hence southern India is not deprived of gas availability, but demand is yet to materialise. Details of capacity utilization of various terminals can be found in **Table-I**.



**Table-I. Capacity Utilization - LNG Terminals**

Sl. No	Year of Commissioning	Operator	Terminal	Present Capacity (MMTPA)	Utilisation 2023-24	Historical Utilisation 2015-16 to 2022-23
1	2004	PLL	Dahej	17.5	95.10%	98.23%
2	2013	PLL	Kochi	5.0	20.60%	13.14%
3	2005	Hazira LNG Pvt Ltd.	Hazira	5.2	30.30%	67.17%
4	2013	KLL	Dabhol	5.0	42.7%	57.50%
5	2019	Indian Oil LNG Pvt Ltd.	Ennore	5.0	18.30%	12.00%
6	2020	GSPC LNG Ltd	Mundra	5.0	14.60%	24.93%
7	2023	Adani Total	Dhamra	5.0	27.40%	-
			<b>Total</b>	<b>47.7</b>	<b>50.50%</b>	<b>54.64%</b>

**Figure-II:**



### **3. Capacity Utilization:**

#### **3.1 Kochi Terminal:**

The regasification terminal at Kochi, with a 5 MMTPA capacity, was commissioned in August 2013. A long-term contract was executed for about 1.44 MMTPA LNG from Exxon Mobil's Gorgon Project in Australia. The geographical proximity of Australia to Kochi offered an economic advantage, enabling cost-effective shipping from Gorgon.

**3.1.1.** However, due to the absence of anchor customers and connectivity issues, the terminal handled hardly a cargo each month, while the remaining volumes were assigned to Dahej. Shifting to Dahej from Kochi results in an additional 3-day voyage, increasing shipping costs and incurring a 10% additional VAT in Gujarat. Although alternate options can be explored for optimization, Gorgon LNG volumes continued to flow to Dahej. A single 3.4 TBTU cargo diversion on a \$10/MMBTU priced LNG would imply an additional \$3.4 million in taxes and in excess of \$100,000/day in extra shipping and fuel costs. The Kochi Koottanad pipeline is yet to be connected with DBPL and Ennore Bengaluru pipeline which is however not going to enhance the utilisation of these two terminals.

#### **3.2 Ennore Terminal:**

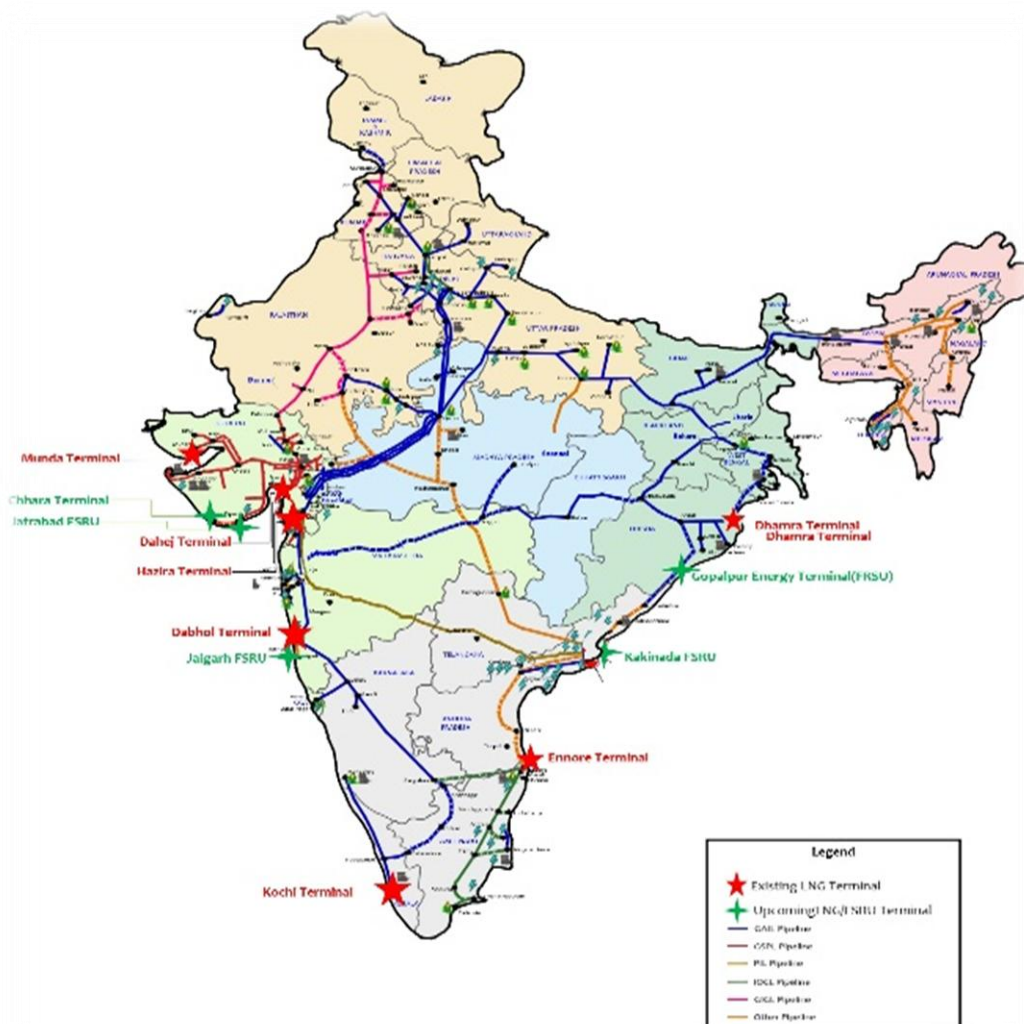
Despite the challenges faced by Kochi, another land-based terminal with a 5 MMTPA capacity and an estimated Rs 4900 crores outlay was planned at Ennore, Tamil Nadu. Commissioned in 2019, the terminal operates under a tolling agreement with the parent company. Even though the Ennore-Tuticorin mainline has been completed, the utilization of the 5 MMTPA terminal remained modest at 18.5% last year. Projections from the company indicate that the terminal will not be substantially utilized even in the near foreseeable future. With the anchor demand on the above pipeline not having materialised even the connectivity with Bangaluru which is long delayed (IOCL is constructing it) is not expected to add substantial business to Ennore LNG terminal



### 3.3 Dabhol Terminal:

The Dabhol LNG terminal commenced operations in 2013 and has necessary connectivity to main demand centres. It also well positioned to cater to upcoming demand centres in Maharashtra along MNJPL. However, its capacity utilization remains low due to the absence of a breakwater facility, limiting operations to the non-monsoon period for several years now. Additionally, the re-gas system at Dabhol relies on the heat from the power plant to regasify the supercooled liquid. In the absence of operational load at the power plant, its capacity remains severely impaired. GAIL is now aiming to enhance the capacity of its pipeline going northwards to pose a challenge to the already oversupplied market of North and west.

**Figure-3: LNG Infrastructure in India**



### 3.4 Dhamra Terminal:

Commissioned in May 2023, the Dhamra terminal was meant to cater to the East's requirements through JHBDPL. However, its capacity utilization is still at 27%. Substantial volumes still flow from the West Coast to fertilizer plants and other demand centres in the East, causing Eastern fertilizer customers to potentially pay the higher Zone III tariff of Rs.106.77 instead of Zone II's Rs. 80.08. This additional cost impacts customers and adds to the government's fertilizer subsidy burden. Even if the differential in shipping costs is accounted for, the net additional charge for East Coast customers due to tariff differences will be close to \$0.25/MMBtu on a \$10/MMBtu LNG.

**3.4.1** The flow of gas from West terminals to the East also increases compression requirements at Vijaipur and Auraiya compressor stations. Considering 1.8 BCM gas flowed from West Coast terminals to East Coast customers in the last 12 months, the cost implication to fertilizer plants and other East Coast customers due to tariff differentials (less additional shipping cost to Dhamra via Cape) will be close to Rs. 150 Crores.

### 3.5 Mundra Terminal:

Commissioned in February 2020, the Mundra terminal had a mere 14.6% capacity utilization last year. Over the past four years, it hasn't managed to reduce the re-gas congestion at Dahej terminal to its advantage. With Dahej planning to expand from the existing 17.5 MMTPA capacity to 22.5 MMTPA, two more terminals, Chhara and Jafrabad, within 100 kms of each other, are under commissioning. Utilization plans for these two, as well as the soon-to-be-commissioned Jaigarh FSRU, remain unclear. List of upcoming terminals & expansion in capacities can be seen in **Table II** and **III** below:

**Table II. Upcoming / proposed Regas Terminals**

S. No	Terminal	Capacity (MMTPA)
1	Swan LNG, Jaffrabad (FSRU)	5.0
2	HPCL Chhara	5.0
3	WCPL (FSRU) Jaigarh Mah.	6.0
4	Karaikal	1.0
5	PLL Gopalpur	5.0
6	Kakinada (FSRU)	7.2
	<b>Total</b>	<b>29.2</b>



**Table III. Capacity Expansion Planned in existing terminals.**

<b>S. No</b>	<b>Terminal</b>	<b>Capacity (MMTPA)</b>
<b>1</b>	Dahej 17.5 MMTPA to 22.5 MMTPA	5.0
<b>2</b>	Dabhol 5 MMTPA to 10 MMTPA	5.0
	<b>Total</b>	<b>10 MMTPA</b>

**4. Customer Suggestions and Concerns:**

Customers have approached PNGRB to allow access to existing LNG terminals to source LNG cargoes from international markets at reasonable regassification charges. Some issues on which intervention is sought include:

- 4.1 Unreasonable regasification tariffs for third parties and difficulties in providing access to terminals for third-party LNG cargoes.
- 4.2 Reluctance in providing third-party access to terminals and stringent conditions, including early off-take of LNG cargo.
- 4.3 All elements in the gas supply chain, including cargo unloading schedules, gas storage, regassification, and pipeline supply, and available terminal capacity should be publicly displayed in real-time. A detailed access code needs to be developed.
- 4.4 LNG terminals should display their tariffs and to ensure commercial transparency, in line with the practice for natural gas pipelines.

**5. Key Issues and Recommendations:**

The utilization of LNG terminals needs to be examined on the basis of thorough demand surveys to avoid high investments from being unproductive. Future LNG import terminals will face uncertainty unless well-coordinated plans align with the overall gas sector's requirements. Some of the recommendations to optimise the infrastructure so created are discussed as follows:

**5.1 Infertuous Assets/Pipelines and Customer Impact:**

To protect customer interests and promote sector growth, PNGRB aims to connect pipelines with demand centres through comprehensive evaluations to avoid creating nonperforming assets. LNG terminals also need to be planned



with firm bookings of regas capacities, upstream contracts, and anchor customer demand centres.

**5.1.1** In cases where pipeline capacity is underutilized or marginally utilized, the significant capital investment, often government-funded, may become infructuous. For example, a 250 km pipeline with a capex of Rs 2000 crore, if not utilized substantially, could increase the levelized unified tariff from Rs 80.97 to Rs 82.08, affecting the entire expanse of customers across the gas grid. It therefore needs to be evaluated whether LNG terminal operators should bear the capex burden involved for such investments.

## **5.2 Basis of Terminal Charges:**

The Dahej LNG terminal, that came up with an initial capacity of 5 MMTPA, established its re-gas charges in 2004 based on certain assumptions taken on power costs, loan interest, tax rates etc. Over 20 years, the terminal in stages expanded its capacity to 17.5 MMTPA, with incremental expansion investments being lower due to shared facilities. However, annual increments in regas charges have continued since then. Terminal capacity expansion should have led to a reduction in regasification costs.

**5.2.1** Further, it is noteworthy to mention that terminals, irrespective of the terminal capacity utilisation such as Dahej at 95% utilization and others with less than 25% utilization are charging almost the same regasification tariff and annual increment.

**5.2.2** On the contrary, in case of regulated infrastructure, i.e. Natural Gas Pipelines, the effect of increased utilisation beyond a benchmark return (12% post tax) is being passed on to the gas consumers. For instance, PNGRB during this year has trued up the tariff of GSPL high pressure natural gas network from Rs 34 / MMBTU to Rs 18.10/ MMBTU as the volumes transported have increased beyond the threshold limit of 75%.

## **5.3 Expansion Benefits and Handling Losses:**

Despite Dahej's plan to expand to 22.5 MMTPA, its re-gas charges have escalated annually by 5% and now stand at an enhanced level for the entire



17.5 MMTPA capacity. Rising charges while capacities have increased along with over 90% capacity utilization has led to the company being able to profit immensely at the cost of gas consumers. As new terminals are established nationwide, they follow the same tariff basis as Dahej, which needs reconsideration.

**5.3.1** Some LNG regasification terminals are designed for further expansion, potentially doubling their existing capacity. However, the benefits of such expansions are not shared with existing customers through reduced regasification charges.

**5.3.2** Additionally, some terminals charge high gas handling losses at fixed percentages from customers. A transparent reconciliation mechanism for gas loss/handling loss could be a more just mechanism.

#### **5.4 LNG in the Transport Sector:**

LNG in trucking, close-loop cement, and mining is a niche segment in India with the potential to reach 25 MMSCMD (7 MMTPA LNG) consumption by 2035. This could enhance terminal utilization if supported initially through incentive schemes, including reasonable loading charges. With the right support, LNG could replicate the success story of CNG in India.

**5.4.1** However, the truck loading charges levied by some terminals are the same as their re-gasification charges, while some are even higher, despite no heating / re-gasification process being involved. Charges and handling fees of the order of \$1.19/MMBTU have needlessly escalated the delivered cost of LNG, hampering sector growth.

**5.4.2** To seed the market, rationalizing loading charges could be a key enabler. This would provide impetus to sectoral growth without significantly impacting terminal profitability, as during the initial few years while infrastructure is under development, the volumes will be low. This would enable LNG marketers to offer cost effective pricing in the transport sector compared to other alternatives like diesel.



## **5.5 Rationalising choice of terminal and regional demand:**

With some of the major LNG sourcing contracts being destination specific, there is a challenge to optimizing the flow of LNG to the customers, as the ocean freight advantage does not get passed on to all customers.

**5.5.1** For a customer located in the East, sourcing Qatar volume on a Brent linked contract, will result in higher tariff as gas is flowing from Dahej. Similarly, Australian volume sourced at Kochi or Dahej will take a longer path and higher tariff to reach a customer in the East. Therefore, going forward, the sourcing contracts need to be flexible on the destination now that several terminals have been set up on both East and West coast of the country providing wider geographical options.

**5.5.2** The greenfield terminal capacity in the LNG terminals must focus now on regionality of demand as there is a cost implication to moving gas from distant sources in terms of higher tariff. Also, impetuous should come from these nearby terminals to create demand in the region. Though some of the terminals are languishing for business but continue to offer high regassification charges across the country. By offering competitive regassification and other charges they will support demand growth and promote terminal to terminal competition.

**5.6 Liberal exchange of Regas slot:** With re-gas capacity holders in terminals primarily being the state-owned entities having capacity in multiple terminals sub leasing of re-gas capacity would be value accretive. This would require deeper cooperation from terminal operators but may ensure better utilization of terminals and enable minimising the use-or-pay penalties.

## **5.7 LNG terminal to terminal competition:**

Following the establishment of Dahej and Hazira LNG terminals, several terminals have been developed and they can potentially attract customers with competitive and flexible terms. However most terminal operators maintain similar tariff ranges and escalation, whether it is a terminal operating at 95% capacity or at lower than 25% capacity. In order to draw customers, terminal operators may need to come up with options in terms of better re-gas rates, larger storage periods, liberal evacuation terms and slots and competitive



truck loading charges that could promote competition among operators and encourage utilization.

### **5.8 Unbundling in terminal ownership:**

The major off takers of R-LNG are also key shareholders of PLL and the LNG sourcing contracts with Qatar and Australia are designed destination specific to terminals at PLL Dahej and Kochi. Therefore, a sizable part of the country's import, is being routed through PLL 's terminals, leaving limited room to take the long-term volume to other existing terminals or any upcoming terminals in futures. Also, large volume of such RLNG is sold to state-owned entities like fertilizer plant for whom cost of gas is pass-through. In order to have an efficient mechanism, this calls for efficient restructuring through separation of ownership in terminals and marketing entities.

### **5.9 Efficiency in tax planning:**

Efficient taxation on natural gas remains a key to increasing the use of natural gas in the economy, and there has been a long-time demand to the government about bringing the fuel within the fold of the GST. However better structuring the LNG contracts at Dahej could have also avoided the off takers from a major cost of 15% VAT in Gujarat, which is being passed on to consumers.

**5.9.1** If these supplies could be sold by PLL either on high seas or directly as an inter-state sale where the gas is being consumed, this will bring down the costs to the end consumer. The structuring of US contracts on high sea have yielded a definite benefit to the customer in this regard. Also diverting cargos to other terminals where VAT rates would be lower like Kochi, Ennore, Dabhol, Dhamra terminals based on proximity to LNG source will also enable optimization.

### **5.10 Need for Regulatory framework.**

PNGRB's role relates to regulate the development of Natural Gas pipeline infrastructure in the country. The rules notified by MoPNG i.e., Petroleum and Natural Gas Regulatory Board. (Eligibility Conditions for Registering of Liquefaction of Natural Gas Terminals) Rules, 2012 mandates providing common carrier capacity, to protect the consumers interest wherein LNG terminals are required to provide additional capacity to any consumer who desires to import gas into the country at publicized tariff. Further as per PNGRB Act 2006, the Board has the power to register LNG terminals.



**5.10.1** However, the regassification and other charges of LNG terminals, LNG transportation and taxation which represent major part of the delivered cost of Natural Gas are currently beyond PNGRB's regulatory oversight. In order to ensure availability of services to customers at reasonable rates, increasing utilization of terminals along all geographies, and promote a well-coordinated development of the sector, it is felt that there is an urgent need for bringing the entire regassification activity including regassification tariff under the regulatory framework.

## **6. Initiatives and Reforms in the Gas Sector**

Several government initiatives have promoted LNG/Natural Gas in the energy mix, including:

- 6.1** Revision in the methodology of determining the domestic gas price formula.
- 6.2** Allocation of domestic gas to Compressed Natural Gas (Transport) / Piped Natural Gas (Domestic) (CNG(T)/PNG(D)) in the no-cut category.
- 6.3** Sustainable Alternative Towards Affordable Transportation (SATAT) initiatives to promote Bio-CNG, and mandatory blending of CBG in CNG (Transport) & PNG (Domestic) segments of the CGD sector.
- 6.4** The objective of PNGRB has been to promote the growth of natural gas and infrastructure, foster competition among service providers, and improve their services and pricing. Concurrently, it aims to ensure that there is no infructuous/idle investment in the sector and that the developed infrastructure is put to optimum use. Key initiatives taken by PNGRB to benefit consumers and facilitate the development of gas markets include:
  - a) Completion of authorization of GAs for CGD in the entire country (except Islands).
  - b) Implementation of unified tariff for natural gas pipelines.
  - c) Authorization of gas exchange.

Most importantly, PNGRB aims to safeguard customer interests by ensuring the availability of natural gas at reasonable tariff or re-gas charges.



## 7. Way Forward

**7.1 Utilization:** Currently, most terminals are under-utilized due to issues such as lack of demand, pipeline connectivity, or terminal specific bottlenecks like breakwater facilities etc. Terminal utilization in FY24 stood at 24 MMTPA, while the capacity is at 47.7 MMTPA, (Figure II) and several new facilities are coming online, widening the utilization gap. Pipeline assets are created with the overall gas sector development in mind, but re-gas assets are often developed independently and do not align with this broader objective.

**7.1.1** On the existing terminals it is crucial to resolve existing bottlenecks and maximize the utilization of terminals before making additional investments in expansion and new facilities.

**7.1.2** For upcoming terminals, comprehensive evaluations are needed to assess natural gas demand, location suitability, and pipeline capacity to handle the volume from new or expanded terminals. Timely and adequate infrastructure in synch with terminal development is essential for terminals to break even.

**7.2 In-efficiencies:** Another key aspect is the efficiency of LNG/RLNG flow. If a customer is paying Zone III tariffs while Zone I or II supply options exist, a better gas delivery plan and proactive approach is necessary to optimize resource utilization and reduce inefficiencies.

**7.2.1** Evaluate which terminals are best placed to receive long-term and spot LNG from specific global locations to minimize shipping costs and address taxation issues. Ensure optimal gas hydraulics to reduce energy and compression costs. Methods like cargo swapping and subleasing of regas facilities, alongside a collaborative approach, are needed to eliminate inefficiencies.

**7.2.2** Future international long-term sourcing contracts being negotiated must support destination flexibility to enable LNG flow optimization.

### 7.3 Regulatory Framework:

Given the challenges outlined, a comprehensive regulatory framework for LNG terminals, in sync with other infrastructure, is essential. As India progresses in the LNG landscape, a well-coordinated development strategy for LNG/natural gas infrastructure is vital to ensure efficient and equitable distribution of natural gas to the last mile.

