Gas Transmission Infrastructure : Current State and Network Addition Plan

Amitabh Ranjan

DGM - GAIL (India) Ltd



3rd March 2022

Contents

01

Overview of India Energy Sector

- Natural Gas Sector
- Investments in Gas Based Economy

02

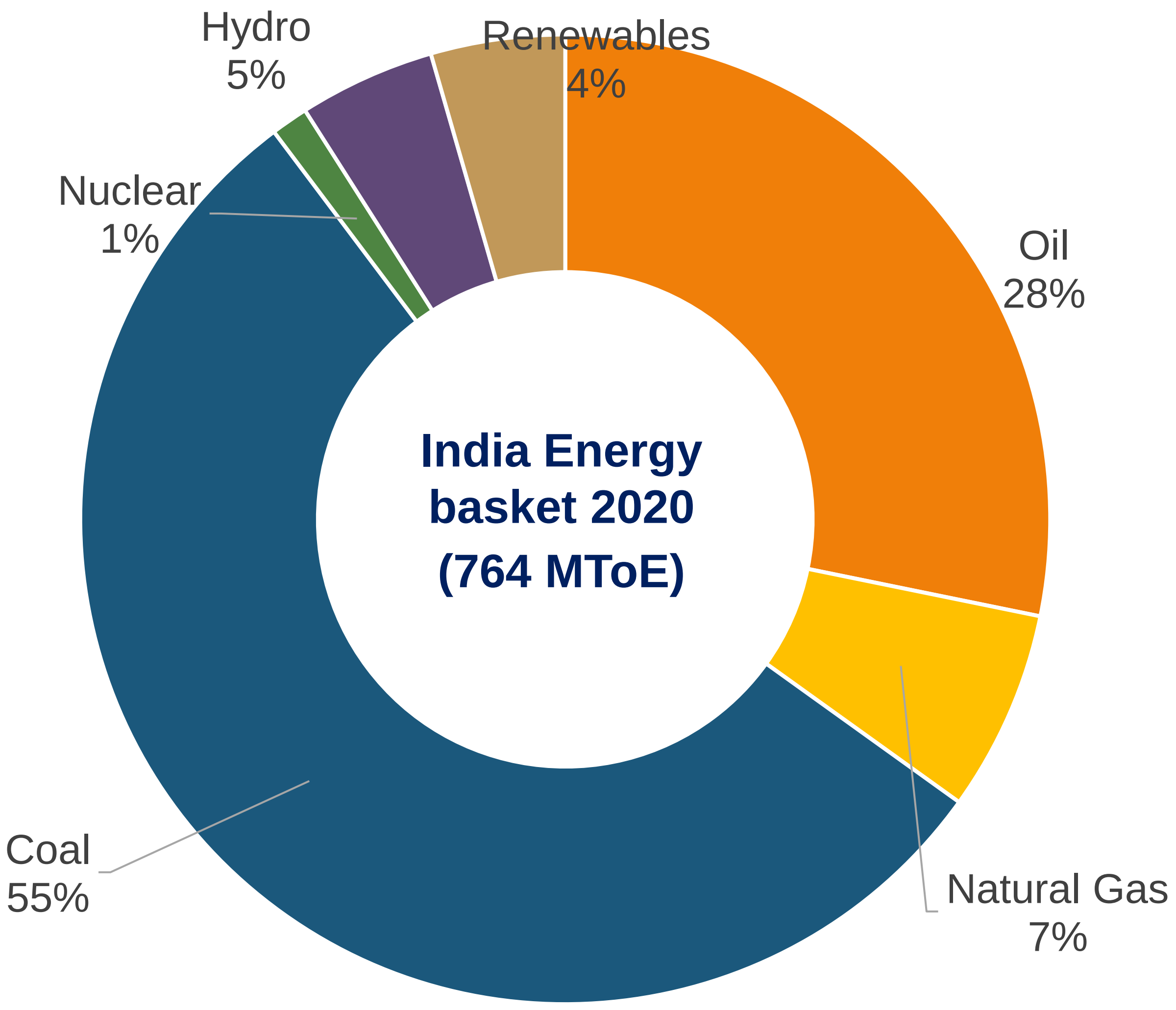
National Gas Grid

- Pipeline Infrastructure
- Way forward

India Energy scenario

- **Third largest** primary energy consumer after China & USA
- **Fastest growing** energy consumers among large consumers
- With growing **population**, **urbanization** and **standard of living**, there will be growing need of **affordable energy**
- Primary energy basket is dominated by Coal and Oil. i.e. around **86%**
- Share of Gas in India's Energy Mix ~6.7% i.e. ~**60 BCM**
- India facing trilemma of achieving higher energy access alongside high energy security and high sustainability
- **Gas based economy** is a step towards addressing these

Target to increase gas share to 15% in Primary Energy mix by 2030 i.e. ~180 BCM



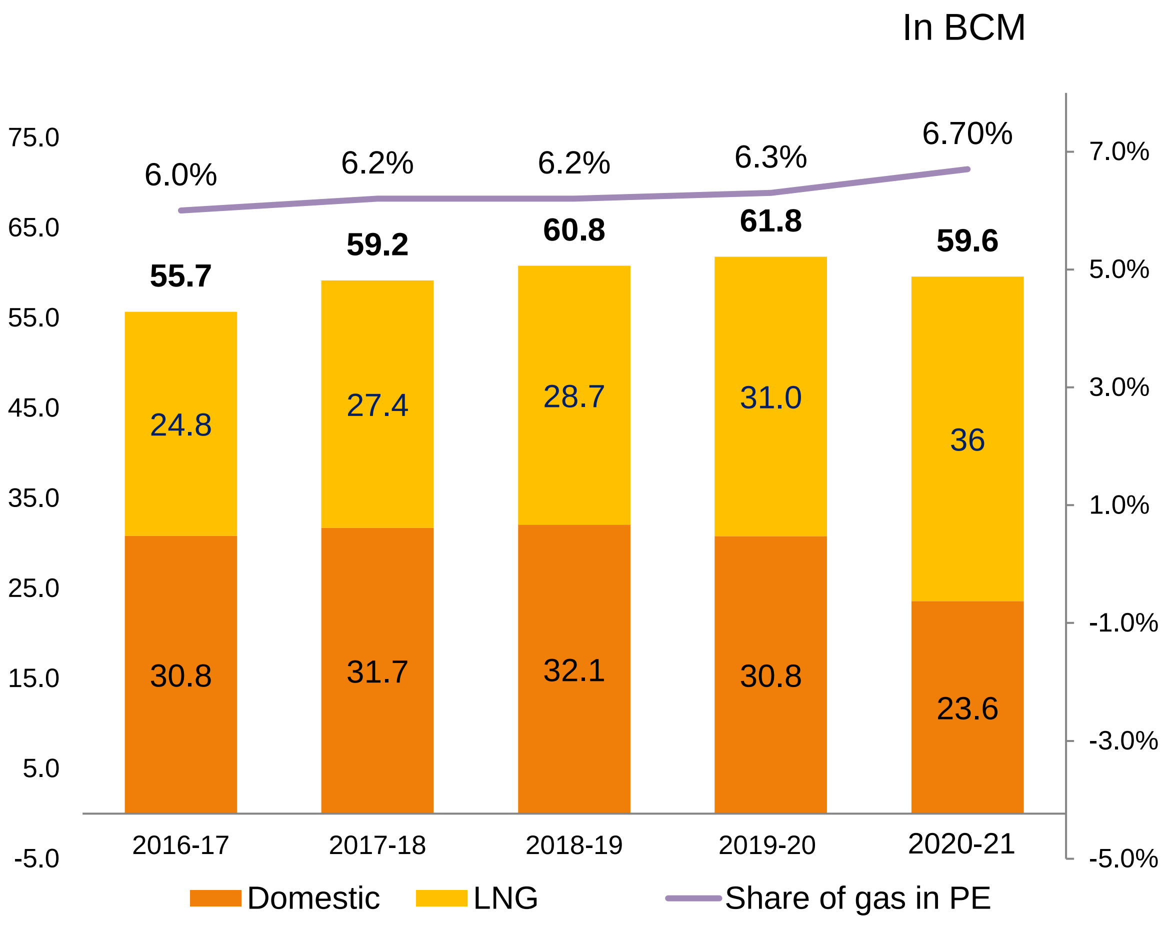
India is among the top 13 gas consuming countries globally

1 BCM = 2.74 MMSCMD

Top 15 Gas consuming countries globally in 2020		Gas Consumption (in BCM)		Growth 2009-19	Share of gas in PE (%)	Pipeline Length (KM)
		2009	2020			
1	US	617.6	832.0	3.2%	34.1%	500,000
2	Russian Federation	397.8	411.4	1.1%	52.3%	180,000
3	China	90.2	330.6	13.1%	8.2%	105,000
4	Iran	134.8	233.1	5.2%	69.8%	22,000
5	Canada	90.5	112.6	2.7%	29.8%	110,000
6	Saudi Arabia	74.5	112.1	4.1%	38.2%	4,000
7	Japan	92.5	104.4	1.6%	22.1%	4,500
8	Germany	84.4	86.5	0.5%	25.7%	28,000
9	Mexico	65.2	86.3	3.0%	48.0%	16,000
10	United Kingdom	91.2	72.5	-1.6%	37.9%	30,000
11	United Arab Emirates	57.6	69.6	2.2%	59.8%	4,000
12	Italy	74.3	67.7	-0.5%	41.5%	22,000
13	**India**	49.1	59.6	1.9%	**6.7%**	**18,700**
14	Egypt	40.9	57.8	3.7%	57.1%	8,000
15	South Korea	35.5	56.6	4.7%	17.3%	4,000

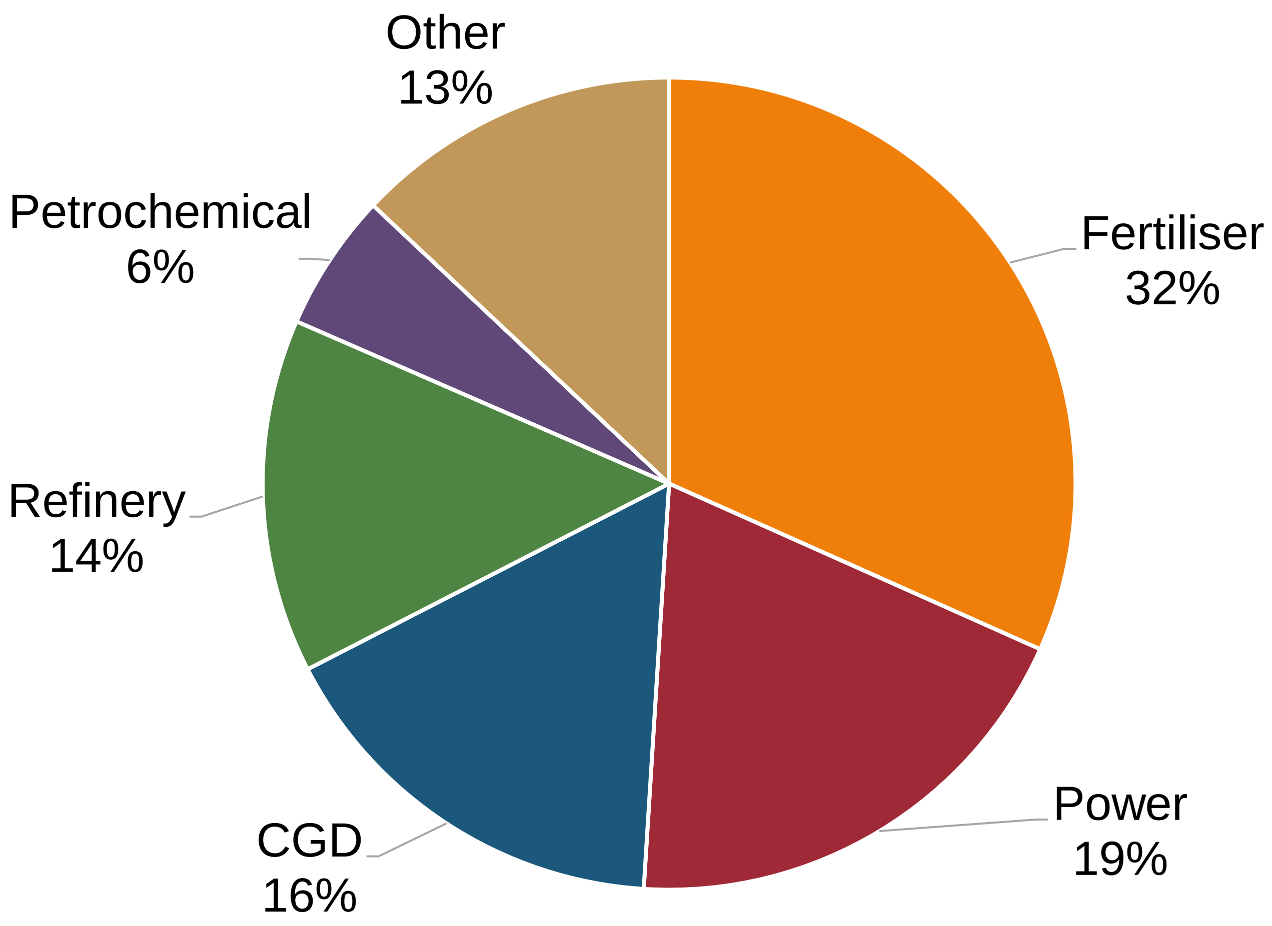
Source: BP Statistical Review 2021

Natural gas sector in India



Consumption pattern shows increasing LNG acceptability and dominance of anchor sectors i.e. Power and Fertilizer

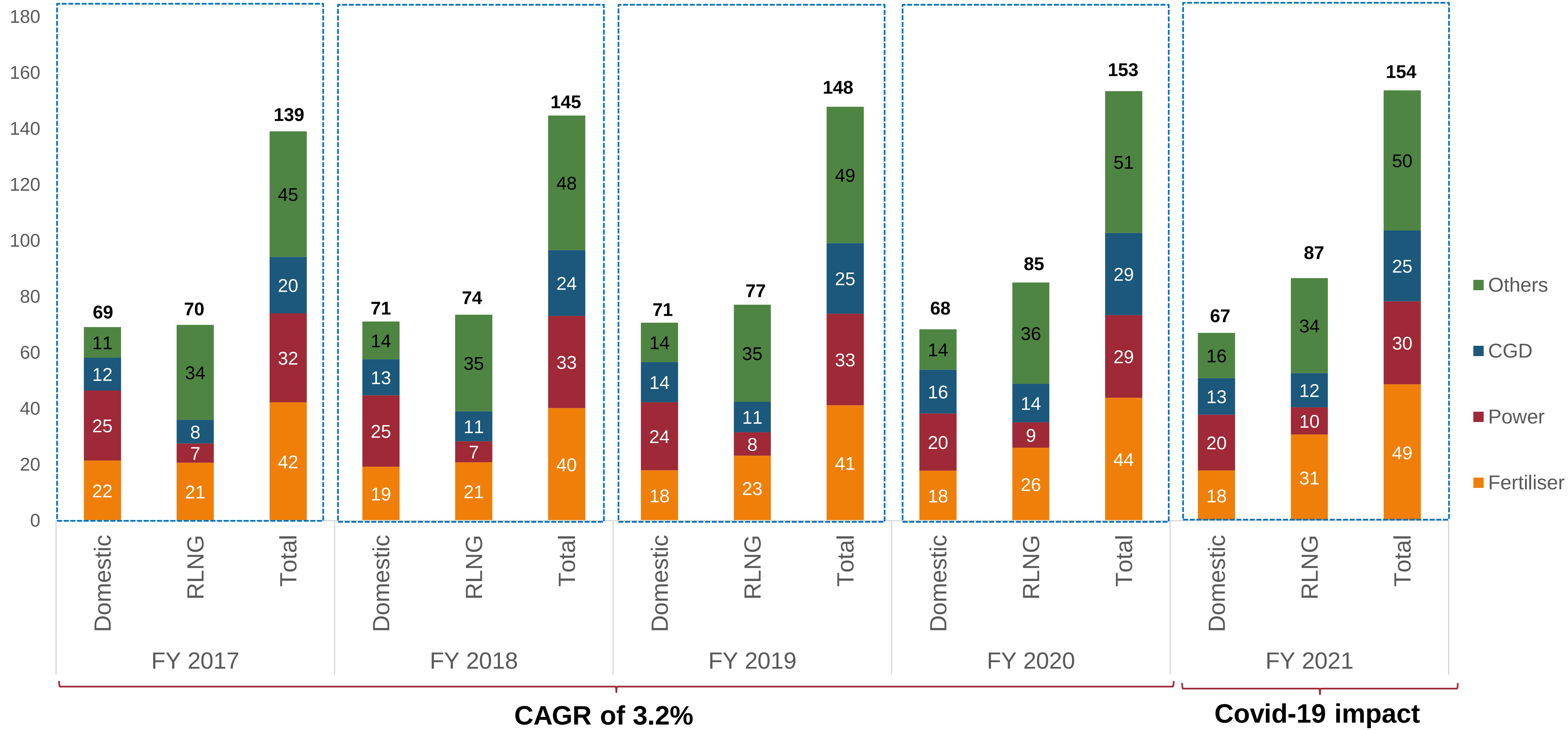
Sectoral Consumption of India 2020-21



* Excludes internal consumption by upstream companies

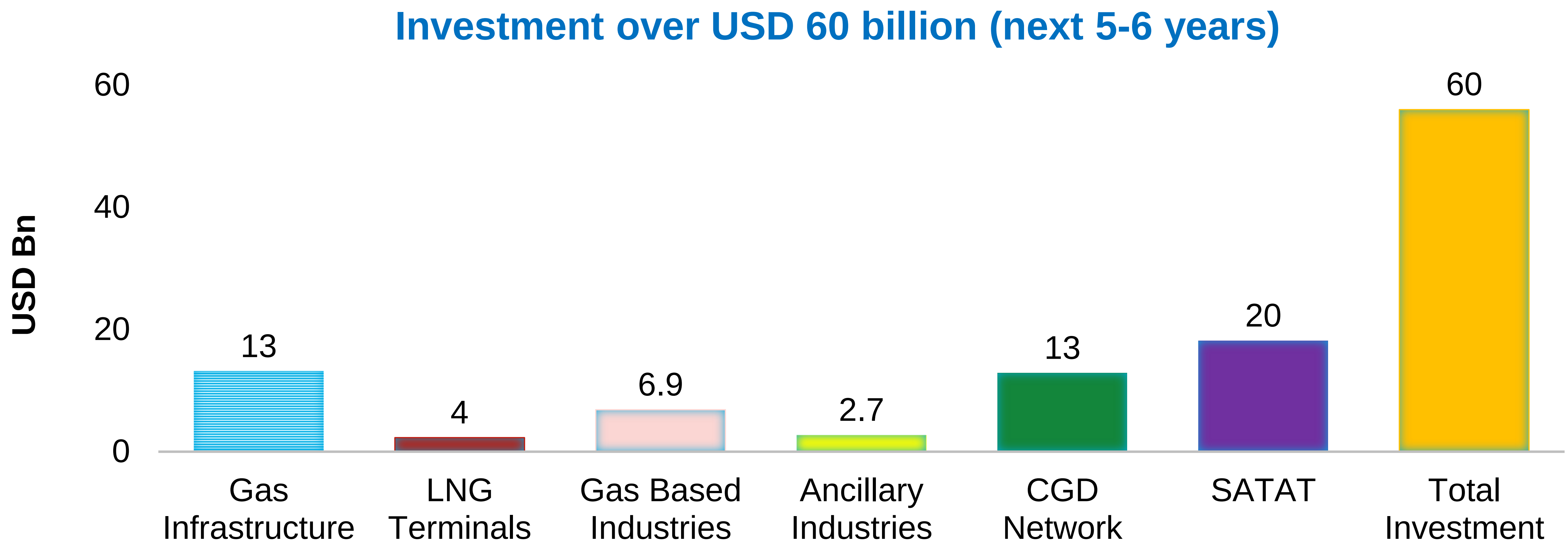
Source : GAIL, PPAC

Sectorial consumption pattern shows growing shift towards CGD and industrial sector



Note - Shows downstream sector consumption MMSCMD. Total consumption including IC in FY21 – 166 MMSCMD

Huge investment for transition to Gas Based Economy



Gas based economy aligned with 'Energy Vision of India'

* Gas based Industries - Fertilizer, petrochem etc.; Ancillary industry includes R&D in CNG automobiles, CGD Equipment manufacturing etc.

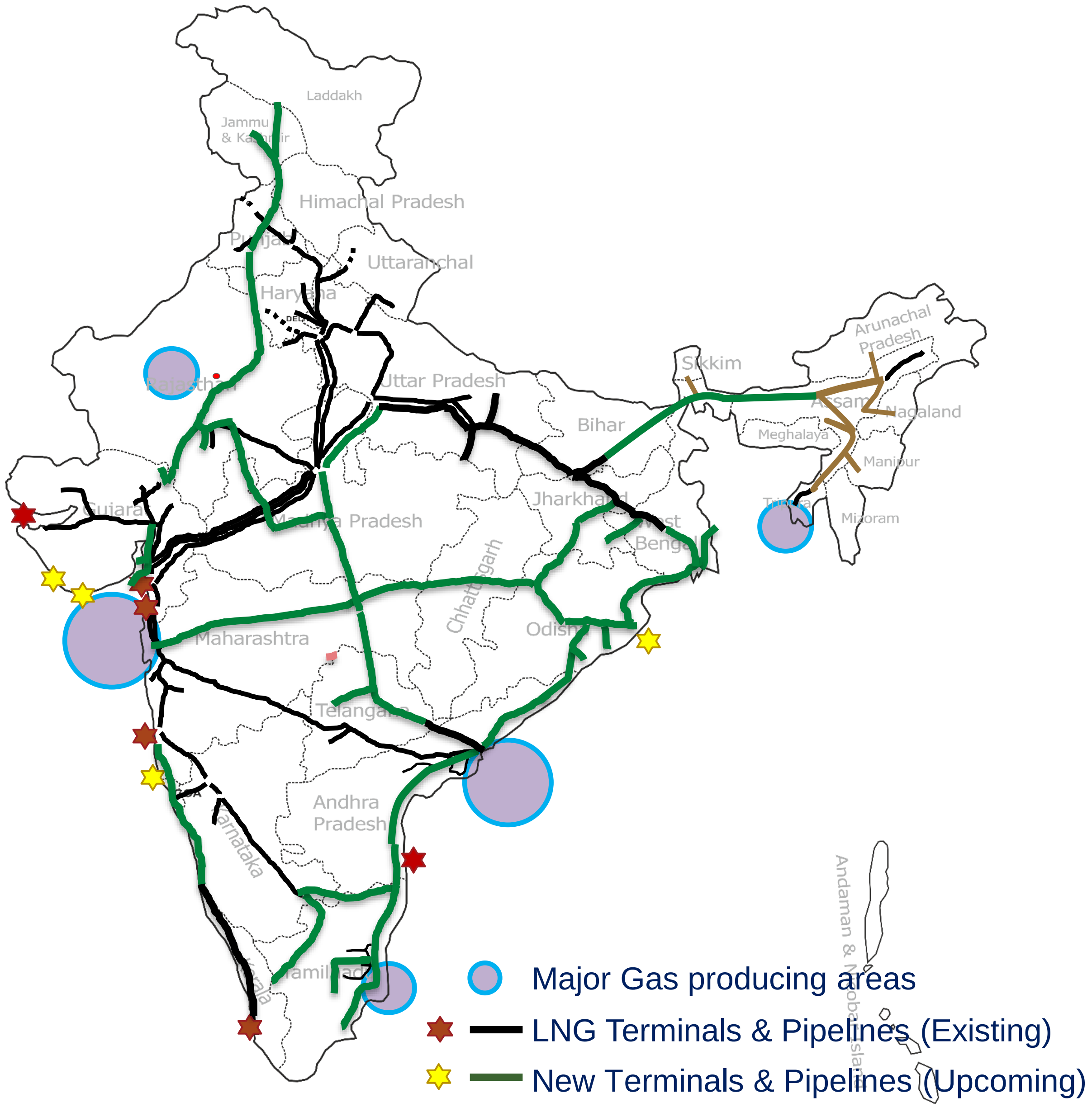
National Gas Grid (NGG)

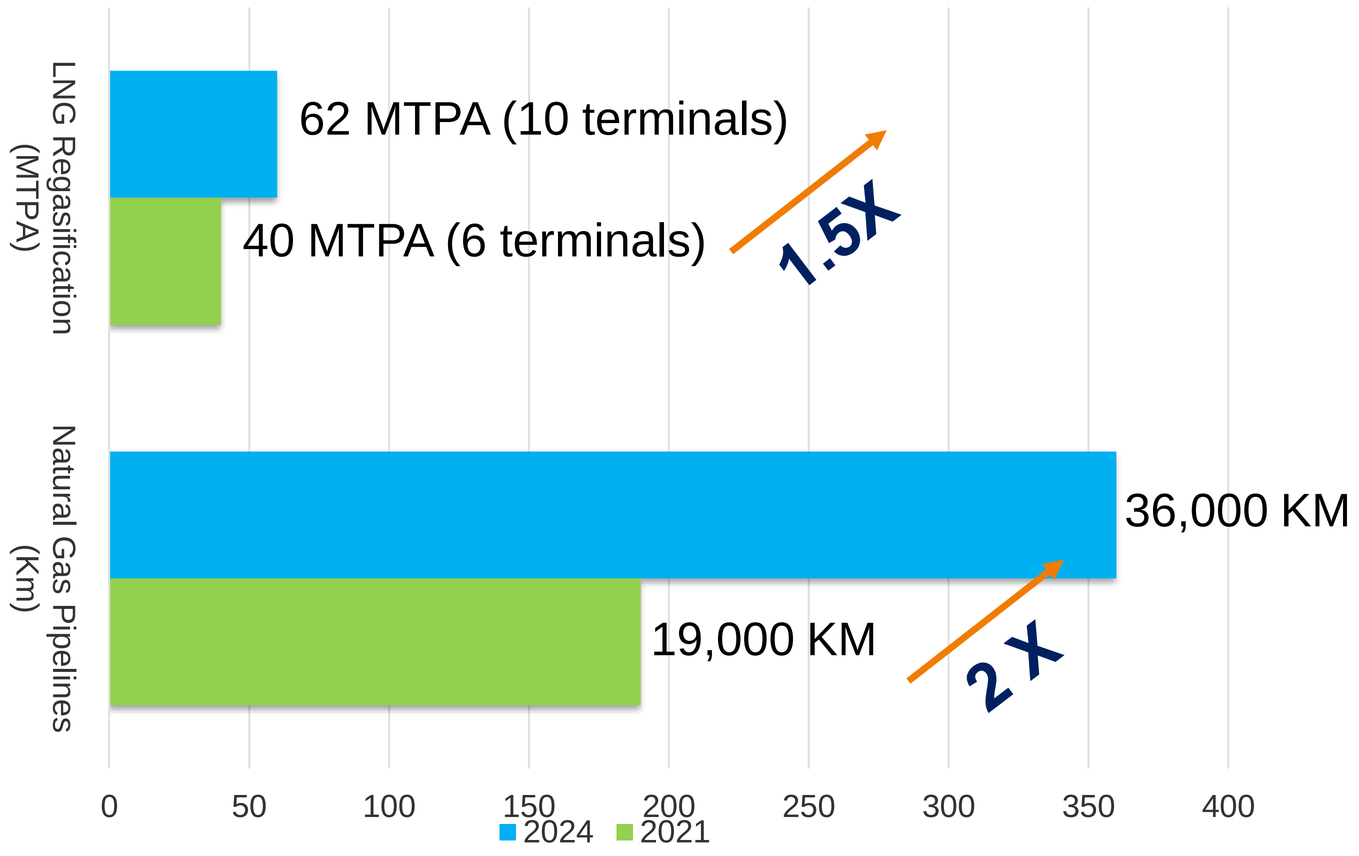
National Gas Grid

- **Govt. Vision**: Increase share of natural gas in primary energy mix from current level of 6.7% to at least 15%
- **One Nation One Grid** - Creation of an integrated nation wide gas network, to improve clean energy access
  - Expansion of gas pipeline network from current 18,700 Km to ~36,000 Km

- **Benefits**
  - Create **new demand centers & facilitate green industrial** corridors leading to employment generation
  - Support CGD & **increase use of CNG/ LNG in transport** leading to **reduction in urban pollution**
  - Drive the **development of domestic gas fields** including **isolated and small fields**.
  - Promotes gas-based economy & increase **pipeline connectivity and access across the country**
  - **Energy Justice** – Reduction of regional imbalance of gas availability

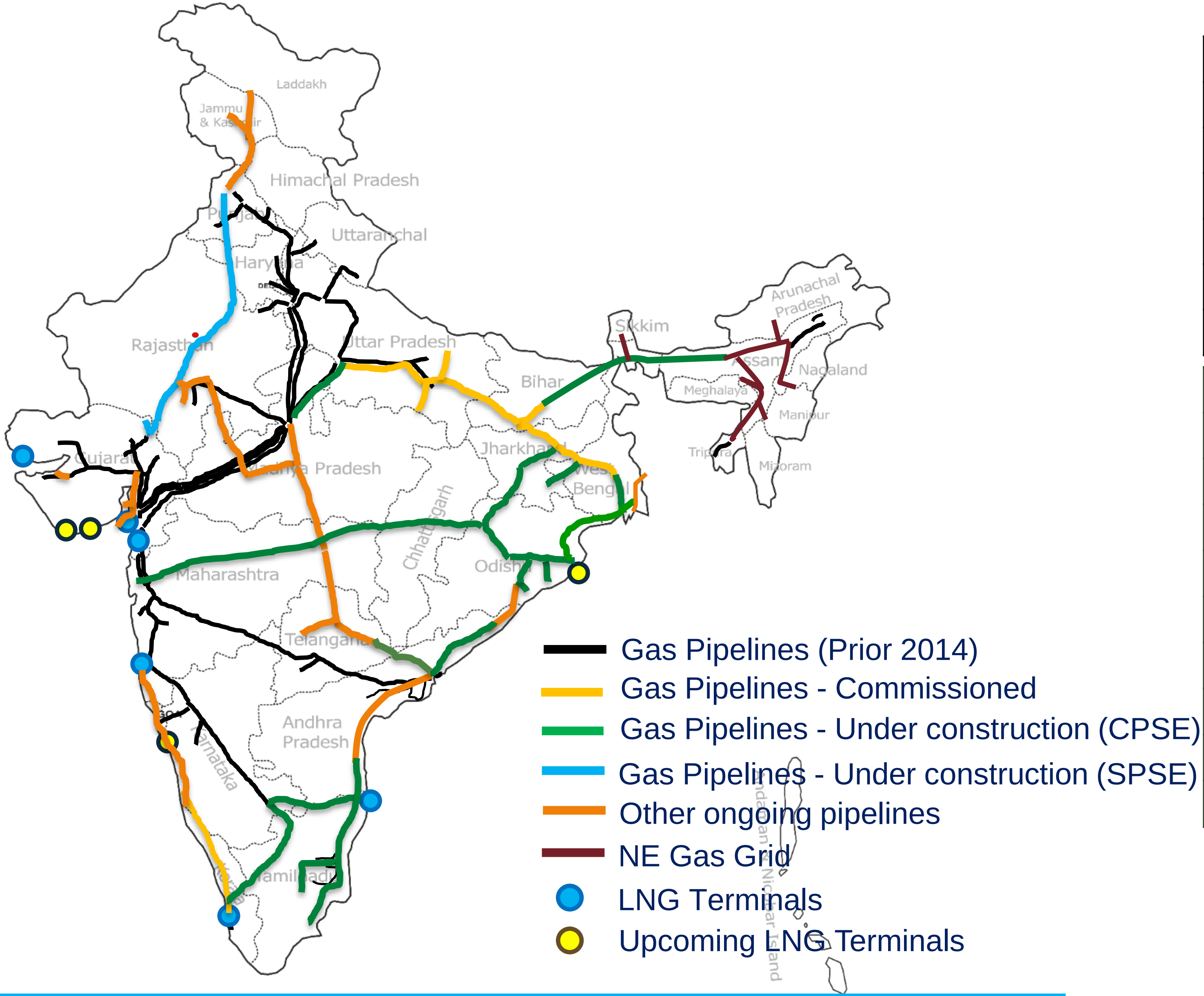
Natural gas pipeline and LNG infrastructure: ‘One nation, One grid’





Connectivity to all Fertilizer, Refineries, CGDs, Industrial clusters - **National Master Plan for multi-modal connectivity (GatiShakti)**

Gas infrastructure in India - “One Nation-One Grid”



Envisaged NGG length of ~36,000 Km in next 4-5 years

Operational Pipelines in India		
Entities	**Length (KM)**	**% Share**
GAIL	**13,700**	**74%**
GSPL	2,765	15%
PIPL	1,460	8%
Others	788	4%
	~18,700	**100.0%**

Under construction pipelines in India	
Entities	**Length (KM)**
GAIL	5,838
IGGL JV (NE Grid)	1,656
APGDCL (JV)	391
IOCL	1,220
GSPC JVs	4,823
Other private	2,019
	15,947
Total Envisaged	**1,495**

LNG terminals in India	
Existing (40 MTPA)	Dahej, Hazira, Dabhol, Kochi, Ennore, Mundra
Upcoming (22 MTPA)	Dhamra, Dabhol expansion, Chhara, Jaigarh, Jafrabad

Under Construction National gas pipeline in India (~ 15,900 Km)

S. No	Name of the Natural Gas Pipeline	Entity	Type	Length (Km)
1	Jagdishpur-Haldia & Bokaro-Dhamra	GAIL	CPSE	1555
2	Baruni-Guwahati	GAIL	CPSE	729
3	Dhamra-Haldia	GAIL	CPSE	253
4	Kochi-Koottanad-Bangalore-Mangalore (Ph-II)	GAIL	CPSE	439
5	Vijaipur-Auraiya	GAIL	CPSE	178
6	Sultanpur-Jhajjar-Hissar section of CJHPL	GAIL	CPSE	135
7	Haridwar-Rishikesh-Dehradun section of DBNPL	GAIL	CPSE	50
8	Srikakulam- Angul	GAIL	CPSE	744
9	Mumbai-Nagpur-Jharsuguda	GAIL	CPSE	1755
	Total GAIL (under construction)			**5838**
10	Ennore-Bengluru-Madurai-Tuticorin	IOCL	CPSE	1,220
	Total CPSE (under construction)			**7058**

Under Construction National gas pipeline in India (~ 15,900 Km)

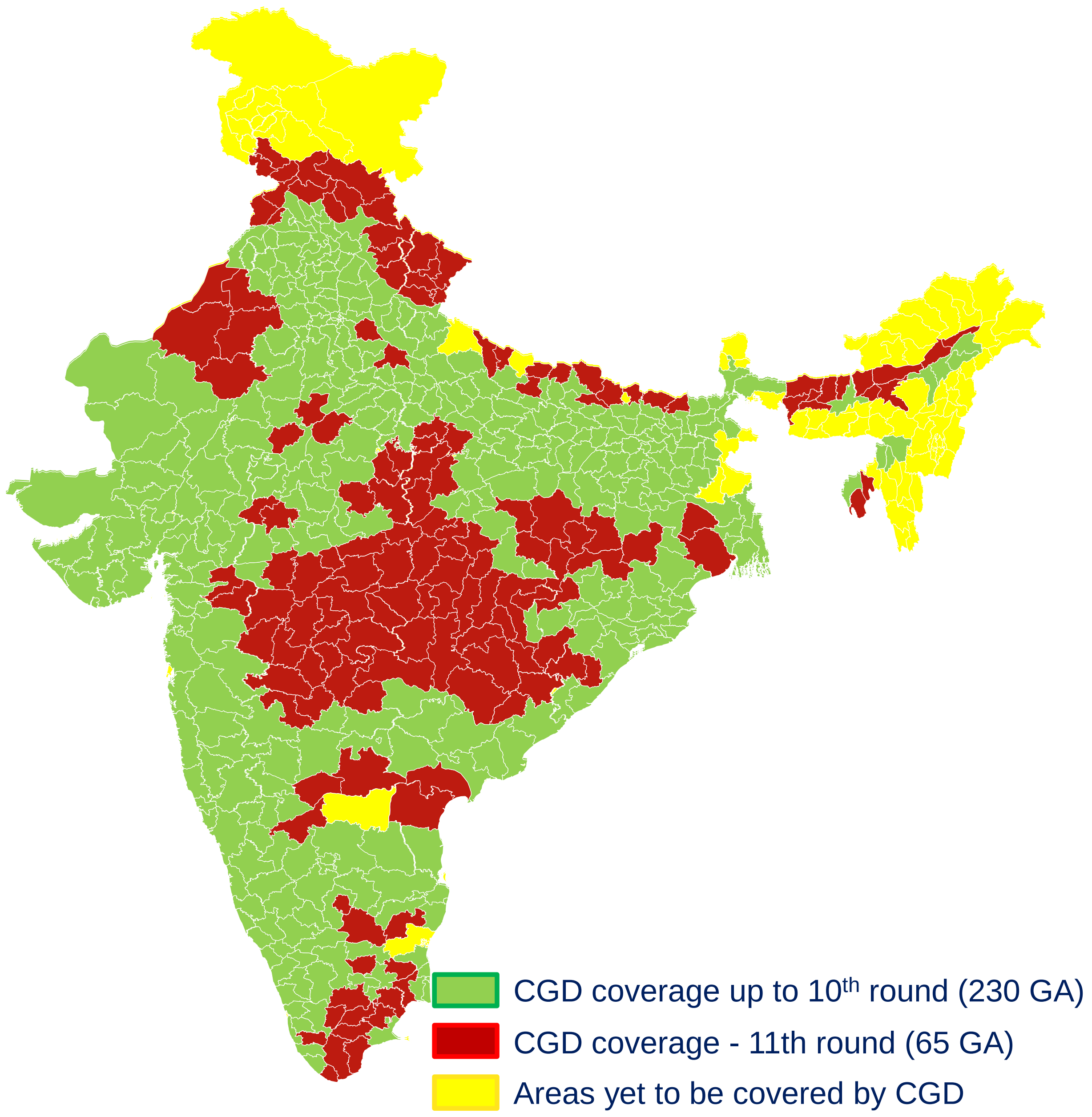
S. No	Name of the Natural Gas Pipeline	Entity	Type	Length (Km)	Target/Expected
11	North East Gas Grid	GAIL/IOCL/ONGC/NRL/ OIL	JV	1656	2024
12	Kakinada-Srikakulam	APGDCL	JV	391	2023
13	Bhatinda - Jammu – Srinagar	GSPL India Gasnet Ltd	State SPV	729	Under fresh DFR
14	Mehsana – Bhatinda	GSPL India Gasnet Ltd	State SPV	2,052	Under various stage of execution. Targeted to be completed in phased manner by FY 23-24.*
15	Mallavaram - Bhopal - Bhilwara via Vijaipur	GSPL India Transco Ltd	State SPV	2,042	
16	Nellore-Vizag-Kakinada	IMC Ltd	Pvt	525	
17	Jaigarh-Mangalore	H-Energy Pvt. Ltd.	Pvt	749	
18	Kanai Chhata to Shrirampur	H-Energy	Pvt	315	
19	Ennore – Nellore	Gas Transmission India Ltd.	Pvt	430	Authorization cancelled
	Total Others (under construction)			**8889**	
	Total			**15,947**	
	Grand Total			**34,678**	

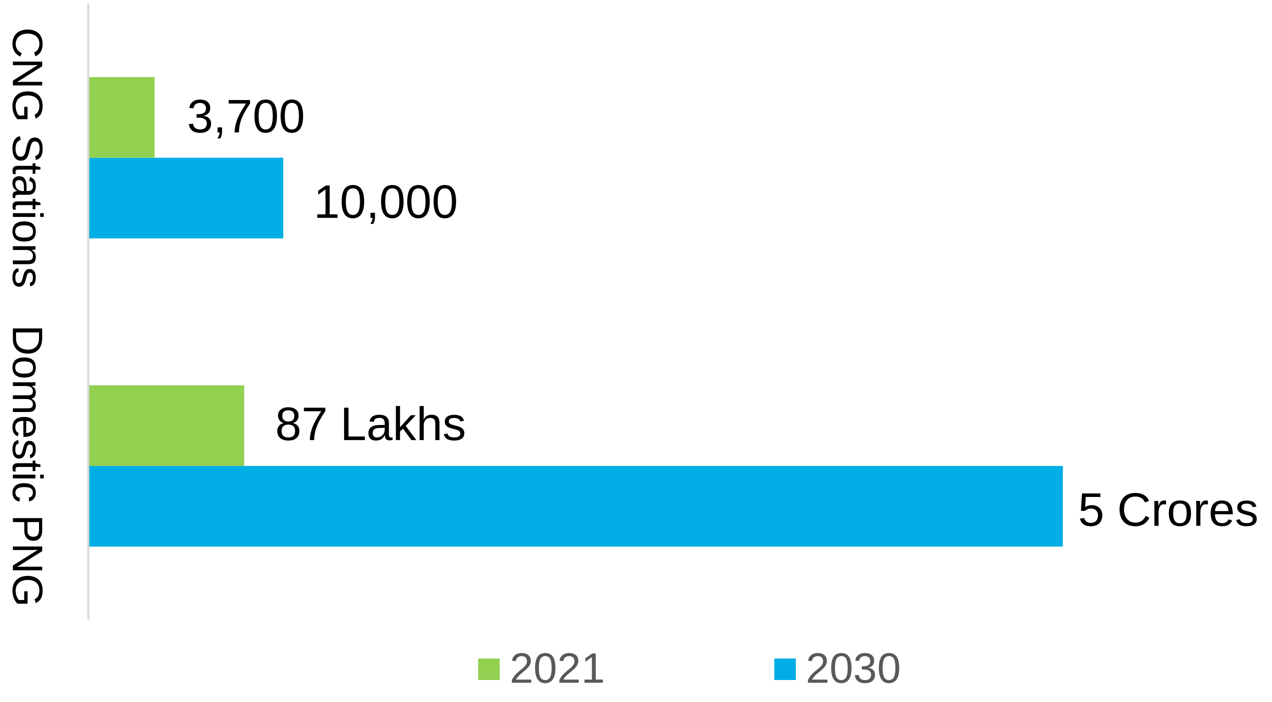
Note: * To be confirmed by the authorized entity / PNGRB.

Envisaged National gas pipeline in India

S. No	Name of the Natural Gas Pipeline	Entity	Length (Km)	Target/Expected
20	Kondalapalli - Tirupati (Andhra Pradesh)	Envisaged	450	EOI
21	Langtala to Pachpadra	Envisaged	290	EOI
22	Gurdaspur - Jammu - Srinagar	Envisaged	425	
23	Haldia (Purba Medinipur) to Panitar (North 24 Parganas)	Envisaged	250	EOI
24	Hazaribagh to Ranchi	Envisaged	80	EOI
	Total Others Envisaged		**1495**	
	Total		**17,442**	
	Grand Total		**36,173**	

City Gas Distribution – Making gas accessible to public





CGD Coverage :

- To cover **86%** of country's area and **95%** of population (after 11th round)
- **1000** LNG stations in next three years across golden quadrilateral and major Highways

CGD infrastructure in India – Current status

- **CGD in India : >**290 GAs comprising 600 districts spread over 28 States / UTs (up to 11th round)
- **CGD Coverage:** 96% population and 86% Geographical area of India
- Gas consumption in FY 20-21: **~25.3 MMSCMD** (Domestic ~13.1 MMSCMD & R-LNG ~12.2 MMSCMD)
- Contributes **16.4 %** of gas consumption in India during FY 2020-21
- **CGD infrastructure in India (as on 31.12.2021)**

Particulars	Pan-India Details	GAIL's CGD Entities / (% of Total)
PNG (Domestic)	86.99 lakh	~58.4 lakh / 67%
PNG (Industrial & Commercial)	47,151	~18250 / 39%
CNG Stations	3771	1896 / 50%
CNG Vehicles	~ 36.5 lakh	~27 lakh / 74%

- GAIL's CGD Entities: 7 JVs and 3 Subsidiaries in 61 GAs (including 6 cities along JHBDPL)

Reforms required and way forward

Infrastructure

- Incentivize pipeline developers for reasonable returns
- Support on RoUs and environmental clearance
- Development of new anchor load customers such as steel, Refineries
- Development of dedicated Gas Pipeline Utility Corridors

CGD

- Single window clearance mechanism
- Reduce GST for CNG vehicles inline with EVs
- Standardize restoration charges
- Push for PNG by replacing LPG and increasing conversion from industry
- CNG to be exempted from excise duty
- Allocation of land for CGD

Thank you