# National Gas Grid

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Energy availability is key to economic growth. High economic growth would lead to an increase in the energy consumption of the country. Natural Gas being an important component in India's energy mix, National Gas Grid becomes important for UPSC preparation.

**In news:** Prime Minister of India inaugurated Kochi – Mangaluru Natural Gas Pipeline.
**Placing it in syllabus:** Economy
**Dimensions**

1. Gas economy
2. Pipeline capacity and doubling of infrastructure
3. Reducing GHG emissions
4. Methanol roadmap
5. Why is gas better

## Content:

### Gas economy:

- National Gas Grid consists of **pipelines to connect gas sources to major demand centres** all over India.
- It is being built to **ensure easy availability of natural gas across all regions** and also help **to achieve uniform economic and social progress**.
- The **share of natural gas** in India's energy basket is **presently 6.2%**. Government plans to increase its share to **15% by 2030.**

***Regional Imbalances:***

- At present, natural gas **markets remain mostly limited to the states where gas sources** have been found.

- **States closer to the gas source or having pipeline** infrastructure (HVJ pipeline) have had the **benefits of higher availability** of gas and local development of gas markets e.g. Gujarat, Maharashtra, Northern markets, Andhra Pradesh, etc.
- Other states like **Punjab, Haryana, Jharkhand, Uttarakhand, Karnataka, Kerala, Bihar, Chattishgarh**, etc. have **not been able to utilize benefits** of gas due to lower gas availability and inadequate pipeline infrastructure.

**CNG vs. LNG Comparison:**

While liquefied natural gas and compressed natural gas are similar, their delivery and storage methods are different.

*Liquefied Natural Gas (LNG):*

- Natural Gas is frozen in order to turn it into liquid form
- takes up less storage space than CNG
- offers an energy density that can be compared to diesel fuel
- Commonly used in long haul transportation/import
- Using proper procedures, LNG can be converted to CNG

*Compressed Natural Gas (CNG):*

- Natural Gas is pressurized to the point where it is very compact.
- is easier to refuel than LNG, which requires special handling and equipment.
- CNG is much safer to handle and cheaper than LNG.

**CNG vs. LPG Comparison:**

- Chief component of CNG is methane. It is lighter than air. It releases less greenhouse gas than LPG.
- Main constituents of Liquified Petroleum Gas (LPG) are propane and butane (heavier than air). LPG releases

carbon dioxide, but is still cleaner than Petrol and Diesel.

- In the case of a spill, CNG quickly dissipates, whereas LPG will settle on the ground. In general, CNG is considered safer than LPG, since LPG is difficult to disperse.

***Supply of Natural Gas in India:***

Domestic Gas Sources:

- The domestic gas in the country is being supplied from the oil & gas fields located at western and south-eastern areas
- Important sites include Hazira basin, Mumbai offshore & KG basin as well as North East Region (Assam & Tripura)
- About 48% of the gas consumed is produced from domestic sources.

*Human settlements:*

- To meet the gas demand, Liquefied Natural Gas (LNG) is imported through Open General License (OGL) in India
- It is imported by the gas marketer under various Long Term, Medium Term and Spot contracts. The price and utilization of imported LNG is mutually decided by buyers and sellers.
- Around 52% of the LNG used today is imported.
- At present, India has six (6) operational LNG regasification terminals operational with capacity of about 38.8 MMTPA.

Pipeline capacity and doubling of infrastructure:

- Gas **Pipeline infrastructure is an economical and safe mode of transporting** natural gas.
- At present, there are about **16800 km long Natural Gas pipeline network which is operational** in India.
- **Additional 14,300 km pipelines** will be built to complete

the National Gas Grid.

Major gas pipeline projects under National Gas Grid which are being implemented by CPSUs are:

1. **Jagdishpur – Haldia/Bokaro – Dhamra Pipeline Project (JHBDPL) & Barauni- Guwahati Pipeline project (BGPL):**

JHBDPL project is supporting the revival of 3 Fertilizer Plants located at Gorakhpur, Barauni and Sindri and a new Fertilizer Unit at Durgapur.

A Pipeline from Barauni to Guwahati is also being implemented as an integral part of JHBDPL project to connect North East Region (NER) with the National Gas Grid. The approx. length of the pipeline is 729 km.

The entire project will cater to the energy demand of Eastern and North-Eastern Region covering six states, namely Uttar Pradesh, Bihar, Jharkhand, Odisha, West Bengal and Assam.

**2. North East Region (NER) Gas Grid**

"Indradhanush Gas Grid Ltd" (IGGL) has been entrusted to develop trunk pipeline connectivity in all North Eastern States i.e. Assam, Sikkim, Mizoram, Manipur, Aruncahal Pradesh, Tripura, Nagaland and Meghalaya

Prime objective of these pipelines would be to transport the domestic natural gas produced in the north east states and the same may first cater to the local requirements.

**3. Kochi-Koottanad- Bangalore-Mangalore Pipeline Project (KKBMPL):**

Construction work by GAIL of Kochi-Koottanad- Mangalore Section (450 Kms) has been completed

**4. Ennore-Thiruvallur-Bangalore-Nagapattinam– Madurai – Tuticorin Natural gas pipeline (ETBNMTPL)**

## City Gas Distribution (CGD) Networks:

- These are supervised by the Petroleum and Natural Gas Regulatory Board (PNGRB)
- PNGRB grants the authorization to the entities for developing a City Gas Distribution (CGD) network (including PNG network) in a specified Geographical Area (GA) of the country.
- CGD sector has four distinct segments – Compressed Natural Gas (CNG) predominantly used as auto-fuel, and Piped Natural Gas (PNG) used in domestic, commercial and Industrial segments.
- To promote the development of CGD network, the Government has accorded the priority in domestic gas allocation to PNG (Domestic) and CNG (Transport) segments.
- Government has decided to meet the 100% gas requirement of CNG (T) and PNG(D) segments through supply of domestic gas which is cheaper than imported gas.
- CGDs have potential to cover about 53% of the country's area and 70% of India's population.
- It will make available environment friendly fuel i.e. CNG/PNG to the public at large.

## Reducing GHG emissions:

- India's INDC has several aims to reduce the emissions intensity of its GDP to 35% by 2030 compared with the 2005 level (A 33% reduction from 2005 levels)
- **Natural gas is the cleanest fossil fuel** presently available.
- Commercial **natural gas sold usually contains 85 to 90 percent methane**, with the remainder mainly nitrogen and ethane. Therefore, natural gas **burns without releasing any soot or sulfur dioxide**.
- It also **emits 45% less carbon dioxide than coal and 30% less than oil**.

- It is currently the cheapest fossil fuel source for producing hydrogen. It can also be used to produce substitute fuels like Methanol.

## Methanol Roadmap:

- Easy and economical availability of natural gas can boost methanol production in India.
- Methanol is a clean burning drop in fuel which can replace fossil fuels used in transportation and cooking (Petrol, diesel, LPG, coal, firewood etc).
- Methanol is a Near Zero Pollution fuel source. It burns efficiently in all internal combustion engines, produces no particulate matter, no soot, almost nil SOX and NOX emissions.
- Dimethyl Ether (DME), which is a gaseous version of Methanol, can blend with LPG and can be an excellent substitute for diesel in Large buses and trucks.
- METHNAOL 15 (M15) in petrol will reduce pollution by 33% and diesel replacement by methanol will reduce by more than 80 %.
- NITI Aaayog has drawn out a roadmap to substitute 10% of Crude imports by 2030, by Methanol alone. This requires approximately 30 MT of Methanol.
- Methanol & DME are substantially cheaper than Petrol and Diesel and India can look to reduce its fuel bill 30% by 2030.

*NITI Aayog's road map for Methanol Economy comprises:*

- Production of methanol from Indian high ash coal from indigenous Technology, in Large quantities and adopting regional production strategies and produce Methanol in large quantities @ Rs. 19 a litre. India will adopt C02 capturing technology to make the use of coal fully environment friendly and our commitments to COP21.
- Bio-mass, Stranded Gas & MSW for methanol production. Almost 40% of Methanol Production can be through these

feed stocks.

- Utilization of methanol as well as DME in transportation – rail, road, marine and defence. Industrial Boilers, Diesel Gensets & Power generation & Mobile towers are other applications.
- Utilization of methanol and DME as domestic cooking fuel – cook stoves. LPG – DME blending program.
- Utilization of methanol in fuel cell applications in Marine, Gensets and Transportation.

## Why is natural gas better?

- Cleaner Fuel: Natural Gas emits less Carbon dioxide than coal, petrol, diesel and other fossil fuels. It is less harmful to the environment
- Easy storage and transport: Natural Gas can be easily stored and transferred through pipelines.
- Easy Availability: Compared to coal and Petroleum and other fossil fuels, it is relatively more abundant.
- Fuel Safety: Natural Gas is lighter than air. In case of leakage, it dissipates quickly rather than exploding. (LPG denser than air therefore settles at the bottom)
- Instant Energy: Natural gas does not require pre-heating. It provides energy instantly.

**Mould your thought:**

1. How does National Gas Grid help to achieve uniform economic and social progress in India?

***Approach to the answer:***

- Basics of National Gas Grid
- How Natural Gas is used in India?
- Write about the imbalances in demand and supply of Natural Gas in India
- How do gas pipelines bridge the gap?
- Conclusion