LPG, LNG – India's Production, Supply and Distribution

Mains: *GS III – Energy*

Why in News?

The ongoing conflict in West Asia has created significant disruptions in global energy markets, affecting the supply of liquefied petroleum gas (LPG) and liquefied natural gas (LNG).

What is the status of liquefied petroleum gas (lpg) in india?

- **Usage and Expansion of LPG Access –** Liquefied Petroleum Gas (LPG) is the primary cooking fuel used across India.
- Key achievements of the scheme of *Pradhan Mantri Ujjwala Yojana (PMUY).*
  - Expansion of LPG coverage to nearly 100% of Indian households
  - Increase from 62% household coverage in 2016 when the scheme was launched
  - Expansion of LPG production capacity
  - Growth in bottling plants and LPG distributors
- As a result of these measures, India's LPG consumption nearly doubled between 2012 and 2023.
- Traditional cooking fuels such as firewood, dung cakes and kerosene have declined significantly in household use.
- **Composition and Production of LPG –** LPG primarily consists of:
  - Propane
  - Butane
  - Small quantities of higher hydrocarbons
- These gases occur naturally along with natural gas (methane) and are also produced during crude oil refining and petrochemical processing.
- **Domestic production –** India's Oil Marketing Companies such as:
  - Indian Oil Corporation (IOC)
  - Bharat Petroleum Corporation Limited (BPCL)
- Collectively produce about 40% of India's LPG requirements domestically.
- The LPG is then bottled and distributed across the country.
- **LPG Imports and Supply Challenges –** India depends heavily on imports for LPG.
  - Around 60% of LPG demand is met through imports
  - Major suppliers include Saudi Arabia and Qatar
  - Most imports arrive via the Strait of Hormuz
- The closure of this crucial maritime route has significantly disrupted supply.
- To address the shortage, the government has instructed Indian refineries to increase the output of propane and butane during crude oil processing.

- **Alternative sources of LPG –** The United States, where LPG is produced as Natural Gas Liquids (NGLs) during shale gas production
- Russia and China, although China largely consumes its LPG domestically

What is LNG?

- **LNG** – Liquefied Natural Gas (LNG) is natural gas (primarily methane) cooled to about –160°C, turning it into a liquid for easier transportation.
- Liquefaction reduces the gas volume significantly, making it feasible to transport LNG across long distances by specialised ships.
- **India's LNG Supply Structure –** India meets its natural gas demand through a mix of domestic production and imports.
- **Domestic production** – About 50% of natural gas demand is produced domestically.
- **Imports –** The remaining 50% is imported as LNG
    - Qatar supplies nearly half, mostly through long-term contracts.
    - Globally, Qatar supplies about 20% of the world's LNG.
    - Any disruption in Qatari production can therefore have major global implications.
- **Other LNG exporters**
    - United States
    - Australia
    - Russia
- However, these exporters often prioritise long-term contractual commitments, limiting availability in the spot market.
- **LNG Import and Distribution Infrastructure –** Imported LNG reaches India through LNG terminals located at major ports.
- The process involves:
    - LNG arriving by **specialised LNG carriers**
    - Storage in **cryogenic insulated tanks**
    - Regasification into natural gas
    - Transport through pipeline networks
- However, India has limited LNG storage capacity.
- Unlike Europe, which maintains underground gas storage facilities for energy security, India largely relies on immediate consumption after regasification.
- **Uses of Natural Gas in India**
- Natural gas is an important industrial and energy input.

Major sectors consuming natural gas

• Sector	• Share of Natural Gas Consumption
Fertilizer production	30%
City Gas Distribution (CGD)	21%
Power generation	13%

- These estimates are based on analysis by ICRA Limited, a credit ratings agency affiliated with Moody's Corporation.
- Other uses include:
    - Refining processes

    - Petrochemicals
    - Various industrial applications
- Natural gas is a key input in the production of ammonia, which is subsequently used to manufacture fertilizers.

What is the Impact of the West Asia Conflict on India's Energy Supply?

- The conflict in West Asia has strained global energy supply chains, affecting India's oil and gas imports.
- **Key challenges include:**
    - Disruptions in supply from the Persian Gulf
    - Rising global energy prices
    - Increased volatility in LNG spot markets
- **Observations** – The JKM Index, which tracks LNG spot prices in Asia, has been highly volatile since the conflict began.
- Fortunately, according to industry experts, the crisis coincides with the off-season for fertilizer usage, reducing immediate pressure on gas demand for fertilizer production.
- Additionally, some industrial users can temporarily switch to alternative fuels such as:
    - Naphtha
    - Furnace oil

What lies ahead?

- India's heavy dependence on imports for LPG and LNG exposes it to geopolitical risks and supply disruptions.
- While government initiatives have successfully expanded LPG access and increased natural gas usage, energy security remains a key challenge.
- Strengthening domestic production, expanding LNG storage capacity, diversifying import sources, and investing in alternative fuels will be essential for ensuring a stable and resilient energy supply system in the future.

Reference

[The Hindu| India's LPG Reserves and Imports]

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