India’s Push for Piped Natural Gas (PNG)

Mains: *GS III – Energy*

Why in News?

India is witnessing a significant policy shift in its domestic energy ecosystem, with a growing emphasis on expanding Piped Natural Gas (PNG) connections.

What is LPG, LNG, PNG, and CNG?

- **Liquefied Petroleum Gas (LPG) –** A mixture of propane and butane.
- Produced as a by-product of crude oil refining and natural gas processing.
- Stored in cylinders and delivered physically to households.
- Widely used for cooking due to ease of transport and distribution.
- **Liquefied Natural Gas (LNG) –** Natural gas cooled to below –160°C to convert it into liquid form.
- Volume reduces by ~1000 times, making it suitable for long-distance shipping.
- Imported via specialized LNG carriers and regasified at terminals.
- **Piped Natural Gas (PNG) –** Natural gas delivered directly to households through pipelines.
- Considered a cleaner and more efficient fuel for cooking.
- Eliminates the need for cylinder storage and manual refilling.
- **Compressed Natural Gas (CNG) –** Natural gas compressed to high pressure (200–250 kg/cm^2).
- Primarily used as a transportation fuel.
- **Reason for LPG adoption** – India’s large-scale adoption of LPG was driven by logistical convenience:
    - Ease of last-mile delivery through cylinders.
    - Lower infrastructure requirements compared to pipelines.
    - Suitability for rural and semi-urban areas.
- Building a nationwide pipeline network was historically capital-intensive and time-consuming, making LPG a practical solution

What is the reasons for shifting to PNG?

- **High import dependence on LPG –** India imports a significant portion of its LPG requirements:
    - Annual consumption – 34 million tonnes.
    - Domestic production – 12 million tonnes.
    - Around 60% is imported, largely from West Asia.

- Recent geopolitical tensions, especially disruptions in the Strait of Hormuz, have exposed vulnerabilities in LPG supply chains.
- **Diversified supply sources for natural gas –** LNG can be sourced globally, unlike LPG which is concentrated in a few regions.
- Global LNG liquefaction capacity is expanding, ensuring better availability.
- India imported ~27 million tonnes of LNG last year, comparable to domestic production.
- **Energy security and strategic autonomy –** PNG reduces dependence on:
    - Maritime chokepoints.
    - Limited supplier nations.
- Domestic production, led by entities like Oil and Natural Gas Corporation (ONGC), is also expected to increase, strengthening self-reliance.
- **Economic and consumer benefits –** PNG is often cheaper than LPG in urban areas.
- Continuous supply eliminates booking delays.
- Safer due to lower density (disperses quickly if leaked).
- **Environmental considerations –** Natural gas is a cleaner fossil fuel:
    - Lower carbon emissions.
    - Minimal particulate matter.
    - Helps India meet climate commitments.
- **Feasibility of replacing LPG by PNG**
- **Domestic Use**
    - PNG can act as a drop-in replacement for LPG.
    - Energy differences are negligible for cooking purposes.
- **Industrial Use –** Requires retrofitting or recalibration of equipment.
    - MSMEs face barriers due to:
    - Lack of awareness.
    - Technical limitations.

What are the government initiatives to promote png?

- **Expansion of pipeline infrastructure**
    - Existing network: ~25,000 km.
    - Under construction: ~10,500 km.
- **Policy reforms**
    - Faster approvals for pipeline expansion.
    - Mandated timelines for infrastructure development.
- **Target setting**
    - 12 crore PNG connections by 2034.
    - Current connections: ~1.5 crore.
- **Regulatory push**
    - Households discouraged from holding both LPG and PNG connections.
    - Expected migration of ~60 lakh households to PNG.
- **Role of city gas distribution (CGD)**
    - Licenses granted for over 300 geographical areas.
    - Focus on urban and semi-urban expansion.

What are the challenges in expanding PNG?

- **Infrastructure constraints –** Pipeline network concentrated in western and northern India.
- Many regions in central, southern, and northeastern India lack connectivity.
- **Last-mile connectivity –** Urban congestion and regulatory hurdles delay pipeline laying.
- Permissions, land acquisition, and NOCs remain bottlenecks.
- **Supply constraints –** Current domestic production insufficient for large-scale transition.
- Increasing PNG demand may divert gas from:
    - Fertilizer sector (~30% usage)
    - Power sector (~13%)
    - Industries (~35%)
- **Import dependency for LNG –** LNG imports may increase to meet demand.
- India lacks long-term storage capacity, unlike Europe.
- System operates on a just-in-time supply model, making it vulnerable.
- **Industrial adaptation issues –** Industries using LPG (e.g., welding) need equipment changes.
- Resistance due to cost and lack of technical expertise.

What are the future prospects?

- **Increase in domestic production –** ONGC's KG basin projects expected to boost output by 10–15%.
- Potential 25% increase projected by industry analysts.
- **Expansion of LNG terminals –** India already has ~9 LNG import terminals.
- Further expansion will support rising demand.
- **Policy and regulatory support –** Continued reforms by Ministry of Petroleum and Natural Gas (MoPNG).
- Support from Petroleum and Natural Gas Regulatory Board in easing infrastructure rollout.

What lies ahead?

- India's push toward PNG reflects a strategic shift aimed at enhancing energy security, reducing import dependence, and promoting cleaner fuel usage.
- While LPG will continue to dominate in the near term—given its vast existing base of over 30 crore connections—the gradual expansion of PNG represents a forward-looking transition.
- However, success will depend on overcoming infrastructural bottlenecks, ensuring adequate gas supply, and facilitating industrial adaptation.
- A balanced, phased approach integrating both LPG and PNG will be crucial for achieving India's long-term energy goals.

Reference

[The Hindu| India Pushing for Piped Gas]



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