

India's Gas Consumption Target Faces Risks

Price Volatility and Infrastructure Constraints Present Challenges

Price volatility and infrastructure constraints challenge India's target to increase natural gas' share of energy, despite resilient demand from city gas distribution companies and rising domestic production.

Mohit Soni: Fitch Ratings

Fitch Ratings believes that India's target to increase the share of natural gas (NG) in the energy mix to 15% by 2030, from 6% in 2017, remains exposed to risks of lower demand from price volatilities, and infrastructure constraints on importing and distributing NG. Progress on the target has been minimal – 6% share in 2021 – as NG growth has not managed to outpace total energy growth.

Price Volatility May Affect Demand

We believe that NG demand from price-sensitive industrial and power sectors may be limited in times of rising NG prices, as they switch to cheaper alternate fuels in the absence of robust emission norms. Gas adoption for mobility and household fuel may also slow when its price benefit against alternate fuels decreases.

Deficient Infrastructure Could Delay Growth

We believe that India's inadequate gas pipeline network and our expectation of execution delays in some under construction projects may limit NG demand growth to lower than its intrinsic levels, even in times of low NG prices.

Underutilised existing liquefied natural gas (LNG) import infrastructure may slow new capex in the near to medium term, creating temporary bottlenecks in case demand picks up sharply. Sustained high NG prices and customers switching to alternate fuels may squeeze developers' returns and fresh capex plans.

CGD Demand and Local Production to Rise

We believe that the operationalisation of new city gas distribution (CGD) geographical areas (GAs), the price advantage of NG against other fuels and increased adoption of NG to comply with pollution norms would support long-term NG demand from CGD companies.

We also expect increasing domestic NG production, on the ramp-up in operations at India's complex deep-water NG fields, to support consumption in the near to medium term.

Price Regulation Review an Event Risk

A government-appointed panel has recommended changes to domestic NG pricing formula, including the introduction of a floor and ceiling price for gas from legacy fields, while continuing the existing ceiling for price of gas from difficult fields.

We believe that any change in the pricing formula remains subject to further government deliberations around considerations of incentivising upstream capex, curtailing inflation and minimising government subsidies while maximising returns, and promoting NG as a fuel.

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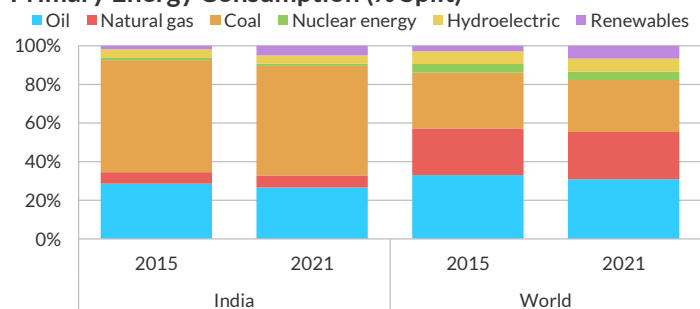
Energy, Decarbonisation Needs Aid Growth; Limited Progress on Target

Fitch believes that energy growth, aided by India's GDP growth estimate of 7% a year over the financial years ending March 2023 (FY23)-FY27 – and the government's efforts to increase NG and renewables' share in energy mix on its path of decarbonisation and net-zero emissions by 2070 – would support mid-single-digit NG demand growth over the medium term.

However, this may not be sufficient to meet India's target of increasing the share of NG in its energy mix from 6% currently to 15% by 2030. The target implies a CAGR of 16% in NG consumption from now until 2030, assuming total energy growth of 5% a year. However, we believe the demand impact from price volatility and infrastructure constraints may limit NG growth.

India's NG share of the energy mix has stayed at 6% over the past seven years, well below the global average of 24%, and dominated by coal (57% of total) because of large domestic coal reserves.

Primary Energy Consumption (% Split)



Source: Fitch Ratings, BP Statistical Review of World Energy

Demand Supply Structure: The Big Picture

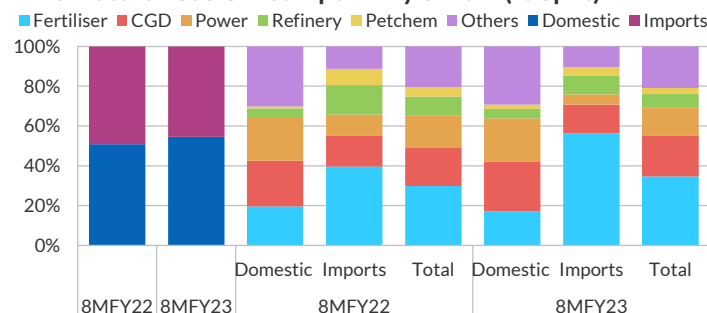
The fertiliser, CGD and power sectors are the largest consumers of NG in India, accounting for 35%, 20% and 14%, respectively, of demand in the first eight months of FY23 (8MFY23).

The fertiliser industry uses the highest share of imported LNG and the second highest share of cheaper domestic gas through a pooled pricing mechanism. However, the sector benefits from government subsidies to support the dual goals of India's food security and farmer income protection.

CGD demand for domestic piped natural gas (PNG) and compressed natural gas (CNG) receives the highest share of domestic gas because of the government's focus on promoting these as cleaner fuels. The segments have been allowed to pool imported LNG in recent times, with domestic gas allocation being subsequently increased too, as demand growth outpaced domestic supply expansion.

Demand from industrial CGD, power, petrochemical and refinery users is more reliant on imported NG, and is highly price sensitive, given the easy availability and ability to switch to alternate fuels.

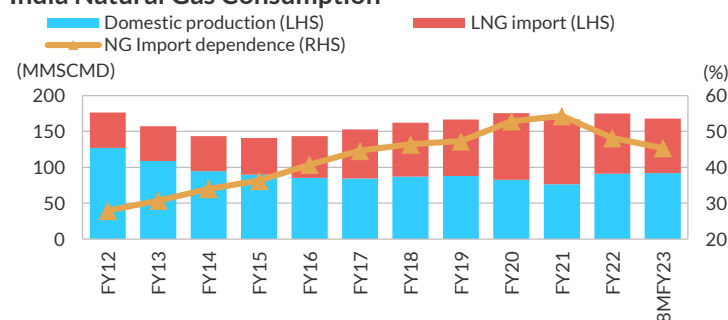
India Natural Gas Consumption by Sector (% Split)



Source: Fitch Ratings, Petroleum Planning & Analysis Cell

On the supply side, India's NG import dependence increased from 28% in FY12 to 54% in FY21 amid benign LNG prices and falling domestic gas production. However, the share of imports has fallen, reaching 45% in 8MFY23, as LNG became more expensive and domestic production started rising. We believe the production ramp-up at some deep-water domestic gas fields and volatile LNG prices are likely to limit India's gas imports from increasing significantly in the near term.

India Natural Gas Consumption



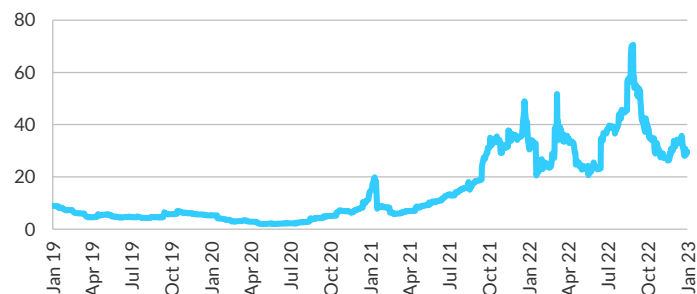
Source: Fitch Ratings, Petroleum Planning & Analysis Cell

High LNG Prices Affect Industrial Demand

We believe that gas demand from India's Industrial sectors, which rely more on LNG imports, is highly sensitive to prices and will fall in FY23 amid all-time high spot prices. This will cause LNG imports to fall by high single digits in FY23, notwithstanding a majority of India's imports being purchased through long term contracts which offer some insulation from spot price volatility. We expect NG price volatility to continue next year, keeping LNG imports below the FY20 peak in the near term, and believe the volatility could also affect long-term contract negotiations in some cases.

International gas prices, including the Asian benchmark JKM, are at historically high levels amid disruptions to the supply of Russian piped gas, and increased demand of LNG from Europe also constraining global shipping capacity. There has been some moderation in recent months, but we believe Indian power, refinery, industrial and petrochemical users would prefer cheaper alternate fuels, such as naphtha, furnace oil, coal and petcoke, and may continue to switch to these fuels. Even so, any introduction of strong pollution control standards, as occurred in the National Capital Region (NCR) or Gujarat in the past, can limit the demand volatility from the switch to alternate fuels over the long term.

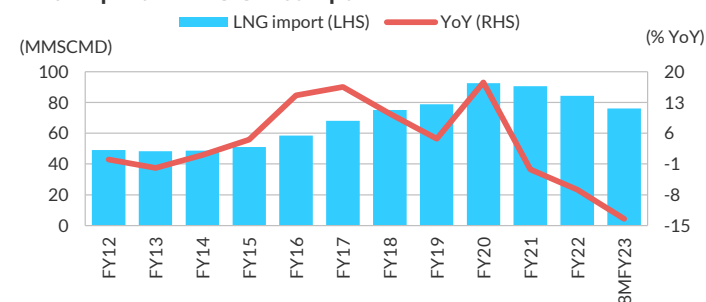
JKM LNG Index (USD/mmbtu)



Source: Fitch Ratings, Bloomberg

LNG imports were down by 13% in 8MFY23 (-7% in FY22, -2% in FY21), and we expect the decline to narrow in the rest of FY23 as prices trend lower to Fitch’s gas price assumptions. The fall in FY21 was on account of the Covid-19 pandemic-induced economic disruptions, and in FY22 it was from a mix of high spot prices and rising production of cheaper domestic gas. The industry tightness exacerbated in 8MFY23 as the Russia-Ukraine conflict led to shrinking global supplies, with geopolitical events resulting in disruption of Gazprom’s contracted LNG of 2.8 million tonnes to GAIL (India) Limited (BBB-/Stable) this year.

India Imported LNG Consumption



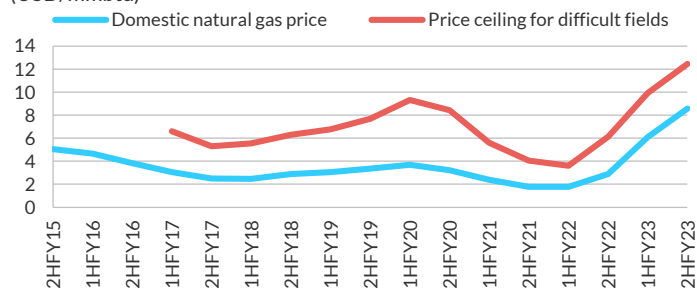
Source: Fitch Ratings, Petroleum Planning & Analysis Cell

CNG and PNG Demand Resilient; High Domestic Gas Prices May Slow Growth

CGD companies’ overall NG consumption continued growing in 8MFY23 despite the weakness from industrial customers. We believe the strength was led by the operationalisation of new CGD GAs, and resilient demand from domestic PNG and CNG sectors, which use domestic gas as their primary fuel. This is despite a sharp increase in CNG and PNG prices following rising domestic gas prices in recent months.

Domestic gas prices are at their highest levels since the current pricing regime was introduced. Domestic gas includes fields under the administrative price mechanism (APM), which were allocated to Oil and Natural Gas Corporation Limited (ONGC, BBB-/Stable) and Oil India Limited (OIL, BBB-/Stable) on a nomination basis, and difficult deep-water fields. APM prices are set semi-annually, reflecting the trailing four quarters’ volume weighted pricing trend of US Henry Hub, Alberta Canada, NBP UK, and Russia, applied with a quarter’s lag, while price ceilings for difficult fields are set at higher levels.

Natural Gas Price (USD/mmbtu)

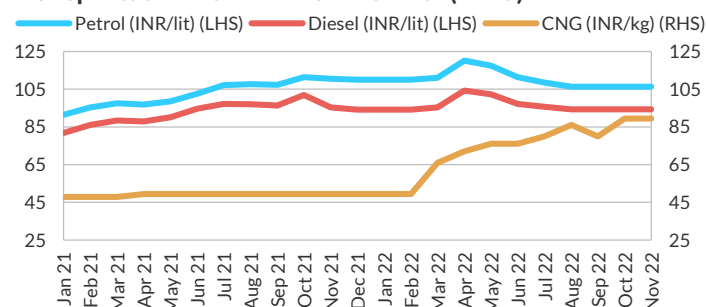


Source: Fitch Ratings, Petroleum Planning & Analysis Cell

We believe CNG’s increasing prices reduce its competitiveness against liquid transport fuels and may slow the pace at which it is adopted in the mobility sector. India’s CNG prices are up 81% since the start of the Russia-Ukraine conflict, against limited change in petrol and diesel prices, despite surging crude oil prices. Higher PNG prices may also affect the switch from domestic liquified petroleum gas (LPG) to PNG, albeit to a lesser extent than CNG.

Nonetheless, infrastructure buildout at a large number of CGD GAs should still support overall volume growth in the sector.

Transportation Fuel Prices - Mumbai (India)



Source: Fitch Ratings, Petroleum Planning & Analysis Cell

Execution Delays Hinder Pipeline Projects

We believe that the absence of a national gas grid and a record of delays in the execution of NG pipeline projects limit India’s ability to connect demand and supply centres adequately, and may delay the achievement of its NG consumption target. The inadequate pipeline network also limits existing LNG terminals’ evacuation capabilities.

India currently has 20,629km of operational NG pipelines, with most concentrated in regions where NG production and import terminals are located, limiting gas availability at inland demand centres that are not connected to the national gas grid.

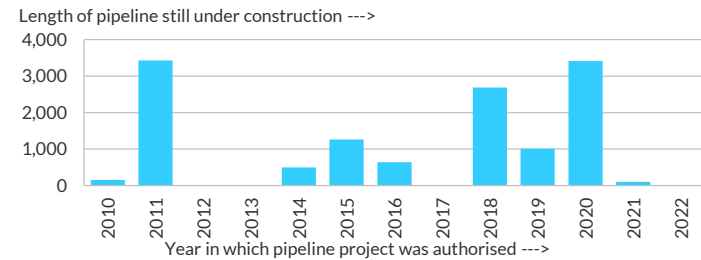
India aims to complete 13,186km of under-construction NG pipelines by end-2024, but we believe this may be subject to execution delays. Progress on projects awarded in recent years has been more satisfactory, including large projects such as the Urja Ganga pipeline awarded in 2018.

However, many under-construction projects are running significantly behind schedule, with around 6,000km of projects under execution since 2016 or before. We believe that timely completion of the entire gas grid is needed to ensure NG can be made available and distributed suitably in the country, to meet the

government's target (see Appendix 1 for full list of projects, timelines and investors).

Factors causing project delays included land acquisition or right-of-way issues, delays in receiving statutory clearances, uncertainty around development of anchor customers and CGD infrastructure, natural calamities and Covid-19, among other things.

India: Gas Pipelines Under-Construction and Year of Project Award



Source: Fitch Ratings, Petroleum and Natural Gas Regulatory Board

This is despite 91% of completed and 88% of under-construction pipeline length being executed by central or state government-controlled entities, of which GAIL is responsible for 68% and 41%, respectively, and is India's largest gas transmission company. GAIL's NG transmission pipelines have historically had sub-optimal utilisation rates (51-54% over FY18-FY22), lower than that assumed by the regulator while setting tariffs. This has led to under recoveries and tariff-related litigation, also hampering the pace of investment in the sector.

The infrastructure has been funded largely through a mix of onshore debt and equity, while the government has also provided direct capital grants and viability gap funding in some cases. The government has been exploring a pipeline asset monetisation plan to tap private sector investment through infrastructure investment trusts, although there has not been much progress.

Underutilised Existing Terminals May Dampen Future Investment

India has LNG regasification capacity of 41 million tonnes (mnt) through six terminals, but only two of these terminals – Dahej (set up in 2004) and Hazira (set up in 2005) are highly utilised. Terminals at Kochi (2013) and Ennore (2019) have operated at utilisation rates of 20% or below since inception, given the lack of pipeline connectivity, while Dabhol and Mundra have had other issues.

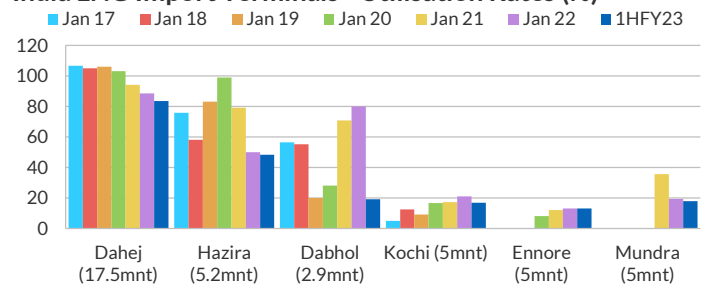
We believe some under-construction terminals may also face connectivity issues, as pipeline development is lagging for the nearly complete terminals at Chhara and the floating storage and regasification unit (FSRU) at Jaigarh. Such sub-optimal utilisation of existing infrastructure may slow or delay investments in the near to medium term, which could result in temporary bottlenecks in case demand growth accelerates sharply. We also believe that sustained high NG prices may exacerbate pressure on fresh capex as slower adoption of NG-based fuels lowers developers' return further.

This is despite a strong presence of state-owned enterprises (SOEs) across India's existing LNG terminals, similar to the entire gas value chain. Five of India's six operational terminals are run by central or state government-controlled entities. However, three of the four

under-construction terminals are privately owned as non-state players try to increase their participation. The under-construction terminals are being funded through a mix of onshore bank loans and equity (see Appendix 2 for more details on projects and investors).

These risks are in addition to the usual execution risks associated with greenfield projects. For instance, the FSRU at Jafrabad has been delayed beyond the initial completion target of early 2020 on disruptions caused by the pandemic and cyclones in the region.

India LNG Import Terminals - Utilisation Rates (%)



Note: mnt - million tonnes

Source: Fitch Ratings, Petroleum Planning & Analysis Cell

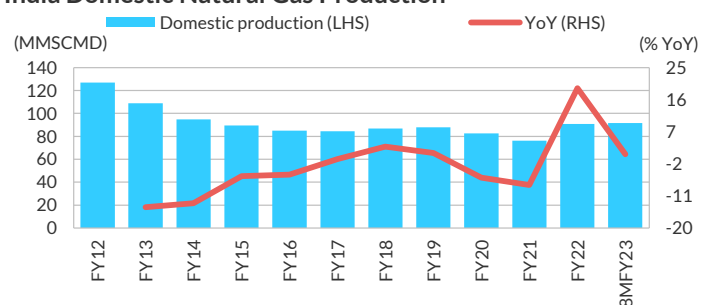
Rising Domestic Production Supportive

We expect India's NG production to increase gradually over the next few years, following a growth of 1% in 8MFY23 and 19% in FY22, and support NG consumption by CGD companies. This will be driven by production ramp-up at India's complex deep-water fields, which we believe will offset the natural declines at mature fields.

Production at Reliance Industries Ltd's (RIL, BBB/Stable) deep-water fields in the KG-DWN-98/3 block should ramp-up to 28 million standard cubic metres per day (MMSCMD) in the next few years from 18 MMSCMD in FY22. Production at ONGC's KG-DWN-98/2 block, located next to RIL's KG block, should ramp-up to 12 MMSCMD from low-single digits currently. ONGC and OIL are also investing to enhance production at their existing fields, which are in natural decline.

This follows domestic NG production falling from a peak of 127 MMSCMD in FY12 to 85 MMSCMD in FY16, led by a sharp fall in production from RIL's KG-D6 field developments, which it attributed to geological complexity, higher than envisaged water ingress and natural declines. We view any technical challenges in ramping up the complex deep-water fields as an event risk.

India Domestic Natural Gas Production



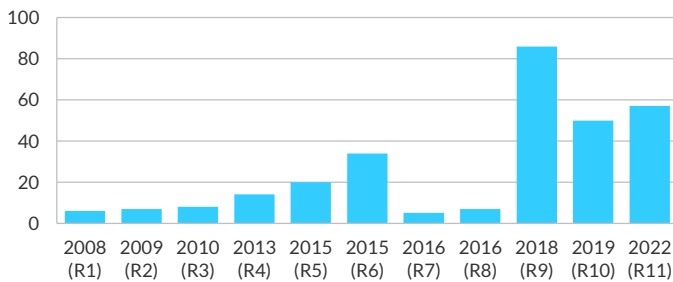
Source: Fitch Ratings, Petroleum Planning & Analysis Cell

Pick-up in CGD Investments Aids Growth

India's CGD sector included some companies operating on an ad-hoc basis historically, before the Supreme Court directed CGD projects to be set-up in 16 highly polluted cities in 2002 and the Petroleum & Natural Gas Regulatory Board (PNGRB) Act was notified in 2006. PNGRB started competitive bidding in 2008, although initial progress was slow amid an evolving bidding criteria and limited private investments.

The bidding criteria was amended in 2018 and subsequent rounds attracted public and private players in a big way, and increased the pace of additional CNG stations and PNG connections. We believe that a significant expansion in the CGD infrastructure, the price advantage of CNG against liquid fuels and increased adoption of NG to comply with pollution norms support long-term volume growth potential of CGD.

Number of CGD Geographical Areas Awarded in Bidding Rounds



Source: Fitch Ratings, Petroleum and Natural Gas Regulatory Board

India has awarded 294 GAs covering 98% of its population, at various stages of execution and operations, with a majority of these awarded in recent years. The number of CNG stations in India increased from around 1,300 in early 2018 to 4,853 by 8MFY23, and as per the bids' minimum work programme (MWP), CGD companies authorised until date could establish 17,700 stations by 2030. Similarly, India's PNG connections have increased from 4.1 million in early 2018 to 10 million currently, and the MWP provides for 123 million connections by 2030.

India's gas infrastructure	Jan 17	Jan 18	Jan 19	Jan 20	Jan 21	Jan 22	Nov 22
CNG stations	1,197	1,326	1,596	1,989	2,713	3,878	4,853
Domestic PNG connections (m)	3.53	4.12	4.95	5.95	7.42	8.90	10.06
Commercial PNG connections	21,833	25,711	27,758	28,740	32,059	34,316	36,106
Industrial PNG connections	6,687	7,418	8,714	10,023	11,010	13,016	14,348

Source: Fitch Ratings

Multiple companies are participating in India's CGD infrastructure creation, with state-owned Gujarat Gas Limited being the largest in

terms of existing sales. However, including future investments, Adani Total Gas Limited (ATGL) is the largest with CGD across 33 GAs under execution and an additional 19 GAs under execution at ATGL's joint venture (JV) with Indian Oil Corporation Ltd (IOCL, BBB-/Stable). The state-owned Oil marketing companies together have 61 GAs under execution, excluding those under their JVs (see Appendix 3 for more details).

Domestic Gas Pricing Norms Under Review

A government-appointed panel has submitted its recommendations on India's domestic NG pricing formula. Kirit Parikh, the panel's head, has discussed the proposals in media, including:

- benchmarking the prices of APM gas fields to imported crude oil prices;
- setting a floor and ceiling price of USD4-6.5/mmbtu for APM fields (currently USD8.6/mmbtu);
- raising the APM ceiling by USD 0.5/mmbtu every year, and fully liberalising APM pricing by January 2027;
- continuing the existing price ceiling on difficult fields, and to be fully liberalised by January 2026.

We believe that whether and to what extent the recommendations are implemented remains subject to government deliberations. However, the proposed APM ceiling being 24% below current prices would support margins of CGD companies, if implemented. The ceiling may lower realisations for ONGC and OIL in the near term. However, the floor of USD4 covers their marginal cost of production and provides downside protection, being above price levels seen over 2015 and 2021. The unchanged pricing formula for difficult fields would maintain RIL's and ONGC's incentive to continue developing newer fields.

However, in case there are significant curbs on upstream producers' pricing freedom, including for difficult fields, it could have an impact on their capex plans and the long-term potential of domestic production. Domestic producers have long argued that the existing formula, based on international indices, understates fair pricing because it excludes costs of liquification, transportation and regasification, which would be entailed in import parity prices.

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