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Impact of LNG Price Volatility on Gas Demand in India

An Opportunity for Gas-Dependent Sectors to Transition to Non-Fossil Fuel Sources

Executive Summary

In recent times, gas prices have been extremely volatile, reaching unprecedented lows in 2020 and all-time highs in 2021. The Japan Korea Marker (JKM), considered a benchmark for spot Asian LNG prices, went from US$2 in April 2020 to US$30 in September 2021 due to the onset of Covid-19 and post-lockdown economic recovery, respectively.

The increasing prices have negative consequences for India which is dependent on the spot market to meet almost 25% of its gas demand. The increasing prices are also leading to an upward negotiation in the long-term contracts. Oil-linked contracts were signed with a 10% slope of Brent Crude futures during the low-price environment of 2020; now, LNG sellers are reportedly unwilling to sign contracts with a slope of less than 12%.

Domestic gas prices are also linked to global gas prices and landed LNG prices in India, which have been fluctuating dramatically in the past few years. Despite domestic gas price ceilings being regulated by the government, they are not insulated from the volatility of global gas prices. Given the peaks in international gas prices, the next domestic gas price revision (effective from April) is expected to be higher than the current prices. The producers' price revision done by government in October led to a 62% increase in prices of regular fields and 69% increase in prices of difficult fields.

Even though there are projections of India driving global gas demand with expansion of its city gas distribution (CGD) network and of energy supply, demand would be conditional on the price of the fuel. LNG has affordability constraints – about US$10/MMBtu is acceptable. Above that price, industrial users have petroleum fuel options such as naphtha, furnace oil or others to replace gas.[1] In terms of residential and transport, the switch to piped natural gas (PNG) and compressed natural gas (CNG) – which is being extensively promoted with more CGD infrastructure and CNG stations – would slow down.

Massive expansion of LNG import infrastructure is also being planned in India to spur gas demand. However, volatile and skyrocketing LNG prices and increased attention on the global warming potential of methane will more than likely lead to a

[1] Bloomberg Quint. High Spot Prices to Dent India's LNG Imports. Here's Who May Feel the Pinch. September 2, 2021.

major risk of under-utilisation of this infrastructure with billions of dollars' worth of investment becoming stranded.

Given the unprecedented and unexpected sharp rises in gas prices in 2021, there can be little certainty prices that will stabilise at about US$19-20/MMBtu as predicted at the start of December 2021. The futures for January indicate prices will remain above US$25. In October 2021, prices were expected to settle at US$14-15 by May 2022 – an indication of the unpredictability and volatility in gas markets.

Apart from the obvious impacts of high prices, the volatility in gas prices poses an even bigger risk. Volatile fuel prices can raise the operating costs of downstream projects in the industrial, power and CGD sectors, harming product competitiveness, utilisation rates and returns on investment. Moreover, higher-risk investments without back-to-back offtake contracts and payment guarantees will have significantly more difficulty sourcing project finance debt capital for new projects. Another key issue is that while gas demand in India is price elastic downstream, gas assets are capital intensive and require massive infrastructure investments. When prices start to surge, these assets run the risk of becoming stranded. The limited domestic supply and global net-zero commitments add to this risk.

According to an IEEFA report, global gas volatility will increase. The report notes that, *"With lower levels of drilling, financial instability in the oil and gas industry, and low levels of industry investment, it is likely that a new era of higher prices and more volatility is upon us."*[2]

An industry analysis shows that between 2016-2020, while the Asia spot LNG prices averaged 27.2% lower than Brent-linked prices, the volatility of the LNG prices was much higher at 51% compared to the Brent-based contract prices.[3]

Peak gas prices in the past few months caused consumers to consider going back to highly polluting liquid fuels. Such a move pushes back India's Nationally Determined Contribution (NDC) commitments under the Paris Agreement and highlights a major problem with relying on gas as a bridge fuel to a lower carbon economy. Further, it adversely affects India's import bill and current account deficit (CAD) – already deeply impacted by the pandemic – and puts the nation's energy security at risk, making it a matter of urgency for the government to explore cleaner alternatives to gas.

Biogas and biomethane, options approved by the U.S. Renewable Fuel Standard program, are equivalent in quality to piped natural gas for transport and industrial use, respectively.

Further, the government should urgently explore greater use of electricity for cooking and mobility. In urban areas where the electricity load is relatively stable, there should be an increased effort to switch to electricity. India would eventually have to move to electric cooking and mobility to achieve the target of 450 gigawatts

[2] IEEFA. Gas and LNG Price Volatility To Increase in 2021. January, 2021.
[3] Reuters. RPT-Oil-linked LNG may be here to stay after spot market skyrockets. January 15, 2021.

(GW) of renewable energy by 2030, so leapfrogging now would be a more pragmatic long-term strategy.

LNG Outlook for India

Declining domestic production and the Government of India's ambition to increase the share of natural gas in the final primary energy mix from 6% to 15% are expected to result in an increased dependence on liquefied natural gas (LNG) imports. However, this is conditional on various factors such as the buildout of import infrastructure, the price of imported fuel and the expansion of the transmission and distribution pipeline network. We note that a tenfold increase in LNG prices in the past year makes this government target even less likely than it was when first set.

India's annual domestic gas production has been in decline since FY2010/11 when it peaked at 37.7 million tonnes (MMT). In FY2020/21, production was about 21MMT on the back of new discoveries. LNG imports, on the other hand, have risen rapidly, increasing from about 9.43MMT in FY2010/11 to 23.93MMT in FY2020/21.[4]

The production peak in 2010 created bullish forecasts for gas demand that the gas supply was unable to match, resulting in the creation of stranded assets and a weak domestic gas market. By the time long-term supply contracts were negotiated, economic concerns and policy changes had diminished the demand for gas. This resulted in India renegotiating the long-term contracts, signed during peak gas consumption, for lower prices and quantities and even changes in linked commodities. In 2018, government owned natural gas company GAIL India renegotiated its 20-year contract, signed in 2011 with Gazprom for delivery in 2018, to lower the delivered volume for first three years with an 80% decrease in the first year of supply. Reports suggested that the deferral was required to develop a bigger domestic market for gas, which has been struggling under the effects of storage constraints, infrastructure limitations, lack of clear policy and declining costs of renewables.[5]

Despite the Indian gas market shrinking 5% in the past decade, in contrast to strong economic growth, there remain plans for growing the gas market in India and investment of nearly US$66 billion has been announced for building midstream and downstream infrastructure.[6] According to the International Energy Agency (IEA), India is going to be a major contributor to global gas demand through 2024 – the second largest in Asia and fifth largest in the world on a country basis (we note the IEA has been making this erroneous forecast for a decade). In its Gas Market Q3 2021 report, the IEA notes that gas consumption in India is expected to increase by 25 billion cubic metres (bcm) per year up to 2024, for a 9% annual growth rate.[7] Half of this is expected to come from domestic gas, owing to some new discoveries,

[4] National Statistical Office. MoSPI. Energy Statistics India 2021. March 30, 2021.
[5] SP Global. India masters the art of renegotiating inflexible LNG deals. January 18, 2018.
[6] Economic Times. India to see $66 billion investment in gas infrastructure. December 2, 2020.
[7] IEA. Gas Market Report Q3-2021. July 2021.

with the remainder to be met by imports.[8] The recent increase in domestic production might have an impact on LNG demand in the short-term but it is not expected to be sustained beyond 2024 as no discoveries of note have happened in awarded exploration blocks and the investment pipeline for domestic gas projects looks weak.[9]

Production levels will not sustain the targeted demand. Total proven natural gas reserves in India are estimated to be 46.6 trillion cubic feet (tcf) or 0.7% of the global gas reserves. The reserves to production (r/p) ratio is 55.6 years, which may appear a sufficient timeline; conversely, this can also be indicative of slow exploration, difficult access to these reserves or unfavourable domestic price regimes versus LNG imports. In Indonesia, which has similar levels of proven reserves, the r/p ratio is only 19.8 years.[10] India's dependence on LNG imports will have to go up to 70% by 2030 if the gas share increases to 15% in the energy mix, according to Petronet chief executive AK Singh.[11]

In all sectors, fuel substitution is expected to lead to the projected expansion in demand for gas. Residential and commercial consumers might switch due to expansion of the city gas distribution (CGD) network but the industry and energy sectors will have an incentive to switch from liquid fuels if there is a price advantage. That advantage is not visible in the immediate term as the prices of LNG skyrocketed to a whopping US$35/metric million British thermal unit (MMBtu) on October 5, 2021, and are expected to stay high for the next four quarters.

Evolution of Imported LNG Pricing in India

For price-sensitive Indian markets, the biggest factor for fuel switching would be a lower price. The LNG price mechanism in India has evolved through different stages, moving from a fixed price regime in the introductory stage (2004-09) to oil-linked in the development stage (2009-14) and now, as it moves to the growth stage with increased dependence on LNG, to a diversified pricing mechanism, with multiple models emerging, including gas-indexed pricing.

LNG prices are determined either by contracts signed by Indian gas companies and exporting countries or on the spot market, based on the form of procurement. The first LNG contract, signed in 2004 with Qatar-based RasGas, was for a fixed price of $2.53/MMBtu for five years.[12]

In 2009, starting the transitional period of five years to 100% oil-linkage, LNG contract prices were fixed to the Japanese Crude Cocktail (JCC) via a predetermined formula, reaching $7/MMBtu in March, 2010,[13] and about $11/MMBtu by 2013.

[8] IEA. Gas 2020. June 2020.
[9] Wood Mackenzie. De-constructing India's gas supply boom. August 12, 2021.
[10] BP. Statistical Review of World Energy. 2021.
[11] Argus Media. India's LNG imports continue to drop in May. June 21, 2021.
[12] OEIS. Gas Pricing Reform in India. April 2015.
[13] Mint. Qatar to sell LNG to India at higher than KG basin price. March 22, 2010.

Since 2016, long-term contracts for imported gas have been revised to the Brent Crude oil price.

U.S. LNG entered the global market in 2016. In 2017, GAIL signed a swap deal with a Swiss trader for a U.S. LNG contract. In 2018, India received the maiden U.S. LNG cargo, under a Henry Hub-linked contract.

As de-linking of crude-linked contracts and spot prices has become more common, there has been a considerable increase in short-term contracts and spot trades globally. Further, low spot prices led to increasing dissatisfaction with long-term contracts and postponement in picking up quantities. Between 2016 and 2020, Asia spot LNG prices averaged at least 27.2% less than Brent-linked contract prices.[14] No exception to this trend, India in 2020 was one of the world's largest buyers of short-term and spot LNG, accounting for 11% of the global share.[15] Spot and short-term quantities received in India in 2020 tallied 18.8bcm,[16] accounting for 55% of that year's imports of approximately 33.96bcm[17] and exposing India to gas price volatility. This same volatility is expected to bring a reversal in this trend, with gas marketing companies looking to shift back to term contracts.

The changing relationship between spot and contract prices has added further complexity. Until recently, spot prices remained well below oil-linked contract prices, triggering tensions between importers and exporters and resulting in demands for contract revisions in some cases and postponement of LNG supply for later years. Late in 2020, when global lockdowns began to ease, gas prices took an upward swing and the relationship between spot and contract prices flipped – spot prices now are way above long-term contract prices.

Domestic Gas Pricing Is Not Insulated From Global Volatility

From 2014 onwards, wellhead price ceilings for domestic gas fields in India have been linked to global gas prices. The price ceilings are based on a formula prescribed by the Ministry of Petroleum and Natural Gas (MoPNG). The formula links the domestic gas price to the volume-weighted average price (VWAP) of four international benchmarks: U.S. Henry Hub, UK NBP, the Russian domestic gas price, and the Alberta reference price.[18] The calculation is derived from the trailing four quarters and applies with a lag of one quarter.

To incentivise domestic production, in 2016 the government introduced marketing and pricing freedom with a price ceiling on gas produced from discoveries in deepwater, ultra deepwater, and high pressure-high temperature areas. The pricing freedom is subject to a ceiling price based on landed price of alternative fuels. The formula includes the landed price of imported fuel oil, weighted average imported

[14] Reuters. RPT-Oil-linked LNG may be here to stay after spot market skyrockets. January 15, 2021.
[15] IEA. Gas Market Report, Q1, 2021.
[16] GIIGNL. The LNG Industry Annual Report. 2021.
[17] PPAC. Historical Demand of Gas.
[18] MoPNG. New Domestic Natural Gas Pricing Guidelines, 2014. October 1, 2014.

landed price of substitute fuels and landed price of imported LNG.[19]

Domestic gas prices are linked to global gas prices and the landed LNG prices in India, which have been fluctuating dramatically in the past few years. Despite domestic gas price ceilings being regulated by the government, they are not insulated from the volatility of global gas prices. Given the peaks in international gas prices, the next domestic gas price revision (effective from April) is expected to be higher than current prices. It is being estimated that the domestic gas prices from regular fields will double in April to US$6/MMBtu and would further be increased to US$8/MMBtu in October revisions considering the high gas prices in 2021.[20]

LNG Demand Expansion Is Conditional: Price Is the Key

The sectors chiefly driving gas demand in India will be industrial, residential, transport and energy. The IEA views the industrial segment accounting for 40% of demand by 2024,[21] with roughly 20% each for the other sectors.

All these projections are, however, conditional on factors such as infrastructure and price. Gas is seen a bridge fuel in India in the transition to a lower carbon economy and policies are being framed to encourage the switch from high-carbon fossil fuels.

Massive expansion of LNG import infrastructure is planned in India. The total import capacity in India is currently 42.5 million tonnes per annum (mmtpa)[22] with average utilisation rate of 52% in FY2020/21[23] despite record low LNG prices. In 2019, the utilisation rate was 67%, following the high of 82% in 2018.[24] Among the reasons for low rates are volatility in gas prices and pipeline capacity restraint, which could also hinder terminals' further expansion.[25] Another 34mmtpa of capacity and 17,000km of transmission pipelines are either proposed for or under construction.[26] According to Petronet chief executive Singh, India would need an import capacity of 155 mmtpa with 80% utilisation to boost gas use.[27]

City gas distribution covers only 20% of the population but the government has awarded contracts for expansion of the CGD network to 70% of the population by 2029. A further 65 geographical areas have been identified for the 11th round of CGD bidding.

Such infrastructure is needed to spur LNG use in the country. However, volatile and skyrocketing LNG prices and increased attention on the global warming potential of

[19] MoPNG. Marketing Including Pricing Freedom for Gas Produced from Difficult Discoveries. March 21. 2016.
[20] ICIS. A challenging year ahead for Indian LNG buyers. January 13, 2022.
[21] IEA. Gas Market Report Q3-2021. July 2021.
[22] PPAC. Oil & Gas Snapshot August 2021.
[23] Calculated from PPAC. Oil & Gas Snapshot April 2021. May 19, 2021.
[24] International Gas Union. 2020 World LNG Report.
[25] Times of India. India's newest LNG terminal at Mundra nears 50% capacity utilization. October 24, 2020.
[26] AusTrade. Insight - LNG infrastructure in India.
[27] Hindu Businessline. LNG's share of Indian gas demand to rise to 70% by 2030: Petronet CEO. June 18, 2021.

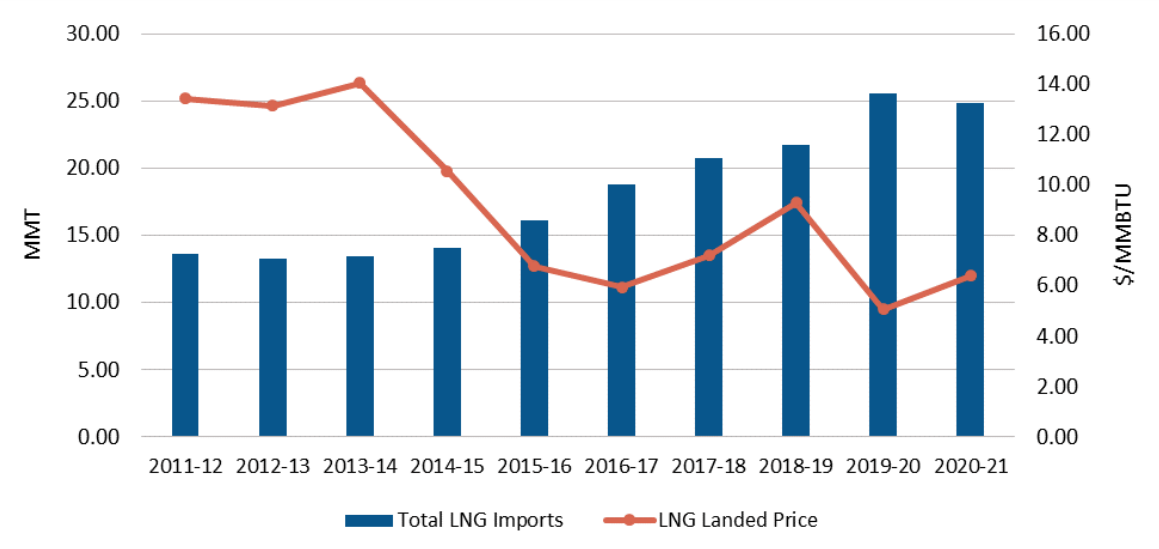
methane will more than likely lead to a major risk of under-utilisation of this infrastructure and the massive investment becoming stranded.

An IEEFA report notes that, *"India's LNG terminals, now under-utilised due to lack of pipeline infrastructure, would further be stranded as LNG prices shoot up. If the inflationary trend remains, companies planning to invest in gas infrastructure, may back out as the affordability factor turns consumers to other fuels. Decreasing renewable prices and increasing gas prices make investing in fossil fuel pipeline infrastructure economically unsustainable."*[28]

A senior GAIL official recently noted that if the price volatility persists, there will be a major impact on LNG demand,[29] to the extent that all the planned infrastructure would be under-utilised and ultimately stranded. A report by the Global Energy Monitor (GEM) has noted that India runs the risk of locking in a huge US$103bn of stranded assets by investing in gas pipeline infrastructure.[30]

LNG demand in India is extremely price sensitive; any increase in gas prices leads to a decrease in demand. The following figure shows the year-on-year change from FY2011/12 onwards in total LNG imports (contracts and spot) with the year-on-year change of the average landed LNG price.

Figure 1: Total LNG Imports and Landed LNG Prices from FY2011/12 to FY2020/21



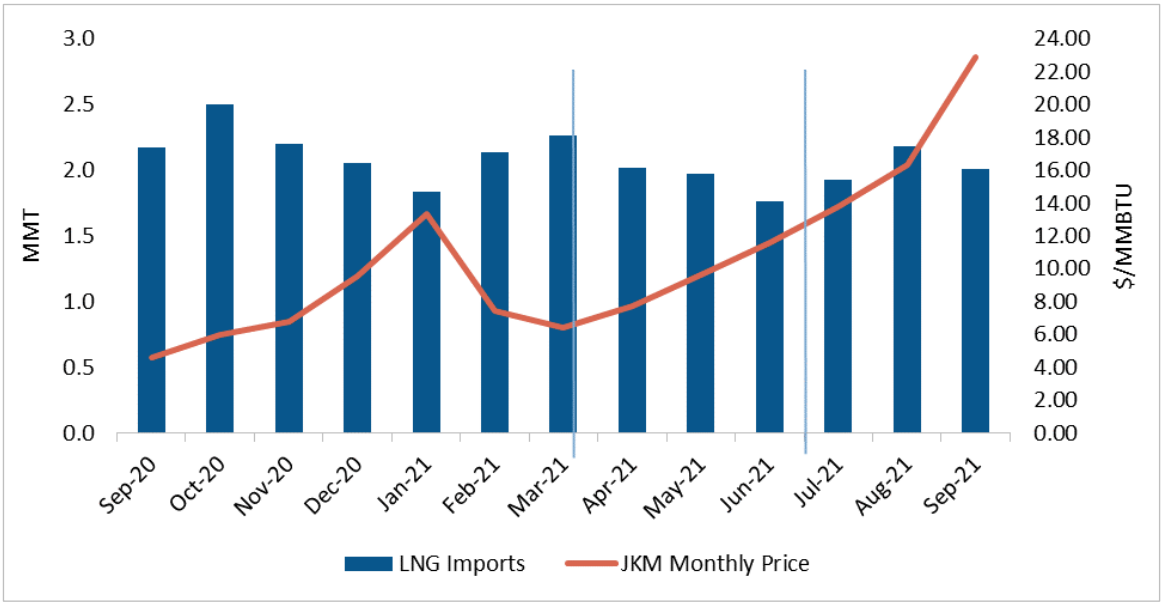
Source: IEEFA analysis based on MoPNG's Indian PNG Statistics, average FY prices calculated from KAPSARC data.

[28] IEEFA. Role of Gas in Cooking and Mobility in the Transition to Cleaner Energy. October 2021.
[29] S&P Global Platts. GASTECH 2021: LNG spot price volatility key focus for market players. September 23, 2021.
[30] Pipeline Bubble 2021. Global Energy Monitor. February 2021.

The figure above shows the inverse correlation between the gas prices and the demand for LNG imports. A dip in LNG prices as seen for three years from 2013, complemented by supportive Indian government policies, led to much higher LNG imports. In FY2019/20, when the average LNG price was US$5.07/MMBtu, LNG imports were the highest ever at 25.57 mmt.

Recent sharp increases in gas prices have resulted in a decline in gas demand. The figure below shows the volatility experienced by gas prices in recent times. The comparison of the spot prices and LNG demand confirms that India is a price-sensitive market.

Figure 2: Total LNG Imports and Monthly Average Japan Korea Marker (JKM) Price from September 2020 to September 2021



Source: IEEFA Analysis based on PPAC's monthly oil and gas snapshot, Average of Daily JKM prices.

In September and October 2021, average monthly prices rose even higher. The September average price for the Japan Korea Marker (JKM), considered a benchmark for spot Asian LNG prices, was US$23/MMBtu, almost 40% higher than the price in August. In October, prices peaked at US$35/MMBtu and, considering supply constraints and onset of winter months, further rises are expected.

LNG Pricing Volatility Expected to Continue in the Near-term

Gas prices have become flexible and globally connected with large volumes traded on the spot market. Previously, the effect of changes in gas prices was limited to a region, but now there is a global impact. Historically, LNG exports were based on long-term contracts linked to the oil price, simply set as a percentage of the oil price. Asian economies continued to use this method for imports until recently. North America and Europe, being more developed spot markets, have been using gas

competitive pricing calculated at hubs. With the rise of the U.S. as an exporter, long-term contracts out of the U.S. market were priced off its domestic market spot (short term) price resulting in more gas linked contracts. Historically the U.S. market was relatively cheap and stable but, as this is no longer the case, gas trades are increasingly volatile.

With the onset of the COVID-19 crisis, demand dropped and so did gas prices, dramatically. In April 2020, the JKM reached its lowest point since its introduction in 2009, at US$2/MMBtu. Once the economic recovery started, gas supply couldn't keep pace and prices started rising, also dramatically, and the JKM peaked at US$35/MMBtu on October 5, 2021. On that day, November futures were predicted to reach US$56/MMBtu. The actual spot import price[31] for November was US$30.61 and the February futures are predicted to be approximately US$33/MMBtu.

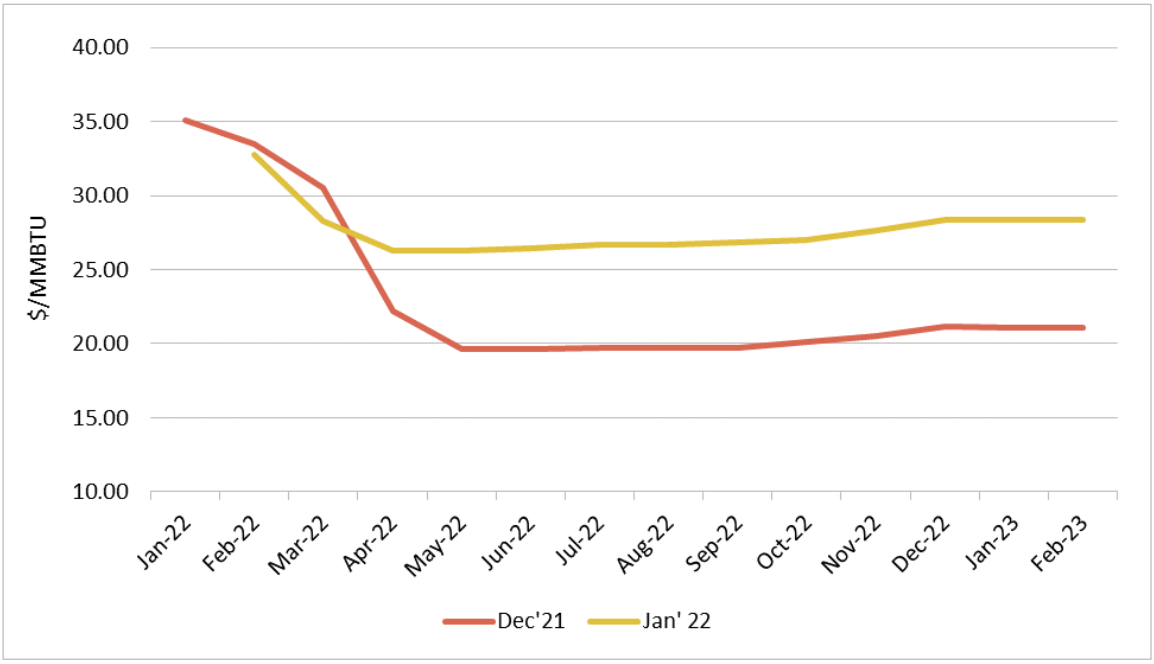
Higher spot market prices are also raising the prices of newly negotiated long-term contracts.[32] Oil-linked contracts were signed with a 10% slope of Brent Crude futures during the low-price environment of 2020; now, LNG sellers are reportedly unwilling to sign contracts with less than a 12% slope. This could hurt India's bargaining power during the coming renewal of fuel supply contracts, resulting in higher long-term prices. The spot market currently is not very liquid due to supply deficiency, further adding to the woes of gas consumers.

Volatility in LNG pricing is expected to remain, with consequences for demand, capital risk and infrastructure, especially for price-sensitive emerging economies such as India. The JKM Futures, as of January 2022, indicate prices will stay above US$25/MMBtu for 2022. This is much higher than the long term contracted price of US$9-10/MMBtu. The long-term contracts are also not completely insulated from volatility but tend to have a ceiling price that may limit impact.

Given the unprecedented and unexpected sharp rises in gas prices in 2021, there can be little certainty prices will stabilise at about US$19-20/MMBtu as predicted at the start of December 2021. The futures for January indicate the prices will remain above US$25; in October 2021, these were expected to settle at US$14-15 by May 2022.

[31] IHS. Historical and Forecast LNG Prices Data Sheet. December 27, 2021.
[32] Nasdaq. LNG sellers hold upper hand in long-term supply talks with buyers. October 19, 2021.

Figure 3: JKM Futures Monthly Price (US$/MMBtu) from January, 2022 to February, 2023 as at December 2021 and January 2022



Source: CME Group data as on December 8, 2021 and January 5, 2022.

This does not augur well for India, as domestic gas prices remain high and would be expected to increase in the six-month revisions. Moreover, LNG has affordability constraints – about US$10/MMBtu is acceptable. Above that, industrial users have petroleum fuel options such as naphtha, furnace oil or others to replace gas.[33]

A key issue is that while gas demand in India is price elastic, downstream gas assets are capital intensive and require massive infrastructure investments. Volatile fuel prices can raise the operating costs of downstream projects in the industrial, power and CGD sectors, harming product competitiveness, utilisation rates and returns on investment. Moreover, higher-risk investments without back-to-back offtake contracts and payment guarantees will have significantly more difficulty sourcing project finance debt capital for new projects.

In turn, this would result in factoring in higher risk and so higher prices for projects, which without debt-backed capital may then become unaffordable. Hedging by switching to long-term contracts also does not work seamlessly, it has its own problems – as seen with India's renegotiating contracts for prices, quantities and linked commodities.

India's lack of available LNG storage capacity also limits its ability to mitigate the impact of global price fluctuations on the domestic market. MoPNG has expressed interest in ramping up LNG storage and securing long-term contracts to shield India

[33] Bloomberg Quint. High Spot Prices to Dent India's LNG Imports. Here's Who May Feel the Pinch. September 2, 2021.

from price volatility but no concrete step has been taken in that regard. Building strategic reserves of gas, as with oil, has been under discussion but will be very expensive and so is not being actively pursued.[34]

According to an IEEFA report, global gas volatility is going to increase. It notes that, *"With lower levels of drilling, financial instability in the oil and gas industry, and low levels of industry investment, it is likely that a new era of higher prices and more volatility is upon us."*[35] An industry analysis shows that between 2016-2020, while the Asia spot LNG prices averaged 27.2% lower than Brent-linked prices, the volatility of the LNG prices was much higher at 51% compared to the Brent-based contract prices.[36]

Clearly, fluctuations in the price trend are going to be more volatile than previously, with adverse effects on capital investments, utilisation of infrastructure and developers' appetite for risk.

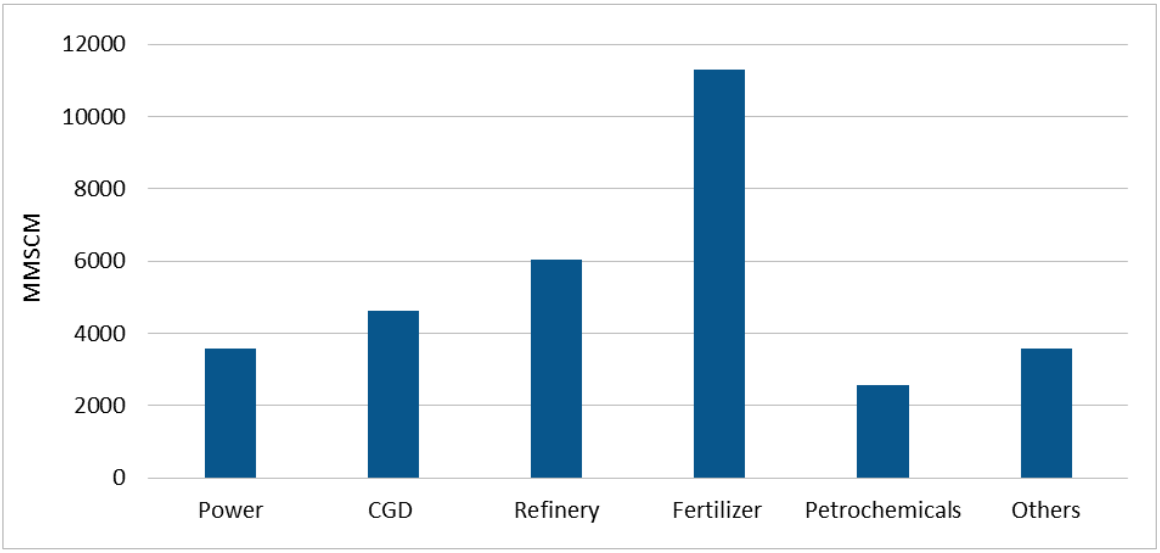
EIA in its December Short Term Energy Outlook has noted that the pressure on LNG prices will remain due to high global demand.[37] Constrained supplies, due to a 40% reduction in drilling operations in 2020,[38] have already increased gas prices dramatically. The constraints are expected to continue as investors lack confidence in renewed large-scale expansion of the industry. The limited capital discipline of the sector, with investors focusing on debt backed volume growth, has resulted in poor returns and inability to absorb the shock.[39]

Sectoral Gas Demand Impacted by High Gas Prices

Rising LNG prices have drastically reduced demand in the gas consuming industrial, power and CGD segments in India.[40] Many import tenders have been postponed due to increasing prices, so industries are scurrying for alternative fuel options to meet demand.

[34] Economic Times. More long-term LNG purchase deals, higher storage needed: Petro Secretary. Oct 7, 2021.
[35] IEEFA. Gas and LNG Price Volatility To Increase in 2021. January, 2021.
[36] Reuters. RPT-Oil-linked LNG may be here to stay after spot market skyrockets. January 15, 2021.
[37] EIA. Short Term Energy Outlook. December 2021.
[38] IEEFA. Gas and LNG Price Volatility To Increase in 2021. January, 2021.
[39] McKinsey. Oil and gas after COVID-19: The day of reckoning or a new age of opportunity?. May 15, 2020.
[40] Impact on fertilizer, a key gas consuming sector, will be analysed in the next note.

Figure 4: Sector-Wise Consumption of Regasified LNG in India in FY2020/21



Source: PPAC's Monthly report on Natural Gas Production, Availability and Consumption (million metric standard cubic metres).

In response to sharp price increases in FY2020/21 industries dependent on methane gas had requested that the government allow a switch to alternative, more affordable fuels such as liquefied petroleum gas (LPG). For tile manufacturers, for example, fuel is 30% of the production cost and they cannot afford high LNG rates.[41]

Rising global gas prices have also translated into increases in domestic producers' prices, announced by the government on a half-yearly basis. On October 1, 2021 the government increased prices by 62% for gas from regular fields to US$2.9/MMBtu and by 69% for gas from difficult fields to US$61.13/MMBtu.

The CGD segment, supplying fuel for cooking, mobility and to some extent industry, would be most affected as it is the priority segment for the relatively cheaper domestic gas. Unfortunately, domestic gas prices are not entirely insulated from the volatility of the global gas prices.

Thus there has been an increase in Compressed Natural Gas (CNG) and Piped Natural Gas (PNG) prices in various Indian states with the increase in producers' prices announced in October 2021. The CNG and PNG prices were revised more than five times by a gas utility in Mumbai leading to 34% and 31% increases, respectively. Similar revisions were observed in the other states with higher CGD penetration such as Delhi and National Capital Region (NCR) and Gujarat where the prices have already increased earlier that year due to higher spot prices.

These price revisions may not lead to an immediate fuel switch for domestic consumers, given the lack of affordable alternatives, but would definitely slow the

[41] Reuters. Record LNG prices push South Asia nations to ration gas, seek other fuels. January 15, 2021.

adoption of gas which till now has had a price advantage in transport and mobility. This would impact the proposed infrastructure expansion and increase the risk of becoming stranded for existing gas assets.

According to the IEA, the gas demand growth for 2022 is expected to be about 7% due to increasing domestic production, expanding infrastructure and a supportive policy environment. However, high LNG prices will continue to limit the growth. The demand growth for 2021 is expected to be only 3% due to record high LNG prices.[42]

In December 2020, prices exceeded US$10/MMBtu for the first time in a year of low prices. According to the IEA, *"Price-sensitive natural gas users in India (especially in the refining and petrochemical sectors) reportedly switched from imported LNG to liquid fuels, and monthly gas burn in the power sector was down by 10% in January 2021 from the average of the previous six months while coal-fired generation rebounded sharply in early 2021."*[43]

Cleaner Alternatives to Gas Must be Urgently Explored

The government must treat massive volatility and ever-increasing prices of gas as an opportunity to enable cleaner, non-fossil alternatives for gas-dependent sectors such as CGD and industry.

The argument of using gas as a bridge fuel, already weak, has lost even more strength in the face of price volatility. Investing billions in LNG import infrastructure and dual-fuel units is not a long-term strategy as gas has started showing inflationary trends and prices are expected to remain high. Supplies, already constrained due to many companies going bankrupt during the pandemic or because of poor capital discipline, could be further limited by countries' net zero commitments and lowered investor enthusiasm.

Peak gas prices in the past few months caused consumers to consider going back to highly polluting liquid fuels. Such a move pushes back India's Nationally Determined Contribution (NDC) commitments under the Paris Agreement and highlights a major problem with relying on gas as a bridge fuel to a lower carbon economy. Further, it adversely affects India's import bill and current account deficit (CAD) – already deeply impacted by the pandemic – and puts the nation's energy security at risk

Gas prices for 2022 are expected to remain way above US$10/MMBtu, leading consumers to substitute with polluting fuels. The focus should be on developing renewable energy alternatives that would not only be more affordable but also help India transition to a low-carbon economy.

Biogas and biomethane, options approved by the U.S. Renewable Fuel Standard program, are equivalent in quality to piped natural gas for transport and industrial use respectively. Compressed Biogas (CBG) plants are being set up in Punjab and Haryana, to use paddy stubble – which is otherwise burned at the onset of winter and results in massive air pollution. There are plans to build 5000 such plants by

[42] IEA. Gas Market Report Q4 2021.
[43] Ibid.

2023 with an investment of Rs1.75 lakh crore (US$23.2 billion). These are expected not only to result in 75,000 jobs but also to reduce India's CNG bill by 40%. To combat in part the increasing volatility in gas prices, the government should incentivise construction of CBG plants, increase the number of projects and hasten their operation.

The government should urgently explore greater use of electricity for cooking. In urban areas where the electricity load is relatively stable, there should be an increased effort to switch to electricity. Domestic gas if used for generation of electricity would help in better balancing renewable energy and maintain grid stability. India would eventually have to move to electric cooking to achieve the target of 450GW of renewable energy by 2030, so leapfrogging now is a more pragmatic long-term strategy. For areas where power distribution is still poor, the government should urgently explore and deploy decentralised renewable energy (DRE) options. Solar hybrid mini grids become extremely cost effective with increased electricity use and applying this technology to cooking can stimulate demand and bring the grid above the break-even tariff of US$0.40/kWh (Rs29.7/kWh).[44]

Beyond aiding mobility with biogas, the government should focus on incentivising use of electric vehicles (EVs) especially in the passenger segment as battery prices decline, making EVs increasingly affordable. Studies have shown that lifecycle emissions of EVs are much lower than conventional vehicles, especially as the grid decarbonises. Natural gas vehicles (NGVs) have much lower emissions from combustion than petrol or diesel vehicles but relying on imported gas negates this environmental benefit.

In a nutshell, there is an urgency to invest in alternatives to natural gas to insulate India from energy security and balance of payments risks and from the fuel's inflationary pressure – and, most importantly, to meet low-carbon goals.

[44] World Bank. Cooking with Electricity: A Cost Perspective. September 21, 2020.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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