

Can LNG Displace Coal Demand in India?

High costs, infrastructure challenges, and the rapid growth of renewable energy undermine LNG's role as a "bridge fuel"

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Key Findings

There is little evidence that liquefied natural gas (LNG) is displacing coal use in India, despite claims from the global oil and gas industry that LNG serves as a "bridge fuel" from coal to clean energy.

In India's power sector, which accounts for 70% of coal consumption, natural gas has fallen to less than 2% of the generation mix due to high LNG costs and limited supplies of cheaper domestic gas. Rather than adopting LNG as a "bridge fuel," India does not plan to build new gas-fired power capacity through 2032 and is instead leapfrogging to cheaper forms of renewable energy.

In India's non-power sectors, LNG demand growth will continue to face challenges related to end-user price sensitivities, competition with cheaper energy alternatives, and high public subsidy burdens. Despite efforts to expand the country's gas network, demand growth barriers may exacerbate the current underutilization of pipelines, LNG terminals, and other gas infrastructure.





Executive Summary

Liquefied natural gas (LNG) producers and policymakers in gas exporting countries often claim that LNG can replace coal use in India, the world's second-largest coal-consuming country. They argue that more LNG exports are necessary to help the country reduce coal demand and meet national emissions reduction targets.^{1, 2, 3, 4, 5, 6, 7, 8} In a recent example, Australia's Woodside Energy Group stated that exports from its newly approved Louisiana LNG liquefaction facility in the United States would contribute to coal-to-gas switching in India.^{9, 10}

Although the government has set ambitious targets to increase gas consumption and expand the gas infrastructure network, this report finds that claims about the role of LNG in displacing coal in India are largely unsubstantiated for several reasons:

- India's LNG import growth pales compared to its coal demand. Despite government targets to increase the share of natural gas in the national energy mix to 15% by 2030, its share has fallen from 10% in FY2013 to 7% in FY2024.¹¹
- 2. Roughly 70% of India's overall coal demand is in the power sector. However, rather than displacing coal-fired electricity, natural gas generation has been effectively squeezed out of India's power mix over the past decade due to high LNG costs and limited supplies of cheaper domestically produced gas. The generation share of natural gas has fallen from nearly 13% in FY2010 to less than 2% in FY2025. In FY2025, 31 gas-fired power plants with a combined capacity of nearly 8 gigawatts (GW) and representing 32% of the country's total gas power capacity did not generate any electricity at all, rendering them stranded



¹ TotalEnergies. <u>LNG: TotalEnergies supports India's energy transition ambitions</u>. 02 February 2022.

² "Replacing foreign coal with U.S. natural gas should be our #1 focus for reducing global emissions." EQT. <u>Unleashing U.S. LNG</u>. Date Accessed: 09 May 2025.

³ "Emissions from Coal-Reliant Countries are Soaring Without Access to Natural Gas." EQT. <u>Unleashing U.S. LNG – The Largest</u> Green Initiative on the Planet. Date Accessed: 09 May 2025. Page 23.

⁴ "Expanding U.S. gas exports to fast-growing Asian nations and others around the world now primarily reliant on coal consumption can cut emissions and help prevent Russia from dominating new global gas export markets." Progressive Policy Institute. <u>The Climate Case for Expanding U.S. Natural Gas Exports</u>. 19 January 2023.

⁵ "I want to sell [Canadian] natural gas to India... We can reduce greenhouse gas emission by three times as much as the total emissions of Canada because we'll displace dirtier coal." Hindustan Times. <u>Canada's Conservative leader seeks to expand trade</u> with India, focusing on natural gas, uranium, and lentils. 02 June 2024.

⁶ According to Dan Byers, former vice president of policy at the U.S. Chamber of Commerce, "Dan Byers, vice president of policy at the U.S. Chamber of Commerce, where he works on environmental issues. "*The notion that, you know, LNG and natural gas reduce emissions by displacing coal is completely well established.*" Scientific American. <u>Coal is Bad for the Environment. Is Liquefied</u> <u>Natural Gas Any Better?</u> 06 February 2024.

 ⁷ Asia Natural Gas & Energy Association. <u>Study shows more US LNG is needed to curb Asia's surging coal use</u>. 02 December 2024.
⁸ Fraser Institute. <u>Doubling Canadian natural gas production and exporting to Asia could reduce global emissions by up to 630</u> million tonnes—nearly as much as Canada produces in a year. 22 May 2025.

⁹ Woodside Energy. <u>Woodside approves Louisiana LNG development transcript</u>. 29 April 2025. Page 13.

¹⁰ Note that this is despite the fact that Woodside CEO Meg O'Neill stated one month earlier that she was unable to prove claims that LNG was displacing coal usage in India. Woodside Energy. <u>Sustainability Briefing 2025 Transcript</u>. 03 April 2025. Page 14.

¹¹ India Climate and Energy Dashboard. Source-wise Primary Energy Supply. Date Accessed: 23 May 2025.

assets. In April 2025, 5.3GW of this 8GW was retired due to inoperability¹², leaving 20.1GW of remaining gas-fired power capacity. Moreover, India does not plan to build any through at least 2032. Since FY2016, gas demand in India's power sector has fallen substantially.

3. While the share of natural gas in electricity generation has declined consistently over the last decade, the share of wind and solar in the mix has quadrupled from 3% in FY2016 to 12% in FY2025, with plans to reach 596GW of installed capacity by 2032. Meanwhile, the utilization of India's gas-fired power fleet has dropped since 2019 and was 14.47% in FY2025, falling below 10% in the winter months from November 2024 to March 2025. While gas generators are used to meet peak demand in the short term, the country is rapidly turning to other sources for grid flexibility, including coal flexibilization, energy storage, and demand-side management.

In FY2025, 31 gas-fired power plants—with a combined capacity of nearly 8 gigawatts (GW) and representing 32% of the country's total gas power capacity-did not generate any electricity at all, rendering them stranded assets.

4. Since FY2016, India's LNG demand growth has come almost entirely from the fertilizer sector due to high government subsidies that shield fertilizer end-users from volatile fuel and production costs. However, the fertilizer sector historically does not consume large amounts of coal, so there is limited potential for coal displacement. Meanwhile, gas demand for fertilizer production is not expected to grow significantly by 2030 due to the small pipeline of proposed gas-based urea capacity and government efforts to contain chemical fertilizer demand growth.

¹² Economic Times. India shrinks its gas fleet as idle plants become unusable. 20 May 2025.





Figure 1: Net Change in Sectoral Natural Gas and LNG Demand, FY2016-2025

Source: IEEFA analysis based on data from the Petroleum Planning and Analysis Cell (PPAC).

- 5. After power generation, iron and steelmaking is India's second largest individual coalconsuming sector. Since FY2016, however, natural gas demand in this sector has increased by just 0.63 billion cubic meters (bcm), 0.55bcm of which has come from domestically produced gas, not LNG. Although India is the largest producer of direct reduced iron (DRI) in the world — a process which typically uses natural gas — 80% of the country's DRI fleet uses coal-based rotary kilns due to relatively cheaper fuel. Looking ahead, proposed iron and steel capacity is dominated by coal-based processes rather than natural gas or LNG.
- 6. Besides power and steel production, Indian government data identifies a broad "miscellaneous" category as a major coal consumer. This category includes the ceramic, glass, metal, and pharmaceutical sectors, as well as other small industries. This sector accounts for a large share of coal and natural gas demand. While there may be room for coal-to-gas switching among smaller industries, especially as the country expands its national gas grid, the suitability of LNG will depend on pricing, infrastructure, and the competitiveness of alternative fuels. Over the past decade, LNG demand in these sectors has remained marginal compared to demand growth for cheaper domestic gas.

While the evidence demonstrates that LNG is not displacing coal use in India's largest coalconsuming sectors, most forecasts expect natural gas demand to grow rapidly in sectors that do not consume significant amounts of coal, such as city gas, transportation, fertilizers, and others.



This report also examines gas demand growth in these sectors. To date, nearly all gas demand growth (excluding fertilizer production) has come from domestically produced gas rather than LNG. In fact, LNG demand has fallen over the last decade in several energy-intensive sectors, including power, petrochemicals, and refineries. Based on historical trends, the Institute for Energy Economics and Financial Analysis (IEEFA) expects that LNG demand growth will continue to face challenges related to the price sensitivities of end-users, competition with other energy alternatives, and efforts to contain high public subsidy burdens.

Bullish forecasts about India's LNG demand often imply that (a) LNG will compensate for any shortfalls in domestic gas production, and (b) infrastructure expansion necessarily means demand will grow. While these may be true to some extent, end-users in India have repeatedly demonstrated a tendency to reduce gas demand altogether and switch to more affordable alternatives when prices rise, leading to an underutilization of existing infrastructure. India's gas-fired power plants, LNG import terminals, and natural gas transmission networks struggle with low utilization rates.

For example, out of the country's seven LNG import terminals operating in FY2025, six operated at utilization rates below 50% due partly to price sensitivities, lack of demand, and site-specific operational challenges.^{13, 14, 15} This has led to financial losses for public sector oil and gas companies.¹⁶ Meanwhile, the country's existing natural gas pipeline network operates at very low rates. Based on available data, IEEFA estimates that the capacity-weighted average utilization rate of India's major gas pipelines is 41%¹⁷, with some major pipelines operating at less than 10%, leading to losses for pipeline operators.¹⁸ In other words, consumers opt for cheaper alternatives even when LNG is available.¹⁹

In short, IEEFA's analysis indicates that LNG is not serving as a "bridge fuel" from coal to clean energy in India. In June 2024, a similar study of China, the world's largest coal-consuming country, found that global oil and gas industry claims about the potential of LNG to displace coal usage were overstated.²⁰ These analyses demonstrate that LNG has yet to play a significant role in supporting the transition to clean energy in the world's two largest coal-consuming economies.

¹³ Petroleum and Natural Gas Regulatory Board (PNGRB). <u>Optimising LNG Supplies from Terminals in India</u>. December 2024. Page 8.

¹⁴ Petroleum and Natural Gas Regulatory Board (PNGRB). <u>Optimising LNG Supplies from Terminals in India</u>. December 2024. Page 19.

¹⁵ Note: This does not include India's eighth LNG import terminal at Chhara, which entered into service in 2025.

 ¹⁶ Petroleum and Natural Gas Regulatory Board (PNGRB). <u>Optimising LNG Supplies from Terminals in India</u>. December 2024. Page 8.
¹⁷ IEEFA calculations based on: PPAC. India's Oil and Gas Ready Reckoner, H1 FY2024-25. Date Accessed: 12 May 2025. Page 59.

 ¹⁷ IEEFA calculations based on: PPAC. India's Oil and Gas Ready Reckoner, H1 FY2024-25. Date Accessed: 12 May 2025. Page 59.
¹⁸ Business Line. India's natural gas pipeline network operating at 50% capacity: PNGRB. 27 March 2025.

¹⁹ For example, PNGRB notes that even though Southern India has gas availability, "demand is yet to materialize." Petroleum and Natural Gas Regulatory Board (PNGRB). Optimising LNG Supplies from Terminals in India. December 2024. Page 8.

²⁰ IEEFA. LNG is not displacing coal in China's power mix. 25 June 2024.

Introduction

Supply and Demand Trends for Coal, Natural Gas, and LNG

Between FY2013 and FY2024, India's primary energy supply grew at a compound annual rate of 4.2%²¹, driven by rapid economic growth and industrialization.²² India is the world's second-largest coal consumer, relying on coal for 56% of its primary energy consumption. Meanwhile, the share of natural gas fell from a peak of 11% in FY2011 to 7.2% in FY2025, despite government policies aiming to increase the share of natural gas to 15% by 2030.²³

India is also the world's second-largest coal producer, and output has grown rapidly in recent years due largely to government incentives aiming to reduce reliance on coal imports amid rising power demand (Figure 2).²⁴ Since 2013, coal production has increased by 56%, surpassing 1 billion tonnes in FY2024.²⁵

In comparison, natural gas production peaked in 2010 and has remained relatively stagnant due to challenges related to declining output from mature fields and limited new commercially viable upstream discoveries. As a result, India produced nearly 15 times more coal than natural gas in 2023.²⁶



²¹ NITI Aayog. <u>Source-wise Primary Energy Supply</u>. Date Accessed: 23 May 2025.

²² Energy Institute. <u>Statistical Review of World Energy</u>. 2024.

²³ IEEFA calculations based on: Energy Institute. <u>Statistical Review of World Energy</u>. 2024.

²⁴ Economic Times. India wants to increase domestic coal production, reduce imports, coal minister says. 13 June 2024.

²⁵ The country also has 378 billion tonnes of coal reserves, according to government estimates. Ministry of Coal. <u>Annual Report</u> <u>2023-24</u>. Page 14.

²⁶ Energy Institute. Statistical Review of World Energy. 2024.



Figure 2: Coal and Natural Gas Production (left); Coal, Natural Gas, and LNG Consumption (right)

Source: Energy Institute. Note: LNG represents a subset of natural gas consumption.

India does not import natural gas via pipeline, so domestic production and LNG imports, which began in 2004, account for the country's natural gas supply. While domestic production has remained flat over the last decade, LNG imports have doubled since 2013, from 13 million tonnes per annum (MTPA) to 26.6MTPA in 2024.²⁷ India is the world's fourth-largest LNG importer, behind China, Japan, and South Korea.

However, the growth of LNG imports pales compared to coal consumption growth. In absolute terms, India's coal consumption increased by 7.55 exajoules from 2013 to 2023, compared to just 0.49 exajoules for natural gas demand growth — nearly all of which was from LNG.²⁸

The Indian government has ambitious goals to expand the country's natural gas usage and infrastructure network. Along with the 15% target for the share of gas in the energy mix, the government plans to expand the national gas transmission grid to 35,000 kilometers (km) by 2030, up from nearly 23,800km in May 2025.²⁹ Other goals include expanding gas distribution by increasing household piped natural gas (PNG) connections from 15 million to 120 million by 2030 and establishing 18,300 compressed natural gas (CNG) stations by 2032, up from nearly 8,000.³⁰

Sectoral Consumption of Coal, Natural Gas, and LNG

India's LNG imports have had little impact on coal use for several reasons. First, there is limited overlap between sectors that consume coal and natural gas. The power sector accounts for over



²⁷ Kpler data.

²⁸ IEEFA calculations based on: Energy Institute. <u>Statistical Review of World Energy</u>. 2024.

²⁹ Petroleum Planning & Analysis Cell (PPAC). <u>Pipeline Structure</u>. Date Accessed: 13 May, 2025.

³⁰ PPAC. <u>City Gas Distribution Network</u>. Date Accessed: 13 May 2025.

70% of India's coal consumption, followed by smaller shares for steel, cement, and other sectors.³¹ Conversely, natural gas is consumed primarily in the fertilizer and city gas sectors (Figure 3). As a result, higher gas consumption in these sectors has had little impact on coal demand.



Figure 3: Coal Consumption by Sector (left); Natural Gas Consumption by Sector (right)

The power sector accounted for 13% of the country's overall natural gas consumption in FY2024^{32, 33}, but due to the challenging economics of LNG for power generation, the majority of power sector demand was met by domestically produced natural gas rather than LNG. Between FY2016 and FY2024, the power sector experienced the most significant drop in gas demand of any sector in India's economy. In FY2024, only 8% of the country's LNG imports were consumed in the power sector (Figure 4), where coal usage is most prevalent.

The fertilizer sector, historically accounting for less than 1% of India's coal use³⁴, consumes 55% of the country's LNG and has driven nearly all LNG demand growth since FY2016 (Figure 3). This is due primarily to substantial fiscal subsidies designed to stimulate fertilizer production while shielding end-users from fuel cost volatility. Sectors that do not receive significant subsidies and instead pass through natural gas costs to consumers either use small volumes of natural gas or rely on cheaper, domestically produced gas.³⁵



Source: Ministry of Statistics & Program Implementation; Petroleum Planning & Analysis Cell (PPAC).

³¹ Ministry of Statistics and Programme Implementation (MOSPI). <u>Energy Statistics India 2024</u>. March 2024. Page 57.

³² India's fiscal year runs from 01 April to 31 March. FY2024 refers to 01 April 2023 to 31 March 2024.

³³ Petroleum Planning & Analysis Cell (PPCA). <u>Natural Gas – Sectoral Consumption.</u> Date Accessed: 11 October 2024.

³⁴ Ministry of Statistics and Programme Implementation (MOSPI). <u>Energy Statistics India 2024</u>. March 2024. Page 57.

³⁵ IEEFA. Is India's 2030 gas consumption target feasible? 01 July 2024.



Figure 4: FY2024 Sectoral Consumption of LNG and Domestic Gas (left); Share of LNG **Consumption by Sector (right)**

Source: PPAC, IEEFA.

Fuel Costs

LNG has also struggled to replace domestic coal production and coal imports in various sectors due to higher costs. Average LNG prices in FY2024 were roughly nine times the cost of domestically produced coal, and more than twice the cost of coal imported from Indonesia, India's largest coal supplier (Figure 5). In the power sector, high LNG fuel costs have made gas-fired power generation uncompetitive with other sources of electricity generation (see Box 1 on page 18 for more details).

India's domestic gas production from older onshore fields is priced according to the Administered Price Mechanism (APM), linked to 10% of the Indian Crude Basket, and has been capped at a ceiling price of USD6.75 per million British thermal units (MMBtu) since April 2025.³⁶ Gas from deep and ultra-deepwater fields is priced according to the market, with a ceiling price determined by the cost of alternative fuels. In 2024, approximately 64% of India's domestic supply was priced according to the APM.37

The Ministry of Petroleum and Natural Gas allocates cheaper APM gas and has prioritized the residential and transportation sectors, which explains city gas demand growth since 2016. However, between May 2023 and November 2024, lower domestic production caused APM allocation to fall for the city gas sector, leading to an increase in retail prices.³⁸



³⁶ Note, USD6.75/MMBtu is an increase from the ceiling price of USD6.5/MMBtu over the previous two years.

³⁷ International Energy Agency (IEA). India Gas Market Report: Outlook to 2023. February 2025. Page 23.

³⁸ Economic Times. Lower APM gas allocation to raise cost of city gas cos by Rs 2-3/kg: Crisil. 24 October 2024.

Allocations under the APM scheme will likely depend on the country's domestic gas production. Lower output could ultimately hurt domestic gas allocations, hindering the competitiveness of gas and undermining demand growth in city gas segments.



Figure 5: Estimated Coal and Natural Gas Prices in India on an Equivalent Basis

Source: IEEFA's calculations based on CIL's price notification; PPAC's Gas Price LNG Imports data. Note: Power includes coal supplied to power utilities, independent power producers, fertilizers and defense. Others include all other sectors. Medium Grade is from G2 to G8, Low Grade is G9 to G17. Prices shown do not include transportation costs and taxes.

LNG Infrastructure and Utilization

India has eight operational LNG import facilities with a combined capacity of 52.7MTPA. All of the country's terminals are onshore facilities rather than floating storage and regasification units (FSRUs), with a total investment cost of USD4.85 billion (INR412.5 billion).^{39,40} However, the utilization rates of these terminals have remained low. Six of the seven functional LNG import terminals in FY2025 (excluding the eighth terminal that came online in January 2025) operated at utilization rates below 50%. Underutilization is due to various factors, including volatile pricing, low demand, pipeline connectivity, and terminal-specific issues. In May 2025, India's Petroleum and



³⁹ Petroleum and Natural Gas Regulatory Board (PNGRB). Optimising LNG Supplies from Terminals in India. December 2024. Page 6

⁴⁰ The Hindu. HPCL commissions ₹4,750 cr. LNG Regasification Terminal in Gujarat. 13 January 2025.

Natural Gas Regulatory Board issued a suite of regulations to mitigate underutilization by ensuring that new terminal projects align with gas demand.⁴¹

Terminal	Start Year	Capacity (MTPA)	Utilization FY2025	Utilization FY2016 - FY2025
Dahej	2004	17.5	98%	99%
Hazira	2005	5.2	35%	61%
Kochi	2013	5	22%	17%
Dabhol	2013	5	47%	54%
Ennore	2019	5	25%	16%
Mundra	2020	5	22%	24%
Dhamra	2023	5	41%	
Chhara	2025	5		

Table 1: India's LNG Import Terminals and Capacity Utilization

Source: PPAC's monthly oil and gas snapshot.

Note: Chhara terminal came online in January 2025. Utilization figures above are for full year only.

Along with the existing terminals, India also has 87MTPA of new import capacity at various stages of development.⁴² However, according to the Petroleum and Natural Gas Regulatory Board (PNGRB), the proposed facilities require further study to ensure that they align with demand: "*The utilization of LNG terminals needs to be examined on the basis of thorough demand surveys to avoid high investments from being unproductive. Future LNG import terminals will face uncertainty unless well-coordinated plans align with the overall gas sector's requirements."*⁴³

As India's LNG terminals remain underutilized, the country's existing natural gas pipeline network also faces low-capacity utilization rates. Based on data from the government's Petroleum Planning and Analysis Cell (PPAC), the Institute for Energy Economics and Financial Analysis (IEEFA) estimates that the capacity-weighted average utilization rate of India's major natural gas pipelines is 41%.⁴⁴ Many large pipelines throughout the country operated well below 50% from April to September 2024.⁴⁵ These figures suggest that despite the availability of existing infrastructure, barriers to end-user demand growth may continue to impede capacity utilization.



⁴¹ Economic Times. <u>PNGRB rolls out LNG Terminal Regulations 2025; mandatory charge disclosure, pre-FID filings now required</u>. 02 June 2025.

⁴² Petroleum and Natural Gas Regulatory Board (PNGRB). <u>Optimising LNG Supplies from Terminals in India</u>. December 2024. Page 8.

⁴³ Petroleum and Natural Gas Regulatory Board (PNGRB). <u>Optimising LNG Supplies from Terminals in India</u>. December 2024. Page 13.

 ⁴⁴ IEEFA calculations based on: PPAC. <u>India's Oil and Gas Ready Reckoner, H1 FY2024-25</u>. Date Accessed: 12 May 2025. Page 59.
⁴⁵ PPAC. <u>India's Oil and Gas Ready Reckoner, H1 FY2024-25</u>. Date Accessed: 12 May 2025. Page 59.

Outlook for the Power Sector: Can LNG Replace Coal?

Over the last decade, India's electricity demand has grown at an average rate of 5% per year⁴⁶ and is expected to increase through 2027 due to increasing electrification and economic expansion.⁴⁷ To meet rising demand, generation from various sources has increased, primarily coal, solar, and wind.⁴⁸



Meanwhile, generation from natural gas-fired power plants has fallen 24% since 2017 (Figure 6). Gas-fired power generation peaked in 2010, along with India's domestic gas production. It has since fallen by more than half due to a lack of affordable gas supply, economic competition from other energy resources, infrastructure constraints, and the prioritization of domestic gas supply for non-power sectors, among other factors.



Figure 6: Electricity Generation by Resource, 2000-2024

Bioenergy Coal Gas Hydro Nuclear Other Fossil Solar Wind

Source: IEEFA analysis of Ember Climate data.



⁴⁶ IEEFA analysis based on Ember climate data.

⁴⁷ Oil Price. IEA: India's Power Demand To Grow At 6.3% Annually Through 2027. 03 March 2025.

⁴⁸ Between 2015 and 2023, coal-fired electricity supply increased by 465 terawatt-hours (TWh), solar increased by 107TWh, and wind by 49TWh.

Coal generation increased at an average annual rate of 5% between FY2016 and FY2025, maintaining a dominant 73% share of the generation mix (Figure 7). Renewables, excluding large hydro, have grown to a 14% market share. Wind and solar generation reached a 12% share in FY2025, four times more than their share a decade earlier. Meanwhile, gas has been effectively squeezed out of the generation mix, falling from a peak share of 13% in FY2010 to below 2% in FY2025.49





India has not built any new gas-fired power capacity since 2016 (Figure 8), except for much delayed 370 MW Yelahanka power plant commissioned in January 2025, and has no plans to add any in the next few years. A report by India's Central Electricity Authority (CEA), a government agency that sets short- and long-term plans for the power sector, states that no new gas capacity will be added this decade, even under high electricity demand growth scenarios.⁵⁰ According to CEA modeling, the share of gas in the generation mix would fall to 1.4% by 2030.⁵¹ The country's 14th National Electricity Plan, released in October 2024, does not include any new gas-fired power capacity by 2032.⁵²



Source: IEEFA analysis of India Climate Energy Dashboard data. Note: Renewables includes solar, wind, small hydro and bio-energy.

⁴⁹ Reuters. India's natural gas use target hinges on higher gas-fired power generation. 13 February 2025.

⁵⁰ Central Electricity Authority. <u>Report on Optimal Generation Capacity Mix for 2029-30</u>. April 2023. Page 39.

⁵¹ Central Electricity Authority. <u>Report on Optimal Generation Capacity Mix for 2029-30</u>. April 2023. Page 25.

⁵² India Ministry of Power. 14th National Electricity Plan. October 2024. Page 95.



Figure 8: Annual Power Capacity Additions by Resource, 2016-2024

Coal Gas Nuclear Hydro RES

Source: IEEFA analysis based on Central Electricity Authority's <u>Installed Capacity Report</u>. Note: April 2025 series represents the net change in total installed capacity between January and April 2025.

There are no plans to build any new gas-fired power capacity because of high stranded asset risks. The average utilization of the country's 25 gigawatts (GW) of gas-fired power plants has fallen from 23.3% in FY2021 to under 14.5% in FY2025. Utilization spiked to 25% in June 2024, following the government's decision to mandate the availability of gas-based generating stations to meet peak demand.⁵³ However, higher load factors were short-lived. Fleetwide utilization fell below 10% in the winter months from November 2024 to March 2025 (Figure 9).⁵⁴ For comparison, coal fleet utilization averaged 70% in FY2025.⁵⁵

In FY2025, 31 gas-fired power plants with a combined capacity of nearly 8GW, representing 32% of India's entire gas power capacity, did not generate any electricity.^{56, 57} 24 of these plants are privately owned, meaning that 66% of all private gas-fired power capacity did not operate in FY2025, rendering those plants stranded assets. In April 2025, 5.3GW of the 8GW idle capacity was retired due to inoperability⁵⁸, leaving 20.1GW of remaining gas-fired power capacity. IEEFA has previously

⁵⁴ Central Electricity Authority, Operation Performance Monitoring Division. <u>January 2025 Gas-based Stations Report.</u> Date Accessed: 12 March 2025.



⁵³ IEEFA. Gauging Gas-based Power's Role in Meeting India's Peak Electricity Demand. May 2024. Page 4.

⁵⁵ Central Electricity Authority, Operation Performance Monitoring Division. <u>January 2025 Coal/Lignite/Multi-fuel Report.</u> Date Accessed: 12 March 2025.

⁵⁶ IEEFA analysis based on data from the National Power Portal. <u>Monthly Generation Reports ACTUAL for March 2025</u>. Date Accessed: 16 May 2025.

⁵⁷ IEEFA. <u>Flexible Generation: A Role for India's Stressed and Stranded Gas-based Power Plants?</u>. October 2022. Page 6.

⁵⁸ Economic Times. India shrinks its gas fleet as idle plants become unusable. 20 May 2025.

estimated that the total value of stranded assets was INR650 billion (USD8.2 billion), of which banks had funded 77% or INR500 billion (USD6.3 billion).59



Figure 9: Monthly Fleetwide Utilization of Gas-fired Power Plants

Asset stranding of gas-fired power plants is due primarily to dwindling supplies of domestic gas allocated to the power sector, as well as an inability of gas plants to compete with cheaper resources. Many of India's existing gas plants were constructed in the late 2000s on the premise that large potential reserves would be developed to provide feedgas. However, production forecasts soon turned out to be overly bullish, and limited domestic output was allocated primarily to city gas and fertilizer sectors, leaving new power capacity without affordable fuel. LNG has been unable to stimulate gas generation due to high costs and uncompetitive economics (Box 1).

Box 1: Unfavorable Economics of Gas and LNG for Power in India

According to the government think tank NITI Aayog, the total weighted average cost of gas power in FY2024 was significantly higher than power from coal and renewables (Figure 10). The International Energy Agency (IEA) estimates that an LNG price of USD8/MMBtu would result in a generation cost of INR8-11 per kilowatt-hour (kWh). On a variable cost basis, fuel prices would likely have to fall to

Source: National Power Portal, monthly reports.

⁵⁹ IEEFA. Flexible Generation: A Role for India's Stressed and Stranded Gas-based Power Plants?. October 2022. Page 6.

USD5-5.75/MMBtu for gas-fired power plants to compete with coal and renewables. The cost of producing and delivering LNG to Asia, meanwhile, is typically over USD7/MMBtu.⁶⁰

However, amortization of fixed plant costs depends heavily on plant utilization factors. Given low plant load factors for India's gas fleet (14.5% in FY2025), IEEFA estimates that the levelized cost of LNG-fired power generation at a USD8/MMBtu fuel price could reach nearly INR17/kWh.⁶¹ This demonstrates clearly why it is no longer economically viable to build new gas-fired power plants in India.





Source: NITI Aayog.

By contrast, solar prices have fallen to between INR2.5-3/kWh in recent competitive tenders and may decrease further, corresponding with declining solar module costs. For wind and solar hybrid projects, discovered prices have been in the INR3-3.5/kWh range.⁶² Moreover, decreasing battery prices are driving increases in standalone energy storage and hybrid renewables plus storage projects. The most recent tenders have resulted in renewables plus storage tariffs of INR3.32/kWh.⁶³

⁶¹ This assumes an exchange rate of INR85.47/USD, assessed on 31 March 2025.

⁶² PV Magazine. <u>NHPC concludes 1.2 GW wind-solar hybrid tender with a price of \$0.039/kWh</u>. 12 March 2025.

⁶³ JMK Research. <u>The Latest SJVN Auction Drives "Solar plus 4-hour Energy Storage Solution" Tariff to a New Record Low</u>. 13 May 2025.



⁶⁰ IEEFA. <u>LNG is not displacing coal in China's power mix</u>. June 2024. Page 18.

Figure 11: Utility-scale Non-solar Tariff Trends



Source: IEEFA. Challenges in India's Tender-Driven Renewable Energy Market.

While rising peak demand in India may create more opportunities for gas-fired electricity, falling costs for storage projects make batteries increasingly competitive in peaking roles. Rising battery deployments are likely to reduce the need for gas-fired power generation to meet peak demand through 2030.

Rather than relying on gas as a "bridge fuel" in power generation, India has continued building coal capacity while emphasizing rapid renewable energy growth. 4.6GW of coal capacity was added in 2024⁶⁴, up from an average annual increase of 3GW since 2017. The country's 14th National Electricity Plan envisions coal capacity rising from 212GW to 260GW by 2032, an increase of 48GW.⁶⁵

Meanwhile, the growth of renewable energy capacity has continued apace, toward a 2030 goal of 500GW by 2030 and 596GW by 2032.⁶⁶ The country's 2032 target includes 365GW of solar and 122GW of wind. By October 2024, the country had reached 200GW of renewables capacity (including large hydro), of which 92GW was solar, and 48GW was wind.⁶⁷ Due to the growth of

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⁶⁴ Central Electricity Authority. Installed Capacity Report, December 2024. Date accessed: 12 March 2025.

⁶⁵ India Ministry of Power. <u>14th National Electricity Plan</u>, page xxix. October 2024.

⁶⁶ India Ministry of Power. <u>14th National Electricity Plan</u>, page xxix. October 2024.

⁶⁷ Ministry of New and Renewable Energy. India's Renewable Energy Capacity Hits New Milestone. 13 November 2024.

renewables, the IEA expects the share of coal in the generation mix to fall from 74% to 66% in 2027.⁶⁸

Renewable capacity installations are primarily driven by utility-scale renewable energy tenders. Tender issuance reached a record 73GW in 2024, up from 57GW in 2023. High issuances are in line with government mandates requiring at least 50GW of tendered capacity each year.⁶⁹ Ambitious tendering targets have resulted in numerous challenges, including bidding undersubscription, contractual delays, and project cancellations, that threaten 2030 renewable capacity targets. While long-term targets remain ambitious, stakeholders are actively working to overcome shortcomings, and India remains one of the most advanced countries for market-based renewable energy auctions.⁷⁰

Instead of relying on gas for grid flexibility, India employs other tools to balance renewables generation, including flexible coal operations, energy storage, and demand-side management. For example, in 2023, the CEA released a report on improving the flexible operations of coal plants for renewables integration, aiming to prepare the coal fleet to reduce its average minimum load from 55% to 40% by 2030.⁷¹

India's battery storage market has been described as a "sleeping giant"⁷² due to its potential for rapid growth in the coming decades. As of March 2024, the country's total battery energy storage system (BESS) capacity was 219.1 megawatt-hours (MWh), with 1.6 gigawatt-hours (GWh) under development.⁷³ An additional 9.7GW of renewable projects paired with storage and 18.1GW of pumped storage hydropower projects are under development.⁷⁴ In the first quarter of 2025, tenders were held for 9.5GW of new energy storage capacity, including 6.1GW specifically for standalone energy storage systems.⁷⁵ India's National Transmission Plan forecasts that BESS capacity will grow to 47GW by 2032, along with 36GW of pumped hydro storage capacity.⁷⁶

LNG has failed to be a "transition fuel" in India's power sector despite the availability of existing gasfired power capacity. While existing gas capacity has met short-term growth in peak demand, this role is expected to shrink over the remaining decade as India employs other tools to support grid flexibility, balance renewables, and meet peak demand.



⁶⁸ International Energy Agency (IEA). <u>Coal 2024: Analysis and Forecast to 2027</u>. December 2024. Page 28.

⁶⁹ IEEFA. <u>Challenges in India's Tender-Driven Renewable Energy Market</u>. March 2025. Page 5.

⁷⁰ IEEFA. <u>Challenges in India's Tender-Driven Renewable Energy Market</u>. March 2025. Page 21.

⁷¹ Central Electricity Authority. <u>Flexibilisation of Coal-fired Power Plants: A Roadmap for Achieving 40% Technical Minimum Load</u>. February 2023.

⁷² IEEFA. India's battery storage market is a sleeping giant. 07 May 2021.

⁷³ Mercom India. India's Installed Battery Storage Capacity Hits 219 MWh. 09 July 2024.

⁷⁴ Mercom India. India's Installed Battery Storage Capacity Hits 219 MWh. 09 July 2024.

⁷⁵ IEEFA. <u>The standalone energy storage market in India</u>. 28 April 2025.

⁷⁶ Central Electricity Authority (CEA). National Electricity Plan Volume II. October 2024. Page 96.

LNG vs. Coal in the Industrial Sector

The power sector accounts for 70% of India's coal consumption, followed by smaller shares from the steel (6%), cement (1%), and other (22%) sectors.⁷⁷ Figure 12 shows the sectoral consumption of coal for FY2024 and the growth of sectoral demand since FY2016.

Coal is a critical input for heavy industries like iron and steelmaking and can be used to produce chemicals like benzole, ammonia sulfate, and coal tar, among others. Many industries in India, including manufacturing (paper, chemicals, and aluminum), food processing, fabrics, and others, use coal for process heat and captive power generation. Coal-fired boilers are considered a costeffective and reliable way to generate heat for industrial processes. Since FY2016, industries using coal for process heat have shown a significant increase in consumption.





Source: Ministry of Statistics and Programme Implementation (MOSPI). Note: Others include colliery consumption, jute, coal for soft coke, imported non-coking coal, and other industries such as manufacturing, food processing and pharmaceuticals.

The industrial sector accounted for 19% of the increase in India's coal consumption from FY2016 to FY2024, while the power sector was responsible for the remaining 81%. Figure 13 shows the changes in coal consumption by both sectors since FY2016. Following the COVID-19 pandemic, coal use in the power sector increased substantially. In contrast, coal consumption by the industrial sector flattened, except for a rise in FY2024, likely driven by higher domestic coal production.

The increase in coal use for electricity could be attributed to unprecedented peak demand increases, heatwaves, and enhanced industrial activity post-pandemic. Notably, the share of electricity consumption by industries increased by 52% between FY2016 and FY2024, but the share of



⁷⁷ Ministry of Statistics and Programme Implementation (MOSPI). Energy Statistics India 2024. March 2024. Page 57.

industrial use of electricity in overall electricity consumption remained at 41-43%. Figure 13 shows that coal consumption for industrial input and heating is rising more slowly than for electricity generation.





Electricity Industry & Others (Electricity) Industry & Others (Feedstock) Industry & others (Total)

Source: MOSPI.

Total coal consumption in the industrial sector grew by 60 million tonnes (Mt) between FY2016 and FY2024 compared to 342Mt in the power sector. The increase in industrial coal consumption is driven by imported coal, which met 70% of the sector's demand in FY2023-24 (Figure 14). However, domestic coal consumption has been inconsistent, possibly because the power sector is prioritized for the more affordable domestic fuel.





Figure 14: Domestic & Imported Coal Consumption by Industrial Sector, FY2016-2024

In FY2024, the medium grade domestic coal prices averaged USD1.2/MMBtu and imported coal prices averaged USD6/MMBtu.⁷⁸ Notably, the average price of imported coal is comparable to the current domestic gas price which has been a key input for industries particularly since a price ceiling was established. Domestic gas price was capped at USD6.5/MMBtu in April 2023 and revised to USD6.75/MMBtu in April 2025.

Gas consumption in the industrial sector has also increased since FY2016. However, as with most sectors, this has been driven by more affordable domestic gas rather than LNG (Figure 15). For example, total gas demand among miscellaneous industries increased by 7.69 billion cubic meters (bcm) between FY2016 and FY2024, the second-highest growth sector behind city gas. LNG demand accounted for just 0.22bcm of that increase.

In essence, although these industries may be increasing natural gas consumption, this has not slowed coal demand. Moreover, gas consumption growth has relied almost entirely on domestic gas, not LNG. The factors driving higher domestic gas demand include more PNG connections to industrial end-users, lower consumption of domestic gas by the fertilizer sector, and a price ceiling on domestic gas.





Source: IEEFA analysis of NITI Aayog's India Climate & Energy Dashboard Data.

⁷⁸ IEEFA's calculations, see Page13 for more details.



Figure 15: Net Change in Sectoral Natural Gas Demand by Fuel Type (FY2016-2025)

Note: "Other Industries" includes the following sectors: Agriculture primarily from tea plantations; manufacturing including ceramics, chemicals, glass, metals; and other small-scale industrial consumers. "LPG Shrinkage" refers to losses in the liquefied petroleum gas (LPG) supply chain, making it a technical category rather than a sectoral consumer.

Ultimately, the suitability of gas and LNG for India's industrial sector depends on pricing. While industrial gas consumption has been rising, spikes are seen in times of low prices (Figure 16). When prices increase, there is evidence of gas-consuming industrial sectors switching to cheaper alternative fuels. For example, in FY2022-23, the consumption of alternate industrial fuels like furnace oil (FO), low sulfur heavy stock (LSHS), petcoke, and liquefied petroleum gas (LPG) increased due to relatively higher coal and LNG prices in the global market.



Source: IEEFA analysis of PPAC data.





Domestic Gas Price (Nomination Fields) Domestic Gas Price (Difficult Fields) Spot LNG Prices Domestic RLNG

Industrial output in India is expected to grow at 9% from FY2025 to FY2031, compared to 6% over the previous decade.⁷⁹ However, for key coal-consuming sectors like iron and steelmaking, growth may not result in higher gas and LNG demand because companies are likely to continue to rely on cheaper coal. The iron and steel sector consumed 2.58 exajoules of coal in FY2024, compared to just 0.05 exajoules of gas, of which less than half came from LNG.⁸⁰

Limited gas demand in an energy-intensive industry is mainly due to the technologies deployed. Roughly 65% of steel produced in India is made through coal-based blast furnace-basic oxygen furnace (BF-BOF) production, using coking coal as the primary reductant.⁸¹

Natural gas is commonly used in direct reduced iron (DRI) processes. However, in India, the world's largest DRI producer⁸², over 80% of the country's DRI capacity uses coal-based rotary kilns rather than natural gas. In 2023, only 19% of domestically produced DRI used natural gas, while 81% relied

Source: IEEFA's Domestic Gas Drives Industrial Consumption; PPAC's Report on Natural Gas Availability.

⁷⁹ Economic Times. India's economic growth pegged at 6.5% for FY26 despite Trump tariff threat: Crisil. 06 March 2025.

⁸⁰ IEEFA calculations.

⁸¹ Global Energy Monitor. <u>Why India's 'build now, decarbonize later' approach to achieving a net-zero steel industry will fail</u>. December 2024. Page 5.

⁸² In 2024, India produced 49.6 million tonnes, up from 36.8 million tonnes in 2019. World Steel Association. <u>World Steel in Figures</u> <u>2024</u>. January 2024.

on coal. This was primarily due to the abundance of relatively cheaper coal.⁸³ Moreover, gas-based DRI plants tend to have lower utilization rates compared to coal-based blast furnaces.⁸⁴

It appears unlikely that India will rely more heavily on natural gas for iron or steelmaking in the future. Proposed and under construction coal-based DRI and blast furnace capacity far exceeds plans for gas-based DRI technologies.⁸⁵ The government is also aiming to produce 25% of steel from ferrous scrap by 2028 and 50% by 2047, potentially reducing the need for DRI in domestic steel production.⁸⁶ Over the longer-term, the Indian government is exploring the potential to blend green hydrogen with natural gas in vertical shafts.

For other industries, where both coal and gas are used for heating purposes, coal-to-gas switching will depend on fuel prices and available infrastructure. Switching from coal to gas has been witnessed in some small to medium-scale industries like tea plantations when gas-based infrastructure is available. It is limited due to the volatility of gas prices, domestic gas availability, and slow build of LNG infrastructure like terminals and pipelines. The government's ambitious target for expanding the city gas distribution sector could enhance gas supply to small and medium-scale industries. As of February 2025, there are about 20,000 industrial PNG connections⁸⁷, up from about 10,000 in April 2020. Even with the necessary infrastructure, industries will remain sensitive to the price and availability of gas.

Studies indicate that electrification as a decarbonization pathway for industries would be more effective for emission reduction. According to an Ember report, "deploying advanced electrification technologies powered by renewable energy systems could reduce carbon dioxide (CO₂) emissions from India's heavy industries by 37% (737Mt) in 2050."⁸⁸ India could follow the European Union's (EU) example, which has shifted the majority of its industrial processes to electricity and biomass and implemented the EU Emission Trading Scheme (ETS) as an enabler.⁸⁹

⁸³ Sponge Iron Manufactures Association. <u>DRI Update</u>. 11 March 2024. Page 25.

⁸⁴ Global Energy Monitor. <u>Why India's 'build now, decarbonize later' approach to achieving a net-zero steel industry will fail</u>. December 2024. Page 6.

⁸⁵ Global Energy Monitor. Why India's 'build now, decarbonize later' approach to achieving a net-zero steel industry will fail. December 2024. Page 9.

⁸⁶ Fastmarkets. Four things we learned at the MRAI 2023 scrap conference in Kochi, India. 17 February 2023.

⁸⁷ PPAC. <u>Snapshot of India Oil and Gas Data</u>. February 2025.

⁸⁸ Ember. <u>Green Electrification of Indian industries for clean energy gains</u>. 26 June 2024.

⁸⁹ Ministry of Power. <u>Elements of Electrification Strategy for India</u>. May 2022.

Other Sectors

The previous sections have examined the prospect of coal-to-LNG switching in India's largest coalconsuming sectors, namely power generation, iron and steelmaking, and other industries. This section examines the prospect of LNG demand growth in sectors that do not consume large volumes of coal and are forecasted to be drivers of gas consumption in the country. These sectors include city gas and transportation, fertilizers, petrochemicals, and refineries.

Although India has set ambitious targets to expand the national gas grid, demand growth specifically for LNG, in contrast to cheaper domestic gas, will continue to face challenges related to the price sensitivities of end-users, competition with other energy alternatives, and efforts to contain high public subsidy burdens.

City Gas and Transportation

Over the past decade, gas consumption in the city gas distribution (CGD) sector has more than doubled, driven by supportive government policies and expanding infrastructure. India's CGD sector includes four categories: transportation, which relies on CNG, and residential, commercial, and small industrial segments, which use PNG. Transportation accounts for nearly two-thirds of gas demand in the city gas sector.

Recent forecasts, such as those from the IEA⁹⁰, suggest that the CGD sector will be one of the main drivers of India's gas demand through 2030, supported by ongoing infrastructure buildouts and economic development.

Gas consumption in the CGD sector has risen steadily. However, 90% of this growth since FY2016 has been met through domestically produced gas, rather than LNG.⁹¹ The government has implemented several policy measures to prioritize cheaper domestic gas supply to the transportation and residential sectors, aiming to boost gas usage in passenger vehicles and residential cooking.

Key initiatives include a 2014 policy mandating the maximum possible domestic gas allocation to these two segments⁹², a 2016 provision allocating up to 6,000 standard cubic meters (scm) per day to new CGD entities⁹³, the 2022 introduction of LNG pooling with a uniform base price for CGD⁹⁴, and



⁹⁰ IEA. India Gas Market Report. February 2025.

⁹¹ IEEFA analysis of PPAC data.

⁹² MoPNG. Revised Guidelines for allocation/supply of natural gas to CGD entities. 03 February 2014. Page 3.

⁹³ MoPNG. <u>Allocation of domestic gas to new CGD entities</u>. 08 June 2016.

⁹⁴ MoPNG. Guidelines for domestic gas supply to CNG and PNG of CGD. 06 May 2022.

a recent move to provide advanced allocations starting FY2025-26.⁹⁵ These policies have significantly improved the CGD sector's access to domestic gas.

Figure 17: Gas Consumption by CGD Sector Compared with Gas Prices



Source: IEEFA analysis of data from PPAC and Investing.com.

Priority gas supply to the CGD sector has been given from the price-administered nomination fields of the Oil and Natural Gas Corporation (ONGC). However, output from these fields is declining, leading to a gas allocation reduction of up to 20% to CGD entities from April 2025.⁹⁶ To safeguard the sector's interests, the government has allowed for pro-rata allocation of gas from new wells from the nomination fields, priced 20% higher, instead of the earlier auction-based procurement. Prices of regular domestic gas and new well gas are linked to the Indian Crude Basket with a ceiling of USD6.75/MMBtu (up from USD6.5/MMBtu till March 2024) on regular domestic gas.

The CGD sector is price-sensitive, with consumption linked to gas prices. As the CGD entities are allowed to pass through cost increases to consumers, higher dependence on more expensive gas sources, such as new well gas (currently at USD8/MMBtu) or LNG (around USD11/MMBtu), may negatively impact the outlook for the sector's gas demand. This could pose a serious concern as the production from existing nomination fields is declining rapidly. Figure 17 shows the inverse correlation of fuel price and consumption.



⁹⁵ PIB. <u>Government takes steps to ensure affordable domestic gas to CNG and PNG of CGD.</u> 18 April 2025.

⁹⁶ Economic Times. Govt cut cheaper APM gas supply to CNG retailers IGL, MGL, Adani Total Gas. 16 April 2025.

The rapid rise in infrastructure, which has doubled in the last five years, is expected to increase gas demand. However, the infrastructure buildout is likely to fall short of official targets, especially for the PNG segment, where current fulfillment is only 12.5% of the 120 million PNG connections target for 2032.

Moreover, gas demand from the CGD sector has not increased concurrently with infrastructure expansion. Between FY2020 and FY2024, CNG stations increased by 249% and PNG connections rose by 108%, but gas consumption by the CGD sector (which includes CNG and PNG) increased by just 24%. This suggests that additional distribution pipelines and CNG stations may face lower utilization rates as the infrastructure buildout outpaces demand growth.

Finally, the increasing prices of PNG may also deter the increase in piped gas uptake for cooking by families in the country. Figure 18 shows that CNG and PNG prices in Delhi have increased by roughly 67% since 2019. These prices could rise further with reduced gas production from old wells of domestic fields, increased dependence on imported gas, and proposed complete deregulation of domestic gas prices from January 2027.⁹⁷ It remains to be seen if the June price decline of APM gas to USD6.41/MMBtu, due to decline in oil prices, will have any impact on CNG and PNG prices.⁹⁸



Figure 18: Retail Prices of CNG (left axis) and PNG (right axis) in Delhi

Source: IEEFA analysis of Indraprastha Gas Limited data. Note: CNG prices are average prices for each year, while PNG prices are any one price per year (according to data availability).

⁹⁸ Economic Times. <u>Govt cuts APM gas price for first time in 2 years</u>. 1 June 2025.



⁹⁷ MoneyControl. Kirit Parikh committee recommended full deregulation of gas prices from January 2027. 30 November 2022.

In the transportation segment — which accounted for 60% of the CGD sector's gas consumption in FY2025 — India has reached roughly 40% of its target to build 18,300 CNG stations by 2032. CNG faces intense competition from the increasing penetration of electric vehicles (EVs) across all categories, presenting a potential stranded asset risk for newer stations due to insufficient demand. Figure 19 below shows annual increases in CNG vehicles and EVs during FY2018 and FY2025. There are many tailwinds to further EV uptake in the country, such as policy momentum with schemes like PM E-Drive, rapid infrastructure buildout, falling battery prices, and increasing consumer interest. Alternatively, CNG vehicles face constraints due to falling domestic gas output, rising retail prices (Figure 18) and the potential for further price increases because of increasing import dependence and domestic gas price deregulation.



Figure 19: EV and CNG Vehicle Registrations by Category in FY2018 and FY2025

Source: IEEFA analysis of Vahan Dashboard Data.

Therefore, increasing gas consumption in the transport sector faces several barriers. Stiff competition from EV penetration across segments is a significant challenge, especially with the price advantage of CNG slowly waning. Additionally, strong EV policies in different states could impact CNG vehicle sales. For example, the latest draft EV policy for Delhi is considering allowing only EV two-wheelers in the city after August 2026 and is proposing no new registrations for CNG three-wheelers from August 2025.⁹⁹

Institute for Energy Economics and Financial Analysis

⁹⁹ Times of India. <u>Only EV two-wheelers allowed in Delhi after Aug'26</u>. 09 April 2025.

The government of India has mandated replacing one-third of existing and new heavy-duty diesel trucks with LNG by 2030-2032.¹⁰⁰ LNG-fired heavy-duty vehicles have increased from just two units in FY2018 to 368 in FY2025. A recent IEEFA analysis shows that LNG uptake in the trucks segment may not be viable.¹⁰¹ Only 20 LNG dispensing stations have been established compared to the target of 1,000, hinting at sustainability concerns.

Fertilizers

The fertilizer sector accounted for 55% of LNG demand in India and almost 100% of LNG demand growth since FY2016. This is due to substantial fiscal subsidies shielding consumers from fuel cost increases. Natural gas is primarily used as a feedstock to make ammonia-based urea fertilizers, which are more heavily subsidized than others, leading to higher consumption. In FY2023, urea accounted for 68% of the country's total fertilizer production and received USD20 billion in subsidies compared to USD10.5 billion for non-urea alternatives.¹⁰² India is a net importer of urea but is aiming for self-sufficiency by 2032.¹⁰³

Figure 20: India's Urea Supply (left axis) and Sectoral Gas Demand (right axis)



Urea Production Urea Imports Domestic Gas LNG

Source: Ministry of Chemicals & Fertilizers' Annual Report 2023-24, PPAC

Higher demand for subsidized urea-based fertilizers has stimulated LNG consumption in the sector, even as domestic gas allocation for fertilizer production has fallen. In FY24, the fertilizer sector



¹⁰⁰ MoPNG. <u>Scheme for promotion of LNG based mobility</u>. September 2024.

¹⁰¹ IEEFA. Assessing the Viability of LNG Trucks for India's Clean Goals. April 2025.

¹⁰² Council on Energy, Environment and Water. <u>Economic Feasibility of Green Ammonia Use in India's Fertiliser Sector</u>. September 2024. Page 2.

¹⁰³ Ministry of External Affairs. Indian fertiliser industry aims for self-sufficiency by 2032. 28 May 2024.

consumed 21bcm of natural gas, 18bcm of which came from imported LNG. However, gas demand in the sector is not expected to grow significantly by 2030 for several reasons.

First, the growth of urea production may slow as there is only one new gas-based, conventional urea plant planned in India. Between 2019 and 2024, the country started two new urea plants and revived four idle plants, causing gas demand for fertilizer production to rise quickly. A new 1.27MTPA plant is planned in Assam state but is unlikely to come online until after 2030.^{104, 105} India also imported 7Mt of urea in FY2024, indicating that additional capacity may be necessary to meet the country's self-sufficiency goal. This could increase gas demand in the fertilizer sector.

However, the government is also focusing on reducing chemical fertilizer demand by increasing efficiency and promoting organic solutions. India's subsidy-driven approach has resulted in the overuse of chemical fertilizers, leading to environmental damage and a high public financial burden.¹⁰⁶ Due partly to the government's increasing focus on nano-urea and schemes to support organic fertilizers, urea demand remained flat in FY2024 and the FY2025 budget slashed fertilizer subsidies by 13%.^{107, 108}

In the longer term, gas use in the fertilizer sector will likely face increasing competition from hydrogen technologies. National targets aim for at least 5MTPA of green ammonia production capacity by 2030¹⁰⁹, with reportedly 5.8MTPA of projects under construction as of 2023.¹¹⁰

Petrochemicals

According to data from the Ministry of Chemicals and Fertilizers, India's demand for petrochemicals has grown 24% since FY2017, from 43.3Mt to 53.5Mt.¹¹¹ Forecasts suggest that the country will account for 10% of global petrochemicals growth through 2030¹¹², supported by industrialization, economic expansion, and government policies that encourage domestic investment.

However, as petrochemical demand has increased, demand for natural gas has declined (Figure 21). Total gas demand has fallen from 4.2bcm in FY2017 to 2.7bcm in FY2024, and LNG demand has dropped even more sharply. Ongoing volatility in LNG markets caused petrochemical producers to



¹⁰⁴ Independent Commodity Intelligence Services (ICIS). <u>India eyes new urea plant, hikes infrastructure capex, cuts taxes</u>. 03 February 2025.

¹⁰⁵ IEA. India Gas Market Report – Outlook to 2030. 12 February 2025. Page 36.

¹⁰⁶ Science Direct. Decarbonization of urea production in India and its impact on water withdrawal and costs: A cost optimization approach. 01 January 2025.

¹⁰⁷ Ministry of Chemicals & Fertilizers. <u>Annual Report 2023-24</u>. Date Accessed: 23 April 2025. Page 22.

¹⁰⁸ Money Control. <u>Budget 2024-25 lowers fertilizer subsidy allocation by 13% to Rs. 1.64 crore</u>. 01 February 2024.

¹⁰⁹ Ministry of New and Renewable Energy. <u>National Green Hydrogen Mission</u>. Date Accessed: 18 April 2025.

¹¹⁰ ET Energy. India set to add 5.8 million tonne of green ammonia manufacturing capacity. 02 November 2023.

¹¹¹ Ministry of Chemicals and Fertilizers. <u>Chemical and Petrochemical Statistics at a Glance – 2024</u>. Date Accessed: 18 April 2025. Pages 136-137.

¹¹² Kearney. <u>Riding India's petrochemicals wave</u>. 12 May 2020.

shift quickly away from imported gas in FY2023. Figure 21 shows that the sector's shift away from gas began much earlier, even during periods of relatively low prices in global LNG markets.





LNG Demand

Source: Ministry of Chemicals and Fertilizers' Chemical and Petrochemical Statistics at a Glance – 2024.

Petrochemical producers have relied heavily on ethane, natural gas liquids (NGLs), and refinery offgases for feedstocks. Reliance Industries, India's largest petrochemical producer, began using ethane at its crackers instead of gas in 2017 to boost profits¹¹³, and other petrochemical companies have followed suit.¹¹⁴ Reliance has stated a goal to eliminate dependence on LNG imports for petrochemical production.^{115, 116}

Several companies, including the ONGC, have recently pursued investments in very large ethane carriers (VLECs).¹¹⁷ Moreover, a recently renegotiated LNG purchase contract with Qatar Energy will only supply lean gas, which has been stripped of ethane and propane, starting in 2028.¹¹⁸ As a result, ONGC intends to purchase ethane separately for its petrochemical operations. These developments suggest that despite the growing role of petrochemicals in the Indian economy, LNG demand in the sector may continue to decline.

¹¹⁸ Construction World. ONGC to Import Ethane from 2028 Amid Qatar LNG Shift. 26 March 2025.



¹¹³ Reuters. <u>Reliance to boost profit, naphtha exports by using ethane</u>. 23 August 2017.

¹¹⁴ Economic Times. <u>GAIL imitates Reliance with US ethane plans</u>. 19 February 2023.

¹¹⁵ Argus. Indian imports of US ethane for petchems to expand. 07 June 2023.

¹¹⁶ Reliance Industries Limited. <u>4Q FY23 Financial Results Presentation</u>. 21 April 2023. Page 65.

¹¹⁷ Reuters. India ONGC plans foray into ethane carrier business, seeks partner. 19 February 2025.

Refineries

India has the fourth-largest refining capacity in the world and is widely considered to be one of the last major growth markets for the global oil refining industry.^{119, 120} Over the last decade, the country's refining capacity has increased 20% from 215MTPA to 257MTPA¹²¹, and is expected to grow by an additional 53MTPA (1.026 million barrels per day) through 2030.

However, like the petrochemical sector, natural gas demand in India's refining sector has not increased consistently with the growth in refinery capacity. Natural gas is typically used in oil refineries for process heat, electricity, and hydrogen production, but India's price-sensitive refineries often switch to cheaper petroleum-based fuels when natural gas prices approach around USD10/MMBtu. Consequently, sectoral demand for LNG plummeted from 6.7bcm in FY2020 to 2.44bcm in FY2023 following prolonged instability in global gas markets. In contrast, consumption of domestically produced gas has increased steadily since FY2016 (Figure 22).



Figure 22: Refinery Capacity vs. Sectoral Gas and LNG Demand

Source: IEEFA analysis based on PPAC data.

Increases in refinery capacity and the gas grid extension to unconnected refineries are likely to drive higher gas demand. However, demand growth may be slow and uneven, particularly for LNG. Given the expected delays for refinery projects, challenges for gas grid expansion, and ongoing volatility in



¹¹⁹ Bloomberg. <u>The World's Last Wave of Oil Refining Bets Is All About India</u>. 31 January 2024.

¹²⁰ RBN Energy. Running on Empty - Global Refining Capacity Expected to Grow at Slowest Pace in 30 Years. 21 February 2025.

¹²¹ PPAC. Installed Refining Capacity. Date Accessed: 22 April 2025.

LNG markets, IEEFA expects sectoral demand in 2030 to only grow slightly beyond previous highs in FY2021.

Conclusion

Although LNG producers frequently cite the potential for coal displacement in India to justify new investments in liquefaction projects, evidence from the country's largest coal-consuming sectors does not support this claim. In the power sector, which accounts for 70% of India's coal consumption, gas-fired generation has fallen to less than 2% of the generation mix. Rather than turning to LNG as a "bridge fuel" to reduce coal-fired electricity, the country does not plan to build new gas-fired power capacity through 2032 and is instead leapfrogging to cheaper forms of renewable energy. Although natural gas plants continue to be used for peaking power, their role may be usurped in the near future by other forms of grid flexibility, such as battery storage, coal flexibilization, and demand-side management.

In non-power industries, LNG demand has only grown significantly in the fertilizer sector since FY2016, supported by large government subsidies that prevent volatile fuel costs from being passed through to consumers. LNG demand has declined over the same period in some energy-intensive sectors, like petrochemicals and refineries. Effectively, LNG demand growth in sectors that do not receive significant subsidies has yet to materialize.

Bullish forecasts for India's LNG demand growth will require a substantial change from trends observed over the past decade. Rather than simply using LNG to fill in gaps between domestic production and future demand, consumers may use cheaper fuels, leading to low utilization rates for additional gas infrastructure. To date, capacity utilization for India's gas-fired power plants, LNG import terminals, and gas transmission pipelines has remained low. Increasing dependence on more expensive imported LNG may not raise these utilization rates, especially as more cost-competitive alternatives emerge, such as electric vehicles in transportation.



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