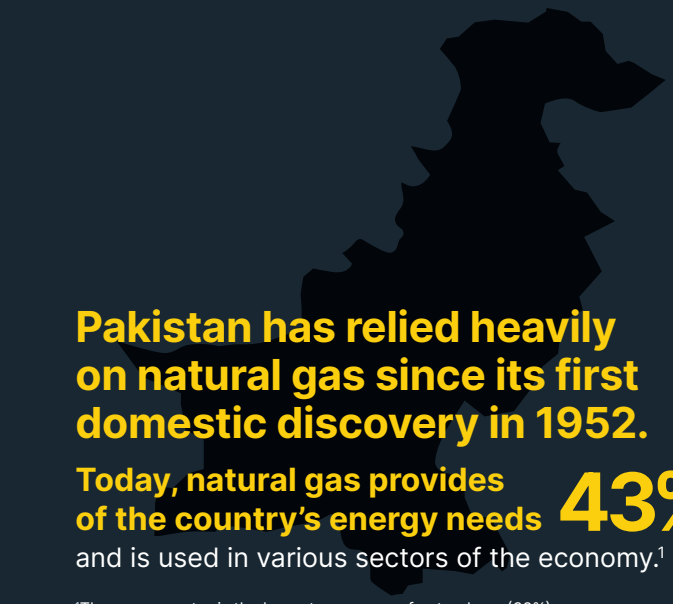
Institute for Energy Economics and Financial Analysis

Fact Sheet

LNG in Pakistan is not cheap, reliable, or clean

Debunking common myths about LNG in Pakistan



Pakistan has relied heavily on natural gas since its first domestic discovery in 1952.

Today, natural gas provides 43% of the country's energy needs and is used in various sectors of the economy.[1]

[1]The power sector is the largest consumer of natural gas (32%), followed by the residential (24%), industrial (19%), and fertilizer (19%) sectors.

However, domestic natural gas supplies are rapidly declining.

At current rates of production, the country has less than 13 years of natural gas reserves remaining. As a result, energy sector planners have turned to liquefied natural gas (LNG) as a replacement fuel.

In Pakistan, however, the opposite is true.

LNG is cheap.

Imported LNG costs have recently been up to 8x more expensive than domestically produced gas.

LNG is reliable.

Suppliers have not delivered contractually obligated cargoes at least 11 times in the last two years, often leaving the country without fuel or power.

LNG is clean.

Pakistan's gas network leaks huge volumes of methane, a compound more than 87x more harmful to the climate than CO_2.

Since the country began importing LNG in 2015, plans to expand LNG dependence have turned into an economic and energy security disaster.

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LNG imports in Pakistan have created a huge financial burden on the energy sector and the economy

As more LNG is injected into the gas system, problems surrounding financial sustainability, energy security, and environmental degradation are likely to get worse.

Solutions to these problems may not be simple given the complexity and interconnectedness of Pakistan's gas sector issues. Problems cannot be solved overnight. However, the country can take a range of actions in the near, medium, and long-term to mitigate the unsustainable growth of LNG demand.

What is liquefied natural gas (LNG)?

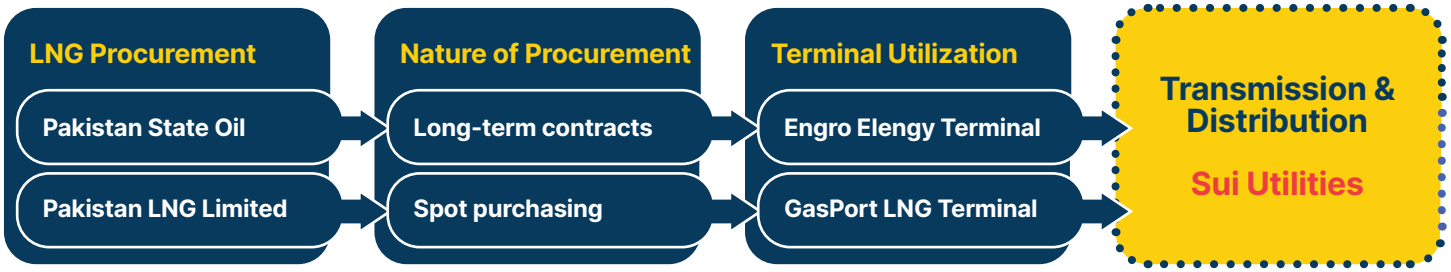
Natural gas is a fossil fuel produced from drilling. Liquefied natural gas is a form of natural gas that has been supercooled to -162°C, changing it into a liquid form. This allows it to be loaded onto an LNG carrier and shipped around the world. LNG is then converted back into a gaseous state via a regasification terminal and transported through pipelines to end-users.

Recent LNG Developments in Pakistan

Pakistan began importing LNG in 2015. Imports reached 7.4 million tons in 2020, and the government expects LNG demand to grow rapidly. The share of RLNG in the country's total gas demand has risen to 26% in FY2020, up from just under 8% in FY2016.

There are now two existing regasification terminals, both located in Port Qasim: (1) An offshore terminal owned by Engro Elengy, with a capacity to import 4.8 million tons of LNG per annum (mtpa);[2] (2) An offshore terminal owned by Pakistan GasPort Consortium Ltd. with a 5-mtpa capacity.

The main players in the LNG supply chain in Pakistan include:



There are also at least 4 major proposed LNG terminal projects under development.

Project Name	Location	Capacity (mmcfd)	Developer	Cost (US$m)
Tabeer LNG	Jhari Creek, Port Qasim	750-1,000	Tabeer Energy Private Ltd. (Mitsubishi subsidiary)	300
Energas LNG	Chara Creek, Port Qasim	750-1,000	Energas Consortium; Qatar Petroleum	180
Daewoo Gas Terminal	Karachi	356	Daewoo Gas and CNCEC	300
Easy LNG Terminal	Karachi	50-60	LNG Easy Pvt. Ltd.	200

[2]The project cost US$133.3 million, with US$20 million in financing provided by the International Finance Corporation (IFC) and US$30 million from the Asian Development Bank (ADB).

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MYTH 1:

LNG in Pakistan is Cheap

Fact: LNG in Pakistan has recently been 8x more expensive than domestically-produced gas.

The average price of domestically produced gas in Pakistan is between **US$3.50-4.00 per MMBtu.**[3]

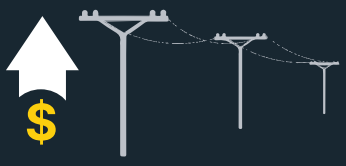
In recent tenders, Pakistan paid ~ **US$30/MMBtu** for LNG.

At that price, one cargo costs US$99 million. Pakistan buys 44% of its LNG on a short-term basis from the international spot market.

Along with spot purchases, Pakistan buys LNG via long-term contracts, and prices are linked to global oil prices.[4] Recently, LNG under long-term contracts has been expensive due to high global oil prices.

The weighted average cost of LNG delivered to Pakistan has reached US$16/MMBtu.

In contrast to high LNG prices, recent auctions for renewable energy projects elsewhere in Asia have **yielded prices as low as US$38/MWh.**



When LNG is used to generate power, a cost of US$25/MMBtu can translate to a power price of US$300 per megawatt-hour (MWh) for just the fuel alone. This does not include the cost of building the LNG-fired power plant.

This is already 4x the annual average price of power in Pakistan of US$75.4/MWh.[5]

Global LNG prices are extremely volatile. After the Russian invasion of Ukraine on February 24, 2022, prices jumped to US$59/MMBtu.

Many expect prices to remain high and volatile until the middle of the decade.

[3]To put this unit into perspective, a household using a single stove is likely to consume 2 MMBtu per month.
[4]56% of Pakistan's LNG supplies are delivered under long-term contracts, which are negotiated with suppliers and specify a pre-determined price formula and quantity, among other details.
[5]International Energy Agency (IEA). Annual average price of electricity in Pakistan, 2019-2025. September 30, 2021.
[6]Cross subsidization is the practice of charging higher prices to one consumer category to keep prices low for another consumer category.

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MYTH 1 (continued):

LNG in Pakistan is Cheap

Fact: LNG in Pakistan has recently been 8x more expensive than domestically-produced gas.

High LNG prices create huge financial problems for the gas system for several reasons:

1. A high share of gas is leaked and therefore cannot be sold;
2. Cross-subsidies are insufficient to recoup LNG costs;[6]
3. Politically motivated decisions to keep gas prices low create large government subsidy burdens.

Since LNG imports began in 2015, gas sector circular debt—which describes a buildup of non-payments throughout the supply chain—has skyrocketed to US$3.5 billion (PKR 650 billion), with some estimates as high as US$7.5 billion (PKR 1.5 trillion).

IEEFA estimates that growing LNG imports in Pakistan could raise the country's LNG import bill to more than US$32 billion by FY2030, up from just over US$5 billion in FY2021.

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MYTH 2:

LNG in Pakistan is reliable

Fact: LNG suppliers to Pakistan have defaulted on cargoes at least 11 times in the last two years, exacerbating fuel and power shortages.

Pakistan has four long-term contracts with global LNG suppliers. These contracts are linked at a certain percentage to the international oil price.

Since 2021, Italian international oil major Eni has defaulted on four cargoes it was required to deliver under its long-term contract with Pakistan. Similarly, international commodity trading house Gunvor has defaulted on seven cargoes to Pakistan since 2021.

While the reasons for non-delivery are unclear, there is intense speculation in local media that suppliers defaulted on deliveries to realize higher profits in markets elsewhere. This speculation is unconfirmed, since neither company has publicly responded to allegations.

In December 2021, textile mills in Punjab were forced to close due to gas shortages caused by LNG supplier defaults and the government's inability to procure emergency cargoes. **As a result, exports worth US$250 million—or 20% of the entire sector's annual revenue—were lost.**

Defaults by suppliers have exacerbated gas shortages in the country. The government has been forced to ration gas, cutting supplies to key economic sectors. **As a result of fuel shortages, in April 2022, about 3.5 GW of power capacity had been offline since December 2021.**

It is unclear whether penalties were imposed on defaulting suppliers. According to a senior official at the Energy Ministry, **"Gunvor sought force majeure for every time to avoid the penalty."**[7,8]

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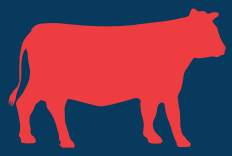
MYTH 3:

LNG in Pakistan is clean and environmentally friendly

Fact: Natural gas contains methane, a potent greenhouse gas (GHG), while LNG developments have negative impacts on natural ecosystems and indigenous communities.

Natural gas emits less carbon dioxide (CO_2) than coal. However, methane (CH_4), the main component of natural gas, is 87x more harmful for the climate than CO_2 over a 20-year period. **Methane emissions are responsible for approximately 30% of observed global warming to date.**



Pakistan is **among the ten largest emitters of methane worldwide. One quarter** of the country's total GHG emissions are methane. The agricultural sector is the largest source of methane emissions in Pakistan.

Methane is also emitted and leaked during the production and transportation of coal, natural gas, and oil. The shipment and importation of LNG can add to the **life-cycle GHG emissions** of natural gas.

Existing and proposed LNG terminals in Pakistan are located in environmentally sensitive areas. **LNG-related activities in Port Qasim, for example, have caused the removal and deterioration of mangrove forests.** Coastal communities dependent on the natural ecosystem may face hardships due to poorer fishing conditions, increased water pollution, and displacement of mud and waste.

Rather than a "bridge fuel," **LNG requires long-term investments that lock-in dependence on imported fossil fuels and GHG emissions,** inhibiting the transition to cleaner energy sources.

Pakistan's gas network has significantly more leakages than other countries.
In FY2019-20, gas losses, known as unaccounted for gas (UFG), reached 17% and 12% on Sui Southern and Sui Northern gas networks, respectively. These levels far exceed international norms of 2% gas losses.

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Recommendations for Stakeholders in Pakistan's LNG Value Chain

- Focus on energy demand, not supply, by rapidly scaling up energy efficiency programs and rationalizing tariffs. These will help ensure gas supply is used more efficiently, and reduce the need for more expensive LNG.
- Reform gas distribution company revenue regulations through performance-based mechanisms. A reformed approach to gas sector regulation can help discourage gas leakage and encourage maintenance of the existing network.
- Improve how LNG is purchased from global markets. A greater emphasis on LNG procurement planning can encourage the country's energy security and ability to flexibly respond to market changes. Reforming tender processes for LNG can also help reduce procurement timelines.
- Maximize utilization of existing LNG terminals before constructing new ones.
- Reduce gas demand in the power sector by accelerating new utility-scale and behind-the-meter renewable energy generation and battery storage projects.
- Begin to transition non-power sectors from gas/LNG reliance to alternative energy sources, such as biogas and hydrogen.

  These may take time to research and develop, but it is critical to lay the groundwork now for a favorable investment environment and sustainable growth.