

Overview

Natural gas is a source of energy already used for various functions, from heating our homes and businesses to cooking and transportation. It is also an industrial heat source for a wide range of manufacturing and a critical building block for other complex chemicals. Liquified natural gas (LNG) is natural gas that has been cooled to a liquid state, to about -260° Fahrenheit, for shipping and storage. This process significantly reduces its volume, making storing and transporting over long distances easier and more economical. This liquefaction process, developed in the 19th century, makes it possible to transport natural gas to places natural gas pipelines do not reach and to use natural gas as a transportation fuel. The process reduces it to 1/600th of its original un-liquified volume and half the weight of water. LNG is valued for being a cleaner-burning fossil fuel, producing fewer emissions than coal and oil, and plays a significant role in global energy markets by enhancing energy security and providing a versatile energy source.

Where natural gas pipelines are not feasible or do not exist, liquefying natural gas is a way to move natural gas from producing regions to markets, such as to and from the United States and other countries. As the world moves towards net zero carbon emissions and renewable energy sources, LNG may be a clean fossil fuel to help transition to a lower carbon future. In this Basic, we will look at the ways LNG is transported, how the U.S. uses LNG, and recent legislation that has impacted it.

LNG Transportation

LNG is transported through a specialized process designed to maintain its low temperature and liquid state, ensuring safety and efficiency. The preferred way of transporting LNG is through insulated pipelines. The pipeline infrastructure moves the LNG from liquefaction facilities to storage facilities, tankers, regasification plants, and possibly export facilities, depending on whether it will be used locally or abroad. Because LNG exports predominantly occur at an intercontinental level, specially designed LNG carriers transport the substance between export and import terminals. These mainly consist of ships and large vessels such as an LNG tanker, which can carry four or five LNG storage tanks simultaneously. These tanks are temperature-controlled and capable of withstanding extremely high pressure. They have advanced safety systems to handle potential hazards, including gas detection systems, emergency shutdown systems, and sophisticated navigation equipment. For shorter distances, LNG can also be transported by specially designed LNG tanker trucks with insulated cryogenic tanks and transported by rail in cryogenic tank cars.

Once an LNG tanker arrives at an import terminal, the LNG is transferred to large storage tanks. After it is compressed, vaporized, and fed into the local gas transmission grid, the LNG can be loaded on trailers and international standard tank containers for distribution to areas that don't have access to the grid. While only a tiny portion of LNG is transported on the road at this time, the demand for this form of distribution is growing.

Center Forward Basics

Center Forward brings together members of Congress, not-for profits, academic experts, trade associations, corporations and unions to find common ground. Our mission: to give centrist allies the information they need to craft common sense solutions, and provide those allies the support they need to turn those ideas into results.

In order to meet our challenges we need to put aside the partisan bickering that has gridlocked Washington and come together to find common sense solutions.

For more information, please visit www.center-forward.org

U.S. LNG

The U.S. is the largest producer and exporter of natural gas, which is shipped via pipeline to Canada and Mexico and exported globally as LNG. LNG facilities undergo a rigorous approval process at three federal agencies, depending upon whether the plants will be built for export: the Federal Energy Regulatory Commission (FERC), the Pipeline and Hazardous Materials Safety Administration (PHMSA) and the Department of Energy (DOE). The FERC and PHMSA approve the physical infrastructure of the facility. If plans for a facility include LNG exports to non-Free Trade Agreement (FTA) countries, it must apply to the DOE for an export license. The DOE will approve the application if it determines that the project and its exports are in the public interest. According to the Energy Information Administration, U.S. natural gas production has nearly doubled since 2005, which has significantly changed both the U.S. energy mix as well as global energy markets. Exports of U.S. LNG have grown to 11.9 billion cubic feet per day in 2023, a substantial jump since starting with the first export facility in the lower 48 states coming online in 2016.

In March 2022, President Biden and European Commission President Ursula von der Leyen announced a joint Task Force to address Europe's dependence on Russian energy, which included a focus on increasing US LNG volumes for the EU market. Europe was the primary destination for U.S. LNG in 2023, accounting for 66% of U.S. exports. As a result of the ability to export, U.S. production expanded to meet both global demand and U.S. natural gas production continues to exceed U.S. consumption. In 2023, U.S. domestic consumption of natural gas set a new record of 89.1 billion cubic feet per day, primarily driven by the continued growth of natural gas in the electric power sector, as natural gas replaces retiring coal-fired power generation. Coal-to-gas switching in the power sector is the leading contributor to U.S. emissions reductions over the last two decades. In the future, natural gas use in power will be an important tool in displacing higher emissions alternatives globally.

The U.S. has successfully reduced its carbon emissions largely through coal to gas switching in the power sector. U.S. LNG exports can help other countries achieve the same results by alleviating energy poverty in the parts of the world that lack access to low-cost energy supplies and providing the flexibility to switch to more reliable shippers or avoid geopolitically sensitive markets.

Getting to Net Zero

LNG is part of addressing the problem of balancing three critical energy needs: affordability, security of supply, and reducing carbon emissions to net zero. Despite these challenges, LNG is considered an improvement over other fossil fuels like coal and oil. The combination of natural gas and renewables is ideal, because while wind and solar provide emissions benefits, LNG is intermittent. Natural gas improves the flexibility of renewable assets and expands their potential usage by serving as a reliable base load fuel, ramping up when the wind slows, or the sun isn't shining. With the right policies and market incentives, the existing natural gas transmission infrastructure has the potential to be used for emerging energy options and new natural gas transportation infrastructures. Consequently, some governments advocate for LNG as a preferable alternative during the transition to a lower carbon future.

Natural gas emits significantly fewer pollutants than coal power generation. Still, mitigating methane emissions from LNG can further improve its benefits. Many oil and gas producers are working to address unintended methane leaks that can make their way into the atmosphere during production, storage and transportation. Methane emissions can be reduced by deploying the latest monitoring and leak detection technologies, upgrading equipment and facilities and investing in best practices, like reducing routine flaring and venting. Additionally, independent third parties have developed rigorous criteria by which producers can receive certification for their methane emissions management.

Fuel poverty is a real problem, so providing affordable energy is critical. Access to a variety of supplies can lower prices and provide the flexibility to switch to more reliable shippers or avoid geopolitically sensitive markets.

Recent Legislation

Recent legislation concerning LNG in the United States reflects a contentious balance between energy security, economic interests, and environmental considerations. In January of 2024, the Administration announced it would temporarily pause its consideration of DOE LNG export license applications pending a review and update of the economic and environmental analyses it uses to determine whether the applications are in the public interest, with a particular focus on the climate impacts of exports. In response to the pause, the House of Representatives considered and passed H.R. 7176, the Unlocking Our Domestic LNG Potential Act of 2024. This bill aims to reverse President Biden's ban on LNG exports to non-Free Trade Agreement countries and underscores LNG's potential for reducing energy costs and enhancing U.S. energy security. It mandates the Federal Energy Regulatory Commission be the sole authority for approving LNG facility operations, overriding previous restrictions based on climate impact considerations. The bill would reverse the pause and place sole permitting authority for the siting, construction, expansion, operation, as well as exports to non-FTA countries with the FERC. The bill passed with bipartisan support 224 – 200.

The Biden Administration's recent pause on LNG export approvals is under scrutiny as this suspension aims to evaluate the climate impacts of LNG exports more thoroughly, reflecting the administration's commitment to addressing climate change. The Senate Committee on Energy and Natural Resources has conducted hearings to examine this pause and the Department of Energy's procedures for LNG export applications. Additionally, the Pipeline and Hazardous Materials Safety Administration has proposed new methane leak detection and repair requirements for LNG facilities. These measures are intended to reduce methane emissions during operations, addressing environmental concerns and operational safety. The proposed regulations include enhanced reporting and record-keeping of methane leaks, as well as updated procedures for minimizing vented emissions during various operational processes.

These legislative and regulatory efforts reflect the ongoing debate over the role of LNG in the U.S. energy landscape, balancing the need for economic growth and energy security with the urgent need to lessen environmental impacts.

Links to Other Resources

- AXPC - [American Energy](#)
- AXPC - [Energy Exports](#)
- Just Energy - [Liquefied Natural Gas \(LNG\): What It Is and Why We Use It](#)
- National Grid - [What is liquefied natural gas? | LNG explained | National Grid Group](#)
- The White House - [Biden-Harris Administration Announces Pause on LNG Exports](#)
- U.S. Energy Information Administration - [Liquefied natural gas - U.S. Energy Information Administration \(EIA\)](#)