



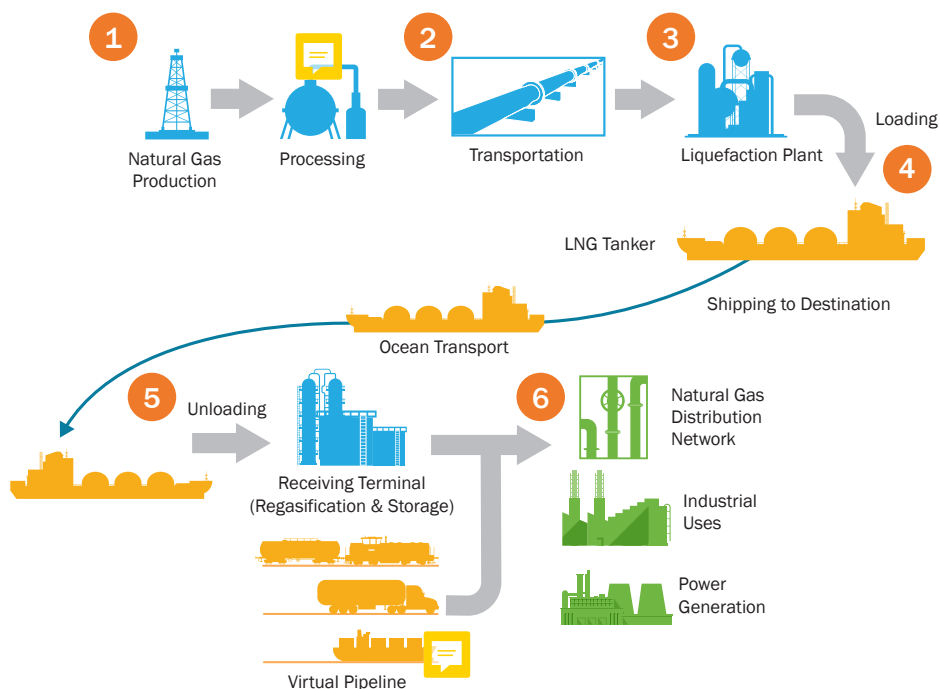
# Liquefied Natural Gas Value Chain

## Background

Natural gas consists almost entirely of methane (CH<sub>4</sub>), the simplest hydrocarbon compound. Liquefied natural gas, or LNG, is **natural gas that has been treated and super-cooled to a liquid form**, which makes it much easier to store and transport long distances when pipeline transport is infeasible or uneconomic. This flexibility enables the **export of natural gas as LNG to energy markets overseas** through the use of LNG tankers and terminals.

## LNG Value Chain

The LNG Value Chain, described below, encompasses the **production, processing, and conversion of natural gas to LNG**, its **long-distance transportation**, and **regasification**, as it travels from the wellhead to end-users.



1. Natural gas is **extracted from subsurface reservoirs and transported in small pipelines, often referred to as a gathering system, to processing facilities** for removal of impurities and natural gas liquids. **Extracted natural gas can contain non-hydrocarbons**, including hydrogen sulfide, nitrogen, carbon dioxide, and water. Natural gas liquids, like propane or butane, are also extracted and sold separately.
2. Processed natural gas is **transported to the liquefaction plant via pipelines**. The feed gas into liquefaction facilities must be **clean, dry, and free of impurities** before liquefaction can take place.
3. At the liquefaction plant, **purified natural gas is converted to a liquid state** by chilling it to about -260

degrees Fahrenheit (-162 degrees Celsius), **reducing its volume by 600 times**. LNG is a clear, colorless, and non-toxic liquid, which is stored in large cryogenic tanks until it's loaded into an LNG tanker.

4. LNG is pumped from storage tanks into **specially designed doublehulled tankers for shipment around the world**. Vessels used for U.S. exports typically have a carrying capacity between about 3.0 and 3.7 billion cubic feet (Bcf) of natural gas (or about 62,000 and 77,000 metric tons of LNG). For context, a typical U.S. tanker carrying the equivalent of 3.5 Bcf of natural gas could support the daily natural gas needs of Spain.
5. When the tanker arrives at its destination, LNG is **unloaded at the terminal and stored in cryogenic tanks**.

LNG is subsequently **transferred to**

**a regasification plant**, where it is heated and allowed to **expand back into its original gaseous state**, for delivery into the natural gas pipeline system. **A distinctive odor can be added to gas for safety**, so people can detect leaks during its delivery and use. Alternatively, a portion of the LNG delivered can be put into smaller containers and loaded onto trucks, barges, or rail cars that act as a virtual pipeline to deliver LNG to more remote areas not served by traditional underground pipelines.

6. Natural gas can be **transported via large diameter transmission pipelines** to local distribution networks of pipelines for delivery to residential consumers, businesses, industrial facilities, and power generation plants.