

Position paper

# **The relevance of LNG in terms of security of supply and achieving climate targets in Germany**

Berlin, December 2024

## Executive Summary

Security of supply and the achievement of climate targets are at the heart of German energy policy. Liquefied natural gas (LNG) plays a crucial role in this, especially against the backdrop of geopolitical uncertainties and the energy transition. LNG enables a diversification of energy sources, the flexible import of natural gas and offers a transitional solution for the integration of renewable energies. Since 2022, Germany has made significant progress in expanding its LNG infrastructure, which not only reduces dependence on individual suppliers, but can also be used in the long term to import new gases such as biomethane, hydrogen and its derivatives.

The global LNG market is growing, but is influenced by geopolitical tensions and competition for supply volumes. The expansion of new and the use of existing LNG capacities increases the resilience of the energy system and stabilizes gas prices, a crucial prerequisite for the competitiveness of German industry, which is heavily dependent on natural gas.

In the transition phase to a fully renewable energy supply, LNG is helping to reduce greenhouse gas emissions and integrate renewable energies. Political measures such as the LNG Acceleration Act and the promotion of green energy hubs are laying the foundations for a sustainable energy transition.

### Political recommendations for action

- **Acceleration, harmonization and facilitation of licenses and permits for projects to implement import capacities for LNG and new gases and ensuring a continued stable legal framework**
- **Continuation of the expansion of LNG infrastructures, taking into account the possibility of conversion for new gases (also for existing floating terminals where possible)**
- **Sufficient strengthening and consideration of the role of local midstream companies with trading houses in Germany**
- **Equivalent promotion of exempted and regulated LNG infrastructure projects or infrastructure for new gases**
- **Enter into international cooperation to strengthen the global supply chain for LNG and, in the future, new gases**
- **Supporting German buyers in concluding long-term LNG contracts, which in turn guarantee the security of supply and base load supply of German terminals**

## Introduction

Energy supply security is of key importance for Germany, particularly in view of the current geopolitical challenges and the energy transition towards renewable energies. Liquefied natural gas (LNG) has proven to be an important bridge in the transition phase to a climate-neutral energy future.

LNG is natural gas that is cooled down to around  $-162^{\circ}\text{C}$  and thus liquefied. Liquefaction technology was developed back in the 19th century by the British chemist and physicist Michael Faraday. The first liquefaction plant was built in the USA in 1917. LNG was also used commercially there for the first time in 1941. The global LNG trade took off in the 1960s and 70s, when the LNG business became profitable despite the costs of liquefaction, transportation and regasification (i.e. the conversion back into a gaseous state). For a long time, the price of gas was also linked to the price of oil. This price peg was abandoned in 2010. Since then, the gas price has been developing independently and the price-dampening effects of LNG are becoming clearer.

The development of the German LNG infrastructure has become considerably more important in recent years, particularly against the backdrop of the Russian war of aggression against Ukraine and the subsequent end of Russian pipeline gas supplies to Germany. LNG offers an opportunity to import natural gas flexibly and in significant quantities in order to react to fluctuations in pipeline supplies and fluctuations resulting from the green transformation process. This increases security of supply, diversifies energy sources and provides a bridge to a more climate-friendly energy supply with new gases such as biomethane, hydrogen and its derivatives.

## An LNG import infrastructure for Germany

### LNG import terminals

The central building blocks of the new German LNG infrastructure are the import terminals. These terminals are designed to receive LNG tankers, store the liquefied natural gas, regasify it and finally feed it into the gas grid. Operations began at Germany's first LNG terminal in Wilhelmshaven at the end of 2022, followed by other terminals at Lubmin (which has since been relocated to the industrial port of Mukran), Stade and Brunsbüttel. LNG offers great advantages in the short term, as it can be transported worldwide and thus enables trade with international partners who are unable to transport gas to Germany via pipelines. The development of its own pipeline-independent infrastructure for gas opens up new sources of supply for Germany and secures the high level of supply of natural gas and new gases.

In addition to ensuring security of supply and moving away from Russian pipeline gas, floating and land-based LNG terminals can play a key role in Europe's transition to renewable and low-carbon energy. They can accommodate bio-LNG and synthetic LNG, two energy solutions that enable immediate high greenhouse gas emission reductions with minimal adaptation costs.

As a result of the future (and legally stipulated) rededication of LNG terminals and existing infrastructure, as well as the construction of new infrastructure, the terminals will also be

able to handle hydrogen derivatives (e.g. ammonia), liquefied hydrogen and captured CO<sub>2</sub> (see e.g. Lubmin H<sub>2</sub> import terminal<sup>1</sup>). As hybrid hubs for different molecules, they enable a gradual, cost-efficient and safe energy transition.

Import capacities for LNG are of great importance for the German energy supply. With the LNG Acceleration Act (LNGG) 2022, the German government emphasized this and focused on a fast approval phase for LNG terminals in order to drive forward the expansion of its own LNG infrastructure. The German government has currently leased five floating LNG terminals (FSRU). The first went into operation in Wilhelmshaven at the turn of 2022/2023. Further terminals, including some financed by the private sector, followed in 2023 in Brunsbüttel and Lubmin (relocated to Mukran in July 2024). Further FSRUs are scheduled to go into operation in Stade in 2024 and a second one in Wilhelmshaven. The terminals are expected to have a total capacity of 30 billion m<sup>3</sup> of natural gas per year. Further LNG projects are also planned. These include stationary terminals, at least three of which are currently in an advanced project phase.

The annual capacity of a stationary terminal could be up to 20 billion m<sup>3</sup>. The German government is also supporting the realization with financial resources and is participating in the planned LNG terminal in Brunsbüttel with a 50 percent share via KfW, for example, and is funding the construction of a jetty in Stade, which is currently being used for an FSRU. The jetty is to be leased to the stationary LNG terminal from 2027.

The floating LNG terminals are important for securing gas supplies in the short term in the event of a crisis. In the long term, the focus will shift to LNG terminals that offer a solution for the required imports of hydrogen-based energy sources. This is the case for land-based terminals, but conversion options are also emerging for some floating terminals. In the course of the transformation to new gases such as hydrogen and its derivatives, for example ammonia, the terminals will play a central role as green energy hubs in the supply of green energy in the future. Green energy hubs will be an important starting point for clean, safe, affordable and available sustainable energy in Germany and Europe and at the same time become a catalyst for the circular carbon economy.

In the past, Germany has imported up to 55 billion m<sup>3</sup> of natural gas per year from Russia, which must be compensated for. The corresponding LNG terminals/feed points are therefore needed on both the North Sea and the Baltic Sea. The three terminals are very well utilized in view of the given conditions. The assessment benchmark for capacity utilization is not the technically possible capacity utilization, but the capacity utilization that can realistically be achieved under the given conditions. This is because the tank storage ships for the regasification of LNG cannot provide their maximum capacity 365 days a year. Their operation is largely dependent on the weather, regular service intervals and the specific location. Last but not least, the terminals are required in particular for peak loads and as a reserve for supply bottlenecks.<sup>2</sup>

## Overview of the global LNG market: supply and demand dynamics

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<sup>1</sup> Deutsche ReGas, [H<sub>2</sub>-Import-Terminal Lubmin](#) (2024)

<sup>2</sup> Zukunft Gas, [LNG-Terminals in Deutschland](#) (2024)

The global LNG market is in a crucial phase, currently characterized by moderate growth and dynamic shifts due to geopolitical and economic changes. The number of importing countries rose to 48, while the number of exporting countries remained constant at 20. The LNG market recorded moderate demand growth of 2.1% to 545 bcm, a slowdown compared to the growth of 5.6% in 2022. This growth was mainly driven by the LNG markets in Asia (+9.5 billion m<sup>3</sup>/+2.8%) and the Americas (+1.7 billion m<sup>3</sup>/+10.6%), while demand in Europe remained stable at 164 billion m<sup>3</sup>.<sup>3</sup>

European LNG imports have stabilized, with Germany and the Netherlands expanding their regasification capacities, leading to a significant increase in imports. However, other European countries such as France and the United Kingdom, which had increased their imports in 2022 due to the decline in Russian pipeline gas, recorded a decline in 2023. The LNG market is expected to grow massively by the end of the decade. Its attractiveness will be crucial to ensuring energy security in the coming years as competition increases with the growing demand for LNG in the emerging Asian and American economies.

## Increasing security of supply through LNG

### LNG enables strong diversification of energy sources

The rapid development of the German LNG infrastructure was able to compensate for the loss of Russian pipeline imports amounting to 55 billion m<sup>3</sup> per year. Securing a sufficient quantity of LNG remains a challenge, especially in the long term, in view of global competition, particularly from Asia. The origin of the LNG delivery volumes that reached Germany between 01.01.2023 and 22.10.2024 is as follows 87% of LNG deliveries came from the USA, 4% from Angola, 4% from Norway, 2% from Trinidad and Tobago, 2% from Egypt and 1% from the United Arab Emirates.<sup>4</sup> Further LNG reached Germany in the form of pipeline gas, particularly from the Netherlands and Belgium.

To ensure security of supply, even greater diversification in terms of the origin of supply volumes would continue to be desirable. To this end, the role of local midstream companies in particular should be given sufficient consideration and strengthened. These companies reliably perform the task of ensuring security of supply compared to pure trading houses, for which profit is the priority.

### Safety margins are not overcapacity

The expansion of the LNG import infrastructure, particularly in Germany, is particularly important in order to ensure a resilient energy supply. A common misunderstanding is the safety margins, which are often interpreted as overcapacity. In order to ensure a reliable and secure gas supply, gas capacity must exceed current demand at all times. This fulfills N-1 security - the principle that if, for example, a major supply route fails, the peak load must continue to be managed.

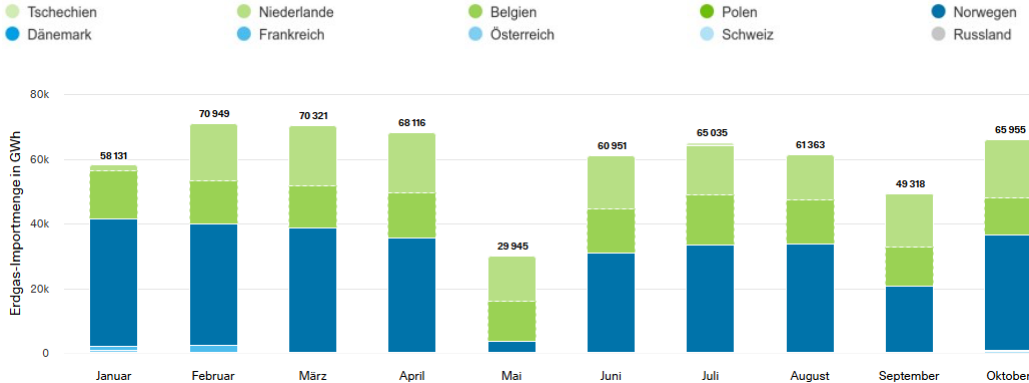
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<sup>3</sup> GIIGNL, [Annual Report 2024](#) (2024)

<sup>4</sup> BDEW, [Erdgasdaten aktuell](#) (2024)

Such precautionary measures are necessary in order to be able to absorb unforeseen interruptions to important supply routes, such as those from Norway. The explosion of the Nord Stream pipeline and the destruction of the pipeline between Finland and Estonia have not only highlighted the vulnerability of energy infrastructure, but also the importance of back-up capacity in ensuring the security and reliability of energy supply. This is common practice: countries such as Japan and Korea have developed LNG import capacities that are many times their annual gas demand, highlighting the importance of reserve capacity as a hedge against potential supply disruptions and to ensure a liquid market. This logic should also be seen against the backdrop of the current debate surrounding the protection and security of critical infrastructures (see KRITIS umbrella law).<sup>5</sup>

In 2023, Germany imported 968 TWh (-33% compared to 2022) of gas. Around 43.5% of the natural gas used came from Norway, around 25.8% from the Netherlands, around 21.9% from Belgium and the rest was imported from other European countries. Almost 70 terawatt hours of natural gas were landed via the three new LNG terminals on the North Sea and Baltic Sea, which corresponds to a share of 7 percent of total imports. Domestic production covered around 5.2 percent (42 TWh) of natural gas consumption. In addition, 10.5 terawatt hours of regionally produced biomethane flowed through the German gas grid.<sup>6</sup>



**Gas imports to Germany in 2024 (data source: Federal Network Agency)**

Germany as well as the Netherlands and Belgium essentially have three remaining sources of natural gas: the EU's own remaining production (including biogas), Norway and LNG. This illustrates the necessity of German LNG terminals and corresponding safety margins for security of supply and future affordability of natural gas.



## Relevant natural gas import capacities via pipelines to Germany

The costs for any idle terminal capacity are an insurance policy and an essential component of security of supply. Only in this way can additional LNG be delivered if necessary.

## Flexibility and resilience of the energy market

LNG is another key to Germany's gas supply security. It offers the necessary flexibility to react to fluctuations in pipeline supplies. The LNG terminals on the North Sea coast mainly serve as backup feed-in capacities for important western pipelines (e.g. NETRA, RHG, NEL), while the backup feed-in capacities of the Mukran terminal serve important eastern pipelines (e.g. EUGAL, OPAL and NEL), which were supplied via Nord Stream in the past.

The detour of global LNG flows to the EU mitigated the immediate crisis and allowed LNG imports to increase from 78 bcm in 2021 to 134 bcm in 2023. This shift contributed to market equilibrium despite significant economic costs and shows that the flexible LNG market is able to adapt to sudden supply shocks.<sup>7</sup>

## Contribution to the stabilization of gas prices

The introduction of LNG has the potential to intensify competition on the gas market and thus dampen price fluctuations. A stable gas price is essential for German industry and households in order to ensure economic planning security. Wholesale gas prices in the EU averaged € 103/MWh in 2022, compared to € 32/MWh in Asia and € 19/MWh in North America.<sup>8</sup> In light of improved LNG imports, high storage levels and the decline in demand in the EU, gas prices could fall further to pre-crisis levels. Conversely, higher prices in Asia will result in supplies from the EU being diverted to Asian markets.<sup>9</sup>

## Essential for German industry

Stable gas prices also benefit German industry, which consumed a total of 970 terawatt hours of energy in 2022. 335 terawatt hours - and therefore more than a third of energy requirements - were covered by the use of gas. Industry therefore remains the largest consumption segment in the German gas market. Gas is indispensable for industry, particularly due to its wide range of uses. It can be used for heat production, electricity generation and as a raw material in the chemical industry. With a gas consumption of 92.5 terawatt hours in 2022, the chemical industry is the largest industrial gas consumer in Germany. Around

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<sup>7</sup> Rystad, [Rystad Energy Cube](#) (2024)

<sup>8</sup> Rystad, [Rebalancing Europe's Natural Gas Supply - 2nd Edition Summary](#) (2023)

<sup>9</sup> ACER, [Analysis of the European LNG Market Developments](#) (2024)

three quarters of this demand will be used to generate energy. The remainder is used as a raw material for chemical production.<sup>10</sup>

## The contribution of LNG to achieving Germany's climate targets

### LNG as a transitional technology

LNG is of fossil origin, but is considered less harmful to the environment than coal. LNG burns cleaner and produces less CO<sub>2</sub>, particulate matter, sulphur and other pollutants.<sup>11</sup> In the transition phase to a fully renewable energy supply, natural gas or LNG can help to reduce emissions, particularly in industry and the transport sector. Taking into account both CO<sub>2</sub> and methane emissions, switching from coal to gas in electricity and heat generation can reduce emissions by 50% and 33% respectively, making the switch from coal to gas an efficient and cost-effective way to reduce emissions.<sup>12</sup>

In line with Germany's climate targets, the permits for the LNG plants are limited until December 31, 2043 at the latest. Continued operation of the plants beyond this date can only be approved for climate-neutral hydrogen, synthetic methane and their derivatives. This ensures that the goal of climate neutrality can be achieved by 2045 at the latest.

Gases are becoming increasingly popular as alternative fuels for heavy goods vehicles and shipping. Starting with CNG/LNG, heavy-duty transportation can transition to net-zero emissions by gradually incorporating liquefied biomethane and synthetic methane into the fuel mix in combination with other solutions. These fuels can be blended in any ratio without changes to the infrastructure, so they can be introduced as soon as they are available on a large scale. In addition, LNG and biomethane will serve as base sources for the development of other energy solutions such as biomethanol and ammonia. This approach aims to provide the right molecules for the right end-user needs, accelerating the decarbonization of various sectors.

There are now over 1,000 LNG-powered vessels in the global shipping industry, with nearly 1,000 more on order.<sup>13</sup> LNG is becoming a preferred alternative fuel in maritime transportation and is helping to maintain air quality, a major public health concern, by significantly reducing air pollutant emissions. Compared to conventional fuels, LNG reduces sulphur dioxide emissions by 99%, particulate matter emissions by 91% and nitrogen dioxide emissions by 92%.<sup>14</sup>

The requirements of the FuelEU Maritime Initiative and the EU ETS will drive the rapid introduction of high-performance LNG ships and the increase in blending rates of liquefied biomethane and synthetic methane, which will lead to a further significant reduction in greenhouse gas emissions. Ship owners see LNG propulsion as an established technology for

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<sup>10</sup> Zukunft Gas, [Gasbilanz 2023](#) (2024)

<sup>11</sup> UBA, [CO<sub>2</sub>-Emissionsfaktoren für fossile Brennstoffe](#) (2022)

<sup>12</sup> IEA, [The Role of Gas in Today's Energy Transition](#) (2019)

<sup>13</sup> Clarksons, [Research Data](#) (2024)

<sup>14</sup> CMA CGM, [Sustainable Development Report](#) (2020)



which the fuel is sufficiently available at economic cost and with which significant CO<sub>2</sub> savings can be achieved in the short term.

## Integration of renewable energies

In future, the LNG infrastructure can be used for the import and distribution of green hydrogen or synthetic methane.<sup>15</sup> This makes LNG an essential building block for the transition to renewable energies. For example, gas-fired power generation, which can use renewable and decarbonized gases, supports the integration of fluctuating renewable electricity sources into the German energy mix.

LNG terminals are technologically suitable to be converted for the import of green hydrogen and other forms of energy in a relatively short time and at a lower cost than new buildings.<sup>16</sup> According to the LNGG, the onshore LNG terminals must be able to be converted by January 1, 2044 at the latest so that they can be used for the import, unloading, storage and regasification of liquefied ammonia.

The flexibility of LNG makes it the perfect partner for the green transformation. Depending on the speed of the transformation, more or less can be supplied. The remaining volumes are sold on the global market.

## Reduction of methane emissions

The LNG industry is actively committed to reducing its environmental footprint through stricter reporting standards, advanced methane leak detection technologies, the integration of renewable energy and investment in carbon capture and storage (CCS). As part of the Global Methane Pledge, 155 countries, accounting for 50% of global anthropogenic methane emissions, have committed to reduce methane emissions across all sectors by at least 30% by 2030 compared to 2020 levels<sup>17</sup>. Qatar, one of the largest LNG exporters, is investing heavily in CCS technology and plans to store over 11 million tons of CO<sub>2</sub> annually by 2035<sup>18</sup>. Such commitments improve the greenhouse gas balance of LNG along the entire value chain.

In addition, the EU Methane Regulation, which comes into force in 2024, is the first of its kind in the world to regulate methane emissions not only in the EU, but also indirectly via the import of fossil fuels.<sup>19</sup>

## Outlook and recommendations

The development of the LNG infrastructure in Germany faces several challenges. These include high investment costs and uncertainties regarding the future demand for LNG in the context of the energy transition. In addition, securing a sufficient quantity of LNG remains a challenge, especially in the long term, in view of global competition, particularly from Asia.

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<sup>15</sup> BMBF, [LNG2Hydrogen](#) (2024)

<sup>16</sup> GIE, [Securing & Greening Energy for Europe](#) (2024)

<sup>17</sup> Global Methane Pledge, [Fast Action on Methane to Keep a 1.5°C Future Within Reach](#) (2024)

<sup>18</sup> QatarEnergy, [Climate Change and Environmental Action](#) (2024)

<sup>19</sup> EU Methane Regulation [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L\\_202401787](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202401787)

Realistic assumptions about gas demand and clear political messages that support German buyers in signing long-term LNG contracts are crucial.

The LNG infrastructure offers great opportunities. It can diversify the energy supply, increase security of supply and serve as a bridge to a low-carbon economy. Germany's strategic position in the heart of Europe could make the country an important LNG hub, supplying not only the domestic market but also neighboring countries. Overall, the German LNG infrastructure is in a phase of expansion and development. The next few years will be decisive for the successful establishment of LNG as part of the German energy supply. Infrastructure projects, the regulatory framework and technological developments will play a key role in this.

To ensure security of supply, it is essential that the German government does not limit itself to infrastructure alone, but also secures long-term LNG volumes for the event of a crisis via the German midstream companies whose trading houses operate out of Germany. In the event of a crisis, these can then be ordered to Germany by the companies at short notice.

## Political recommendations for action

- **Accelerating, harmonizing and facilitating licenses and permits for projects to implement import capacities for LNG and new gases and ensuring a continued stable legal framework**
  - Reducing the bureaucratic burden
  - Enabling hybrid permits that allow several molecules (e.g. including ammonia)
  - A stable legal framework, which the legislator has created through the LNGG, is also required after its expiry in order to ensure the most targeted approvals possible. A follow-up regulation to the LNGG should be created that also creates legal certainty beyond the period after June 2025
- **Continuation of the expansion of LNG infrastructures, taking into account the possibility of conversion for new gases (also for existing floating terminals where possible)**
  - In the interests of greater security of supply and European comparability, the Federal Network Agency has set a discount of 40% on the fees to be paid for feeding gas from an LNG terminal (for annual and quarterly capacity products) into the transmission network. The discount should also be made possible for shorter-term products (monthly and daily) in order to take account of the usual market batches for LNG imports
  - Setting incentives via tariffs that lead to the most efficient use of gas pipeline infrastructure. The use of existing gas pipelines should be given priority over the expansion of the gas network in order to prevent possible medium-term capacity utilization deficits
- **Sufficient strengthening and consideration of the role of local midstream companies with trading houses in Germany**

- Further expansion of international energy partnerships with the support of the German government in feedback with the midstreamers
  - Support through state guarantee instruments/financing instruments/framework for capital procurement, insofar as this benefits the conclusion of corresponding LNG contracts that increase Germany's security of supply
  - Securing LNG volumes via the trading houses for crisis situations
  - Promotion of LNG and CNG as a fuel in the transport sector
- **Equivalent promotion of exempted and regulated LNG infrastructure projects or infrastructure for new gases**
- While all FSRUs make a unique contribution to overcoming an urgent supply crisis in the short term, a level playing field must be created, especially for exempted projects. In this way, they can establish themselves as a long-term supply solution, contribute to the competitiveness of European industry and help shape the energy transition
  - For the next market phase, Germany must also improve the development of the hydrogen infrastructure beyond the initiated H2 core network, i.e. also with regard to storage and import terminals. Germany needs a clear investment framework for the import terminals for new gases as quickly as possible, precisely because the high forecast import demand (50-70%) means that hydrogen derivatives such as ammonia will have to be transported to Germany by ship and the aforementioned demand for new gases cannot be imported via pipelines alone
- **Enter into international cooperation to strengthen the global supply chain for LNG and, in the future, new gases**
- Advancing the harmonization of methane regulations between the EU and the USA
- **Supporting German buyers in concluding long-term LNG contracts, which in turn guarantee the security of supply and base load supply of German terminals**

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As the voice of the gas and hydrogen industry, the association DIE GAS- UND WASSERSTOFFWIRTSCHAFT e.V. pools the interests of its members and is committed to utilising the potential of hydrogen and its derivatives as well as biogas and natural gas, including the associated infrastructure. The industry association also provides information on the opportunities offered by gaseous energy sources and their infrastructure in a climate-neutral and resilient energy system and drives the industry's transition to new gases. It is supported by leading companies in the energy industry and covers the entire value chain from production, transport and distribution to trading, sales and applications. Other industry associations and industrial companies support DIE GAS- UND WASSERSTOFFWIRTSCHAFT e.V. as partners.