# Offshore LNG terminals in Europe

## Part 1

*Greece*

*Republic of Bulgaria*

*Romania*

2025

# Contents

## The role of LNG in the global gas infrastructure

Liquefied Natural Gas (LNG) is a product of natural gas processing, including separation of valuable components and compounds, purification from unwanted impurities and liquefaction, in which the gas is deeply cooled below boiling point to become a liquid. As a result, the density exceeds the original density by 600 times, transforming into a transparent, colorless, non-toxic and non-corrosive liquid with non-corrosive properties.

*The term "LNG" means a mixture of hydrocarbons, the main part of which 85-99% is methane $CH_4$, up to 15% are additional substances: ethane 3-4% $C_2H_6$ 2-3%, propane C3H8, 2% butane C4H10, 1.5% nitrogen N2., as well as undesirable impurities: oxygen O2, hydrogen sulfide HS 2, mercaptan sulfur CH 3SH and others.*

To understand the properties and behavior of LNG in various processes such as storage, transportation and use, it is important to focus on the physical characteristics of LNG.

### Main physical characteristics of LNG

- Boiling point at atmospheric pressure: -162°C/ -260 degrees Fahrenheit
- LPG density at atmospheric pressure: 420 kg/m3
- Lower calorific value (at 0°C and 101.325 KPa): 35.2 MJ/m3(or 11500 kcal/kg)
- Gasification ignition limits: 4...16% (volumetric)
- Minimum ignition temperature of gas-air mixture: 557°C (830 K)
- Highest calorific value of gas in liquid form at 15°C for methane is 16.672 GJ/m3 (calculated conditionally as for an ideal gas)

The LNG regasification process produces about 618 volumes of natural gas from one volume of liquid under standard conditions (21°C, 1 atmosphere).

Liquid gas is usually stored in isothermal tanks at boiling point, which is maintained by vaporization of LNG.

Liquefied natural gas represents an important element of international natural gas trade, providing the ability to transport the energy carrier over significant distances without pipeline infrastructure, especially in regions where there is no access to pipelines leading from natural gas fields.


This process consists of several consecutive stages.

### Main stages of LNG technology

1. Purification and liquefaction of natural gas.

In the first step, natural gas is pre-cleaned of impurities such as sulfur, CO 2, water, sulfur dioxide, carbon dioxide and other contaminants and converted into a liquid by cooling to -162 °C. As a result of this process, the volume of the gas is reduced by about 600 times compared to its gaseous state, which allows for efficient transportation, and is stored until it is shipped aboard LNG tankers.

2. LNG transportation.

For the delivery of liquefied natural gas, specialized gas tankers are used, equipped with cryogenic tanks that maintain the required low temperature of the cargo during transportation.

3. Gas regeneration.

After arriving at its destination, LNG undergoes a regeneration process that returns it to its original gaseous state. This process can be carried out either in stationary plants or in floating regasification units (FSRUs).

Heat exchange takes place either by ambient heat or by means of specialized heat exchangers.

4. Gas supply to end users.

Regenerated natural gas is delivered to distribution networks and then sent to various categories of consumers, including industrial plants, energy facilities, residential buildings and other infrastructure facilities.

## Areas of LNG utilization

Liquefied Natural Gas (LNG) is used in a variety of applications, including vehicle fuel infrastructure, electric power generation, heating systems, and a variety of industrial process applications.

Main applications of LNG:

| Areas of application | Discription |
| --- | --- |
| Energy | — Fuel for power plants, especially in regions without gas pipelines.<br><br>— Backup energy source to cover peak loads. |
| Industry | — Used in metallurgy, cement and chemical industries as a source of high-temperature heat.<br><br>— Feedstock for the production of fertilizers, hydrogen and synthetic materials. |
| Transport | — **Marine vessels:** Alternative to fuel oil, reduces $SO_x$, $NO_x$ and $CO_2$ emissions (IMO 2020 environmental compliance).<br><br>— **Trucks and buses:** Saves on fuel and reduces carbon footprint.<br><br>— **Rail transportation:** being implemented in countries with developed eco-policies (e.g. EU). |
| Domestic usage | — Heating and cooking in remote areas without gas networks. |

## Main advantages of LNG technology

The key advantages of LNG technology are its economic benefits, environmental cleanliness and flexibility.

Let's take a closer look at this issue:

| Advantages | Discription |
|---|---|
| Low specific transportation costs | Maritime transportation is the cheapest in the world, recouping liquefaction costs |
| Less start-up capital | Possibility of gradual commissioning of capacities and start of deliveries |
| Independence from transit countries | Increases project efficiency by reducing political risks. |
| Flexibility of supply | Ability to quickly change routes when the market situation changes |
| Economy in gas consumption for needs | Gas consumption for own needs is lower than in pipeline projects |
| Energy efficiency | Up to 40% of energy used for liquefaction is recovered during regasification. |
| Environmental friendliness | Best environmental performance among hydrocarbons. |
| Reduced construction time | Construction takes from 1 to 3 years, allowing for rapid capacity expansion |
| Compatibility with organic synthesis technologies | Allows utilization of tail gases from chemical reactors |
| Energy efficiency in cold regions | Application of DMR technologies, reduces the cost of LNG production |
| Smoothing demand fluctuations | LNG technology helps smooth out daily fluctuations in energy demand |

LNG thus holds an important place for consumers, serving as a cost-effective and clean alternative to traditional fuels, providing flexibility and accessibility in the absence of traditional gas networks, providing reduced environmental burdens.

## Classification of LNG terminals

LNG terminals have been developed and commissioned to address a number of critical challenges related to the transportation and use of natural gas and now play a key role in the global energy system, ensuring the efficient use of natural resources and maintaining a sustainable energy supply, providing a logistical link between production/receiving facilities and transportation.

LNG marine terminals are special port facilities designed to handle large liquefied natural gas (LNG) carriers. These terminals provide loading, transportation and unloading operations for LNG and are located in close proximity to liquefaction and storage facilities (for exports) or regasification and storage facilities (for imports). These facilities are connected to pipelines leading to onshore or offshore gas fields or to gas storage and distribution facilities.

LNG regasification terminals vary in design, purpose, technology, scale and location in supply chains.

## Main categories of LNG terminals:

- By location:

- Land-based terminals: are located on land, usually close to the coast. This is the most common type of terminal and includes berths for unloading gas tankers, LNG storage tanks and regasification equipment.

- Offshore terminals: built on offshore platforms or barges located offshore. These terminals allow LNG to be received directly in the water area, which may be more convenient when onshore space is limited.

- By construction:

- Fixed (onshore) terminals: built on a permanent basis and designed for long-term operation. They typically include berths, storage tanks and regasification systems.

Advantages: High capacity, durability, integration with the gas transportation network.

Disadvantages: Long construction time (5-7 years), high cost ($1-5 bln).

- Floating terminals (FSRUs): These are vessels equipped with LNG regasification and storage facilities. They can be temporarily moored in ports or on platforms to meet temporary or seasonal gas demand.

Advantages: Rapid deployment (1-2 years), mobility, lower costs.

Disadvantages: Limited capacity, dependence on weather conditions.

- Floating terminals are in turn divided into:

- LNG regasification vessels (LNG re-gasification vessel (LNG RV): capable of carrying and independently regasifying LNG at the discharge point.

- Floating storage and regasification unit. (FSRU) or raid terminals: fixed facilities, based on LNG tankers, capable of regasifying LNG on their own.

- By functions:

- Import terminals: used for receiving LNG from gas tankers and its further regasification and transmission to gas transportation networks.

- Export terminals: used to regasify gas from domestic sources and load it onto gas tankers for export.

- Hybrid terminals: combine import and export functions.

- Bunker terminals: refuel ships with LNG instead of fuel oil.

- By regasification technology:

- Subsea heated systems (open cycle): use seawater to heat LNG and regasify it.

- Air-heated systems (closed cycle): use air to heat the gas, which can be more energy efficient but requires more space.

- By type of storage:

- Terminals with aboveground tanks: use aboveground tanks to store LNG.

- Terminals with underground tanks: store LNG in underground storage facilities, which may be safer and more cost-effective in certain circumstances.

- By capacity and scale:

- Large terminals: handle 5-15 million tons of LNG per year.

- Medium-sized: 1-5 million tons.

- Small (mini-terminals): for localized needs or remote areas.

- Specialized terminals:

- Cryogenic storage: for industry and transportation (e.g. refueling LNG trucks).

- Terminals for RES-hybrids: utilize excess energy from wind/solar for regasification.

- By type of operation:

- Integrated model - the terminal is part of a single LNG chain with a link to specific gas sources.

- Tolling model - the terminal owner provides regasification services to third-party users for a fee.

- Commercial model - the terminal buys LNG on the spot market and resells it to consumers without long-term contracts.

Different types of regasification terminals allow the infrastructure to be customized to meet specific needs and market conditions, from giant hubs to mobile solutions, providing flexibility and reliability in natural gas supply.

*Fixed terminals have a service life of 30-50 years or more, while floating FSRUs wear out faster due to constant exposure to salt water and dynamic operation and have a service life of 20-30 years. Actual operation depends on the type of facility, modernization investment and energy strategy. Floating terminals are less durable but more flexible, while fixed terminals last for decades with proper maintenance. **

**Sources: GIIGNL (International Group of LNG Importers) data, Shell LNG Outlook reports, S&P Global analytics (2023).*

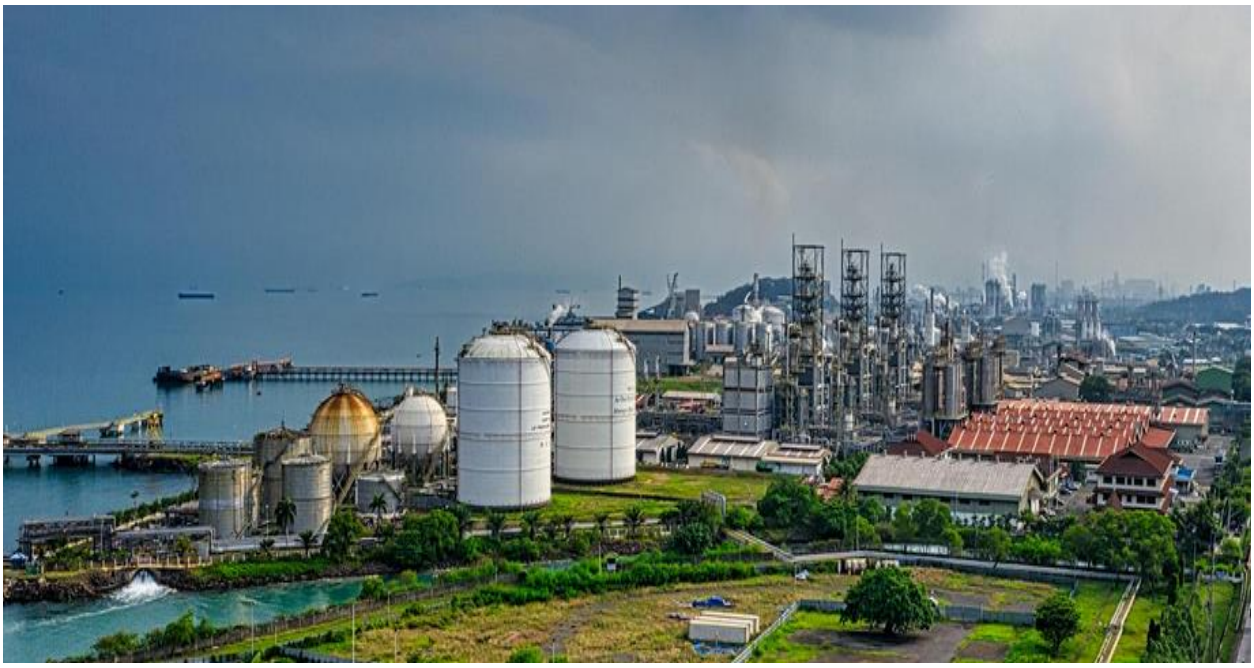
Let's analyze the current state of global capacity serving LNG carriers.

## World LNG hubs

As of 2023, there are approximately 50 LNG export and over 100 LNG import marine terminals worldwide. These figures include both existing facilities and terminals undergoing expansion or modernization.

1. **Export terminals** are concentrated in LNG producing countries:
    - **Qatar** (world's largest Ras Laffan complex),
    - **Australia** (e.g. Wheatstone, Gorgon),
    - **USA** (Sabine Pass, Corpus Christi).
2. **Import terminals a**re predominant in regions with high gas demand:
    - **Asia** (Japan, South Korea, China),
    - **Europe** (Netherlands, Spain, UK),
    - **America** (Brazil, Argentina).

The number of LNG terminals is steadily increasing as environmental standards tighten and countries strive to reduce their carbon footprints. LNG emits significantly less $CO_2$ and is virtually sulfur-free than oil and coal, making it an attractive choice for many industries.



Consider information on existing and under construction LNG terminals in Europe, including throughput capacity, LNG storage capacity and key terminal characteristics.

## LNG marine terminals in Europe

***Historical note***

*Historically, the first supplies of liquefied natural gas started from the Algerian field Hassi R'Mel in 1964 to France (CAMEL project) and Great Britain, and later Libya and the Netherlands started exporting gas. Later, in addition to the above countries, LNG was imported by Spain, Italy, Belgium and Portugal. Since the early 80s, Greece became a recipient of Algerian LNG.*

*In the early 2000s, Qatar, Egypt and Norway joined the group of LNG producers.*

*Europe has traditionally based its energy system on pipeline natural gas, the main supplier of which for many years was Russia. However, the escalating conflict between Russia and Ukraine has dramatically changed gas logistics on the continent, provoking not only supply disruptions but also a reassessment of energy security strategies. This crisis has intensified the search for alternative sources, bringing LNG (liquefied natural gas) to the forefront. Today, European countries are actively developing infrastructure to receive LNG, accelerating the construction of regasification terminals and signing long-term contracts with global exporters such as the US, Qatar and Australia.*
*Thus, the war has not only disrupted established chains, but also catalyzed the transformation of the European energy landscape, where LNG is becoming a key element in ensuring stability.*

Liquefied Natural Gas (LNG) marine terminals play an important role in ensuring the energy security of European countries seeking to diversify their energy supply sources and reduce their dependence on traditional gas import routes.

Liquefied natural gas (LNG) accounts for more than 40% of the total natural gas supply in the European Union. Although countries such as Spain and the UK already had developed infrastructure for receiving and processing LNG, from 2022 onwards other EU member states, especially Germany, started to invest heavily in the construction of terminals and regasification plants.

According to January 2024 statistics, there were 57 liquefied natural gas (LNG) terminals operating in the European Union, of which 43 are fixed facilities and the remaining 14 are floating storage tanks and regasification units (FSRUs).

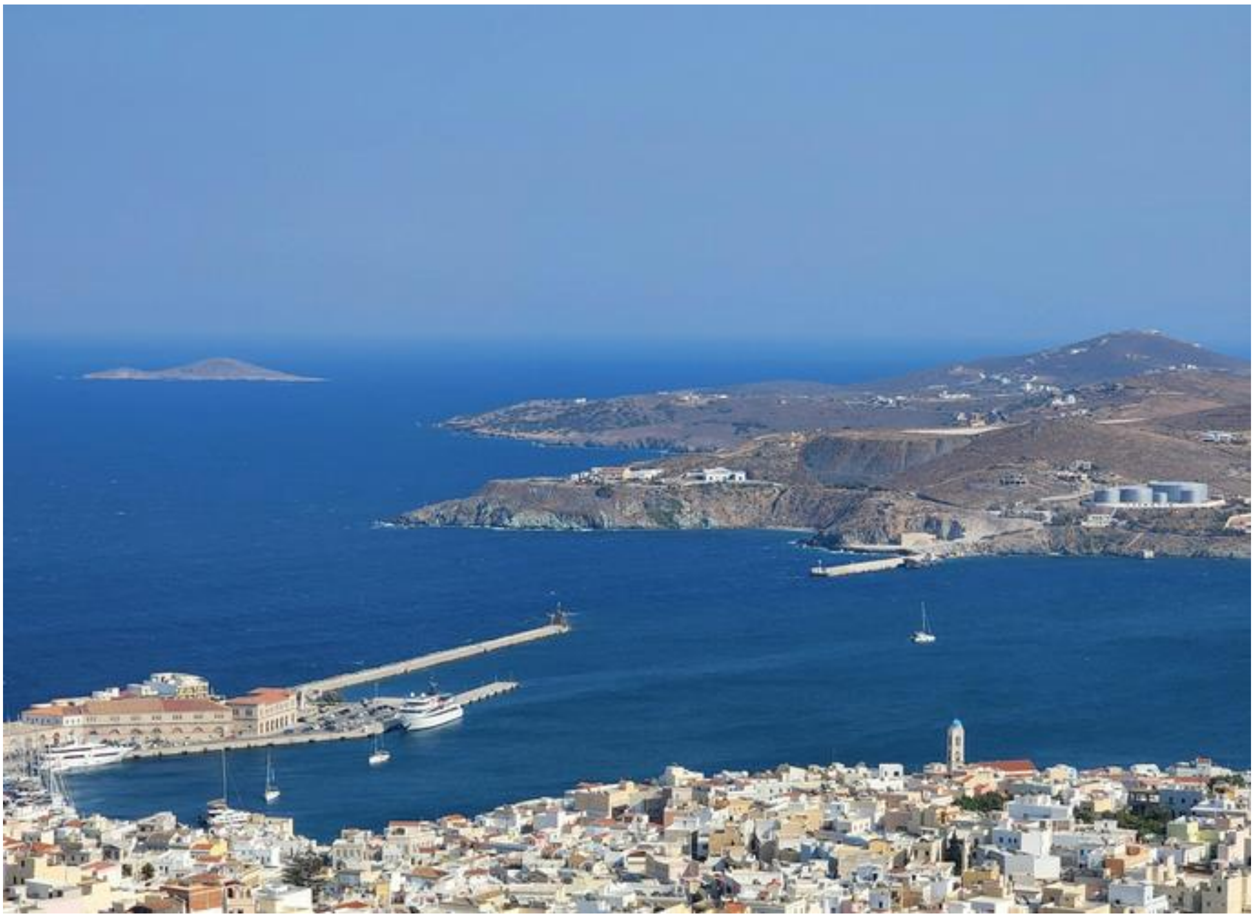
Over the past few years, European countries have significantly increased their LNG receiving capacity in an effort to diversify their energy supply sources and reduce their dependence on Russian gas resources. The largest number of LNG terminals is concentrated in France and Spain, where seven such facilities are operating respectively.

Germany, on the other hand, has planned to increase the number of LNG import terminals from the current three to fifteen units, envisaging the construction of twelve additional facilities, including both onshore terminals and FSRUs.

Norway, the leading hydrocarbon producer in the region, remains the only country in Europe with five active LNG export terminals, totaling five units.

Let's take a closer look at the seashores of Southeastern Europe, in particular Romania, Bulgaria and Greece.

## LNG marine terminals of Southeast Europe



### Greece

- **Revithoussa LNG Terminal**

Land-based non-gasification LNG terminal on Revitoussa Island, Gulf of Megara, Attica, near Athens, in operation since 2000.

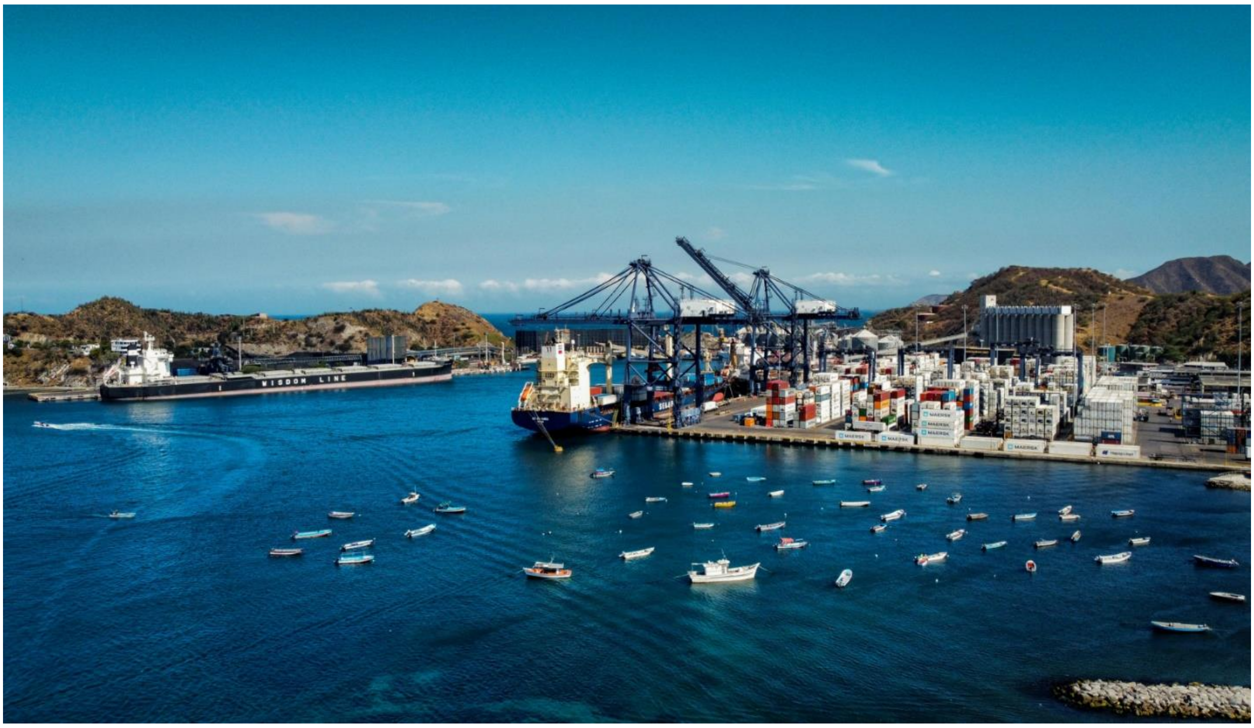
**Operator and owner:** DESFA S.A. DESFA shareholders: Senfluga SA (Snam SpA, Enagás SA, Fluxys and Damco Energy SA) with 66% and the Greek state with 34%.

**The Revitus LNG terminal includes:**

- Three liquefied natural gas tanks with useful capacities of 63,379,931, 63,379,931 and 95,055,815 m3 of LNG.
- Unloading facilities for gas carriers with a total capacity of 7,250 m3 LNG/hour.
- LNG gasification units with a total gasification capacity of 1400 m3 LNG/hour under continuous operation conditions.
- LNG truck loading complex with a capacity of 100 m3 LNG/hour.
- Storage area is 225,000 m2.
- 1 berth with handling of large volumes of LNG (up to Q max).

**Terminal Characteristics**

- Export capacity - 590 thousand $m^3$/hour.
- Capacity: 5.2 bln (planned to be modernized in 2025 to 7 bln $m^3$/year).
- Storage capacity 370,000 $m^3$.
- Max. vessel class size accepted by the terminal 260 thousand m3 of LNG.
- Min. sea depth along 13.5 m.
- Max. outlet pressure 64bar



The terminal supplies the National Natural Gas Transportation System NGTS. It can supply up to 60% of LNG imports.

In 2024, the Revitus terminal accounted for 26.43% of imports.

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***Terminal performance in 2024:***

*18.69 TWh of gas (≈ 1.73 billion m³) was delivered to the Revithoussa terminal in 2024 by 27 LNG tankers from four different countries, radically lower than the 2023 result of 41 shipments or 28.52 TWh.*

*Most of the LNG shipments came from the United States (71.64%), which increased LNG volumes from 17 to 19 shipments (from 10.75 to 13.89 TWh), Russia with a share of 15.30% (2.86 TWh), Algeria (7.81% -1.46 TWh) and Norway (5.24% -0.98 TWh).*

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- **Alexandroupolis FSRU**

Floating LNG terminal 17.6 km southwest of Alexandroupolis, Greece, in the Aegean Sea and 10 km off the coast of Makri village in water depth of about 40 meters.

It started commercial operation on October 1, 2024.

The facility represents one of the key energy projects of European, regional, national and local scope, which was realized at the Seatrium shipyard in Singapore by converting an LNG tanker into a floating system for LNG storage, regasification and shipment.

**Owner:** Gastrade - specialized terminal company, owned by Bulgarian gas transmission system operator Bulgartransgaz (20%), Greek gas transmission system operator DESFA (20%), Greek gas company DEPA (20%), Greek infrastructure investor Copelouzos Group (20%) and Cypriot gas carrier owner GasLog (20%).

**Terminal Characteristics**

- Total storage capacity 153,500 m3.

- Regasification capacity: 5.5 billion m3 per year.
- Max. outlet pressure 100 bar
- Max. shipment 22 mln m3/day.
- Max. vessel class size accepted by the terminal 170,000 m3 of LNG

The Floating Storage and Regasification Unit (FSRU) is connected to the Greek National Natural Gas Transportation System by a 28 km long subsea and onshore pipeline.

The terminal connects to the Pan-European grid via the Greece-Bulgaria Interconnector Gas Pipeline (IGB) and the Trans Adriatic Pipeline, part of the Southern Gas Corridor pipeline system.

In the future, it is planned to increase the throughput capacity of the terminal by installing another FSRU at the roadstead of the port of Alexandroupolis.

*Currently, 14 Greek and foreign gas companies have reserved almost all of the terminal's capacity up to and including 2030.*

**Suppliers:** LNG from the USA and Qatar and other countries.

**Consumers:** Domestic market of the country, Bulgaria, Romania, Serbia, North Macedonia, Hungary, Moldova and Ukraine.

**Domestic market consumer categories:**

- 68.65% / consumption by electricity generating units,

-17.71%/consumption by household consumers and enterprises connected to the distribution grid,

-13.62% / domestic industrial enterprises and CNG stations directly connected to the DESFA high-pressure system.

**Country needs:** 66.2 TWh, equivalent to 6.2 billion cubic meters of gas per year, consumption showed a growth of 30.03% in 2024.

*The population of Greece is 10.36 million.*

Greece almost entirely covers its natural gas needs through imports, as its own production is minimal.

**Main mechanisms of gas supply:**

1. **Imports through pipelines**

- **Trans Adriatic Pipeline (TAP)**:
  — Supplies gas from Azerbaijan via Turkey and Greece to Italy.
  — Annual volume: up to 10 bln m³ (of which about 1 bln m³ remains in Greece).
- **Gas pipeline from Bulgaria (ICGB)**:
  — Current capacity 3 bcm/year, Connects Greece to the Bulgarian grid, providing access to gas from other sources (e.g. LNG via Greek terminals).

2. **LNG Terminals**

- **Revithoussa LNG Terminal**
  —Power: **5.2 bln m³/год**
- **FSRU „Alexandroupolis"**
  — Power: **5.5 bln m³/год**.

3. **Planned LNG terminals**

- **Thessaloniki FSRU**
  - FSRU + FSU
  - Year of launch: 2028
  - Operator: ELPEDISON S.A.
  - Maximum capacity 837 thousand m3/hour
  - Nominal annual capacity 4.82 bln m³/year

- LNG storage capacity 270 thousand m3 of LNG
- Max. accepted vessel class size 260 thousand m3 of LNG
- Number of births: 1
- Min. water depth along 15 m
- Max. outlet pressure 78 bar

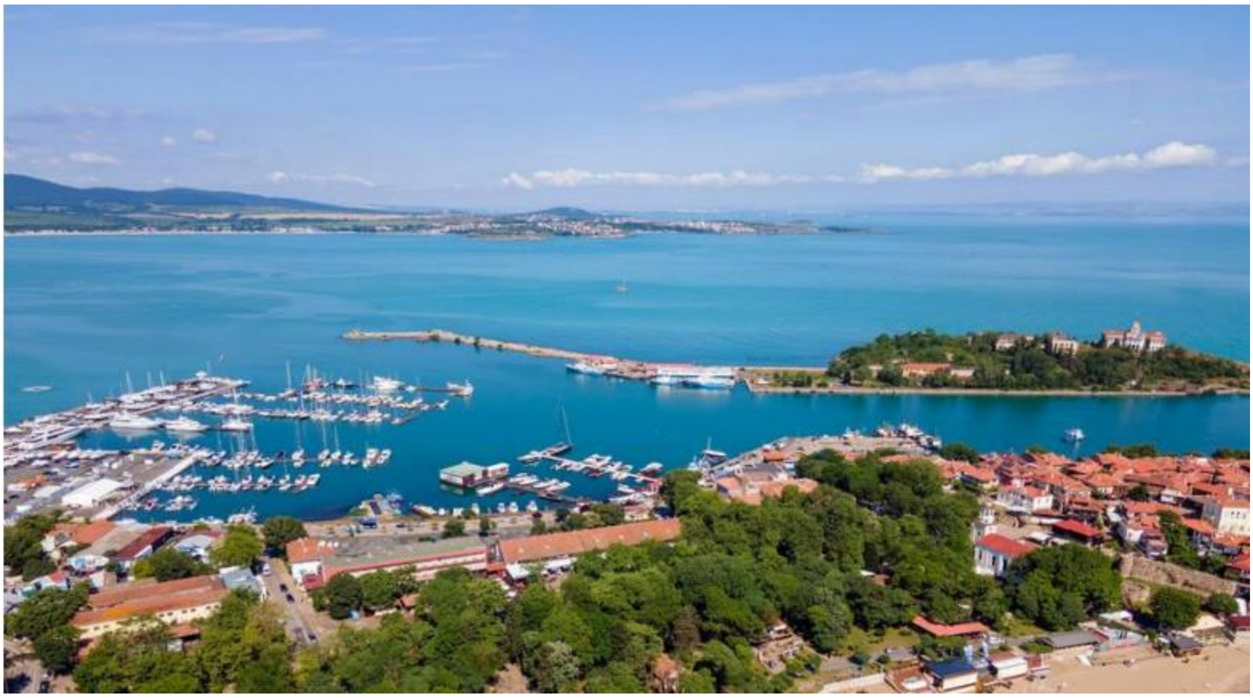
- **Argo FSRU**
  - FSRU
  - Year of launch: initially planned for 2024
  - Operator: ExxonMobil LNG and Mediterranean Gas
  - Maximum capacity 945 thousand m3/hour
  - Nominal annual capacity of 5.5 billion m3/year
  - LNG storage capacity 170,000 m3 LNG

- **Thrace LNG**
  - FSRU
  - Operator: Gastrade SA
  - Maximum capacity 885 thousand m3/hour
  - Nominal annual capacity 5.2 bln $m^3$/year
  - LNG storage capacity 170 thousand m3 LNG

- **Dioriga Gas FSRU**
  - FSRU
  - Operator: Dioryga Gas
  - Maximum capacity 470 thousand m3/hour
  - Nominal annual capacity 2.5 billion m3/year

*The annual regasification capacity of the existing LNG import terminals in Greece, according to the GIE* database, is 13 bcm/year.Annual regasification capacity of planned LNG import terminals 18 bcm/year.* **GIE- European Association of Gas Infrastructure Operators*

## Republic of Bulgaria



Bulgaria does not have any offshore LNG terminals, but is actively involved in the development of liquefied natural gas (LNG) infrastructure in Greece to reduce dependence on Russian energy and enhance energy security.

Bulgarian gas transportation operator Bulgartransgaz, currently owns a 20 percent stake in the new liquefied natural gas (LNG) terminal in Alexandroupolis, where it has a reserved capacity of 1 billion cubic meters of liquefied natural gas. The facility's capacity for the first five years is almost fully utilized

**Country needs:**

Bulgaria consumes 3.5 bcm per year.

*Population of the country 6.43 million people*

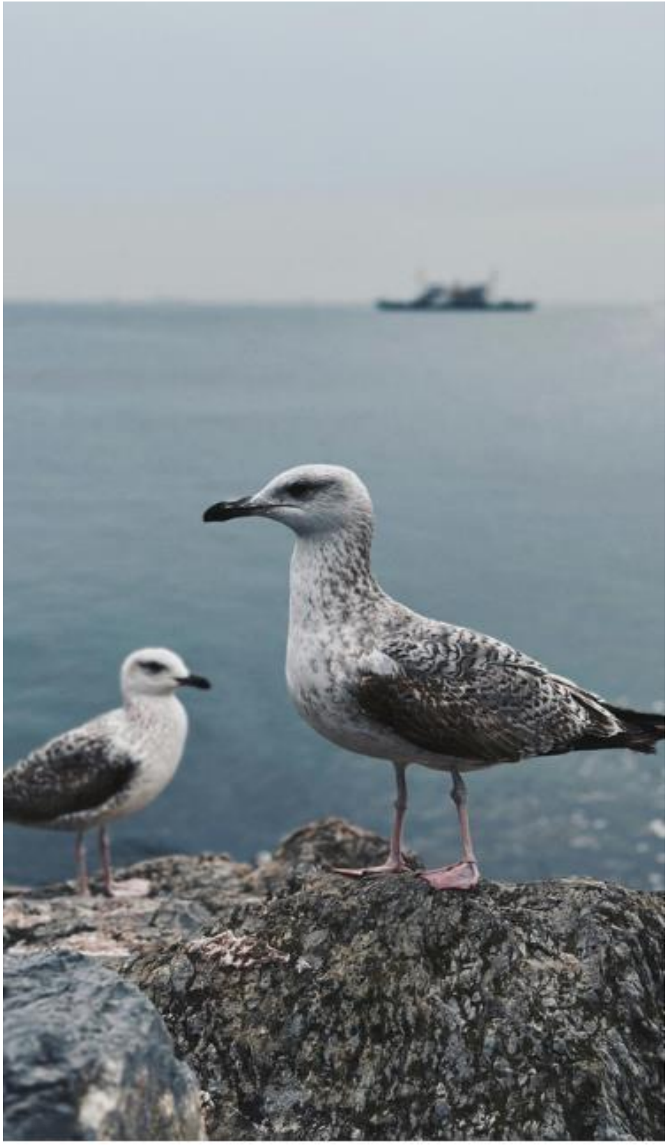
Own production is insignificant and amounted to 16 million cubic meters in 2023.

**Main consumers:**

Energy and chemical sectors, which together account for 54% of consumption.

**How needs are being met:**

- **Caspian gas through the Greece-Bulgaria interconnector.**



Bulgaria has been receiving Azeri gas since 2021. As of February 2024, the interconnector provides 42% of Bulgaria's monthly consumption.

- **Turkish agreement.**

Since January 2023, Bulgarian company Bulgargaz has gained access to Turkish LNG infrastructure through a 13-year agreement with Turkish state-owned oil and gas pipeline and trading company Botaş, allowing the transportation of up to 1.5 billion m³ of gas per year to Bulgaria, as well as the use of pipelines to supply Iranian and Azeri gas, strengthening the country's energy diversification.

- **Greek FSRU "Alexandroupolis".**

Bulgaria has reserved capacity of 1 bcm of gas per year at Turkish LNG terminals, in addition to 1 bcm to be supplied through the new IGB interconnector pipeline and 1 bcm imported directly from the Alexandroupolis floating terminal.
After regasification at the Alexandroupolis LNG terminal, natural gas will be delivered to Bulgaria via 2 entry points from Greece:

- **Kulata-Sidirokastro connection** on the Greek-Bulgarian border:

  - technical capacity in the flow direction from Bulgaria to Greece - approximately 120363 MWh/day (11.5 million m3/day), the same for both sides,

- o technical capacity in the flow direction from Greece to Bulgaria - approximately 66,576 MWh/day (6.3 million m3/day), the same for both sides;

**- Komotini-Stara Zagora gas interconnection** pipeline.

- **Chiren underground gas storage facility** with an active natural gas storage capacity of 550 million m3.

- **Planned terminal in Kokelar (near Varna)**

In 2022, the government of Bulgaria announced its intention to build a floating terminal in the Black Sea, near the port of Varna.

The capacity of the terminal was expected to be 1-2 billion m3 gas per year, with the possibility of expansion.

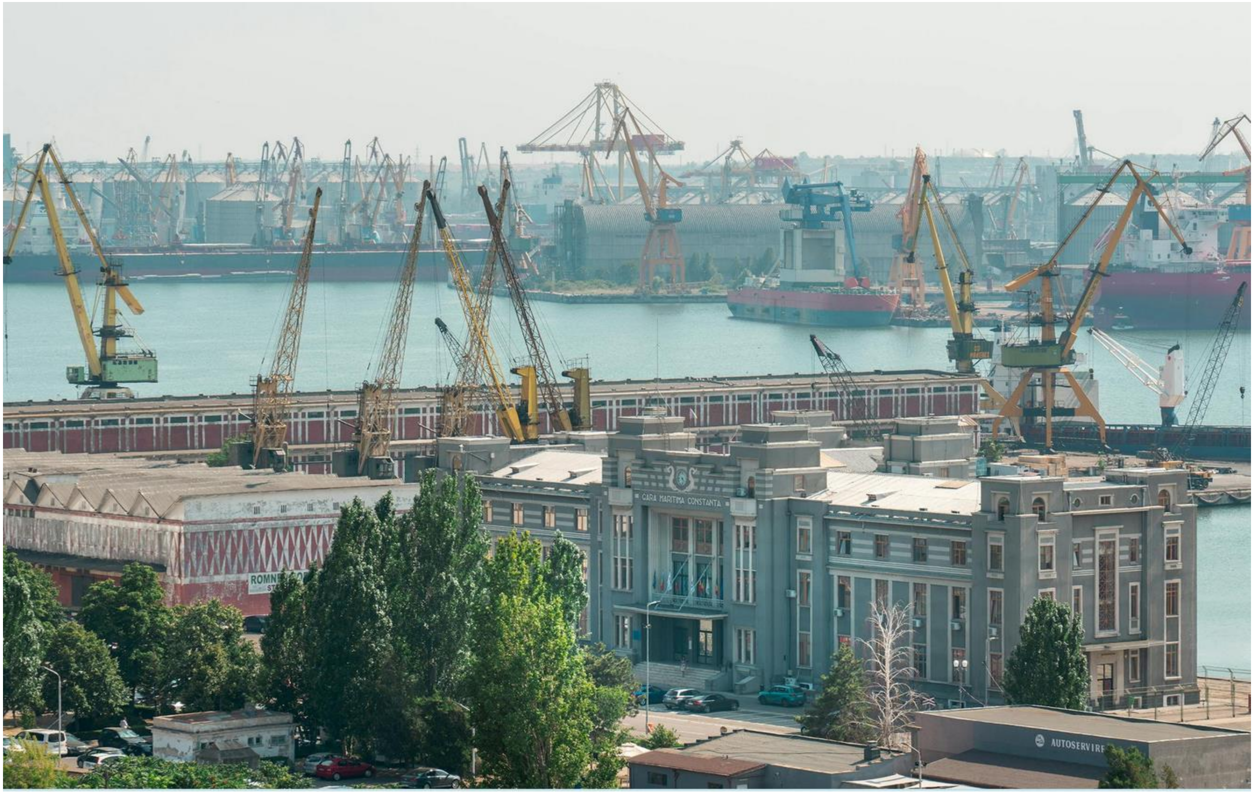
Originally planned to be launched in 2023-2024, but due to bureaucratic and logistical difficulties the implementation may be delayed until 2025.

- **Planned terminal in Albania.**

In mid-2022, the Bulgarian private company Overgas, which manages gas distribution networks in 16 regions of Bulgaria, has entered into a 10-year agreement to purchase up to 1 billion cubic meters of LNG per year with Excelerate Energy of Texas at the planned Vlora LNG terminal in Vlorë, Albania and the proposed Vlorë-Fieri pipeline, which is expected to be will be connected to the existing natural gas infrastructure in Europe's southern gas corridor.

There were no project updates in the following 2 years, from which it can be concluded that it is postponed.

## Romania



There are currently no LNG offshore terminals in the country, but in October 2022 Romanian gas producer Romgaz and Azerbaijani state company Socar announced the development of a LNG project in the Black Sea consisting of a gas liquefaction plant (in Kuleviy), LNG regasification plant (in Constanta) and all other installations and facilities necessary for the transportation of natural gas from the Caspian region to Romania.

In April 2024, it was reported that the feasibility study had been completed and Romgaz and Socar were still planning to invest in the project.

Romania's domestic market **needs** are about 10-12 billion m3/year of gas. Romania is the third largest country in the EU for gas reserves.

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*Population of Romania 19 million.*

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**Consumption by sector**:

— Heat: ~40%.
— Industry: ~35%.
— Household sector: ~25%.

**How needs are closed:**

1. **Domestic production** of ~8-9 billion m3 gas per year (about 70-80% of the country's demand:

- **Offshore projects in the Black Sea:** Midia (operator - Black Sea Oil & Gas, BSOG), with annual production volume of 1 billion m3/year and Neptune Deep (operator - OMV Petrom) with reserves of 100 billion m3, launch by 2027.
- **Dry deposits (Transylvania)** provide 5-7 billion m3 of gas per year.

2. **Import 1-3 billion m3/year:** from neighboring countries (Hungary, Ukraine) via gas pipeline network, through the Turkish flow, LNG via terminal in Greece (Revithoussa) and future FSRU in Constanta (planned capacity up to 8 billion m3/year**).**

Romania is striving for energy independence through the development of offshore deposits and LNG infrastructure.

**LNG terminal in Constanta (FSRU)** is planned to be launched by 2026-2027. years, for supplies of liquefied gas from the USA, Qatar or Egypt. Gasified LNG can be delivered to Moldova and Ukraine through the Iasi-Unghenu pipeline.Traditionally, Romania has been one of the largest producers of gas in the EU, and thanks to production in the second quarter 2.3 billion. cubic meters of gas, overtook the absolute leader, the Netherlands, which produced 2.2 billion cubic meters. By 2030, the country can completely abandon gas imports, becoming a net exporter and gas hub in South-East Europe.

## Summary of the 1st Part

Today, liquefied natural gas plays a key role in the global energy transformation, used in power, industry, fertilizer, hydrogen and synthetic materials, In the home and transport sector, being the only practical and realistic alternative to conventional fuel, but requiring a balance between environmental goals and economic feasibility.

Geopolitical risks (conflicts in Europe and the Middle East) and logistical challenges make 2025 a challenging year for the LNG transport sector.

Demand for LNG will be determined by weather conditions, price dynamics, state policies and competition with alternative energy sources.

The common concept of a vertical gas corridor, supported by the EU and the US, is an opportunity to provide diverse and sustainable natural gas supplies to Eastern, South-Eastern and Central Europe.

The Vision reflects a common Western strategy to create a flexible, crisis-resilient gas infrastructure capable of adapting to the challenges and long-term goals of "green" energy.

Diversification of LNG sources, integration of LNG terminals in the Black and Mediterranean Seas with gas transport networks in Central and Eastern Europe, creation of interconnections between countries for bilateral deliveries, modernization of gas pipelines - all this allows countries in the SouthEastern Europe to replace gas from Russia with supplies from the US, Azerbaijan, Algeria and other countries.

Mutually beneficial cooperation between neighbouring countries strengthens their position, but depends on political will and funding.

Planned new capacity is being developed with active EU support under the REPowerEU strategy.

These efforts reflect the position of South-East Europe as a future transit hub for alternative liquefied gas supplies.

Natural gas will be an indispensable fuel in the coming decades, and the prospects for LNG use look very promising.

## Glossary

**LNG —** Liquefied Natural Gas — liquefied natural gas, produced from gas fields and consisting of more than 98% of methane and small impurities inorganic gases: nitrogen, carbon dioxide, oxidized sulphur, water vapours. Methane boiling point at atmospheric pressure around -164°C.

**Regasification** is the process of converting LNG back into a gaseous state for delivery to pipelines.

**FSRU (Floating Storage and Regasification Unit) -** a floating terminal for the storage and regasification of LNG.

**Cryogenic technologies** are ultra-cold cooling techniques used for gas liquefaction.

**Nominal capacity** is the volume of LNG produced per calendar year under normal operating conditions based on the engineering design of the facility.

**The Vertical Gas Corridor (VGC)** is a main gas pipeline from Greece to Romania via Bulgaria. Includes the Greece-Bulgaria gas interconnector (IGB), the Trans-Adriatic gas pipeline (TAP), the Revithoussa LNG terminal, and the underground gas storage facility of Kavera Sul.

**Gas tanker -** specialized vessel for the transport of LNG.

**LNG tankers** are a type of refrigerated gas trucks. Designed for the transport of liquefied natural gas (LNG) at atmospheric pressure and temperature 162°C.

Most LNG tankers (methane tankers) have a capacity of 125,000 to 145,000 m3. However, there are also ships of this type with a capacity of 18,000-19,000 m3. Modern tanks of the series Q-Flex and Q-Max can transport up to 210-266 k. m3 LNG. Floating regasification plants are also being built on the basis of LNG tankers.

**Gas pipeline -** a pipeline designed for the transport of gas.

**Gas transportation network** is a system of pipelines for the distribution of gas.

**Interconnections -** gas pipelines connecting networks of different countries (for example, Greece-Bulgaria (IGB)).

**Underground gas storage facility -** a structure based on underground capacity, intended for the injection, storage and subsequent sampling of gas, having connection to the main gas pipeline.

**Ignition limits** are the range of concentrations of a combustible gas in air at which the mixture is capable of igniting and maintaining combustion.

There are two limits:

- **The lower limit of flammability** is the minimum concentration of gas in air at which a mixture can ignite. If the gas concentration is lower than NPV, the mixture is not sufficiently inflammable to sustain combustion.
- **The upper flammability limit** is the maximum concentration of gas in air at which a combustion is still possible. If the gas concentration exceeds ERW, the mixture becomes too rich in combustible substance and the air can no longer provide enough oxygen to maintain combustion**.**

For each type of gas, the flammability limits are different. For example, for methane (the main component of natural gas), the lower limit is about 5% and the upper limit is about 15% concentration in air.

**The highest calorific value of a gas** is the maximum amount of heat energy produced when a unit volume or mass of gas is fully burned, including the energy obtained from the condensation of water vapour produced by burning hydrogen contained in the gas.

**REPowerEU -** the EU's program to eliminate Russian energy resources by 2030.

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