ERDGAS MOBIL

LNG – Liquefied Natural Gas

The fuel of the future

ENGLISH

Energy supplies for the future

Securing energy supplies for the future that can provide energy sustainably and affordably, while also reducing greenhouse gas emissions and improving energy efficiency, represents one of the biggest challenges facing the world today.

This important goal of the United Nations Climate Change Conference in Paris will only be achieved by huge collaborative efforts. For years, RAG has been working on innovative solutions that take account of changes in energy policies and the situation in the energy industry. RAG has been producing natural gas in Austria for decades. And for a number of years now, RAG has been using its expertise to carry out research into power to gas technology. This will make it possible to convert excess renewable wind and solar energy into gas, which can be stored in natural underground gas reservoirs.
We firmly believe that gas can make an important contribution to meeting climate protection targets, because of its flexibility and range of uses – for heating and transportation, and in industry.
As a result, RAG is investing in pioneering LNG infrastructure, driving forward this environmentally friendly development. Commissioning of our first LNG filling station, at Ennshafen port in September 2017, is the first milestone in this process.

Company profile

RAG Austria AG is Europe's fourth-largest gas storage operator. The company has developed and operates its own storage facilities at Puchkirchen and Aigelsbrunn, as well as the Haidach gas storage facility in a joint venture between RAG, Gazprom and Wingas, and the 7Fields storage facility in partnership with Uniper. Both of the latter facilities straddle the border between the provinces of Salzburg and Upper Austria. With storage capacity now totalling around 6 billion cubic metres, RAG makes a major contribution to security of supply in Austria and Central Europe as a whole. RAG sees itself as a partner to renewable energy, and carries out extensive research into manufacturing gas and its use in transportation.

LNG – the fuel of the future

Transportation plays an essential role in a functioning economy. All medium and long term forecasts predict growth in the volume of road traffic, especially heavy goods traffic.

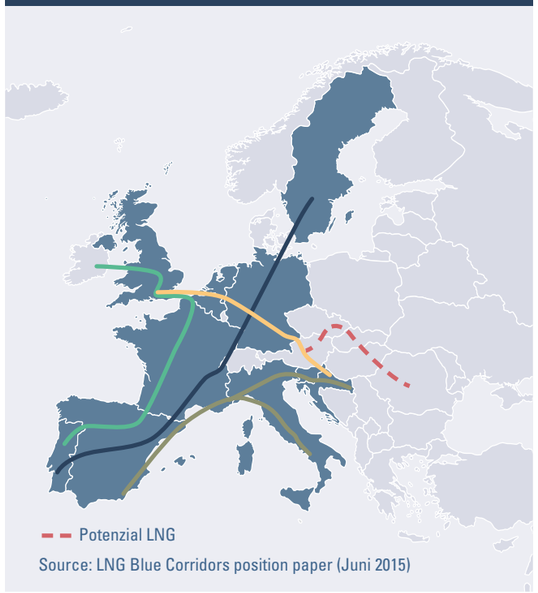
Global, European and national climate protection targets aim at a reduction in emissions produced by vehicles. The use of gas as a fuel can make a major contribution to achieving these targets, since vehicle traffic contributes about 45% of emissions. Numerous EU initiatives are promoting the increased use of natural gas and LNG. In the future, gas produced from renewable sources (biogas and gas generated from wind and solar, using power to gas) might also be used in addition to conventional natural gas. So steady supplies of gas will be available for use as a fuel for the long term.

Advantages of trucks that run on LNG

- Carbon dioxide emissions up to 20,000kg lower per year in comparison with Euro 6 diesel trucks
- 95 % reduction in fine particulates
- Over 70 % reduction in nitrogen oxides (NO, NO_2)
- No AdBlue/catalytic convertor needed
- LNG technically mature for use in industry and heavy goods vehicles, and available for the long term
- Using LNG as a fuel reduces noise emissions by about 50 %
- Infrastructure is under implementation along the LNG Blue Corridors – principle routes for LNG heavy goods vehicles in Europe
- EU initiatives such as Horizon 2020

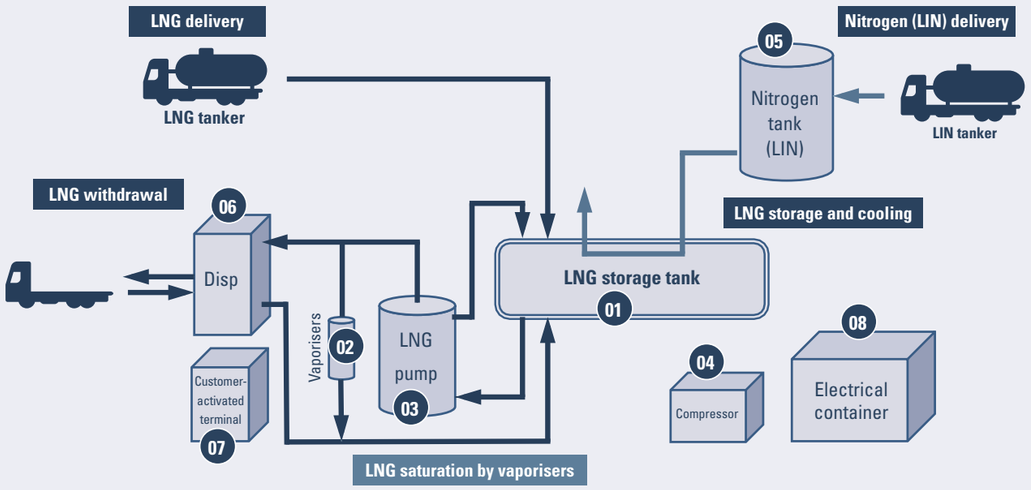
What is LNG?

Liquefied natural gas (LNG) is natural gas that has been converted to a fluid state by cooling it to a temperature of around -160°C. The expansion ratio of natural gas from liquid to gaseous form is 1:600, meaning that large volumes of energy can be transported and stored as LNG. It can be produced in Austria or transported to customers in specially designed road and sea tankers. As well as being easy to transport and store, LNG offers another significant benefit: it is very economical and efficient. As highly pure natural gas that consists of almost 100 % methane, it has an average gross calorific value of 11.3 kWh per cubic meter of gas.



Source: LNG Blue Corridors position paper (Juni 2015)

Functional diagram



01 LNG storage tank

The LNG storage tank is a horizontal, cylindrical, double-walled container, which is vacuum-insulated using perlite. The inner container is made from stainless steel, and the outer container from carbon steel.

02 Vaporisers (pressure build-up and saturation vaporisers)

Pipes with star-shaped aluminium fins are attached along either side of the container, to act as vaporisers. These provide pressure build-up when the storage tank is filled and saturation when LNG is withdrawn via the dispenser.

03 LNG pump

The built-in immersion pump is permanently submerged in the LNG.

04 Air compressor (piping)

The air compressor and drier are built in to an ISO standard frame with the required process valves and piped connections.

05 Nitrogen tank (LIN)

When necessary, liquid nitrogen is used to cool stored LNG; it is stored in a separate tank.

06 Dispensing pump (dispenser)

LNG is withdrawn via the dispensing pump. Withdrawal volume is measured using an integrated mass flow meter.

07 Customer-activated terminal

The customer-activated terminal opens the dispenser, allowing truck drivers to refuel using a special card.

08 Electrical container

Electrical switchgear and the control system are built into a separate container.

LNG is already being manufactured at a pilot facility in Puchkirchen, Upper Austria.

Safety

LNG is safe throughout the entire supply chain. Years of experience from industrial application shows that LNG does not present any greater risk than conventional fuels, which are transported every day – provided gas standards are complied with. LNG transportation fuel systems meet the same high safety standards as conventional systems. The design of LNG tanks differs fundamentally from that of tanks for conventional transportation fuel. LNG tanks are optimally protected against mechanical and thermal influences thanks to their compressive strength and tank-in-tank systems with integrated insulation.

Facts and figures

Builder and operator:	RAG
Project partner:	Ennshafen OÖ GmbH
Technical specifications:	
Capacity:	approx. 25 trucks a day
Refuelling time:	approx. 5–10 mins
LNG storage tank	
Filling capacity:	approx. 12 tonnes
Operating pressure:	max. 18 bar
Temperature:	approx. -161 °C

Renewable natural gas – the future

Using gas from naturally occurring deposits can play an important part in reducing emissions. What's more, gas can be manufactured from renewable wind and solar energy, using power to gas technology, or from agricultural waste.

The goal is to produce LNG from renewable sources. RAG's research projects aimed specifically at achieving this vision are unique worldwide.
Supported by the Austrian Climate and Energy Fund, the Underground Sun Storage project investigated whether hydrogen manufactured from renewable energy can be stored in natural underground gas reservoirs. This was confirmed in the course of the project. Building on the research conducted so far, for the first time the Underground Sun Conversion project will enable production of natural gas directly within a gas reservoir using a microbiological process initiated specifically for this purpose by RAG, and to store it in the same reservoir. This innovative method is unique worldwide, and recreates the natural process by which gas originates, but shortens it by millions of years – geological history in fast motion.
First, hydrogen is produced from solar or wind energy and water in an above-ground facility, and then injected into an existing gas (pore) reservoir, together with carbon dioxide – creating a sustainable carbon cycle.
At a depth of over 1,000 metres, in a relatively short time naturally occurring microorganisms convert these substances into renewable natural gas which can be stored in the same reservoir, withdrawn as needed at any time, and transported to consumers via the existing pipeline network.

For further information, visit
www.underground-sun-conversion.at

ENNSHAFEN

Ennshafen is not only Austria's newest public port, but also its most modern. The port and neighbouring business parks in Upper Austria and Lower Austria form the largest contiguous industrial zone in the Upper Danube region, with an area of over 350 hectares. As a result of extensive investment in infrastructure and state-of-the-art technology, the port has become a logistics hub for three different modes of transportation, and an important business location for the Enns-Perg-Amstetten area, providing employment for more than 2,000 people.

Visit www.ennshafen.at for more information.

In the heart of Europe

Western and Eastern Europe are linked by the Rhine-Main-Danube Canal, and Northern and Southern Europe by one of the continent's most important rail routes. Ennshafen port is situated at the intersection of these transportation axes.

It's all about the location

Ennshafen port has access to the three most important transportation modes – rail, road and water. Its ideal location on Europe's main traffic axes opens up direct transportation routes and facilitates implementation of multi-modal logistics solutions.

- Link to the A1 Westautobahn motorway via the B1 Enns-Asten bypass
- Direct link to the major urban centre of Steyr via B309A
- Goods station and connecting line to Austria's Western Railway
- Access to the Rhine-Main-Danube Canal

The Donaustrasse site in Ennshafen was chosen by RAG for its first LNG filling station due to its ideal location in Upper Austria. Transport companies that use LNG will be able to refuel vehicles with the fuel of the future without having to make major diversions.

Directions

Take the motorway exit for St. Valentin, Enns West, or Asten, in the direction of Wirtschaftspark Enns. Follow the directions provided by the new signage system at Wirtschaftspark Enns.

Continue to follow the new signage on the approach to Ennshafen: turn right over the railway track, then immediately left at the new roundabout to reach the LNG filling station.

Contact

Thomas Pleßnitzer
thomas.plessnitzer@rag-austria.at
T +43 50724-0
www.rag-erdgas-mobil.at

RAG Austria AG
Schwarzenbergplatz 16
1015 Vienna, Austria
office@rag-austria.at
www.rag-austria.at

Imprint
Published by RAG Austria AG
Schwarzenbergplatz 16, 1015 Vienna
Pictures: RAG archives, steve.haider.com, Karin Lohberger Photography, Ennshafen
Last updated: September 2018