



ENERGINET



REPORT

SECURITY OF GAS SUPPLY 2021; IN BRIEF

Note: the editorial team for this publication closed on January 6 2022

GLOSSARY

Degree days:

Degree days are a measure of how cold it has been. The degree days in a 24-hour period are the difference between the average daily temperature and 17°C. For example, if the average temperature over the 24 hours is 4°C, there are 13 degree days in the given day. 24-hour periods with an average temperature above 17°C do not count. The degree days for the year are found by adding up the degree days of the individual 24-hour period.

Gas year:

A gas year is defined as the period from 1 October to 30 September.

Nm³:

One Nm³ (normal cubic metre) is the amount of gas which at 0°C and an absolute pressure of 1.01325 bar takes up 1 cubic metre. 1. mio. Nm³ equals approx. 11 GWh in 2020.

Normal year:

A normal year is defined as and calculated at 3,113 degree days.

THE REPORT IN BRIEF

Energinet believes that the supply situation at the beginning of the year is robust

Security of supply remained high in Denmark during the past year. We have passed through our second winter without the Tyra complex in operation, and with no incidents threatening security of supply. Despite low temperatures up until May 2021 and high demand for gas throughout much of Europe.

Biomethane continues to contribute increasingly to security of supply. The number of biogas plants supplying gas to the gas system is constantly growing and the biomethane in the gas system now averages a 21 % share of volume over the year.

Right now, we are seeing a gas market with high gas prices, also in Denmark. One reason for this is that Danish gas prices are closely tied to gas prices in Germany, which supplies most of Denmark's gas. Overall, gas prices in Denmark are also determined by global supply and demand, which depends largely on how market participants

choose to handle the availability of gas for their gas customers.

Global economies have opened up again following COVID-19 shutdowns, and in summer 2021, electricity production was based more on gas than it was the previous year, in part due to lower-than-normal electricity production from wind and hydroelectric power. These and other factors have driven up gas prices. High gas prices have made it less attractive for market participants to store gas, as they usually do in summer.

There has been no shortage of storage capacity, and in interaction with adjacent gas systems, Energinet ensured the necessary entry capacity for the gas system in Denmark.

Denmark is more vulnerable to gas supply disruptions or extraordinary demand for gas while redevelopment of the Tyra complex continues, which is expected to be until June 2023. It is



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therefore vital that market participants respond appropriately and book sufficient storage and transport capacity to supply Danish gas consumers.

It has been a challenge to fill the gas storage facilities for winter 2021/2022 due to the high gas prices in summer and autumn 2021. The storage level for the coming winter was therefore lower at the beginning of the winter than in previous years. For example, 7,545 GWh was booked in the Danish gas storage facilities in 2021/2022. In comparison, the storage facilities were filled up to 10.1 GWh until the end of November in 2020/2021.

Energinet believes that the supply situation at the beginning of the winter is robust, but with the low storage level and high gas prices, security of supply during the coming winter and early spring will to a larger extent be in the hands of market participants. During

New emergency supply principles adapted to this future scenario are being prepared. Denmark will also increasingly become a transit country for gas.

the redevelopment period of the Tyra gas complex, Energinet has adjusted the market rules to create incentives for optimum utilisation of the capacity available in the system. Energinet also continuously briefs market participants on the supply situation and their obligation to ensure optimum utilisation of the system.

In line with EU requirements, Energinet has purchased emergency storage from Gas Storage Danmark A/S and reserved filling requirements (the amount of gas that must be available

in the various gas storage facilities at given times) from storage customers, to supply protected and non-protected customers if an emergency situation arises. The reserved storage volumes are sufficient to meet consumption for three consecutive days with extraordinarily high demand (20-year event) and supply protected customers for 30 days.

International supply and demand factors will continue to determine the gas price in Denmark in the future. However, Denmark will remain robust in relation to security of supply, as there are two Danish gas storage facilities and direct connections to Norway, Poland and Germany, and the Tyra platform will also be back in operation. New emergency supply principles adapted to this future scenario are being prepared. Denmark will also increasingly become a transit country for gas.

SECURITY OF SUPPLY IN DENMARK ALSO DEPENDS ON GLOBAL MARKET CONDITIONS

As winter 2021/2022 approached, gas prices throughout Europe and Asia rose dramatically. Gas prices in Denmark have risen in step.

In 2021, the gas market in Denmark – and worldwide – saw major fluctuations within a short period of time and large price increases. This has put pressure on security of supply in several European countries. Despite this, the supply situation in Denmark looks adequate at the beginning of the winter. However, gas supplies in Denmark are vulnerable due to a lower storage filling level in Denmark in 2021/2022, and dependence on Germany, where the levels of stored gas were historically low in autumn. Longer term, the gas market is expected to continue to see price fluctuations, due in part to the phasing out of coal-fired power stations in several countries.

During the Tyra platform redevelopment, Denmark has imported most of its gas from Germany. Germany is the largest gas market in Europe, with annual gas consumption of approx. 86 bcm¹. In comparison Denmark's annual gas consumption constitutes 2.5 bcm. The European gas transmission systems are closely connected, and gas can be traded across borders in the EU. Gas pricing is reciprocally linked across the largest gas markets in Europe.

¹ Billion cubic metres of gas

² LNG: Liquefied Natural Gas. Natural gas that is pressurised and cooled to approx. -160° C. LNG is transported by ship around the world.

Much of the gas imported into the EU comes from LNG². Most of the global LNG production is in Qatar, Australia and USA. Global LNG production has risen dramatically over the past five years. The price of LNG is therefore having an increasing impact on gas prices around the world. LNG producers ship the LNG to where the price is highest. Several countries in South East Asia and South America are very dependent on LNG imports, and therefore willing to offer a high price. The EU countries therefore compete internationally to attract LNG supplies.

Why are gas prices rising in Europe?

The prices reflect global gas supply and demand.

Demand for gas in Europe was high in 2021. The winter of 2020/2021 was generally cold throughout much of Europe and lasted into May, which is longer than normal. European gas storage facilities therefore ended last winter at low levels. A lot of gas therefore had to be put into storage during the summer and autumn. At the same time, economies have reopened after COVID-19 restrictions were eased. This has led to high demand from industries depending on gas for the production of goods. Reopening economies has also led to higher demand for electricity. Electricity generation from wind turbines and hydroelectric power reservoirs was



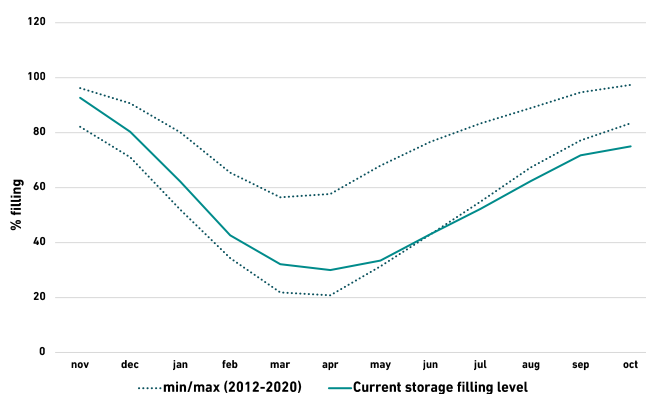
below average in Europe during summer 2021. The higher electricity generation required has therefore derived in part from gas-fired power stations in Europe, pushing demand for gas even higher.

Gas supplies in Europe were impacted by several factors in 2021 which made it difficult to increase the supply of gas in step with the higher demand.

EU gas production has been declining for several years, as many existing fields are being exhausted, or have been rebuilt (including the Tyra field in Denmark). The supply shortfall in recent years has been replaced by more gas imports from countries such as Russia and Norway and via LNG.

The rapidly growing LNG market has been unable to keep up with the sharp increase in gas demand in 2021. Several countries in East Asia, in particular, have had high demand for LNG. LNG prices have therefore been higher in Asia than in Europe. As a result, LNG supplies have primarily been shipped to Asia. Europe has therefore imported less LNG in 2021 than expected.

Gas imports from Russia and Norway were affected by several temporary interruptions in the first half of 2021. A gas treatment plant in Russia caught fire last summer, reducing the volume of gas Russia could export. The Norwegian offshore gas system underwent extensive maintenance over the summer, which also reduced the volume of gas imported from Norway.





As a result of the increase in demand and the failure to increase gas supply in 2021, the gas price has risen dramatically. In October, the price rose above EUR 100/MWh, which was a clear sign of a strained supply situation on the European gas market.

Prior to the winter, security of supply in Europe was under more pressure than normal, as the high gas prices clearly indicated.

The gas storage facilities in Europe are necessary to secure the gas supply during a cold winter. At the beginning of the winter (1 October), the average storage level in Europe was 75 %. This is the lowest level since 2012. The figure on the previous page shows changes in the storage level in Europe in 2021.

Impact on security of supply in Denmark

As long as the gas storage facilities are sufficiently full, Denmark is equipped to handle a cold winter. However, the Danish gas market is still highly dependent on imports from Germany, where gas storage levels were also relatively low at the start of winter. If a gas crisis occurs on the German gas market, and the fixed capacity being exported to Denmark cannot be maintained, this will have a major impact on supply in the Danish gas market. Depending on the seriousness of a given gas crisis on the German market, this will affect the volume of gas that can be imported from Germany. If the import capacity from Germany is hit hard, this will have a negative impact on security of supply in Denmark. However, the probability of this is deemed to be low, as northern Germany in particular is well supplied, in terms of pipelines and access to stored gas.

Gas market in Europe in the long term

The EU has adopted binding climate targets, whereby CO₂ emissions must be reduced by 55 % by 2030, and the EU must be climate neutral by 2050.

This naturally affects the role of gas in Europe's energy mix. The gas being used today can be partly replaced by biogas and hydrogen. But much of the current gas consumption must be replaced by electricity before 2050.

The transition is already underway. In the short term, this means that EU member states have decided to gradually phase out their coal-fired power stations. Several countries have also decided to phase out nuclear power plants.

This means that a large proportion of electricity production capacity will be decommissioned as 2030 approaches. This is to be primarily replaced by renewable energy, but it will be difficult to replace 100 % of the decommissioned coal and nuclear power plants with renewable energy. It is therefore expected that part of the capacity will be replaced by new gas-fired power stations in the short term, while renewable energy production is further expanded. Since gas emits approx. half as much CO₂ as coal, this will result in a rapid reduction of CO₂ emissions.

It therefore does not seem likely that gas demand will decrease in Europe towards 2030. As coal-fired and nuclear power plants are phased out, gas will probably account for a larger share of electricity production than in recent years. With varying electricity production from wind turbines and solar cells, the demand for gas may vary considerably in the future. The gas price in the market may therefore fluctuate more in the future.

International supply and demand factors will continue to determine the gas price in Denmark in the future. LNG transport capacity is continually being expanded globally. Poland and Germany are both currently planning to expand their LNG capacity. With Baltic Pipe, Denmark will also be closely connected with Norway and Poland. This will lead to a more tightly coupled world market price for gas.

However, Denmark will remain robust in relation to security of supply, as there will be Danish storage facilities and direct connections to Norway, Poland and Germany. The Tyra platform will also be back in operation. There will therefore be many sources of gas, and two gas storage facilities to smooth out seasonal fluctuations in the gas system.



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