Fuelling the future:
Progressing the gas transition for Net Zero

THE ROLE OF GAS STORAGE IN ENSURING ENERGY SECURITY

Energy UK

Carbon Capture & Storage Association

Fuelling the Future: Progressing the gas transition for Net Zero

The role of gas storage in ensuring energy security

This is the fifth in a series of briefings from Energy UK and the Carbon Capture and Storage Association (CCSA), exploring the role of gas in the transition to a Net Zero economy. This briefing explores the key role of gas storage in the UK, now and in the future, in ensuring the UK's security of supply for both gas and electricity markets.

Gas is used to heat our homes and fuel industrial processes, playing an important role alongside other technologies in ensuring the UK has a resilient electricity system. The UK is gearing up for significant investments in clean power, and infrastructure upgrades to meet the anticipated increase in electricity demand from homes and businesses across the country. Although the use of gas will decline in the coming decades, it will continue to play a critical role in the transition, and having access to it through storage systems is an essential part of that process.

The anticipated scale and pace of change in energy technologies in the next decade will be significant. This will include the introduction of more and diverse electricity storage. The UK has limited natural gas storage capacity and the country's current assets need to be carefully managed moving forward. This will also be important to lay the groundwork for hydrogen storage and instil confidence in the wider hydrogen economy, as the UK transitions to low-carbon alternatives to meet the Government's clean power 2030 ambitions.

Visit the Fuelling the Future webpage to explore previous briefings in the series that look at the broad role of gas across the whole economy, in the power sector, in heating homes and across the UK's industry.

Types of gas storage in the UK

The UK has a range of storage facilities, varying by size and the rate at which gas can be withdrawn. These are privately owned and operated and as such, can respond quickly and efficiently to market signals at times of demand. As of January 2025, the UK has eight operational gas storage facilities that are made of two types of geological storage: salt caverns and depleted oil and gas fields.

Salt cavern storage

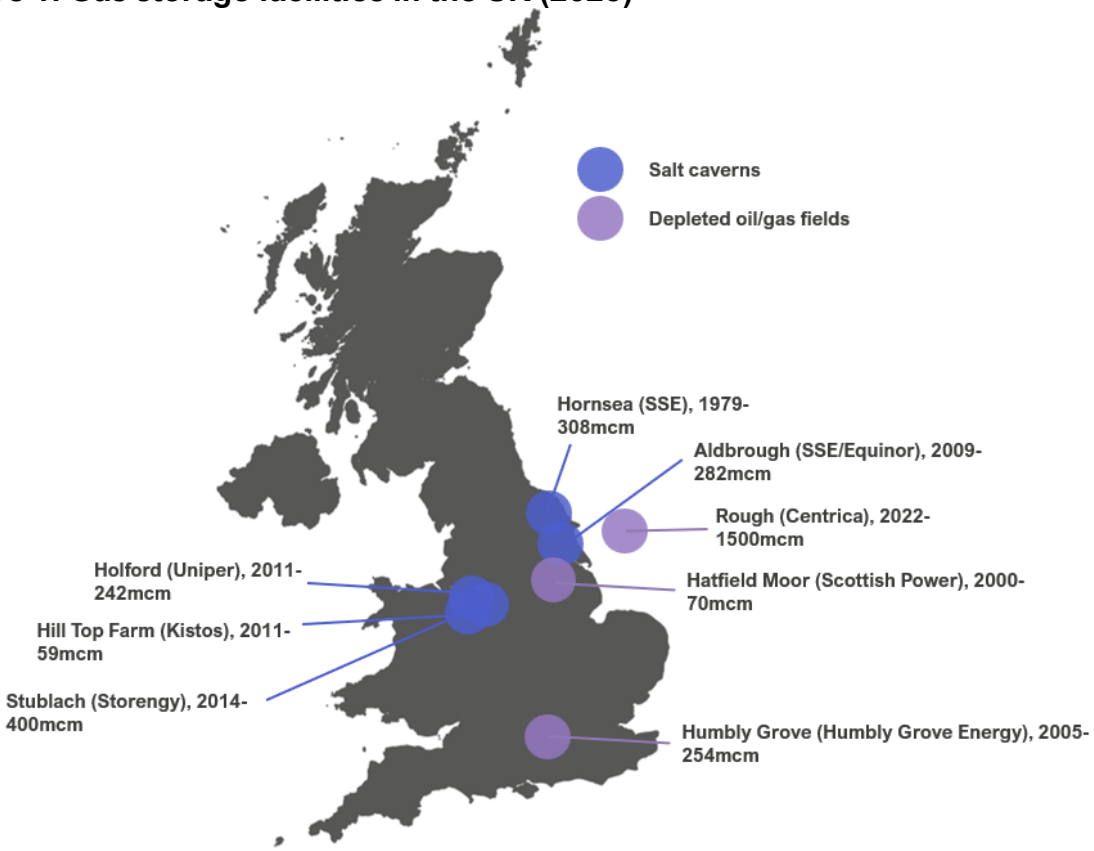
- Gas is stored in underground salt caverns, which are created for this purpose.
- These facilities can be filled quickly and are used to manage short-term fluctuations in supply and demand.
- This type of storage is limited by the location of naturally occurring layers of salt in the subsurface, and is mostly located in Cheshire and Yorkshire.

Depleted hydrocarbon areas

- Gas is stored in fields where most of the oil or gas has been extracted and has been converted to enable the withdrawal and injection of natural gas.

- These facilities provide a large storage capacity but are relatively slow to fill and generally used to manage seasonal variations in gas use. This is known as long-range storage.
- The largest depleted gas field used for storage is the Rough facility in the North Sea, which currently accounts for nearly 50% of UK storage capacity.

Figure 1: Gas storage facilities in the UK (2025)



Source: Ofgem GB gas storage data 2025.

Out of the UK's eight gas storage facilities, seven are classified as medium-range storage, meaning they inject and withdraw gas in response to market demand to ensure security of supply. They will have a duration (i.e. the time the facility takes to deplete from full at the maximum withdrawal rate) ranging from a week to a couple of months. The Rough offshore facility is considered to be a long-range storage site, with gas reserves emptied over much longer periods of time.[1]

In the past, storage use complimented domestic gas production to ensure demand could be met. Clean energy sources such as offshore wind and nuclear will form the backbone of our future electricity system, however even under a clean power system, gas will still be needed. As the UK's domestic gas production declines, there will be a greater reliance on gas storage and shipped imports of liquified natural gas (LNG) to provide flexibility and meet demand.[2] This puts greater reliance on gas

[1] DESNZ (2023) The role of gas storage and other forms of flexibility in security of supply.
[2] DESNZ (2025) Building the North Sea's energy future.

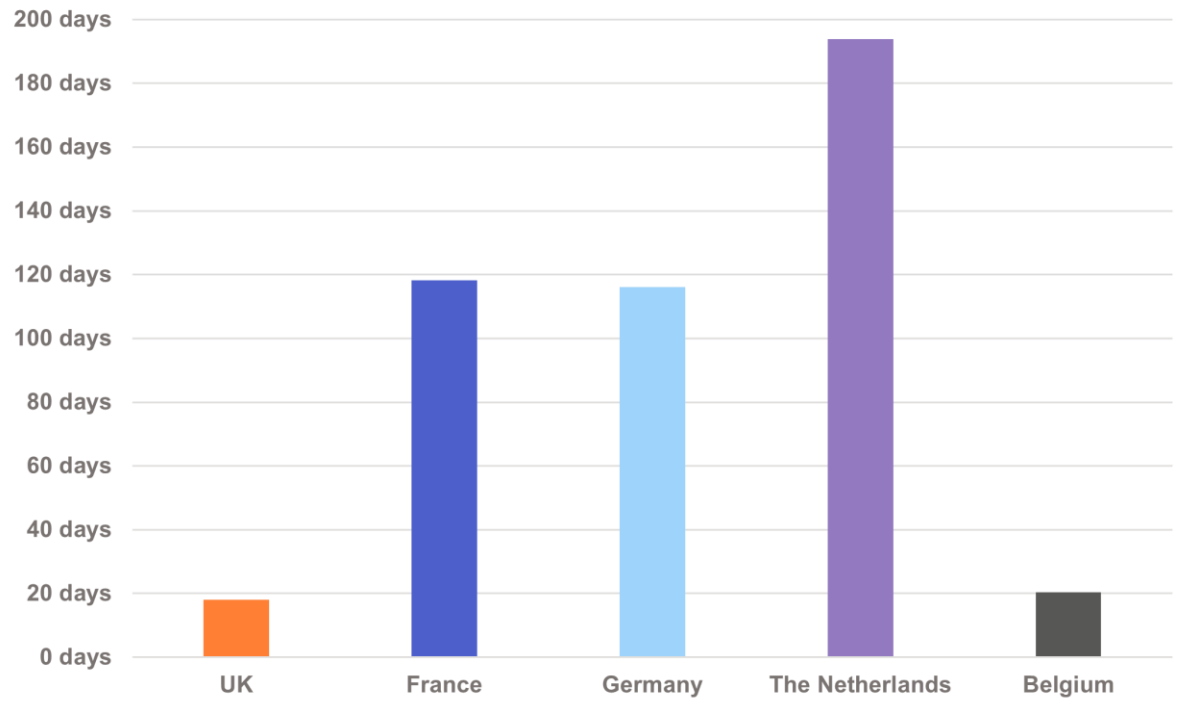
storage and shipped imports of liquified natural gas (LNG) to meet demand and ensure security of supply.

The UK's gas storage in context

The UK has significantly less natural gas storage capacity compared to other European countries. Historically, many European countries have built large gas storage capabilities to manage seasonal gas demand due to their limited domestic production and lower LNG import capacity. Gas storage is typically relied upon to provide a baseload level of supply during the winter months when demand is higher.

Equally, differences in geology mean that the UK has relatively less potential salt cavern capacity compared to countries such as the Netherlands and Germany. With the UK benefitting from more diverse sources of LNG supply and higher import capacity, the need for extensive gas storage has been lower than in mainland Europe, as shown in Figure 2 (below).

Figure 2: Comparison of gas storage capacity in the UK and other countries



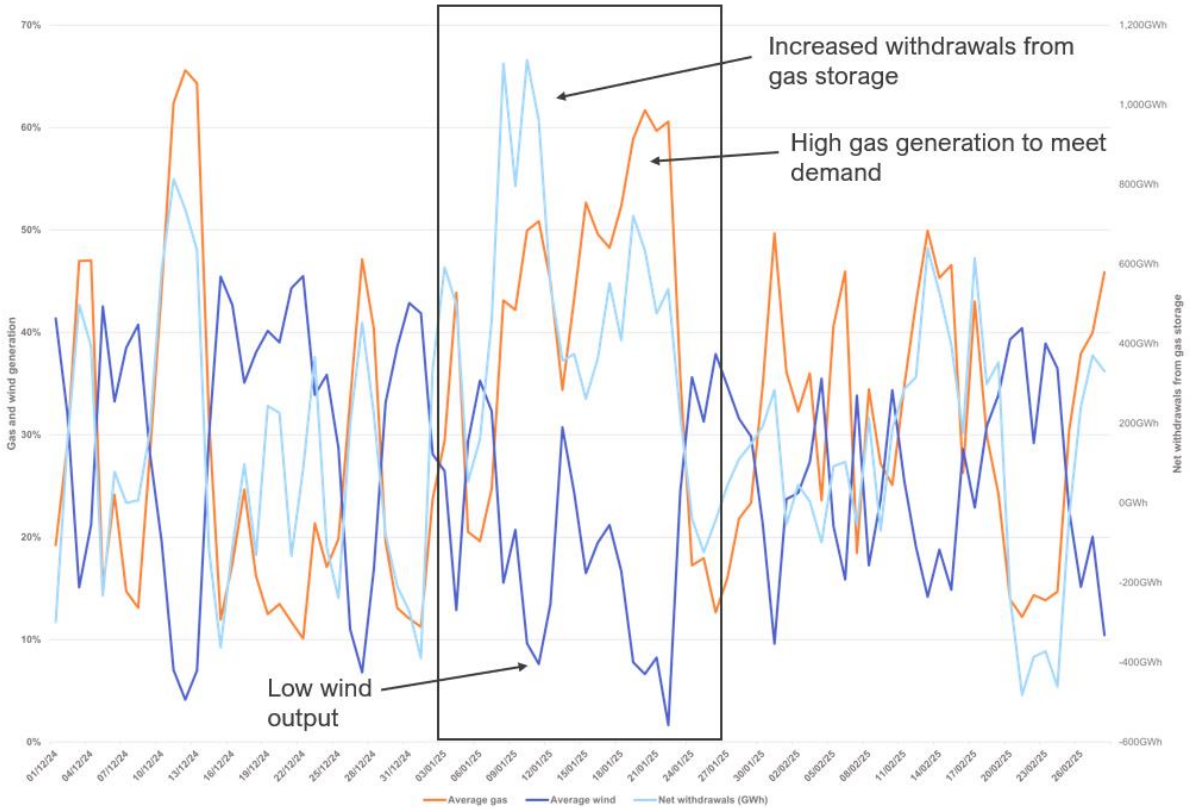
Source: Energy UK analysis of Associated Gas Storage Inventory 2025, IEA. Note: days of storage are calculated using IEA data on each country's annual gas consumption.

How does the UK currently use gas storage?

Domestic peak demand generally aligns with withdrawals from storage – helping to heat homes and provide gas for generation to maintain the UK's electricity grid and power industry.

More recently, storage has also become increasingly important at times of low renewable generation. Figure 3 (below) demonstrates the inverse relationship between periods of low wind output and net storage withdrawals.

Figure 3: Comparing gas storage withdrawals and total wind output

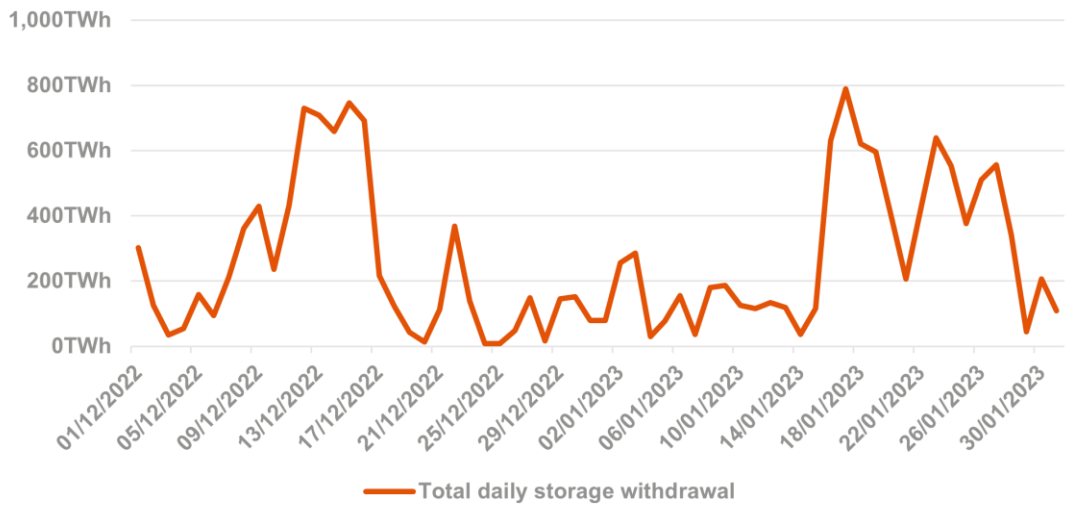


Source: NESO historic generation mix and carbon intensity, and National Gas reports.

Crucially, gas storage has been effective in supporting the UK's security of supply in responding to periods of high demand and low supply.

For example, Figure 4 (below) shows that in the winter of 2022-23, gas storage was able to respond effectively in providing crucial flexibility of supply onto the National Transmission System (NTS) during two separate cold spells in December 2022 and January 2023. This was a period that saw some of the highest spikes in demand in recent years.

Figure 4: Gas storage withdrawals in winter 2022-23



Source: National Gas Energy Reports

Creating a secure, resilient clean power system

The need for replacing a large proportion of unabated gas on our system is clear, but the Government has confirmed that the UK will need a limited amount of unabated gas into the 2030s, and possibly beyond.

As we work to achieve this ambition, gas storage will continue to be a key component of the power system as it decarbonises, ensuring we maintain security of supply. Gas storage reserves are crucial to ensure that gas generation can provide the necessary flexibility and security of supply in times of high demand, low renewable output, or when the system experiences an unexpected stress event.

Gas-fired generation with carbon capture and storage (CCS), as well as hydrogen-to-power (H2P), will play a unique and important role in our clean power transition. This is due to their ability to provide low-carbon and dispatchable (available) sources of electricity that use a storable fuel. CCS and H2P offer a way of delivering the benefits that gas currently provides to the electricity system, but with reduced emissions.[3]

Power-CCS and H2P have the potential to add significant value to the energy system, with even relatively small levels of operational capacity materially reducing the overall challenge for the rest of the clean power 2030 mission.[4]

The UK Government's action plan states that 2–7GW of low-carbon dispatchable capacity will be needed by 2030.[5] This is a positive recognition of the critical role that low-carbon dispatchable power will play in enabling a clean and cost-effective power system. While industry stands ready to deliver these targets, the Government must

[3] Energy UK and CCSA (2024) Fuelling the Future: The role of gas in generating electricity
[4] NESO (2024): Advice on achieving clean power for Great Britain by 2030
[5] UK Government (2024): Clean Power 2030 Action Plan: A new era of clean electricity

now provide long-awaited project selection updates and funding commitment for CCS projects that follow Track-1. Clear and timely updates will maintain investor and developer confidence, ensuring the UK's CCS and H2P pipeline is realised.

The future role of hydrogen storage

Hydrogen will play an increasingly important role in a clean power system. As a low-carbon source of flexible generation, that may be required in large quantities for relatively short periods of time, there is a risk that hydrogen production would not be able to match the demand in real time. Therefore, hydrogen storage is key to having sufficient hydrogen available to meet this demand and enable a secure electricity supply.

There is ongoing work to enable hydrogen storage but to make this a reality, the Government needs to make further progress on the first hydrogen transport and storage business model design and future allocation rounds. This should be treated as a matter of priority to get the first projects progressing and instil confidence in the wider hydrogen economy.

A key barrier to hydrogen storage in the UK is the lack of policy progress by the Government to deploy commercial-scale projects. Given the 'first of its kind' nature of these projects, the sooner the first projects are confirmed and begin to be deployed, the sooner the lessons can be learnt about optimal deployment pathways. Furthermore, supply chain constraints can be worked through and smoothed, finance can be crowded into the investments, and risk profiles can be reduced.

Moreover, the future potential of hydrogen storage can only begin to be explored once the first projects have been launched. Given long lead times of hydrogen storage development (up to 10 years for some projects), delays in getting the first projects deployed are simply pushing deployment potential into the future.

Partnering with industry to ensure the future of gas storage

A coordinated and collaborative effort is needed to ensure our energy system continues to deliver the required flexibility and security of supply, now and in the future. Gas storage is key to this. As such, we urge Government to consider the following:

- **Maintain existing natural gas storage facilities** to ensure the UK retains a secure gas network, including for home heating, unabated gas, and power CCS generation in line with the Government's Clean Power 2030 modelling. New gas storage can take up to nine years to be constructed (including planning and consenting); existing storage must remain commercially viable to ensure the UK has a resilient gas supply. Clarity is also needed on the conversion of natural gas stores to hydrogen stores, without compromising security of supply.
- **Provide long-awaited project selection and funding updates for CCS projects that follow Track-1 as part of the Government's Spending**

Review. This includes Track-2, Track-1 expansion and a route to market for wider clusters delivering to the same timescales. Clear and timely updates are needed to maintain the investor and developer confidence that will be required to ensure the CCS and H2P project pipeline can be deployed to meet the Government's clean power 2030 targets.

- **Continue to work with industry to develop and progress transport and storage business models for hydrogen and progress the first allocation round as a matter of priority** to instil confidence in the wider hydrogen economy. Government must ensure that business models are robust and well-designed to enable hydrogen storage that can help meet the Government's clean power mission and advice in the Seventh Carbon Budget, and complement CCS cluster sequencing and Hydrogen Allocation Round processes.[6]
- **Maintain existing cooperation with the EU on gas security** and consider further cooperation on technological developments for hydrogen between NESO and the European Network of Network Operators for Hydrogen (ENNOH) which will oversee the EU's hydrogen infrastructure.

Industry stands ready to deliver investment to ensure that the UK has a robust, clean energy system, but awaits critical policy direction from the Government. The timely communication of REMA outcomes and the Government's long-duration flexibility roadmap will be critical to provide targets and certainty to projects and investors.

[6] Climate Change Committee (2025); Seventh Carbon Budget

Energy UK is the trade association for the energy industry, representing companies investing billions of pounds to secure our country's current and future energy needs.

From growing start-ups to major electricity generators, grid and infrastructure developers and energy suppliers, our members are driving change across power, heat, transport and flexibility.

We provide a collective voice for the sector working with governments, regulators, charities and other organisations to provide crucial insight that shapes policy, offers solutions and promotes best practice.

Our broad view across the whole system supports evidence-based positions which are not tied to particular technologies, and are focused on delivering strategic benefits for people, businesses and the economy.

We champion initiatives such as our Vulnerability Commitment, which pushes suppliers to go beyond regulation to support customers with additional needs, and TIDE, the industry's drive for greater inclusion and diversity. Through our Young Energy Professionals Forum, we support the development of future leaders.

We are equally committed to our team and are proud to be recognised as a 'Gold' Investors in People employer.

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CCSA

The CCSA is the trade association promoting the commercial deployment of Carbon Capture, Utilisation and Storage (CCUS), an essential solution to deliver net zero emissions across the economy, predominantly in power, industrial and transport sectors.

It works with members, governments and other organisations to ensure CCUS is developed and deployed at the pace and scale necessary to meet net zero goals and deliver sustainable growth across regions and nations.

The CCSA has over 120 member companies who are active in exploring and developing different applications of carbon capture, CO2 transportation by pipeline, ship and rail, utilisation, geological storage, and other permanent storage solutions, both end-users of the technology and those in the supply chain, as well as members from management, legal and financial consulting sectors.

www.ccsassociation.org/

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This briefing is part of a series of reports from Energy UK and the Carbon Capture and Storage Association (CCSA) exploring the role of gas in the transition to a Net Zero economy.

Find out more at:
www.energy-uk.org.uk/fuelling-the-future/

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