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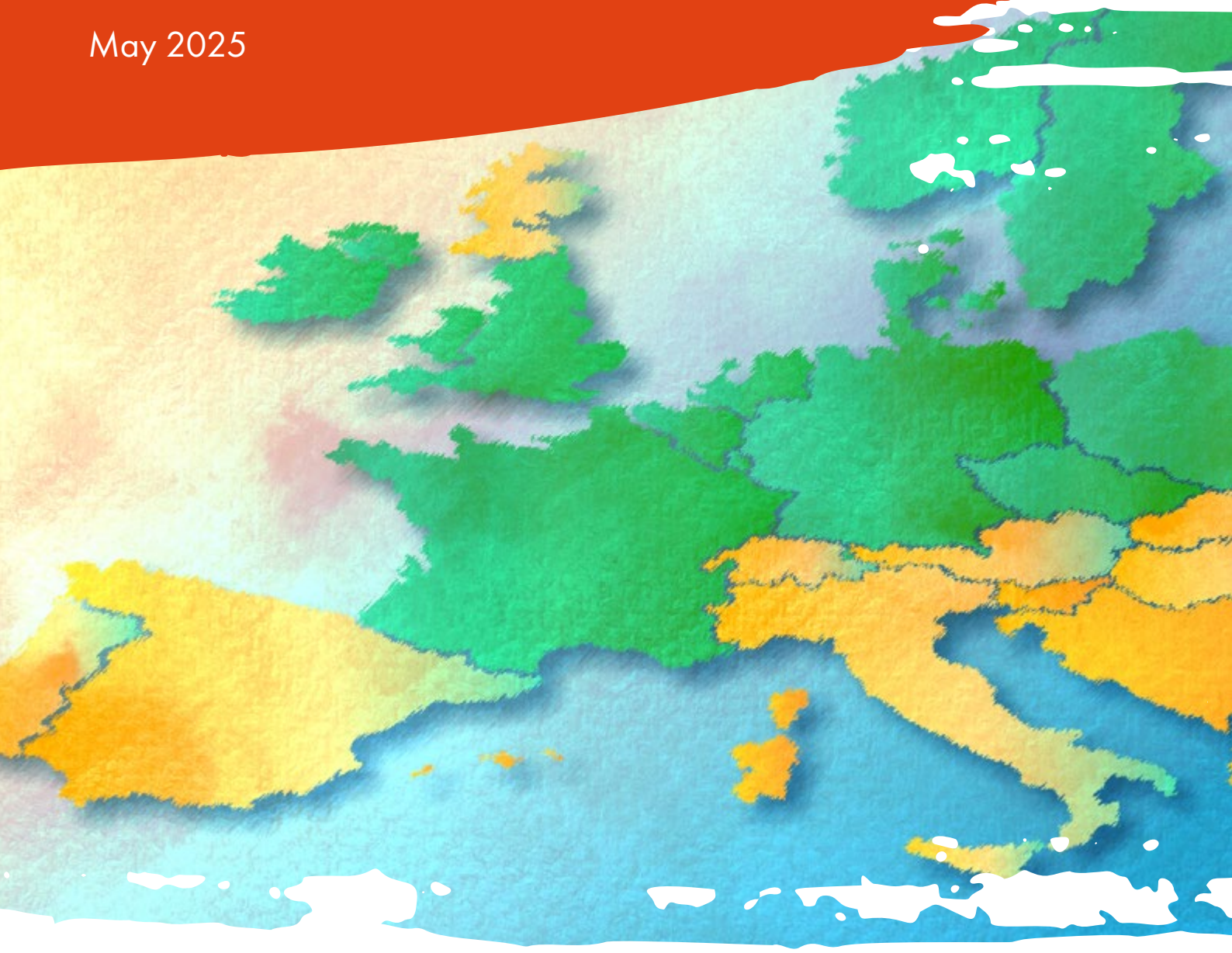
Your Gas Network

Gas Networks

Learnings from Europe

May 2025



Executive Summary

Over the past few years, we have increased our collaboration with gas networks across Europe to both learn about different approaches to decarbonisation and support knowledge sharing.

Whilst the penetration of gas networks and the demands on the gas infrastructure are different across Europe, there are sufficient similarities to draw upon, particularly across northern Europe. There are emerging significant differences between the European approach and their views of gas infrastructure when compared to the UK, which are worth highlighting and can be summarised as:

- Other European counties see value in the gas networks in support of net zero and have been pragmatic in establishing the positive and supportive role they will play in decarbonisation. As an example, France has confirmed that they only see a potential to decommission 3% to 5% of their gas network by 2050.

- This has in part been driven by the fact that in many municipalities, gas and electricity infrastructure is owned by the same organisations and therefore 'whole system' planning has a much stronger foothold. We have seen examples of where gas infrastructure is being effectively utilised to reduce the overall investment needed in electrical network upgrades – through things like hybrid heating systems in the Netherlands.

- There is a significant focus on biomethane as a route to support decarbonisation and displace natural gas and whilst there is a range of different approaches and support mechanisms across Europe, France is leading (connecting on average two biomethane sites per week) and there is a significant ambition to reach higher levels of biomethane production by 2030 across the whole of Europe, 35 billion cubic metres (or 366 TWh). The EU have over six times the population of the UK, but they have ten times the biomethane ambition.

- Planning for hydrogen infrastructure is now significantly more advanced in Europe with plans for an overall European backbone. Germany in particular have made positive commitments to the infrastructure, investing €19bn to establish a 9,040 km hydrogen grid by 2032, which will already start to become operational this year.

- Some of the European gas networks are more advanced than the UK in how they manage the network through sophisticated sensors for leak detection and asset management. Italgas in Italy is a company leading in this space, and we are focusing on the efficient delivery of leakage management in our own network (to reduce methane emissions in a similar way). We have sought funding for this approach in our RIIO-3 business plan submission to Ofgem. Plastic networks will be more efficient to operate for our customers and also be compatible with hydrogen should that become an option.

More detail on key findings from across Europe

Countries in northern European such as Germany, France, the Netherlands and (northern) Italy provide very useful reference points for the UK, with their significant residential and industrial gas demands, well developed gas grids and similar climates.

Through collaboration and research, we have sought to understand how the gas network operators, regulators and Governments in these countries are approaching some of the key questions facing the UK's gas networks today:

- → Do they see a long-term role for the gas network in the country?
- → How are they approaching innovative ways to actively utilise the gas network to support decarbonisation of the country, such as hybrid heating systems and transportation of biomethane and hydrogen?
- → How are they using digital technologies to modernise the network?

Our findings and relevant learnings for the UK are detailed as follows.

Europe is committing to the gas network in the long-term

We are seeing a significant willingness of European nations to directly or indirectly confirm their ambition for a gas network long-term in their countries. The French regulator has fully assessed the gas network longevity, concluding that decommissioning of only 3% to 5% was likely by 2050,[1] and have committed to ongoing investment in the gas networks. Their rationale is clear: gas networks provide resilience and enable lower overall investment in the energy system (particularly in the capacity of electricity networks), while the introduction of home-grown energy in the form of biomethane reduces France's dependence on imported gas.

Snam, Italy's state-controlled gas transmission network operator, has similarly confirmed that repurposing of the network and rollout of green gasses such as biomethane will ensure a long-term role for the gas network in a net zero energy system, with only 1% of its network at risk of stranding by 2040.[2]

Other European Governments and regulators have not been so explicit in their position but have made it clear the intention for the long-term need for a gas network to carry low-carbon gases. The Netherlands, which is very similar to the UK in housing stock and domestic gas demand, confirmed that gaseous fuels will continue to supply up to 50% of the country's total energy demand in 2050 even in a net zero scenario (compared to ~90% today), [3] and have begun construction of a green hydrogen network to decarbonise their energy system. Gas networks provide the most cost and environmentally effective solution to transport gas across long distances, so it's clear from this Dutch commitment that they see gas networks being needed long-term.

As the UK considers the ongoing role of its own gas network, it's crucial to bear two things in mind:

1. A gas network in a local area cannot be decommissioned until the last customer on the network is switched off gas. This means the network will be needed at a similar scale even if overall gas demand is significantly reduced.

2. The proportion of households using methane for heat in the UK is far greater than France and Germany and only slightly lower than the Netherlands. This has been made necessary by the UK's low reliance on coal or nuclear energy.[4] If France sees a long-term need for its gas network, then the UK with an even higher dependence on gas is likely to need to follow the same strategy.

If the UK were to make a similar commitment to the ongoing role of the gas network that we are seeing in European countries, we could change how we consider the depreciation charges for this infrastructure which feeds into customers' bills. This could help to reduce the impact of the gas networks on annual gas bills.

Energy networks (electricity and gas) are planned together to deliver benefits through new technologies like hybrid heating systems (hybrids)

Hybrids are a solution for homes that combine an existing gas boiler with a smaller heat pump. The heat pump provides most of the space heating and the gas boiler provides hot water and top up heating on the coldest days of the year.

Hybrids typically deliver around 80% of annual heating demand via a heat pump, with only ~20% met by a gas boiler during the coldest periods. Crucially, this remaining 20% can then be decarbonised using green gases like biomethane and hydrogen, making hybrids compatible with the goal of achieving net zero carbon emissions.

This approach also offers significant system-wide benefits in that it preserves the gas grid for resilience and industrial use, reduces peak electricity demand, and avoids unnecessary electrical grid reinforcement, additional wind turbines and heating system replacements. A study in the Netherlands involving 200 homes, highlighted the tangible benefits, carbon savings, and cost efficiencies of hybrid heating.[5]

There are some in the UK Government who see this option as only a temporary measure on the path to having a fully electrified heating set up. This view stems from the assumption that full electrification of home heating is the only viable route to net zero by 2050. The Netherlands, however, is successfully deploying hybrid heating systems not only as a transitional measure, but in many cases as the final, cost-effective solution—particularly for homes where full electrification is unaffordable or impractical.

Beyond the Netherlands, hybrid heating systems are emerging as a pragmatic, cost-effective and scalable solution for decarbonising home heating. Their growing adoption across the EU and other markets offers actionable insights for the UK as it accelerates its own transition to low-carbon heating.

Italy leads Europe in hybrid heating systems uptake, thanks to targeted financial incentives and the technology's adaptability to regional climate variation. Government-backed schemes helped drive a 350% year-on-year increase in sales, from 14,000 in 2020 to 63,000 in 2021. Importantly, support is focused on factory-built hybrids to ensure quality and performance standards.

France and Germany are seeing accelerating adoption, with sales rising steadily. Germany explicitly includes hybrid heating systems in its 2024 target for new heating systems to use 65% renewable energy. This clear policy recognition reinforces industry confidence and consumer uptake.

Poland integrates hybrid heating systems within its Clean Air Programme, offering grants and loans to replace polluting heat sources. Although starting from a low case, this initiative is steadily driving interest and adoption, particularly among low-income households.

In Canada, electric and gas utility Fortis BC modelled the impact of home heating electrification and found that hybrid heating systems offered the most cost-effective pathway for consumers. The study showed that hybrids strike the right balance between emissions reduction, affordability and grid stability – especially in colder climate where full electrification can strain infrastructure and increase costs.

Hybrid heating systems are currently completely excluded from the scheme that supports heat pump uptake (the Boiler Upgrade Scheme). **The UK government should consider a targeted hybrid heat system strategy, positioning them as a transitional yet future-proof technology.** This would include supporting hybrids under the Boiler Upgrade Scheme and coordinating with industry to ensure supply chain readiness. Europe's progress and whole-system modelling in Canada show hybrids are not a compromise – they're a smart, balanced step toward net-zero heating.

Growth in biomethane

Biomethane is produced through the process of anaerobic digestion - usually of plant derived material - and it produces methane which is identical in composition to natural gas. As biomethane is derived from plants it provides no (or low) additive carbon emissions.

Whilst the UK has made some progress in growing biomethane, we are significantly behind the rest of Europe. We currently produce 8 TWh of biomethane from around 130 sites,[6] whereas France produces 13 TWh with plans to grow this by four times by 2030.[7] Europe overall has plans to produce 366 TWh of biomethane by 2030.[8]

This is important because biomethane production provides a green gas to displace natural gas, it can be home grown and provide a solution for hard to electrify homes and industrial processes. The French have particularly excelled at growth with 720 biomethane sites (and connecting two each week) – achieved through a clever combination of a 'feed in tariff' and 'right to inject' into the gas network for biomethane producers. Most importantly, this is being achieved without impacting farmland or food production and provides an additional income stream for farmers.

We'd encourage the UK Government to look at this specifically, especially as the potential growth sits across both DEFRA and DESNZ mandates.

European hydrogen pipelines are happening and will put pressure on UK supply chains

Several European countries are delivering both significant commitments to hydrogen networks and actual construction of these networks.

The largest commitment so far to a hydrogen network was made in October 2024, when Germany approved a 9,040 km core hydrogen grid to be completed by 2032, at a cost of €19bn.[9] This compares to the 2,000 km envisaged in the UK across transmission and distribution that is only in the very early days of development.[10] Approximately 60% of the Germany hydrogen grid will be made available by repurposing existing gas pipelines, with the remaining 40% (or ~3,600 km) coming from new pipelines. This is being supported by the EU through €3bn of low interest loans.[11] Construction has since begun and hydrogen is expected to flow in pipelines by the end of this year.

The Netherlands since 2023 has also been constructing the first stage of its proposed 1,200 km hydrogen network, connecting domestic production to national and international demand for hydrogen. The project, Hynetwork, is being delivered by the Dutch gas network operator Gasunie and the first section will be ready for use by 2026,[12] with Gasunie paying €100m for 30km of new hydrogen pipeline.[13]

Countries like Italy are also using the hydrogen as a diplomatic tool, planning to provide a 'hydrogen hub' connecting hydrogen demand in Europe with hydrogen production in North Africa through a 4,000 km long "South Hydrogen Corridor".[14]

These examples demonstrate how the European countries are supportive and, crucially, actively investing in the development of more hydrogen infrastructure. They have determined that the infrastructure will accelerate inward investment into production and storage in the regions and support re-industrialisation. **In the UK, we await further clarity on the Government's preferred funding route for our pioneering hydrogen infrastructure project HyNet, and other subsequent projects.** Our evidence from working with the supply chain on HyNet, is that they are ready to move to support Europe's growth leaving the UK in an insecure position to deliver.

Investment in digitalisation is lowering costs for customers and reducing emissions

Italy's largest gas distribution system operator, Italgas, has been a pioneer in the use of digitalisation to improve the business and reduce operating costs.[15] Their ambition remains strong, with a further €2.7bn of spending planned across 2024-2030 to deliver further benefits.[16] Their approach has been to fundamentally reinvent their operating processes using AI and advanced analytics, for example:

- Rolling out new gas leakage identification technology to reduce fugitive emissions
- Developing a remote control and command system for their network
- Launching AI-enabled digital applications for remote control of construction sites
- Using advanced analytics to optimise allocation field force resources and move from reactive to proactive work

Italgas has demonstrated the value from investing in digitalisation. In our RIIO-3 business plan we have asked Ofgem to allow us to fund our own digitalisation investments, which could be accompanied by a long-term commitment to the gas network.

Conclusion

We have found through our learnings across Europe that their approach appears different to the UK. In Europe, gas networks are being considered as a key part of supporting both decarbonisation and energy resilience. They are supporting with a combination of policy support and incentives that both enhance how they are used today (with digital technology) and how both green gases of hydrogen and biomethane can be integrated.

We also see a greater focus on whole system planning (by this we mean gas and electricity infrastructure being planned together) which has resulted in the view that continued utilisation of the already existing gas infrastructure for green gases, significantly reduces the investment needed in the electricity infrastructure on the pathway to net zero. Ultimately reducing the cost of net zero for consumers.

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