

# Decarbonised Gas

## A Future of Gas Programme Sensitivity

**This is the second of three publications which set out divergent views of the future energy landscape. Given the uncertainty which exists around the future of gas, they have been produced in order to support our testing of a broader range of possible uncertainties and what might need to happen to reach the 2050 carbon reduction goals. They are not intended to provide a National Grid view of what the future energy landscape will look like, but are intended to facilitate debate and test the boundaries when considering what the future of gas could look like.**

### Background

The Decarbonised Gas sensitivity looks at what would happen if the economy favoured a cleaner form of gas use through decarbonised gases, an alternative approach which still enables the 2050 carbon reduction target to be met.

Consumers are not convinced by the level of disruption required to install heat pumps and continue to prefer gas technology which they have become familiar with over several decades. This, alongside a recognition amongst policy makers that a wholesale switch to electric heating could be expensive, means that government policy shifts towards decarbonising the gas system.

Hydrogen created from natural gas is the key contributor, allowing the heat and transport sectors to contribute towards the long-term green ambition, but we also see contributions from other green gases such as biomethane and bioSNG.



### The Journey to 2050

In the early 2020's, the first Hydrogen regional implementations are established, with Hydrogen production coming from steam-methane reformation (SMR). In conjunction with this development, the government has intervened in support of low carbon heat and carbon capture & storage (CCS), supporting innovation projects to encourage more work in the Hydrogen sector.



Hinkley Point C does not materialise and the government does a u-turn on nuclear power, shifting its funding towards decarbonised gas technologies. Midway through the decade, the first SMR hub comes online in Teesside, which along with offshore caverns help to provide inter-day and inter-seasonal storage and CCS allows the first city to move to Hydrogen.

By 2030, Hydrogen pipelines exist connecting other regional cities and the Hydrogen caverns near Teesside. The government continues to support the development of decarbonised gas and CCS, as the disruption for customers is proving to be manageable. CCS infrastructure continues to develop with the first project focussed on power generation, which is important as there is no longer any nuclear generation left on the electricity system. Electricity demand remains relatively constant as appliance efficiency is balanced by the rise in electric vehicles and electrolysis for Hydrogen. Gas demand, however, is now 20% above 2016 due to SMR demand and the continued use of natural gas boilers in areas that have not yet adopted Hydrogen.

In 2040, a patchwork of increasingly connected Hydrogen cities has emerged, . CCS continues to develop mainly along the coasts to reduce costs. Urban heat is now primarily supplied by Hydrogen rather than natural gas. More rural residents are still using natural gas boilers, however increasing amounts of biomethane and bioSNG in the supply mix means that this sector is also contributing towards decarbonisation. Imports make up the majority of gas supplies and this, combined with the rise in demand means that new gas import infrastructure may be required. Hydrogen is also now becoming popular for HGV's, buses and vans.

By 2050, Hydrogen supplies 28% of heat in the UK, across major cities including London, Birmingham, and Manchester; heat pump use is very limited. Electricity is mainly supplied through renewables with 43GW of CCS

enabled gas plant providing a significant backup.

Gas demand is more than 130% of 2016 levels, with 55% of this converted to Hydrogen. On the road HGV's, buses and vans and are solely Hydrogen powered, however, private cars remain a mix of fossil and electric powered.

### Summary

Whilst all of the various decarbonisation approaches require significant investment, Decarbonised Gas can be cost effective through utilising existing infrastructure, which also minimises disruption for consumers. It will however still require investment in Hydrogen production and CCS infrastructure. Clean electricity generation will also be important, supplying volumes of incremental Hydrogen and supporting the transition to electric vehicles.



If you would like to discuss anything contained in this document, or discuss the Future of Gas programme in general please get in touch with [Justin Goonesinghe](#) directly or contact us via our website.

