

Resilience in our Future Energy Mix

IGEM Policy Position Paper
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About IGEM

The Institution of Gas Engineers & Managers (IGEM) is the UK's Professional Engineering Institution, supporting individuals and businesses working in the global gas industry. IGEM was founded in 1863 with the purpose of advancing the science and relevant knowledge of gas engineering for the benefit of the public.

As a not-for-profit, independent organisation IGEM acts as a trusted source of technical information, guidance and services for the gas sector. In today's net zero context, IGEM is focused on engineering a sustainable gas future – we do this by:

- Helping our members achieve and uphold the highest standards of professional competence to ensure the safety of the public
- Supporting our members in achieving their career goals by providing high quality products, services and personal and professional development opportunities
- Acting as the voice of the gas industry when working with stakeholders to develop and improve gas policy

Key messages

- In support of a resilient, flexible and secure future energy system, a mix of low carbon energy vectors and technologies must be harnessed.
- Hydrogen, biomethane, heat pumps, hybrid technologies, and to some extent heat networks, all have a role to play in the decarbonisation of heat.
- A 100% electrified energy system is impractical, due to the challenges of energy storage, intermittency, peak energy demand and the scale of infrastructure required by 2050.
- 8-12m homes are unlikely to be suitable for heat pumps, due to affordability, insufficient exterior space and/or the thermal properties of the building fabric.
- Which low carbon technology is used should be based on a local/regional as well as national level assessment, looking at factors such as local infrastructure/supply, building type and fabric, carbon savings potential, consumer preference and costs.
- An energy system based on hydrogen and biogases, alongside electrification, could save around £13bn a year by 2050 compared to an alternative pathway that relies on electricity alone.

Current context

The recent energy cost crisis, coupled with extreme weather events, have emphasised the importance of UK energy security and resilience. Storms, flooding and gales have caused devastation across the UK during the Autumn/Winter period, with many living without power to their homes. Those with gas fires, gas ovens and wood burners were able to continue heating their homes and cook, however those that were completely dependent on electricity were not able to do so. This serves as a vital lesson for our Net Zero energy policy makers considering how we heat our homes and businesses by 2050.

The current high cost of electricity and gas, driven by growth in global gas demand, poor weather conditions and ultimately higher wholesale gas prices¹, puts a greater emphasis on securing the UK's long term energy supply – relying less on imports and increasing UK based energy generation. This is in addition to the challenges presented by periods of low wind, the extended winter period for heating and the reduced storage capacity for gas since the closure of the UK's largest gas storage plant in 2017.

The recently published British Energy Security Strategy includes very encouraging commitments to wind and solar generation, an accelerated role for nuclear and a much amplified role for hydrogen for homes, industry and transport². This approach suggests that the Government is embracing a multi vector energy future to achieve Net Zero.

The future energy mix

IGEM supports an integrated, 'whole-system' approach to meeting the energy transition challenge and welcomes UK Government support for a portfolio of low carbon technologies and projects. A portfolio with major roles for hydrogen, wind, nuclear, energy efficiency and demand response, that are optimised for lowest total system cost and balanced across local, regional and national levels.

A range of solutions for low carbon heating should be embraced, including proposals to use the existing network of gas pipelines to carry low carbon gases, such as biomethane and hydrogen blends, working towards the eventual use of 100% hydrogen. Recognising the role that heat pumps, hybrid gas/electric solutions and to some extent, heat networks, also have to play in the technology mix.

Natural gas should be replaced with a combination of hydrogen and biomethane, working in partnership with an increased use of electricity³. Analysis shows that a balanced combination of low carbon gases and electricity is the optimal way to decarbonise the UK energy system⁴.

A 'Balanced Net Zero Pathway' is one also supported by the Climate Change Committee (CCC) as part of its Sixth Carbon Budget⁵, where contributions to Net Zero by 2050 comes from a balanced mix of demand-side action, electrification, hydrogen, and natural and engineered greenhouse gas removals (GGRs).

¹ House of Commons, [Research Briefing 9340 – The energy price crunch](#), January 2022

² HM Government, [British Energy Security Strategy](#), April 2022

³ ENA, Gas Goes Green Programme, www.energynetworks.org/creating-tomorrows-networks/gas-goes-green

⁴ Navigant, [Pathways to Net-Zero: Decarbonising the Gas Networks in Great Britain](#), October 2019

⁵ Climate Change Committee, [The Sixth Carbon Budget: The UK's path to Net Zero](#), December 2020

As part of the Gas Goes Green programme, Britain's Hydrogen Blending Delivery Plan sets out how the gas networks are readying to blend up to 20 per cent hydrogen on the gas distribution networks by 2023. This would result in 6m tonnes of carbon dioxide being saved per year, the equivalent of 2.5m cars being off the road. IGEM are actively supporting this programme of work through its technical leadership on gas safety and quality.

From a consumer perspective, the application of hydrogen for domestic heat offers minimal disruption to homes and businesses. No prerequisite building retrofit would be required and consumers would be able to continue using their heating and cooking appliances as they do currently. The UK's major boiler manufacturers have also made a price-promise that hydrogen-ready boilers will cost no more than natural gas equivalents. Crucially, hydrogen offers consumers choice in which energy vector they use in their buildings. These are factors overwhelmingly supported by the general public, as evidenced through the work of Climate Assembly UK¹⁸.

Concluding points

Building energy resilience, flexibility and security must underpin how the UK decarbonises its energy system in the lead up to 2050. This can only be achieved through the use of a balanced mix of energy vectors and technologies.

Choosing the right low carbon technologies should be based on a range of carefully assessed factors depending on the application. For the decarbonisation of heat, IGEM rejects calls for the full electrification of heat across the UK. An assessment should be made at a local/regional and national level based on what local infrastructure/supply is in place, a building's type and fabric, carbon savings potential, consumer preference and costs.

Testing and trials of hydrogen are ongoing, overseen by the Health & Safety Executive and BEIS. As the conclusions of these trials continue to emerge, industry experts and policy makers must work together, with urgency, to articulate hydrogen's long term role in the energy mix and implement the policies required to develop a flourishing hydrogen economy.

¹⁸ Climate Assembly UK, [The Path to Net Zero – Full Report](#), September 2020



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