



PGES

All-Party Parliamentary Group
for Energy Studies
Founded in 1980

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Heidi Genoni, CEng, Project Manager, Arup **AN OVERVIEW OF HYDROGEN PROJECTS**

Introduction

The scale of the task facing us to achieve net zero and completely decarbonise the UK energy system is enormous. However, it is entirely possible with government decision making and backing. Hydrogen has an important strategic role.

Look at the role hydrogen could play in heat.

Energy consumption context

It is important to understand how and what we currently use our energy for, to better understand the challenges that we must overcome:

- Currently, only about 1/6 of our total energy comes to us via the electricity network,
- About a 1/3 comes in oil and liquid form for transport fuels,
- About ½ comes via the gas network.

Whilst an excellent start has been made with decarbonising the electricity grid, even on a windy and sunny day, renewables still only represents about 15% of energy used.

Even if we were to double the capacity of the electricity network (e.g. which would include more power cables in the roads and electricity pylons), we would still need the gas network to distribute the energy we consume.

The CCC (Committee in Climate Change) and the National Grid Future Energy Scenarios work also agree that hydrogen has an important part to play.

Looking at hydrogen for heating

UK is a temperate climate, a lot of our energy, is used for heating our homes and buildings especially in winter months. This is about HALF of all energy consumption, which contributes to about a THIRD of all carbon emissions. And ~80% of our circa ~23 million homes use gas for heating and cooking.

We need to find a way to decarbonise our homes easily, quickly and cheaply. Much of the existing housing / building stock is likely to still be around in 2050. There can be particularly challenging and where hydrogen could play an important role. New build may have different solutions.

BEIS is funding an innovation programme called Hy4Heat – exploring if it is feasible to use hydrogen gas in the existing gas network instead of natural gas (methane).

This programme is well underway, and much progress has been made in a relatively short period of time. Example of good collaboration between government and industry.

So far research studies into the commercial and industrial market suggest that hydrogen gas use is feasible and that there are no technical barriers. These reports, along with others have been published on the Hy4Heat website. <https://www.hy4heat.info/reports>

Officers

Alan Brown MP; Julie Elliott MP; Jim Shannon MP; Taiwo Owatemi MP
The Rt Hon Lord Hunt of Kings Heath OBE; Lord O'Neill of Clackmannan;
Lord Oxburgh KBE; Lord Ravensdale; Lord Redesdale

Development of a range of domestic technologies (hydrogen gas, boilers, cookers and gas fires) are progressing well. Recent news - the Hy4Heat Worcester Bosh and Baxi boilers have successfully been installed and are operational - heating some empty homes - up in a test site in Spadeadam, Northumberland.

Appliances developed in Hy4Heat are '**hydrogen-ready**'. Essentially meaning that they can operate on natural gas, and can operate on hydrogen gas, with a small component part change. Definition has been defined further by the HHIC (Heating and Hotwater Industry Council). This has potential to support the ease of conversion from a consumer perspective. Equally, the appliances are very similar to existing appliances (wonderfully boring!).

The Hy4Heat programme is continuing to progress on time / schedule and the safety assessment evidence is undergoing an independent review from the HSE.

What next

We don't have to wait for all the answers on conversion of the gas grid to 100% hydrogen, because through projects like HyDeploy we have already seen that up to 20% hydrogen can be blended safely into the gas distribution network with no impact on end consumers. This could be a good way to start the decarbonisation of the gas grid, by balancing and building up the supply and demand of hydrogen in tandem.

It's possible to imagine, if hydrogen were to be in the in the gas network, distributed around communities and streets, that it could be feasible, with some further innovation, to extract the hydrogen, that it could then also be used for transport. Whether that be road, rail, shipping, air travel etc.

Actual pipeline projects to get going

- HyNet - blue hydrogen with CCUS, to provide the energy for industrial purposes and to start to blend hydrogen in the gas network
- Zero Carbon Humber project and H21 looking to do similar in the North East
- Teeside
- Merseyside
- Bacton and Hydrogen East
- Project Cavendish - London and re-use of the Isle of Grain
- Fife, Scotland – green hydrogen and full hydrogen gas network
- Etc.

Conclusion

Activity in parallel:

- Reduce – the amount of energy we use
- Reuse the existing gas network - whilst hydrogen is not a silver bullet, it will still have an important part play in future energy systems
- Transition needs to be a smooth and fast as possible – therefore 'hydrogen-ready' and blending can support
- Innovation funding – needs to continue, to drive down costs
- Demonstrations – to showcase tangible benefits
- Integrated vision and plan – energy cuts across all sectors

<https://www.arup.com/projects/hy4heat>
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