

Hy4Heat – demonstrating hydrogen for heat

The aim of the Hy4Heat programme is to establish if it's technically possible safe and convenient to replace natural gas (methane) with hydrogen in residential and commercial buildings and gas appliances. This will enable government to determine whether to proceed to a community trial.



Domestic hydrogen appliance development (WP4)

A number of organisations have started the process of developing prototype domestic hydrogen appliances for use in demonstrations in 2020. These companies are all part of the Hy4Heat programme's innovation competition to demonstrate the safe use of hydrogen as a fuel for heating, hot water and cooking. As well as developing appliances that can be used with hydrogen gas, the workstream, (work package 4) will be providing important evidence regarding safety, in-use emissions, and functionality. The first part of the innovation competition, which is now complete, was the development of a solution design report outlining how the appliances would be developed.

Speaking at the kick-off event Steve Loades, BEIS Hy4Heat programme manager, said:

"This is a significant part of the Hy4Heat programme and we're pleased to have a good variety of products being developed. The prototype appliances including boilers, cookers and fires will all be demonstrated in spring 2020 under another of Hy4Heat work packages (work package 8)."

Organisations taking part in the innovation competition include:

Baxi Heating, Birmingham Burner, Charlton & Jenrick, Clean Burner Systems, Enertek International, FocalPoint, Gazco, Glen Dimplex Heating and Ventilation, University of Leeds, Legend Fires, Teddington Bemas, Valor, Worcester Bosch and Worgas.





Industrial appliances (WP6)

A draft report Understanding Industrial Appliances from Element Energy, Jacobs Consulting and Cardiff University has been presented to stakeholders at a workshop event at BEIS Conference Centre. This is a market research study into the variety of industrial appliances and the issues to be addressed in their conversion or replacement with hydrogen appliances. The final report will be published on the Hy4Heat website.



A presentation of the draft report was given to stakeholders at a workshop held on 10 April 2019.



Meters (WP10)

We're currently evaluating bids from manufacturers looking to develop hydrogen smart meters. The procurement process was an OJEU Innovation Partnership. These meters will be shown alongside domestic hydrogen appliances in demonstrations under the Hy4Heat programme's work package 8. We expect to announce organisations in the coming months.



Hydrogen quality standards (WP2)

This work package is concerned with assessing the current gas standards and their suitability for adoption for hydrogen.

IGEM is developing and updating its standards for hydrogen through a committee approval process. A draft of the IGEM standards will be published for consultation with an aim of getting feedback and discovering gaps in evidence. Once feedback has been collated the standards will be published and communicated to the wider gas industry.

The standards are intended to:

- Provide a level of safety equivalent to that of natural gas
- Enable installers to construct and commission the pipework and appliances required
- Support hydrogen appliance demonstrations (WP8)
- Ensure procedures are in place for a potential community trial

DNV GL has published a draft Purity Specification for hydrogen after seeking views from a range of stakeholders including: hydrogen producers, network operators, equipment designers, appliance manufacturers and technical consultants. Consideration has been given to different hydrogen production and clean-up options - with a cost / benefit study undertaken using a number of scenarios for use. DNV GL is also considering the issue of colourant and is consulting with appliance manufacturers and other stakeholders on this. The work includes research, development and testing studies to provide an assessment of the options available for the purity and flame colourant for hydrogen.



Appliance certification (WP3)

There is a need to develop guidance on how to apply current standards to ensure consistency across the industry.

BSI is the National Standards Body whose standards are widely used to test and certify gas appliances. To support Hy4Heat's work package 4 and the wider industry BSI is developing PAS 4444.

Currently in draft PAS 4444 will give guidance on the development and construction of hydrogen-fired gas appliances which are either purpose-built to use hydrogen or might be converted to use hydrogen in the future. BSI is engaging with the industry to write PAS 4444 which will cover the functional specification of the appliance, including specific advice on the demonstration of safety, including worst case conditions to stress the appliance in excess of what it is likely to experience in normal service. It also covers the setting of upper and lower hydrogen supply pressures, and voltage limits. It discusses the possible arrangements of fittings and devices that might help demonstrate compliance with the Gas Appliance Regulations.

PAS 4444 will be reviewed and go out to panel consultation later this year. It's expected to be published in January 2020.



Safety assessment (WP7)

This work package focuses on assessing the safe use of hydrogen gas in domestic properties and buildings and we are engaging with the HSE regarding this. Procurement is underway for experimental testing in this area - and we expect to award a contract shortly.





Commercial appliances and equipment (WP5)

ERM's study into commercial appliances is underway looking at the variety of commercial appliances in use and the issues to be addressed in their conversion or replacement with hydrogen appliances. This is a complex area, covering a wide range of products, and ERM is keen to hear from commercial appliance manufacturers: Hy4HeatWP5@erm.com to assist with the research.

A supplier engagement session was held on 21 May to discuss this area as BEIS is considering commissioning the development of commercial appliances such as:

- Catering appliances
- Commercial space heating & hot water appliances
- Commercial innovative appliances
- Critical system components such as connectors, sensors, alarms, fittings and valves

Feedback from attendees on the day focused broadly on a few key areas including:

- Timescales required to develop commercial appliances
- Cost of research and development for commercial manufacturers
- Certification within the Hy4Heat programme timescales
- Limited marketplace in the UK for some commercial appliances

We have published the [presentation](#) from the day and will keep everyone informed of procurement opportunities through hy4heat.info



The engagement event at BEIS was an opportunity to discuss the scope of commercial appliances and equipment and potential financial support for development.

Events and conferences

Over the past few months Hy4Heat has presented at:

- **Futurebuild** hydrogen for low carbon heating in buildings
- **All Energy 2019:** Decarbonise 2019
- **All Party Parliamentary Group** hydrogen
- **European Heating Industry**
- **Utility Week Live 2019**

We've also been featured in Heating & Ventilation News

Coming up - we will be presenting at

- **IGEM's** 'hydrogen - take control of your future' event
12 June 2019

We're also aiming to hold a stakeholder event in the autumn where there will be presentations outlining how the various work packages are progressing.

If you'd like us to present at your event, get in touch Hy4Heat@arup.com

Get in touch

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