PRESS RELEASE

Published on 11/06/26

The world's first one-megawatt ammonia boiler has been successfully built and tested by a UK consortium, opening the door to viable, cost-effective renewable energy for businesses in the future.

The Amburn project - a partnership between Flogas Britain and Cardiff University - has built the industrial steam boiler over the last three years, progressing from 10kW in a Cardiff University laboratory to a 1 MW system which was tested recently at DNV's Spadeadam site.

With £3.6m of funding from the Department for Energy Security and Net Zero through Phase 2 of the Industrial Fuel Switching programme, run under the auspices of the £1 billion Net Zero Innovation Portfolio, the Amburn team has shown that ammonia has the potential to provide a decarbonisation solution to off-grid businesses currently dependent on oil for industrial heat.

Geoffrey Mullett, Business Development Manager at Flogas Britain, said, "*Amburn is a powerful example of what can happen when innovation is focused on real-world industrial challenges. By proving ammonia's viability as part of a wider liquid gas fuel portfolio, we are opening up new possibilities for off-grid industrial customers to decarbonise with greater confidence, flexibility and ambition.*"

The team's latest milestone builds on the successes of previous testing, where the boiler burnt 100% ammonia at 500kW at Cardiff University's laboratory. Now, the team say Amburn has the potential to not only reduce carbon emissions but also to open new avenues for sustainable energy adoption, paving the way for a greener industrial future.

"*The technology developed by this project has the potential to revolutionise the way off-grid industrials are powered,*" added Geoffrey Mullett, "*and could be an effective use case for food producers, construction material producers and many more*."

Among Amburn's achievements in developing this technology are several world firsts, including:

- **Operated at 1.4 MW**, generated steam at **85/15**$_{VOL.\%}$ ammonia/propane ratio
- **Operated at 1 MW**, generated steam at **90/10**$_{VOL.\%}$ ammonia/propane ratio
- **Operated at 674kW**, generated steam at **99/1**$_{VOL.\%}$ ammonia/propane ratio
- Emissions testing at various ammonia/propane ratios, under load, showed **low emissions** and **high efficiency**
- Successful operation of the pre-heater and Cardiff University's patented integrated cracking burner unit under load, at **90% cracking efficiency**

Steam successfully generated by the ammonia-fed steam boiler, pictured during Stage 2 testing of the Amburn project

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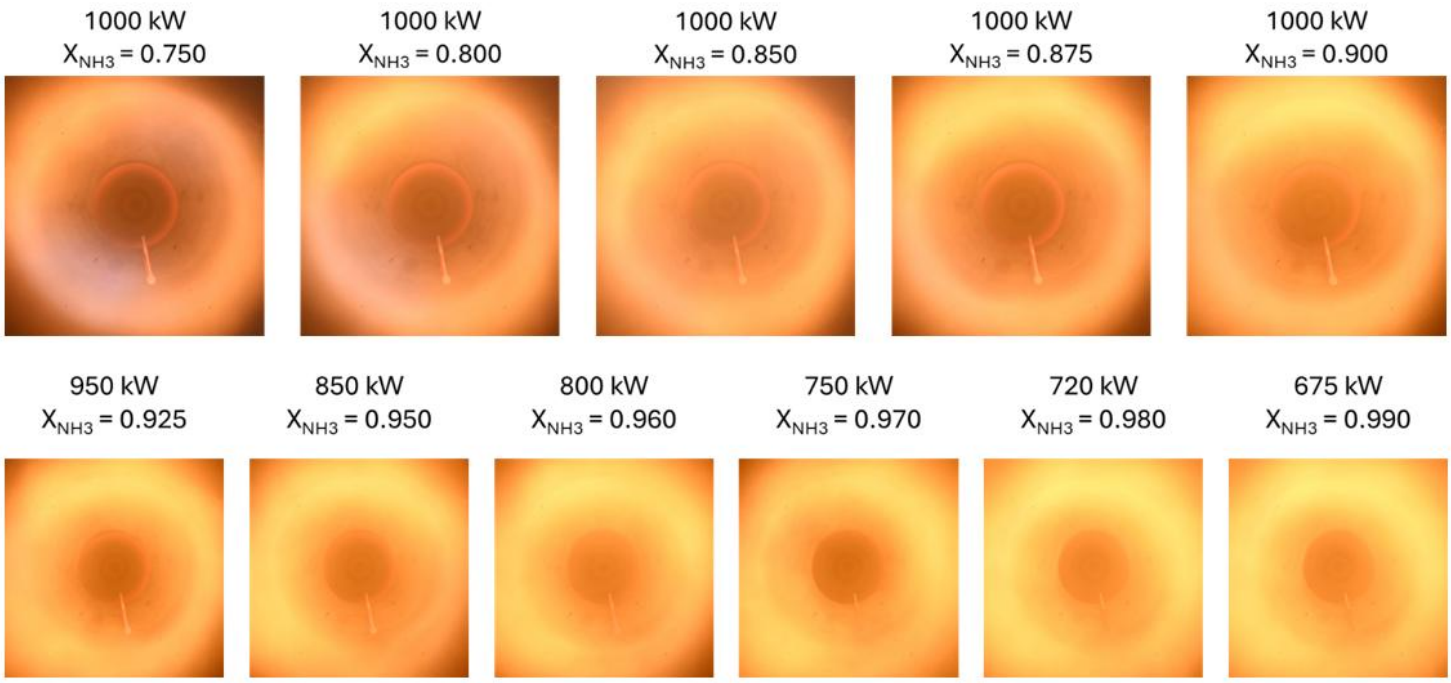
Dr. Syed Mashruk, Zero Carbon Fuels theme leader at Cardiff University's Net Zero Innovation Institute (NZII), said, *"This [latest] stage of the project highlighted the considerable challenges associated with burning ammonia under load, particularly when compared to the 500 kW furnace experiments [we've] conducted [in the past]. These challenges were addressed through our extensive experience in ammonia combustion, enabling the system to achieve excellent combustion and emissions performance under load conditions, marking an important step forward."*

"The project also showcased excellent collaboration between academic and industrial partners, with Flogas playing a leading role in this [latest] phase by designing and installing pipework, control valves, safety devices, and detection systems to the highest health and safety standards. Special thanks are due to ERM for their project management and to DESNZ for their funding support. The outcomes of this work have significant potential to revolutionise decarbonisation in the off-grid sector, with promising opportunities to extend these benefits to other sectors as well."

The Amburn consortium is now investigating future funding options to further test the system before preparing for commercial rollout of the technology. Once commercialised, this technology holds the potential to decarbonise hard-to-abate off-grid businesses and unlock further energy security for the UK.

Tom Houghton, Partner at ERM, said, *"The successful conclusion of [this latest stage of] testing represents another important milestone for the highly innovative Amburn Project and marks a consequential leap forward in commercialising an ammonia-fuelled steam generator at scale. We are thrilled to have supported the project since its inception and are excited by the contribution its widespread adoption could make to decarbonising industrial production."*



Burner operating at varying thermal power levels and ammonia input ratios, pictured during Stage 2 testing

The Department for Energy Security and Net Zero provides dedicated leadership focused on delivering security of energy supply, ensuring properly functioning markets, greater energy efficiency and seizing the opportunities of net zero to lead the world in new green industries.

The Amburn project is part of the Department's £1 billion Net Zero Innovation Portfolio which provided funding for low-carbon technologies and systems and aims to decrease the costs of decarbonisation helping enable the UK to end its contribution to climate change.

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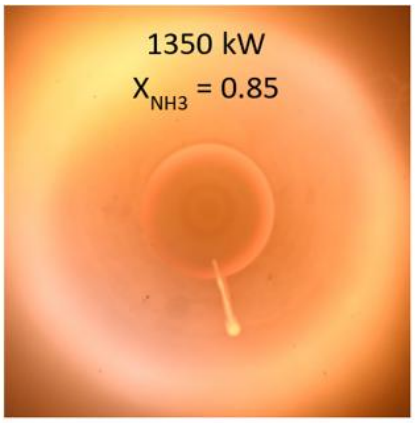

Burner operating at 85/15$_{VOL\%}$ ammonia/propane