

The 11th NEDO-CDTI Joint Workshop

“Technologies for Hydrogen Valley in Spain and Japan – Regional H2 Value Chain”

Hydrogen



水素が
次世代エネルギー
社会を切り拓く!

Current developments in condensing boilers in the European Union in the field of H₂-based combustion. Challenges and difficulties.

Dr. Eng. Marco Boronat

New Markets & Business developer





Organization / Company



MONDRAGON 2021 IN FIGURES



1200 workers

250 M€

Factories :
China- Brazil-
Spain-Italy



Organization / Company



Suppliers | Contact | English |

Products ▾

Innovation

International leadership

About orkli ▾

Work with us

- Comfort&Health Solutions
- Refreshing underfloor heating
- Ventilation solutions
- Solar heating
- Hydraulics, heating and DHW
- Gas safety
- Combustion Cell OEM
- Sustainable hydronics OEM

Laboratories

INNOVATION

...-how and qualified staff in order to stay at the forefront



Alucond Exchangers



Circular heat exchangers



Prism-type heat exchangers

UBE / UBE Corporation



Products, services, technologies of the company



Alucond Exchangers



Circular heat exchangers



Prism-type heat exchangers





Products, services, technologies of the company



Modulo Gas Valve:

- Ultra compact
- No restrictor needed
- Safety valve class B+A certified



Compact Burner Door:

- Standardization: 1 burner door from 2 to 45kW
- High performance Ceramat burner: Silence combustion, lifetime stability, low emissions
- Optimized on eGARC systems: Ionization signal and aging



Circond Heat Exchanger:

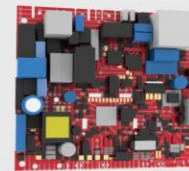
- Wide product range
- Low pressure drop (water & exhaust)
- Stainless Steel monocoil
- High Reliability



Mixer:

- High modulation range: 1:15
- Optimized performance: CO2 stability
- Assembly flexibility: 360°

BeeEngine
Combustion System



Lisa gas adaptive system:

- No need of calibration in start-up
- Faster achievement of λ point
- Combustion control accuracy: $\lambda = 1,3$

Products, services, technologies of the company

Condensing boilers – UK

2020-2025 – Completion of H2 domestic trials towards Hydrogen Neighbourhood

The completion of these trials will provide proof of hydrogen's safety and suitability to wholesale distribution in the main gas grid

2025 – Gas boilers squeezed out of new build properties

Installation of gas-fired boilers will be made difficult due to requirements of 75%-80% CO2 reductions. This is in an effort to push the use of lower-carbon alternatives such as heat pumps, which are suitable in such a setting



2025-2030 – Introduction of 20% hydrogen blend into the gas grid

Hydrogen will be blended into the gas grid in the not-so-distant future before a transition to wholesale hydrogen use



2030-2035 – 100% hydrogen gas expected into gas grid

The use of hydrogen will transition as planned for wholesale use on the gas grid

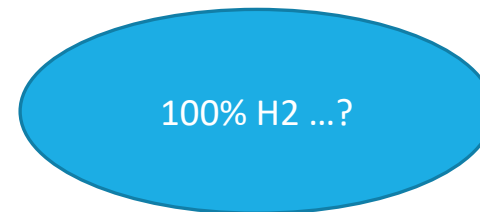
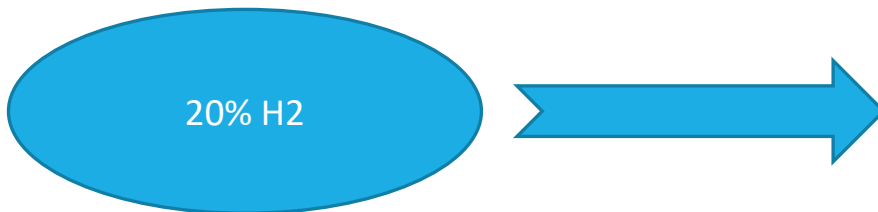


2035 – Gas-fired boilers removed from the market in favour of hydrogen boilers and heat pumps

Once hydrogen gas is fully integrated into the gas grid, homeowners will upgrade to lower-carbon technology, be it hydrogen boilers, heat pumps, or alternative solutions



2030-2050 – Hydrogen conversion rolled out for domestic, dispersed industry, and transport





Products, services, technologies of the company

Hydrogen blend ready– Concept

What does ‘Hydrogen blend ready’ mean?

Nearly all gas appliances that are in use today, including our boilers, are able to run on a mixture of hydrogen and natural gas.

This is called a ‘blend’ and sees 20% of the fuel source powering the appliance being hydrogen gas, with the remaining 80% being natural gas.

This means, that when the government begins to increase the amount of ‘green gases’ into the UK gas grid, your customers can be confident their new gas boiler will run for its lifetime without any wholesale changes to switch to an electric boiler for example.

[Find out more](#)



Hydrogen Blend Ready



Gas adaptive system lambda under control

Premix systems

Hydrogen

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100 %Hydrogen– Concept

Technical challenges

Burner

System management
and security

Materials compatibility
with H₂

Condensing water
management

Flash back – auto ignition T₀ - compatibility with higher T₀

New sensors (no ionization signal)

Heat exchanger – insulators

Heat exchanger – insulators

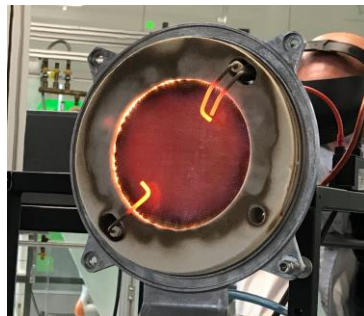
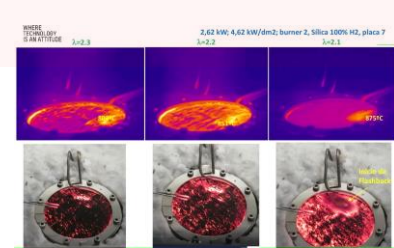


Main challenges and solutions in the project/case presented

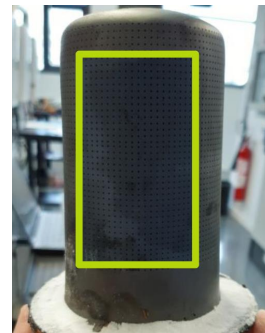
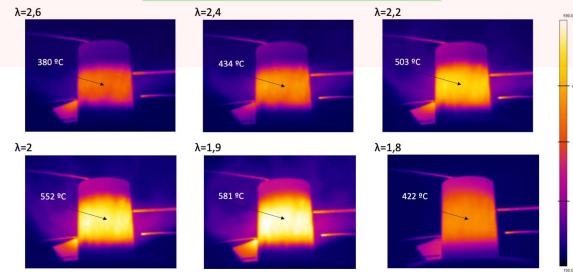
100 %Hydrogen– Concept

PREMIX APPROACH

POROUS CERAMICS

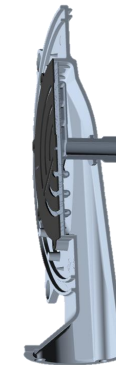


DENSE CERAMICS

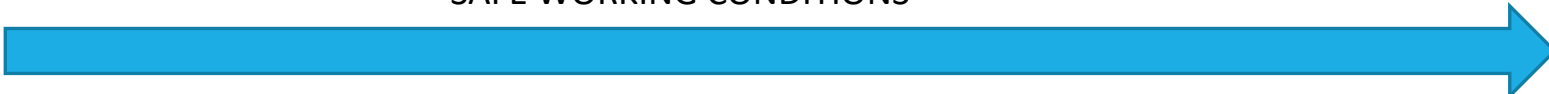


DIFFUSION FLAME

METAL MULTI HOLES INJECTORS



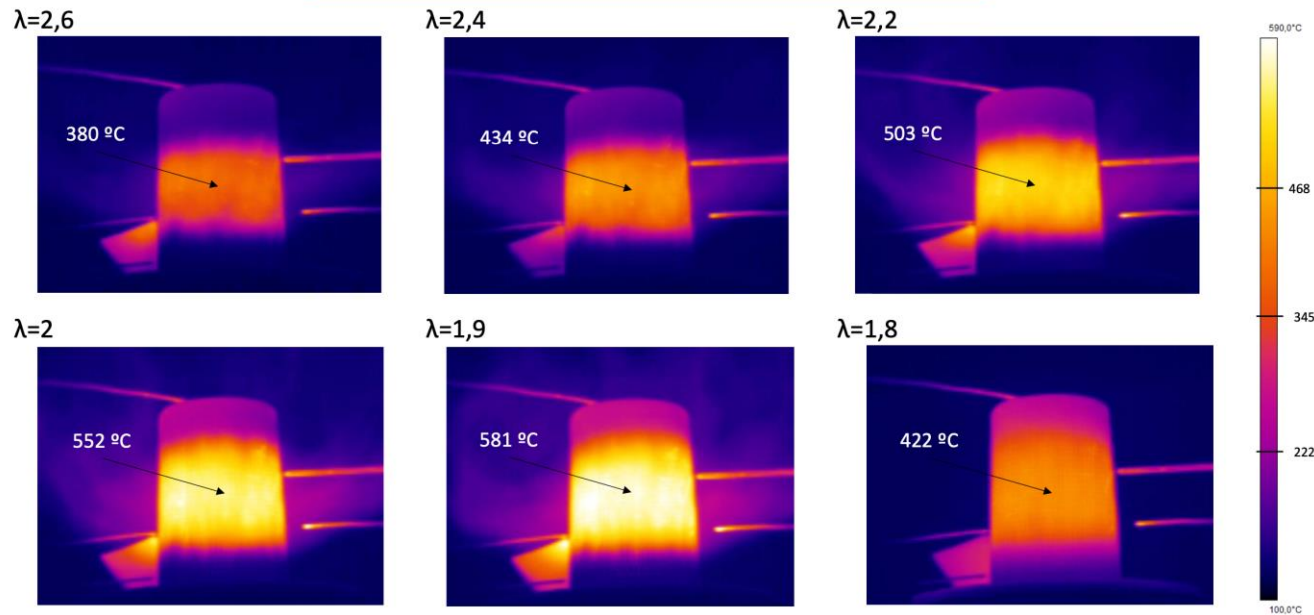
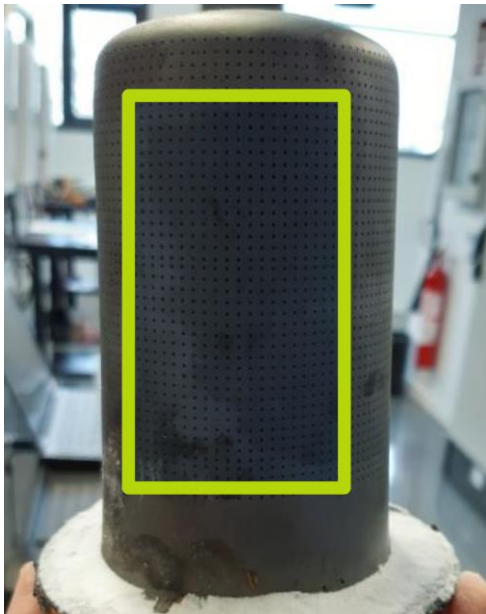
SAFE WORKING CONDITIONS



Main challenges and solutions in the project/case presented

100 %Hydrogen– Concept

PREMIX APPROACH

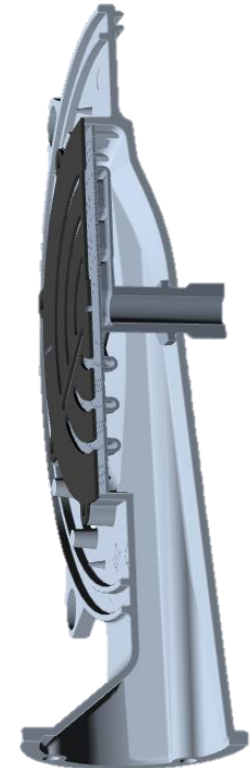


DENSE CERAMIC BURNER – LAMBDA HIGH RATES – FLASH BACK RISK

Main challenges and solutions in the project/case presented

DIFFUSION APPROACH

100 %Hydrogen– Concept





Ideas for a Japan – Spain collaboration



Membranes

Fuel cells

Potential Partnership- JV



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